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I. INTRODUCTION

The University of Notre Dame has developed the Hearing Conservation Program to reflect federal regulations (CFR 1910.95). The goal of this program is to establish employer and employee responsibilities that ensure safe practices. Safe practices are designed to protect each employee from exposure to high sound levels while they perform their duties. Although individual susceptibility, personal hobbies, pre-existing medical conditions and age affect individual hearing loss, it is a priority of the University to protect employees from occupational exposures.

All University employees whose potential exposure to sound levels averaging greater than 85 dBA (see appendix A for definition of dBA) for 8 hours per day, 40 hours per week or to periodic sounds that exceed 115 dBA, are required to participate in the University's Hearing Conservation Program.

II. EVALUATION OF NOISE EXPOSURE

Representative exposure assessments shall be performed when there is an indication that an employee's exposure to noise may equal or exceed an 8-hr TWA of 85 dBA. Monitoring will be repeated whenever it has been brought to the attention of Risk Management and Safety that a change in the process, equipment or controls has been made that may result in exposures that meet or exceed potentially hazardous levels or when modifications indicate.

The methodology of noise monitoring and equipment calibration will be consistent with current governmental requirements.

A. Initial Determination

All work areas producing sound levels in excess of 85 dBA for an 8-hr Time Weighted Average (TWA) shall be identified by reviewing past noise monitoring data, employee complaints, equipment manufacturing data or by performing an initial noise survey.

B. Periodic Monitoring

When it has been determined that an area or piece of equipment produces noise levels that exceed a TWA of 85 dBA, periodic monitoring will be conducted to identify changes in noise output and to evaluate the feasibility of engineering and administrative controls.

D. Corrective Actions

When high noise levels are identified, corrective actions will be made immediately to reduce employee exposures to below a TWA of 90 dBA. Either engineering, administrative or personal hearing protection controls will be implemented.

III. ENGINEERING AND ADMINISTRATIVE CONTROL OF NOISE

Reasonable efforts will be made to reduce employee exposure through engineering and administrative controls. Such controls may include: Selecting less noisy equipment, using noise dampening barriers, increasing the employee's distance from the source of the noise or reducing the time of exposure to the noise through job rotation.

IV. PERSONAL HEARING PROTECTION

When engineering and administrative controls are not possible to effectively minimize exposures to noise the following apply:

- A. Hearing protectors shall be worn by employees exposed to sound levels that meet or exceed an 8-hr TWA of 85 dBA.
- B. Hearing protectors shall provide enough attenuation to reduce sound levels below 85 dBA.
- C. The type of hearing protection shall be approved by Risk Management and Safety.
- D. Hearing protectors shall be worn properly, providing a proper fit.
- E. Hearing protectors shall be provided to the employees at no cost.

V. TRAINING

All employees exposed to noise levels that meet or exceed an 8-hr TWA of 85 dBA shall be trained and then periodically retrained. The training will include:

- A. The effects of noise on hearing.
- B. Contributing factors that cause hearing loss.
- C. The purpose of hearing protection.
- D. Advantages and disadvantages of the different types of hearing protection.
- E. The attenuation factors of hearing protection.
- F. How to select hearing protection.
- G. How to properly use hearing protection.
- H. The purpose of audiometric testing and what it means.
- I. Employee responsibilities.
- J. Employer responsibilities.

VI. RISK MANAGEMENT AND SAFETY RESPONSIBILITIES

- A. Develop and maintain the Hearing Conservation Program.
- B. Schedule annual hearing exams through a qualified audiologist.
- C. Provide annual training to all employees in the Hearing Conservation Program.
- D. Perform workplace assessments. Risk Management and Safety will conduct work place noise assessments when notified by departments of changes which may affect the intensity of noise in the work areas.
- E. Approval of hearing protection devices. All hearing protection devices shall be approved by Risk Management and Safety to ensure that the proper attenuation and specific needs are being achieved.
- F. Maintain related records, including hearing exam results, assessments and measurements.

VII. SUPERVISING DEPARTMENT RESPONSIBILITIES

- A. Schedule annual Hearing Conservation training through Risk Management and Safety.
- B. Ensure program requirements are being followed. The supervising department shall ensure that employees are following safe work practices, wearing hearing protection when required and that all meetings, exams and training sessions are being attended by their employees.
- C. Provide hearing protection at no cost to their employees.
- D. Notify Risk Management and Safety for evaluation when changes occur to equipment, processes or personnel which may change the intensity of noise output in the work areas.

VIII. EMPLOYEE RESPONSIBILITIES

- A. Follow program requirements. Employees are responsible for following safe procedures, including wearing hearing protection devices when required.
- B. Notify supervisor when questions arise regarding sound levels and their hearing.
- C. Attend annual hearing tests.
- D. Attend annual training.

IX. RECORD KEEPING

All employee/employer records shall be kept with regards to exposure, noise survey measurements and audiometric testing in the Risk Management and Safety.

X. MEDICAL EVALUATION OF HEARING

The University will use a qualified audiologist to perform annual audiograms on all employees who are in the Hearing Conservation Program. All audiograms will be consistent with the Occupational Health and Safety Standard, CFR 1910.95 as described by the following:

A. Audiograms:

1. All University employees identified by Risk Management and Safety as being potentially exposed to average noise levels in excess of 85 decibels or to periodic sounds that exceed 115 dBA will be scheduled for annual audiograms.
2. Employee audiograms are interpreted by a licensed or certified audiologist, otolaryngologist, or other qualified person.
3. Results of employee audiograms are forwarded, with individual employee recommendations, to Risk Management and Safety.

B. Recommended Action:

1. The licensed audiologist, otolaryngologist, or other qualified person may make various recommendations with respect to the results of the employee's audiogram. These recommendations and subsequent University actions include, but are not limited to:
 - i. Normal Audiogram:
 - no further action required
 - ii. Improvement in Audiogram:
 - new audiogram is judged more representative and, therefore, adopted as new baseline audiogram.
 - iii. Possible Invalid Audiogram:
 - Employee will be retested.
 - iv. Invalid Audiogram:
 - Employee will be retested.
 - v. Specific Employee Recommendations:
 - will be handled on an individual basis.
 - vi. Standard Threshold Shift:
 - a. An employee with a standard threshold shift (STS) relative to the baseline audiogram, of an average of

10 decibels or more at 2,000, 3,000, and 4,000 Hertz in either ear.

- b. In determining whether an STS has occurred, allowances may be made by the consulting audiologist for the contribution of aging.
- c. If the comparison of the annual audiogram to the baseline audiogram indicates an STS has occurred, the employee will be informed of this fact in writing, within 21 days of the determination.
- d. A physician or audiologist will evaluate the employee and determine if the STS is work-related or aggravated by occupational noise exposures.
 - 1) If the physician determines the STS is not work-related or aggravated by occupational noise exposure, the employee will be referred to his or her family physician.
 - 2) If the physician determines STS may be work-related, the physician will refer the employee for an audiological or otological evaluation at the University's expense.
 - 3) Risk Management and Safety will retrain and refit the employee with appropriate hearing protection and the employee's supervisor or department manager will require its use.
 - 4) Change in job responsibilities or administrative controls may be necessary to reduce exposure.

APPENDIX A: DEFINITIONS

Administrative Control: Any procedure that limits daily noise exposure by control of the work schedule.

Audiogram: A record of an individual's sensitivity for pure tones in each ear at each of the following frequencies: 500, 1,000, 2,000, 3,000, 4,000 and 6,000 Hz. (Note: information at 8,000 Hz is desirable but not always available with automatic audiometric equipment).

Baseline Audiogram: The audiogram against which future audiograms are compared.

dBA: The sound pressure level reading in decibels made on the A-weighted network of a sound level meter at slow response.

dBA – Ceiling (C): The sound level that should not be exceeded during any part of the working exposure.

Criterion Level: The decibel level that will yield 100 percent dose, or an EER of 1.0 in 8 hours.

Decibel (dB): Unit of measurement of sound level (can be power or pressure depending on the reference level).

Doubling Rate or Exchange Rate: The number of added decibels required to double the dose or the EER in a given amount of time.

Engineering Control: Any procedure other than administrative control or personal protection (earplugs, ear muffs) that reduces the sound level either at the source of the noise or in the hearing zone of the employee.

Equivalent Exposure Ratio (EER): Unit of measurement of the combined ratios of exposure time to permissible exposure time for an 8-hour weekday.

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

Impact or Impulsive Noise: Variation in noise levels that involve noise peaks at intervals greater than one (1) second.

Noise Dose (D): The cumulative noise exposure of an employee during a workday, expressed in percent exposure.

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 Exposure: The combination of exposure to a single noise level or any combination of noise levels and the duration of exposure.

Standard Threshold Shift: A change of hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2,000, 3,000, and 4,000 Hz in either ear.

Sound Level Meter: An instrument for the measurement of sound level.

Sound Power Level: Ten times the logarithm to the base 10 of the ratio of a given power to a reference sound power: The reference power commonly used is $1.0 * 10^{-12}$ watts.

Sound Pressure Level: Twenty times the logarithm to the base 10 of the ratio of a sound to the reference sound pressure. Unless otherwise specified, the effective (rms) pressure is to be understood. The reference sound pressure commonly used is 20mN/ m^2 .

Time-Weighted-Average Sound Level (TWA): That sound level, which if constant over an 8-hour exposure, would result in the same noise dose as is measured.