HEARING CONSERVATION PROGRAM

Environmental Health and Safety Office

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Introduction

In compliance with the Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure Standard (29 CFR 1910.95), Elizabeth City State University shall take all precautions reasonable to protect employees from hazardous noise exposure in the workplace. OSHA identifies that a hazardous level of noise exposure is an eight hour time weighted average exposure of 85 decibels. Employers are required to administer a hearing conservation program when employee noise exposures exceed 85 dB.

The objective of the University’s Hearing Conservation Program is the identification and control of noise hazard areas and the recognition and protection of employees who have the potential to develop occupational noise-induced hearing loss.

Definitions of key terms used in the Hearing Conservation Program can be found in the definitions section (Appendix A).

Scope

The University’s Hearing Conservation Program applies to all University employees who work in noise hazard areas or who have the potential to develop noise induced hearing loss as a result of their occupation. This includes employees with measured or projected eight hour time weighted average noise exposures of 85 decibels or greater.

It is the intent of the University that, whenever practical or feasible, efforts to reduce or eliminate excessive noise exposure by means of engineering controls or proper work practices will precede a requirement for mandatory use of hearing protection.

The University’s primary objective is to maintain noise levels in the work areas of its employees below 85 dBA using accepted engineering control methods. However, when this is not feasible, or while such controls are being instituted or evaluated, hearing protection shall be provided to employees who may be required to work in situations where noise exposures are potentially unhealthy. The maximum Permissible Noise Exposure Level for an eight hour time weighted average (TWA) is 90 dBA. Exposure to noise levels over 90 dBA are permissible for shorter periods of time as defined by Table 1.

The University Hearing Conservation Program includes:

- The assignment of responsibilities under the program;
- A description of elements of the program including: noise monitoring, program participation, hearing protection, audiometric testing, training, and record keeping;
- Appendices.
The University Hearing Conservation Program shall be reviewed at least annually and revised as necessary.

**Hearing Conservation Responsibilities**

The following individuals bear responsibility for the implementation of this plan as described below:

1. The EH&S Director is responsible for:
   - Planning and recommending environmental health and safety programs which comply with all federal, state and local laws and regulations;

2. The Director of Facilities has responsibility to:
   - Develop the Hearing Conservation Program;
   - Work with administrators, supervisors and workers to implement appropriate hearing conservation policies and practices;
   - Monitor procurement, and use of hearing protective devices;
   - Conduct spot inspections to assure compliance with the Hearing Conservation Program;
   - Conduct noise exposure surveys and maintain resultant records;
   - Post caution signs at noise hazard areas;
   - Know the current legal requirements concerning occupational noise exposure; and
   - Annually review the University Hearing Conservation Program and seek ways to improve it.

3. The Department Chair or Manager has overall responsibility for hearing conservation within that department.

4. The Supervisor has overall responsibility for the Hearing Conservation Program compliance of his/her workers including responsibility to:
   - Be familiar with the pertinent regulations and the University Hearing Conservation Program;
   - Ensure that workers know and follow the Hearing Conservation Program rules, that protective equipment is available, in working order, stored properly and that appropriate training has been provided;
   - With the assistance of Environmental Health and Safety (EH&S) Office, determine the required levels of protective equipment, ensure it’s availability to personnel and enforce it’s use; and
   - Request assistance from EH&S as needed;
Workers (including student employees), are responsible for:

- Understanding and complying with University policies and programs which pertain to his or her work, including the University Hearing Conservation Program;
- Using appropriate personal protective equipment as required by the operation being conducted;
- Refraining from the operation of any equipment without proper instruction; and
- Following both oral and written instructions from his or her supervisor.

**Identification of noise exposures**

In order to accurately identify employees who are at risk for noise induced hearing loss, workplace noise exposures need to be identified and evaluated. University employee noise exposures are influenced by multiple factors including work task (tools/equipment used), location, and duration. Some of the sources of noise exposures on campus include the following:

- Building Mechanical Equipment (HVAC equipment, fans, chillers, compressors, motors, pumps, emergency generators, etc.)
- Power Tools (located in academic shops and Facility Maintenance shops)
- Landscaping Equipment (typically used by the University Grounds Department)
- Construction equipment (typically used by University Grounds Department Construction Crew)
- Research / testing equipment

Department supervisors can request sound level survey of an area or operation that may have excessive noise levels. Contact the Director of Facilities & Construction to request a survey.

Noise surveys of locations on campus where background noise levels were thought to have the potential to exceed 85 decibels are conducted.

Locations where sound levels are above 85 dB are identified by area sound level surveys.
Noise Hazard Assessment: Noise Surveys/Noise Dosimetry

Noise–Exposed employees and/or noise hazard areas will be identified by appropriate Department Managers or Supervisors in conjunction with the Environmental Health and Safety Office. Where necessary, an assessment will be carried out by means of workplace noise surveys and/or noise dosimetry. Noise surveys / noise dosimetry will identify noise hazard areas and employee tasks (equipment/tool use) that can contribute to employee noise exposures of 85 dB or greater.

EH&S designs and implements the noise monitoring program. The sampling strategy shall be designed to identify employees for inclusion in the Hearing Conservation Program. Specifically, EH&S shall identify equipment use, or areas within the University’s facilities which can be reasonably expected to subject operators or occupants to sound levels above 85 dBA (8 hour TWA). Monitoring shall be repeated whenever changes in equipment or processes may subject operators or occupants to sound levels above 85 dBA (8 hour TWA). Employees shall be notified when monitoring results indicate exposure above 85 dBA (8 hour TWA). EH&S shall provide the opportunity for affected employees to observe noise measurements.

Program Participation:

When an employee of the University is exposed to sound levels at or above the OSHA defined action level of 85 dBA (8 hour TWA) they shall be required to participate in the University Hearing Conservation Program.

Noise Control Measures

Where employee noise exposures can exceed 85 dBA, appropriate noise control strategies are developed and implemented. Control strategies will include engineering controls, administrative controls, and personal protective equipment (hearing protective devices).

Engineering Controls

In a noise hazard area, an investigation of the feasibility of applying engineering controls to reduce noise levels will be conducted and where feasible or practical, noise levels are to be reduced through engineering controls. Engineering controls may include barriers, vibration damping, source isolation and sound absorbing enclosures. When new equipment is to be purchased, consideration shall be given to the noise levels generated and the potential exposure of employees working with or near the equipment.

Administrative Controls

Where engineering controls are not practical or feasible, administrative controls must be considered. Administrative controls include: changes in work procedure, rescheduling of the noisy activity, or decreasing the duration of exposure through rotation of workers.
Clearly visible warning signs must be posted at the approaches to an area where sound levels regularly exceed 85 dBA. These warning signs must clearly indicate that the use of hearing protection is mandatory.

Where a piece of equipment or tool presents the noise hazard operator training and/or labels affixed to the equipment shall be used to reinforce the requirement for hearing protection while operating the equipment.

Regular equipment maintenance can be an important noise control measure since well maintained equipment, can be quieter.

**Personal Protective Equipment (Hearing Protective Devices)**
Where engineering and/or administrative controls are not feasible, hearing protective devices must be used where sound levels regularly exceed 85 dBA or where an individual’s personal exposure may exceed the limits set in table 1.

Hearing Protective Devices include earplugs and ear muffs. A variety of styles are available.

Hearing Protective Devices shall be made available to all program participants. Supervisors of affected employees shall maintain a selection of Hearing Protective Devices, accessible to all program participants. At the discretion of the supervisor, ear muffs may also be provided to program participants. Ear muffs are suggested where the use of hearing protection will be intermittent over the course of the work shift. Ear muffs will not be shared between workers and will be individually assigned. Supervisors may contact EH&S for assistance in the selection, proper use, and/or procurement of hearing protective devices.

The life of the hearing protector is dependent on the care it is given. A sponge type hearing protector is disposable. But as long as it is clean, it may be used until it no longer expands. How long the hearing protection lasts is unique to each employee depending on the makeup of their body.

Typical life of hearing protectors:
- Sponge Plugs: 1 or 2 days
- Custom Plugs: 18-24 months
- Insert Plugs: 4-6 months
- Muffs: Replace when worn out

**Hearing Protection Selection**
Hearing Protective devices are selected based on their ability to reduce the sound level exposure to below 85 dBA. One way hearing protective devices are evaluated/selected is based on their Noise Reduction Rating (NRR) developed by the Environmental Protection Agency (EPA). See figure 1 below for an example of a Noise Reduction Rating label.
The NRR describes the average sound level reduction (attenuation) provided by a hearing protection device (HPD) in a laboratory test. Since the NRR is based on laboratory testing, it does not take into account the loss of protection that occurs when hearing protectors are not fit properly or when they are not worn for the entire time that the wearer is exposed to noise.

Hearing protector attenuation shall be evaluated by EH&S for the specific noise environments in which the protectors will be used. Hearing protectors must be selected which attenuate employee exposure at least to an 8 hour time-weighted average of 90 decibels. Re-assessment of attenuation will be performed as needed for changes in noise environment or hearing protectors.

**Audiometric Testing:**

The University shall maintain an audiometric testing program, coordinated by EH&S. All employees who are exposed to sound levels at or above the action level of 85 dBA (8 hour TWA) shall receive audiometric testing. This program shall be provided at no cost to employees. The University will select an outside vendor to provide this service. Baseline audiometric testing shall be performed upon identification of an employee as a program participant and within 6 months of initial exposure to the action level of 85 dBA (8 hour TWA). Audiometric testing shall be repeated annually thereafter.

*Mobile test van exception* - when mobile test vans are used to meet the audiometric testing obligation, UNC Charlotte shall obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the action level. Where baseline audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, UNC Charlotte shall wear hearing protectors for any period exceeding six months after first exposure until the baseline audiogram is obtained.
Audiometric test requirements shall meet those outlined in section (h) of the OSHA Occupational Noise Exposure Standard (29CFR 1910.95).

It is required that the baseline audiogram be preceded by at least 14 hours without exposure to workplace noise. Time that hearing protection is worn may be included as part of the 14 hours without exposure to noise. Employees shall be notified that they need to avoid non-occupational noise exposure during the 14 hours prior to the audiometric test. This notification shall be documented (see Appendix B).

A retest audiogram may be conducted to verify or confirm a hearing threshold result. Times when a retest may be needed:

- If an employee has suffered a Standard Threshold Shift, the employer may obtain a retest within 30 days and use the results of the retest as the annual audiogram.
- The Audiologist or Physician can request a retest to confirm test results.
- When problems are suspected by the test administrator.

**Threshold Shift:**

Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift (STS) as defined by the OSHA Occupational Noise Exposure standard has occurred.

If the annual audiogram shows that an employee has suffered a standard threshold shift, the University may coordinate a retest of the employee within 30 days and consider the results of the retest as the annual audiogram. The employee will be notified of the standard threshold shift within 21 days of the determination. The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation.

Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the University will take the following steps when a standard threshold shift occurs:

1. Employees not using hearing protectors shall be fitted with hearing protectors, trained in their use and care, and required to use them.

2. Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

3. The employee shall be referred for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if the employer
suspects that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.

Revised baseline - An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the audiogram:

1. The standard threshold shift revealed by the audiogram is persistent; or
2. The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram

Training and Information:
New employees hired into positions with documented noise exposures > 85 dB will receive initial hearing conservation training conducted by EH&S. The content will be the same as the annual training (listed below).

EH&S or the audiometric testing contractor shall conduct annual hearing conservation training for all affected employees. The training will include:

1. The effects of noise on hearing;
2. The purpose of hearing protectors; the advantages, disadvantages and attenuation of various types;
3. Instructions on the selection, fitting, care and use of hearing protectors; and
4. The purpose of audiometric testing, and an explanation of the test procedures.

Written information will be provided to program participants regarding this program and the Occupational Noise Exposure standard 29 CFR 1910.95. A copy of the standard shall be posted in the workplace and additional copies of the standard are available from EH&S.

Recordkeeping:

EH&S shall maintain records of all noise monitoring, including both personal noise dosimetry and area sound level surveys. Noise measurement records shall be retained for two years.

EH&S shall maintain record of employee notification of results of noise monitoring.

Audiometric test records for each participant shall be maintained by EH&S. Records shall be retained for the duration of the affected employee’s employment.

EH&S shall maintain records of the Audiometer(s) and testing booth(s) used to conduct employee testing. Documentation is to be provided by testing contractor.
EH&S shall also maintain records of hearing conservation training for affected employees.

Recording Hearing Loss on the OSHA 300 Log

A Standard Threshold Shift (STS) must be entered on the OSHA 300 Form within 7 days unless a retest is performed and does not confirm the original STS.
Table 1

PERMISSIBLE NOISE EXPOSURES

<table>
<thead>
<tr>
<th>Duration per day, hours</th>
<th>Sound level dBA slow response</th>
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</table>
APPENDIX A

Definitions

A-weighted decibel - The A-weighted decibel or dBA, is a type of decibel measurement which closely represents the manner in which a human ear responds to noise.

Action level - An 8-hour time-weighted average of 85 decibels measured on the A-scale, slow response, or equivalently, a dose of fifty percent.

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

Audiologist - A professional, specializing in the study and rehabilitation of hearing, who is certified by the American Speech-Language-Hearing Association or licensed by a state board of examiners.

Audiometry - A method of hearing assessment that tests an individual’s ability to hear sounds of different intensities and frequencies. Audiometry detects early, asymptomatic noise induced hearing loss before the affected individual is even aware that it is happening.

Baseline audiogram - The audiogram against which future audiograms are compared.

Criterion sound level - A sound level of 90 decibels.

Decibel (dB) – The decibel is a unit of measurement of sound pressure level that is a logarithmic and dimensionless.

Hertz (Hz) - Unit of measurement of frequency, numerically equal to cycles per second.

Noise - In general, noise is considered to be any unwanted sound. The University’s Hearing Conservation Program targets noise levels and noise exposures that are associated with noise-induced hearing loss.

Noise dose - The ratio, expressed as a percentage, of (1) the time integral, over a stated time or event, of the 0.6 power of the measured SLOW exponential time-averaged, squared A-weighted sound pressure and (2) the product of the criterion duration (8 hours) and the 0.6 power of the squared sound pressure corresponding to the criterion sound level (90 dB).

Noise dosimeter - An instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicates a noise dose.
Noise dosimetry - This noise assessment technique measures an employee’s personal noise exposure and is particularly useful and applicable when employees work in numerous noisy areas for short durations at a time or perform different noisy operations on any given day.

Noise hazard area - An area is considered a noise hazard area if the sound levels regularly exceed 85 dBA.

Noise Survey - Noise survey is another noise assessment technique that provides valuable information regarding sound levels in an area. The most common type is a general noise survey which measures sound levels in A-weighted decibels (dBA).

Otolaryngologist - A physician specializing in diagnosis and treatment of disorders of the ear, nose and throat.

Representative exposure - Measurements of an employee's noise dose or 8-hour time-weighted average sound level that the employers deem to be representative of the exposures of other employees in the workplace.

Sound level - Ten times the common logarithm of the ratio of the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micropascals. Unit: decibels (dB). For use with this regulation, SLOW time response, in accordance with ANSI S1.4-1971 (R1976), is required.

Sound level meter - An instrument for the measurement of sound level.

Standard threshold shift - A change in 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 - That sound level, which if constant over an 8-hour exposure, would result in the same noise dose as is measured.
Appendix B

Notification of “Quiet Period” prior to baseline hearing test

It is an OSHA Noise Standard requirement that you be free from high noise exposure for 14 hours before your baseline hearing test.

You should avoid the following types of noise prior to the hearing test:

- Workplace Noise
- Lawn Mowers
- Leaf Blowers
- Weed Trimmers
- Chain Saws
- Power Tools
- Small Engines
- Car Races
- Small Airplanes
- Power Boats
- All Firearms
- Loud Music

Please wear hearing protection until your baseline hearing test is completed to minimize noise exposure on and off the job.

I have been notified of the need to avoid occupational and non-occupational noise prior to my baseline hearing test.

________________________________________________________________________

Employee Signature                     Date