Department of Risk Management

Hearing Conservation Program

1. Introduction

The University of Denver Hearing Conservation Program (HCP) is written in accordance with the Occupational Safety and Health Administration (OSHA) General Industry Standard "Occupational Exposure to Noise" CFR 1910.95 (OSHA Standard). The purpose of the Program is to preclude occupational exposure to high noise through the identification and control of high noise sources, personnel training, and audiometric testing & evaluation of personnel.

Where high noise sources are identified, a reasonable effort, with the support of the appropriate department and EH&S, will be made to reduce the noise through the use of engineering controls, such as the installation of mufflers, noise attenuating walls, and perimeter barricades.

2. Definitions

Action Level – A noise exposure of 85 decibels as an 8-hour time weighted average or the equivalent, measured on the A-scale (dBA), at slow response. The American Conference of Governmental Industrial Hygienist (ACGIH) and the National Institute of Occupational Safety & Health (NIOSH) have both established this dose as an exposure criteria limit.

Audiogram - A chart, table, or graph showing hearing threshold level as a function of frequency.

Baseline Audiogram - An audiogram obtained on testing after a prescribed period of quiet (at least 14 hours) and used as a comparison against future audiograms.

Decibel - A unit for measuring the loudness of sound.

Noise Dosimetry – Noise measurements collected from personnel that register the noise levels and the exposure duration to determine personal exposure.

Hearing Protector - A device inserted into or placed over the ear in order to weaken air-conducted sounds.

Earmuff - A type of ear protector that encloses the entire outer ear.

Earplug - A type of ear protector that is inserted into the ear.

Frequency - The number of times per second that a sine wave repeats itself. It is expressed in Hertz (Hz).

Hearing Conservation - Those measures that are taken to reduce the risk of noise-induced hearing loss.

Hearing Loss - Impairment of auditory sensitivity.

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Noise - Disturbing, harmful, or unwanted sound.

Occupational Hearing Loss - A permanent hearing loss sustained in the course of following an occupation or employment.

Permissible Noise Exposure - The noise exposure, established by OSHA, of 90 dBA, as an 8-hour time weighted average or the equivalent, as measured on the A-weighted scale at slow response.

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

Standard Threshold Shift (STS)- A change in hearing threshold relative to the baseline audiogram of an average of 10 db or more at a frequency of 2000, 3000, and 4000 Hertz in either ear.

3. Responsibilities

Listed below are the responsibilities for applicable persons or departments.

Environmental Health & Safety (EH&S) Manager

- performing or coordinating noise monitoring and maintaining exposure measurement records for two years
- reporting the results of audiograms to employees and providing recommendations, as necessary
- determining which work areas or job titles require participation in the HCP
- providing technical information regarding the attenuation of noise and proper use of hearing protection
- reporting and explaining the results of personal noise monitoring to the worker
- maintaining a list of personnel who are in the HCP
- providing training to DU employees in the HCP
- investigating work areas or cases where an individual has an STS

DU Contracted Occupational Health Services Provider

- providing audiometric testing in accordance with the OSHA Standard
- providing audiograms reports to the EH&S Manager to include the employee name, date of the audiogram, and whether a possible work-related STS exists, along with recommendations for possible evaluation from a hearing specialist

- maintaining, for the employer, audiometric test records for the duration of the employee's employment, plus two years

Department

- notifying the EH&S Manager of potential high noise areas
- posting high noise areas with high noise warning signs
- providing applicable personnel with proper hearing protection
- verifying applicable personnel wear proper hearing protection
- scheduling applicable personnel for audiometric testing, as needed
- maintaining a list of applicable personnel in the HCP
- providing to EH&S Manager the names of personnel required to be in the HCP

Employee

- taking care of and wearing assigned hearing protectors
- completing annual audiograms, as assigned and attending required training

4. Requirements

The OSHA Standard provides for employee protection against the effects of noise when employees are exposed above *Permissible Noise Exposures*. Personal noise exposures are a function of the noise level and the duration of exposure. An equivalent exposure may be of shorter duration but at a higher noise level, i.e., 95 dBA at 4 hours or 100 dBA at two hours. Listed below are the OSHA permissible noise exposures for specific exposure times.

Duration (hr)	Sound level (dBA)
8	90
6	92
4	95
3	97
2	100
1	105
.5	110
.25	115

Per the OSHA Standard, the employer is required to identify high noise sources and to establish a Hearing Conservation Program for employees whose noise exposure equals or exceeds the *Action Level*. The *Action Level*, which is a dose of fifty percent of the *Permissible Noise Exposure*, is an exposure of 85 dBA for 8 hours, or 90 dBA for 4 hours or 100 dBA for one hour, etc. **Personnel whose exposure equal or exceed the Action Level must be enrolled in the Hearing**

Conservation Program and shall receive annual audiograms and annual training as described below.

5. Program components

The components of the program include noise monitoring, audiometric testing, employee notification, hearing protection, training, and recordkeeping.

Monitoring

Noise monitoring will be performed using a calibrated Sound Level Meter (SLM) to identify high noise sources and areas or using dosimetry to determine personal exposures. Monitoring will be performed by the EH&S Manager or coordinated through the EH&S Manager by an outside industrial hygienist using accepted industrial hygiene practices. High noise areas (>85 dBA) will be posted with signs indicating a high noise exists. High noise warning signs will be located in highly visible places that clearly denote the source of the noise.

Noise dosimetry will be performed during recognized high noise activities to determine personal and representative exposures. Based on representative exposures, job titles or classification will be considered as qualifying for participation in the Hearing Conservation Program. Personnel who assume these identified job titles or classifications will be enrolled in the Hearing Conservation Program, unless otherwise confirmed not to have a noise exposure.

Audiometric Testing

Audiometric testing will be performed on all employees in the Hearing Conservation Program. The testing, which will be at no cost to the employee, will include a baseline audiogram and subsequent annual audiograms. The baseline audiogram will be used to compare all other audiograms.

The DU contracted occupational health services provider (see Workers' Compensation for contact information) will evaluate audiograms and notify EH&S. The EH&S Manager will notify the employee of the results of the audiogram (Appendix A, Notification of Normal Audiogram, Appendix B, Notification of Abnormal Audiogram, Appendix C Notification of Standard Threshold Shift). In the occurrence of an STS, recommendations will be provided to the employee to be evaluated by his personal physician.

Employee notification

Employees will be notified of their audiometric test results and the results of any personal noise dosimetry. Noise dosimetry reports, which will be written by the EH&S Manager,

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will include an explanation of the results and recommendations, such as engineering modifications or the requirement for hearing protection. The results of general noise surveys of equipment or areas will be reported by the EH&S Manager to the applicable department.

Hearing protection

Each department will provide, at no cost to the employee, hearing protectors to employees in the Hearing Conservation Program. Additionally, hearing protectors will be provided to employees who have not yet had a baseline audiogram established or who have experienced a *standard threshold shift*.

Workers are required to wear hearing protectors when their exposure equals or exceeds the *Action Level*. The selected hearing protector must be capable of keeping the noise exposure at the ear below 85 dBA. Workers whose 8-hr TWA exposures exceed 100 dBA should wear double hearing protection (i.e., they should wear earplugs and earmuffs simultaneously).

Additionally, employees should be encouraged to wear hearing protection any time they are working in high noise areas, even if the duration of work is short and the criteria exposure is not exceeded.

Training

All employees in the Hearing Conservation Program will attend training. The department is responsible for ensuring employee participation in the training, which is required annually. The training, which is provided by the EH&S Manager, will contain the following information:

- The effects of noise on hearing
- The use of hearing protectors including the purpose, advantages, limitations, the attenuation of various types, fitting, and care
- The purpose of audiometric testing

Recordkeeping

Audiometric test records and noise exposure measurement records shall be retained for two years (see responsibilities above). All records will be provided upon request to the employee and to the Assistant Secretary (OSHA).

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Appendix A

Employee Notification of Normal Audiogram
Hearing Conservation Program
University of Denver

Date: _____

Employee DU ID: _____

Dear: _____

The results of your recent hearing test (audiogram) on _____ indicate your present level of hearing is normal for your age and sex. However, it is important that you continue to wear hearing protection as required for your job. You will remain in the Hearing Conservation Program due to the noise hazards you encounter in your job.

It is also important for you to wear hearing protection off the job during those home activities that are extremely loud. For example, excessive noise levels may be produced from electric sanders, power saws, grass trimmers, lawn mowers, snow blowers, garden tractors, and other equipment. This equipment can damage your hearing if hearing protection is not worn.

Remember, this evaluation is conducted to protect your hearing. Only you know if the hearing protection device is being worn properly. Contact the EH&S Manager, at 303-871-2356, if you have any questions about this manner.

Signature of the Environmental Health & Safety Manager

_____

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Appendix B

Employee Notification of Abnormal Audiogram
Hearing Conservation Program
University of Denver

Date: _____

Employee ID: _____

Dear: _____

The results of your recent hearing test (audiogram) on _____ indicate you have experienced significant hearing loss. This hearing loss may have been caused by unusual noise exposure, current medication, common cold, or other conditions that effect hearing. Your hearing must be retested to determine whether this hearing loss is persistent.

A hearing retest should be scheduled on or about the following date: _____. Please call the DU contracted occupational health services provider at _____ to make an appointment.

It is important that you be in a quiet area for at least fourteen (14) hours prior to the retest. If you are going to be in a noisy area, it will be necessary for you to wear hearing protection. Your supervisor will be able to tell you if you need to wear hearing protection at work. Contact the EH&S Manager, at 303-871-2356, if you have any questions about this manner.

Signature of Supervisor: _____

Signature of EH&S Manager: _____

Signature of employee: _____

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Appendix C

Employee Notification of Standard Threshold Shift
Hearing Conservation Program
University of Denver

Date: _____

Employee ID: _____

Dear: _____

The results of your recent hearing test (audiogram) on _____ indicate you have experienced a Standard Threshold Shift (STS), which is a permanent loss of hearing. Based on this STS, it is recommended that you be examined by your personal physician or a hearing specialist for further evaluation.

At work, you are required to continue to wear hearing protection devices when exposed to high noise. Wearing hearing protection devices will reduce on-the-job noise levels to within acceptable limits and should eliminate further loss in your hearing ability. It is important for you to wear hearing protection off the job during those home activities that are extremely loud. Operating this equipment without hearing protection can further damage your hearing. Contact the EH&S Manager, at 303-871-2356, if you have any questions about this manner.

Signature of Supervisor: _____

Signature of EH&S Manager: _____

Signature of employee: _____

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Appendix D

MEMORANDUM

To: Employee's Name

From: Supervisor's Name

Date: _____

REGARDING: Audiometric Testing

You are scheduled to report for your annual audiogram at Rocky Mountain Medical Group, at 730 E Hampden Ave. Suite #200, Englewood, CO 80110, at _____ on mo/dy/yr. Under the *Hearing Conservation Program,* it is your responsibility to avoid exposure to workplace noise for 14 hours before the test. It is also the employee's responsibility to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric test. Noise exposure may result from personal activities such as operation of lawn mowers, power tools, engines, stereo equipment, or other sources of loud noise such as gunfire or hammering.