Environmental Health & Safety

Hearing Conservation Program

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1.0 Purpose

This written program consists of the policy and procedures needed for departments to set up and manage a hearing conservation program that protects University employees from long-term hearing loss and meets the requirements of the Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure standard, 29 Code of Federal Regulations 1910.95.

2.0 Scope

This written program applies to all departments at the University of Iowa.

3.0 Definitions

Action level – The noise level, measured over a full shift, at which an employee must be included in the hearing conservation program. This is 85 dBA for an 8-hour shift or 82.1 dBA for a 12-hour shift.

Attenuation - Reduction of noise level.

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

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

Baseline audiogram - The audiogram against which future audiograms are compared. Conducted within the employee's first 6 months after an exposure at or above the action level.

Criterion level - The constant sound level in dB that, if applied for eight hours, would accumulate a dose of 100 percent.

Decibel - (dB) Unit of measure for sound levels. Based on a logarithmic scale.

Decibel, A-weighted scale – (dBA) decibels weighted to provide a result that simulates the sensitivity of the human ear at moderate sound levels. The weighting reduces the level of low frequency sounds and increases high frequency sounds in the average.

Dose - A percentage of the maximum allowable noise that a worker can be exposed to per day. This is a computation that is based on the following variables: criterion level, lower threshold and exchange rate. Dose is expressed as a percentage.

Dosimeter - An instrument worn or used by an individual to measure the accumulation of their noise exposure over a work period. The dosimeter calculates the TWA exposure for the individual. Dosimeters have an accuracy of ± 2 dB.

Exchange rate - The rate at which your dose doubles. OSHA uses the 5 dB exchange rate. The exchange rate affects the integrated readings LAvg, dose and TWA, but does not affect the instantaneous sound level.

Frequency - Pitch or the number of cycles that a sound wave completes per second. Measured in Hertz or cycles per second (CPS).

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

LAvg (level average) 80 - The average sound level, in decibels, for the measurement period based on a 5 dB exchange rate and a threshold of 80. This is the measurement that corresponds to the action level.

LAvg 90 - The average sound level, in decibels, for the measurement period based on a 5 dB exchange rate and a threshold of 90. This is the measurement that corresponds to the permissible exposure limit.

Noise reduction rating (NRR) - Measure of the estimated attenuation capacity of a hearing protector. The manufacturer provided NRR is adjusted to account for differences in laboratory-derived and real world values. The following formula should be used: adjusted NRR= (NRR-7) x0.5. If custom molded ear plugs are used the formula is: adjusted NRR= (NRR-7). For double hearing protection 5 dBA is added to the higher adjusted NRR.

Peak level - The absolute highest measurement taken. A peak level above 140 dB requires inclusion in the hearing conservation program.

Permissible exposure limit (PEL) - An eight-hour time-weighted average of 90 dBA. The PEL is not adjusted for longer shift lengths.

Response rate (fast, slow) - Determines how quickly the instrument responds to fluctuating noise. Fast response has a time constant of 125 milliseconds. Slow response has a time constant of one second. OSHA regulations require the use of slow response.

Sound level meter - A sound-level meter is a handheld, direct-reading instrument with a microphone, an electronic-filter network and a visual display such as a meter or digital readout. Because sound-level meters provide a real-time indication of noise loudness, they are typically used to initial survey an area. Once high-noise areas are identified, more exhaustive monitoring can be with an audio dosimeter.

Standard Threshold Shift - an average shift in either ear of 10 dBA or more at 2,000, 3,000, and 4,000 hertz (Hz) when comparing the annual audiogram to the baseline.

Threshold - Sound levels below this point are excluded from all averaging. Threshold is used for averaging and integrating functions affecting LAvg, TWA and dose measurements. Threshold does not affect measurements in the sound level mode.

4.0 Roles and Responsibilities

EHS is responsible for:

- Establishing University expectations to meet regulatory requirements.
- Conduct area and personal monitoring
- Conduct a yearly audit of each department's program

The University Employee Health Clinic (UEHC) is responsible for:

- Performing baseline audiograms for new employees and annual audiograms for all employees who work in areas that are in the HCP
- Notifying employees when they experience a standard threshold shift

The department is responsible for:

- Establishing a written hearing conservation program (HCP).
- Posting warning signs as required
- Providing hearing protection to the employees
- Let EHS know if there are any changes to any equipment or process that could affect the employees' noise exposure.

Supervisors are responsible for:

- Ensuring staff are aware of this program
- Ensuring employees receive initial and annual audiograms
- Assisting the employees in scheduling the initial and annual audiograms
- Ensuring employees receive initial and annual training

Employees are responsible for:

- Complying with the requirements of this program, and any further safety requirements set by supervisors

5.0 Program Requirements

5.1 Written Program

Each department that has employees that are in the hearing conservation program as defined in Section 5.2 or has employees that are required to wear hearing protection as defined in Section 5.5 are required to have a written hearing conservation program. To meet this requirement the department can reference this document with Appendix A filled out. Other formats for written programs are acceptable as long as they contain the information that is included here.

The written program must be accessible by any employee covered by the program. Electronic copies are acceptable as long as employees have access to it.

5.2 Monitoring

Initial area noise monitoring will be conducted in in all areas with a potential noise exposure source. Results will be recorded in the Area Sound Level Results table, or on a facility layout. Examples of these can be found on the EHS Hearing Conservation website. The table will be used for small areas that have a single noise source. Facility layouts will be used for large areas with multiple noise sources.

Initial personal noise monitoring is recommended if area levels are above 80 dBA and required if area levels are above 85 dBA.

Repeated personal monitoring will occur at least every 5 years for employees with a TWA of 83 dBA for an 8-hour shift or 80.1 dBA for a 12-hour shift. At the time of the personal monitoring the area sound levels will also be remeasured.

Area noise levels will be spot checked every year as part of the EHS audit process. If there is an increase in area noise levels of 5 dBA or more than the initial area monitoring, personal noise monitoring will be conducted.

Each person in a department does not need to be monitored. If it is expected a group of workers will have a similar exposure, only a selection of them will be monitored with the results applying to all individuals in the group. Past monitoring will also apply to a new employee who joins the department.

The department must notify the monitored employees and similarly exposed employees of the results within 15 days of receiving the report from EHS. For monitored employees EHS will include a notification letter to be signed and placed in the employee's medical file. For workers that would have a similar exposure but were not monitored, the results can discussed or a copy of the report can be made available to them.

5.3 Inclusion in the HCP

Employees with a TWA greater than 85 dBA for an 8-hour shift or 82.1 for a 12-hour shift will be included in the HCP. EHS will provide guidance if other shift lengths are worked.

If the employee works various shift lengths the lower action level will be used for inclusion in the HCP.

If the employee is exposed to impulse noises greater than 140 dBA they will be included in the HCP.

5.4 Audiometric Testing

Employees must receive a baseline audiogram within 6 months of their first exposure above the action level. They then must have an audiogram at least annually. A final audiogram will be conducted when the employee leaves the position.

Testing must be performed by a licensed or certified audiologist, otolaryngologist, or other physician and is offered free of charge to University employees at the University Employee Health Clinic (UEHC).

Annual audiograms will be compared to the baseline to determine if a threshold shift has occurred. If a shift has occurred the employee's ear plugs will be checked to ensure they are providing adequate protection and that they fit the employee. The employee must be notified of the shift.

Employees may refuse audiometric testing and must fill out the Refusal of Hearing Test form located in Appendix B. The completed form should be placed in the employee's medical file.

5.5 Hearing Protection

The departments must provide hearing protection free of charge to employees that work in areas where hearing protection use is required.

Employees must wear hearing protection if they are in an area with sound levels above 85 dBA.

Employees that have not had their initial audiogram, or have had a threshold shift, must wear hearing protection in areas with noise levels above 80 dBA.

The department must provide a selection of hearing protection options to employees. The hearing protection should have an adjusted NRR that would attenuate the employees TWA to below the action level, 85 dBA for an 8-hour shift or 82.1 for a 12-hour shift.

Double hearing protection, ear plugs and ear muffs, must be worn by employees that work in areas with sound levels above 100 dBA for any period of time.

5.6 Hazard Communication

In areas with a sound level above 85 dBA warning signs should be posted at the entrance to the area. The signs should include the following language: "Warning", "Noise Area", "Hearing Hazard", and "Use of Hearing Protectors Required".

In areas with a sound level above 100 dBA warning signs should be posted at the entrance to the area. The signs should include the following language: "Warning", "High Noise Area", "Hearing Hazard", and "Use of Double Hearing Protectors Required".

6.0 Training

Employees who are in the HCP as defined in section 5.3 or work in areas that require the use of hearing protection must take training annually.

University employees will take the training through ICON. The course is titled “Hearing Conservation” and the course number is W190OS.

The training will cover the anatomy of hearing, health effects of noise, noise monitoring requirements, requirements of the HCP, hearing protection selection, and individual responsibilities.

7.0 Record Retention

Baseline and annual audiogram records will be maintained by the UEHC.

Records and reports from personal and area noise monitoring will be maintained by EHS permanently. EHS recommends the departments maintain a copy of the report on file as well.

A signed copy of the employee notification letter should be placed in the employees’ medical file.

Training records are maintained on the University’s Employee Self Service site.

8.0 Removal from HCP

If a department wishes to be removed from the HCP they must comply with the following guidelines.

They must have documented reasons for why the exposure will be lower. For example removal of a machine, use of engineering controls, or change in work schedule.

EHS will conduct two noise surveys consisting of both area sound levels and personal noise monitoring with at least a year between the two events. If the personal noise monitoring results are below the criteria listed in section 5.2 for both sampling events, then the department and employees can be removed from the HCP.

9.0 Example Documents and References

Examples the area sound level results table and employee notification letter can be found on the EHS Hearing Conservation website.

Links to the OSHA hearing conservation standard and other related reference sites can be found on the EHS Hearing Conservation website.

Appendix A

Required Departmental Information

Department Name:

Date Updated:

Hearing Conservation Program Administrator:

Date of last personal noise monitoring:

Date of last area noise monitoring:

Minimum NRR for Hearing Protection:

Job Titles in the Hearing Conservation Program:

Appendix B

Refusal of Hearing Test

I understand that in my employment with the University of Iowa, I may have had an occupational exposure to high noise levels and may be at risk for hearing impairment. I acknowledge that I have received information about the occupational exposure to high noise levels, and I have had full opportunity to ask any questions I may have about the exposure and the risk it could present.

I also acknowledge that I have been given the opportunity to have my hearing tested as required by IOSH (Iowa Occupational Safety and Health) Noise Standard at no charge to myself. However, at this time I am declining the hearing test.

I also understand that although I have declined the hearing test, I may at any time during my employment at the University of Iowa notify my supervisor to request and schedule such a hearing test, at no charge to myself.

Print Name _____
Last First Middle

Job Classification/Department_____

Print Supervisor Name: _____

Supervisor Signature_____ Date_____

Employee Signature_____ Date_____

Cc: Departmental Personnel file
University Employee Health Clinic