UNIVERSITY of NEW HAMPSHIRE

Hearing Conservation Program

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The most current version of this document can be found at:
http://www.unh.edu/ehs

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I. Introduction

This document presents guidelines to protect University of New Hampshire (UNH) employees against the effects of exposures to high noise levels. The intent of the program is to prevent significant and permanent noise-induced hearing loss. The *Code of Federal Regulations,* 29CFR1910.95, promulgated limits to define acceptable *occupational noise exposures.* The loud nature of many job tasks and machines in the workplace environment often create noise levels which exceed the established limits.

Situations exist where noise attenuation cannot be attained through the use of engineering or administrative control measures. In these cases, regulations require that an effective Hearing Conservation Program (HCP) be instituted. A HCP employs the use of hearing protection equipment, annual testing programs, medical surveillance, and employee training to reduce and monitor the effects of noise on employees.

II. Responsibilities

A. Office of Environmental, Health & Safety (EH&S)

1. Evaluates high noise areas to determine where the potential for noise induced hearing loss exists.

2. Conducts periodic, representative monitoring of these areas to identify employees who receive exposures which exceed the action limit.

3. Calibrates all noise monitoring equipment before and after sampling period.

4. Documents monitoring conducted for certain areas or job tasks.

5. Maintains a file of all employees who are to be included in the HCP.

6. Provides the names of employees who require audiograms to their supervisor. The cost of audiograms will be the responsibility of the employee's department.

7. Directs investigations into engineering and administrative controls to reduce noise exposures.

8. Evaluates and approves all hearing protection equipment before purchase and issuance to employees.

9. Conducts training required for the use of hearing protection equipment.

10. Designates and posts areas where hearing protection equipment is required.

B. Supervisor

1. Identifies areas where the potential for noise exposure exists.

2. Provides for maintenance of noisy machines.

3. Coordinates the availability of approved hearing protection equipment with EH&S.

4. Purchases and issues approved hearing protection equipment.

5. Ensures that employees wear approved hearing protection equipment in areas that are designated as such.

6. Maintains a record of all employees who are to be included in the HCP. This record will include employee name, job title, date of last audiogram, and job duties.

C. Employee

1. Wears approved hearing protection equipment in designated areas.
2. Ensures that hearing protection equipment is maintained and kept clean.
3. Reports areas or tasks associated with high noise to supervisor.

III. Occupational Noise Limits

29CFR1910.95 established limits to protect employees against the effects of noise exposure. Appendix A displays permissible noise exposure durations at different sound levels. When these are exceeded, feasible engineering or administrative controls must be instituted. When engineering or administrative controls fail to reduce noise exposure to a level below permissible limits, hearing protection equipment will be provided at no cost to the employee.

The term “impact noise” refers to any short duration noise, e.g., the noise created by a hammer or a printing press. Impact noise may not exceed 140 dBA peak sound pressure level.

IV. Procedures

A. General Survey

A primary goal of UNH’s HCP is to identify specific areas, job titles, and work tasks which are associated with high noise exposures and possible hearing loss. Initial monitoring will be done with a sound level meter. The meter shall be used on the “A”-weighted scale which best approximates the response characteristics of the human ear. The meter shall also be set to the slow response mode, especially in instances where noise levels fluctuate.

B. Monitoring

Representative noise monitoring will be conducted wherever initial surveys indicate that the noise exposure for an employee exceeds the action limit. The “action limit” for noise is defined as an eight hour time weighted average (TWA) exposure of 85 decibels on the “A”-weighted scale.

Noise dosimeters are used to monitor long term noise exposures. They accurately and electronically calculate the cumulative noise dose. The microphone of the dosimeter is placed in the worker's hearing zone (a one foot diameter imaginary sphere surrounding the head) where it detects sounds that reach this zone and integrates them into the cumulative exposure.

EH&S will use the following criteria when doing noise monitoring by means of dosimetry:

- Less than full shift dosimetry should be rare. Effort should be made to sample work periods of at least seven hours.
- A time study may be necessary to effectively assess the noise dose in cases where the employee's exposure changes with the job task being performed.
- Dosimetry should be conducted on the noisiest days possible. Additionally, the employee at maximum risk in a department or area should be identified. This approach simulates a "worst case" noise dose for the employee.
- Area monitoring is sufficient when the sample approximates the employee dose.
- EH&S will create a sampling strategy plan such as the example shown in Appendix C. In cases where it is difficult to select the maximum risk employee for a department, NIOSH sampling strategies should be consulted.
- All noise monitoring will be documented by EH&S.

C. Area Posting

Any area where the noise level has been determined to exceed 90 dBA TWA, will be designated as a "hearing protection required" area. All employees who enter this area will be required to wear hearing protection equipment, even if the entry period is less than full shift. EH&S will identify these areas and post warning signs.

D. Identification of Employees for Inclusion in the HCP

When representative monitoring indicates that an employee's eight-hour TWA exposure exceeds the action limit for noise, that employee shall be notified and included in the HCP. If it is determined that a particular task exceeds the action limit, then all personnel who perform the task will be included in the HCP.

E. Audiometric Testing

All employees whose exposure is suspected to be above the action limit (85 TWA) will be notified and scheduled for audiometric testing. Testing will be performed off-campus at an occupational health or other medical facility approved by EH&S. The employee will avoid exposure to occupational noise for 14 hours prior to the appointment to prevent a temporary threshold shift and to assure the accuracy of the test. This 14 hour "non-exposure" time may be achieved through the use of hearing protection which attenuates the noise levels below 80dBA. The department for which the employee works will pay for the audiometric testing.

Note: Audiometric testing is required to be available to all employees whose exposures equal or exceed the action limit. Employees who do not wish to participate in the audiometric testing procedure may sign a declination form. (Appendix C)

<u>Audiometric Testing Procedure</u>

1) Upon identifying an employee whose eight-hour TWA exceeds 85 dBA, EH&S will notify the individual's area supervisor.
2) Area supervisor will arrange an audiogram appointment for the employee.
3) Baseline audiogram test results will be sent to EH&S and filed.
4) Test results will be made available to the employee.
5) Annual tests will be performed each year following this initial testing.

Subsequent annual audiogram test results that indicate a standard threshold shift (STS) will require a follow up audiogram.

<u>Follow Up Audiogram Procedure</u>

1) EH&S will notify the employee and his/her supervisor within 21 days if a follow up test is required.

2) Supervisor will schedule follow up audiogram after 30 days of the most recent audiogram. The cost of the follow up audiogram will be the responsibility of the department.
3) Retest results will be sent to EH&S and filed.
4) Test results will be made available to the employee.
5) If successive testing indicates an STS, the employee will be required to wear hearing protection on the job and will be directed to a physician who will further examine the results of the audiograms.
5) Subsequent annual tests will be compared to the previous test to determine if a standard threshold shift (STS) has occurred.

F. Noise Control

Methods used to control occupational noise are dictated by conditions present in the work area. Productivity, technology, and cost may limit the feasibility of reducing noise levels. Noise control may be accomplished by reducing the noise at the source, changing or interrupting the path of the noise, or by eliminating the noise which is detected by the receiver (the human ear).

1. Engineering Controls

   The use of engineering principles to eliminate or reduce noise is generally accepted to be the most effective method of noise control. These types of controls include but are not limited to:

   - Maintenance through the replacement of worn parts and the use of lubrication and cutting oils
   - Substitution by the use of a more quiet machine or process
   - Isolation of the operation or equipment
   - Reduce vibration by reducing forces and rotational speeds
   - Dampen vibration through increased support materials
   - Reduce transmission by using flexible mountings and ducts
   - Reduce reverberation using absorptive materials
   - Set criteria when purchasing machinery, be aware of the maximum noise levels and set limits on acceptable levels

2. Hearing Protection Equipment

Supervisors will contact EH&S to approve, recommend or evaluate any hearing protection equipment before purchasing. Training will be provided to employees included in the HCP by EH&S. The use of hearing protection equipment is necessary where engineering or administrative controls are not feasible or adequate, and for employees who are exposed to excessive noise or have experienced a standard threshold shift (STS). Requirements for hearing protection equipment are:

- Hearing protection will be made available to, and is highly recommended for, those employees who are exposed to noise levels at or exceeding 85 dB
- Hearing protection is required for:
    1) Employees exposed to eight-hour TWA noise exposures in excess of 90 dBA.
    2) Employees in the HCP who have been diagnosed as having a STS and are exposed to eight-hour TWA noise exposures exceeding 85 dBA.
    3) Areas where posted warning signs require the use of hearing protection equipment.

Hearing protection equipment is available in the form of both ear plugs and ear muffs. A quick evaluation of the attenuation provided by the hearing protection can be assessed by consulting the Noise Reduction Rating (NRR) which is printed on the package. For information pertaining to the purchase of hearing protection, contact EH&S at 862-4761.

G. Training

The training and education program will provide information about the adverse effects of noise and how to prevent noise-induced hearing loss. The following topics will be covered:

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 hearing protection equipment.
6. Explanation of noise measurement procedures.
7. Hearing conservation program requirements

Appendix A

Maximum Permissible Occupational Noise Exposure

Sound Pressure Level (dBA)	Maximum Permitted Duration/Workday
90	8 hours
91	7 hours
92	6 hours 6 minutes
93	5 hours 18 minutes
94	4 hours 36 minutes
95	4 hours
96	3 hours 30 minutes
97	3 hours
98	2 hours 36 minutes
99	2 hours 18 minutes
100	2 hours
101	1 hour 42 minutes
102	1 hour 30 minutes
103	1 hour 18 minutes
104	1 hour 6 minutes
105	1 hour
106	52 minutes
107	45 minutes
108	39 minutes
109	34 minutes
110	30 minutes
111	26 minutes
112	22 minutes
113	19 minutes
114	17 minutes
115	15 minutes

Appendix B

Sample Letter of Employee Notification

Date:

To: UNH Employee

From: Environmental Health & Safety Office

Subject: **AUDIOMETRIC TESTING RESULTS**

The UNH Hearing Conservation Program has been established to protect and conserve your hearing against the effects of occupational noise. The program includes noise monitoring, audiometric testing, training, and the use of hearing protection equipment.

Audiometric testing has identified a possible standard threshold shift (STS) on your latest audiogram. This suggests that there has been a reduction in your hearing. In accordance with Federal/OSHA regulation and UNH policy, you will now be required to wear hearing protection equipment during your working hours. Ear plugs or ear muffs will be made available to you through your department.

A follow-up audiogram will be administered after 30 days of the most recent audiogram. If the results of the next test are significantly different from the last, then these control methods can be modified.

If there are any questions concerning these requirements or the results of your audiogram, please call 862-4761.

Appendix C

MANDATORY AUDIOMETRIC HEARING TEST DECLINATION STATEMENT

I understand that due to my occupational exposure to noise with an 8-hour time weighted average that exceeds 85 dbA, I may be at risk of acquiring a noise induced hearing loss. I have been given the opportunity to be included in the Hearing Conservation Program that makes audiometric testing available to employees at risk. However, I decline to participate in the audiometric testing at this time.

I understand that by declining the audiometric testing, no baseline audiogram will be administered to establish whether I have suffered hearing loss as a result of occupational exposure to noise or other non-occupational factors. If I subsequently develop hearing loss and have declined the audiometric testing, I may be waiving rights and remedies that would be available to me if the hearing loss is determined to be the result of occupational exposure to noise.

If, in the future, I continue to have exposure to occupational noise that exceeds an 8-hour TWA of 85 dbA and I want to be included and receive audiometric testing, I will be able to receive this at no charge to me.

_____

Print Name

_____

Signature of Employee

_____

Social Security Number

_____

Date

If you are declining audiometric testing, please state your reason(s): _____

_____

Appendix D

Sampling Strategy Plan

Location	Chemical/Physical Agent	Sample Type (Personal/Area)	Job Position & Number of Employees	Frequency of Sampling
Heating Plant	Noise >85dBA			Annually
Printing and Bindery	Noise >85dBA			Annually
Morse Hall (Basement)	Noise >85dBA			Annually
Carpenter Shop	Noise >85dBA			Annually
Parsons Hall (Mechanical Room)	Noise >85dBA			Annually
Dining (Mixers)	Noise >85dBA			Annually
Morse Hall (Chillers)	Noise > 85dBA			Annually
Whittemore Center (Ice Room)	Noise > 85 dBA			Annually

Appendix E

Glossary of Terms

"A"-weighted scale – A measurement scale that approximates the "loudness" of tones relative to a 40 dB sound pressure level 1000 Hz reference tone. A-weighting is most responsive to frequencies, 400 to 4000 Hz and best approximates what is heard by the human ear. Measurements are expressed as dbA.

Action Limit – The sound level which when reached or exceeded necessitates implementation of activities to reduce the risk of noise-induced hearing loss. OSHA currently uses an 8-hour time weighted average of 85 dbA as the criterion for implementing an effective hearing conservation program.

Administrative Controls - Efforts to limit workers' noise exposure by modifying work schedules or location, or by modifying the operating schedule of noisy machinery.

Baseline Audiogram – A valid audiogram against which subsequent audiograms are compared to determine if hearing thresholds have changed. The baseline audiogram is preceded by a quiet period so as to obtain the best estimate of the person's hearing at that time.

dB (DECIBEL) – The unit used to express the intensity of sound. The decibel scale is a logarithmic scale in which 0 dB approximates the threshold of hearing in the mid frequencies for young adults and in which the threshold of discomfort is between 85 and 95 dB sound pressure level and the threshold of pain is between 120 and 140 dB sound pressure level.

Dosimeter – An instrument that measures sound levels over a specified interval, stores the measures, and calculates the sound as a function of sound level and sound duration and describes the results in term of dose and time-weighted average.

Engineering Controls – Any use of engineering methods to reduce or control the sound level of a noise source by modifying or replacing equipment, making any physical changes at the noise sources or along the transmission path (with the exception of hearing protectors).

HCP (Hearing Conservation Program) – The prevention or minimizing of noise-induced deafness through the use of hearing protection devices, the control of noise through engineering methods, annual audiometric tests, and employee training.

Impact Noise – Used to characterize impact or impulse noise which is typified by a sound which rapidly rises to a sharp peak and then quickly fades. The sound may or may not have a "ringing" quality (such as striking a hammer on a metal plate or a gunshot in a reverberant room).

NIOSH – National Institute for Occupational Safety and Health; a federal agency that conducts research on health and safety concerns; tests and certifies respirators, and trains occupational health and safety professionals.

Noise – any unwanted sound.

Noise Induced Hearing Loss – A hearing loss resulting from damage to the inner ear that is attributed to noise.

Noise Reduction Rating (NRR) – The NRR is a single-number rating method which attempts to describe a hearing protector based on how much the overall noise level is reduced by the hearing protector.

OSHA – The U.S. Occupational Safety and Health Administration.

Permissible Exposure Limit (PEL) – The OSHA permissible limits are presently 90 dbA. This is a time-weighted average exposure that must not be exceeded during any 8-hour work shift of a 40-hour work week.

Sound Level Meter – A device which measures sound and provides a readout of the resulting measurement.

STS (Standard Threshold Shift) – OSHA uses the term to describe 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. It is used by OSHA to trigger additional audiometric testing and related follow up.

TWA (Time Weighted Average) – A value expressed in dbA which is computed so that the resulting average would be equivalent to an exposure resulting from a constant noise level over an 8-hour period.