UPEI
UNIVERSITY
of Prince Edward
ISLAND

# HEARING CONSERVATION PROGRAM

March 2010

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## INTRODUCTION

The University has developed and implemented a comprehensive Hearing Conservation Program (HCP) to protect University workers from hearing loss due to occupational noise exposure.

Fortunately, noise exposure can be controlled. Every effort should be made to use quieter processes, machinery, or equipment. When practicable engineering controls do not reduce the noise level to or below the PEI Occupational Health and Safety Act/Regulations permissible exposure limit of 85 dB, then applicable employees must be included in the Hearing Conservation Program.

**Scope:** This program applies to all UPEI employees who are involved in operations where they are expected to be exposed to the equivalent of 85 dBA on a regular or intermittent basis.

## 2. RESPONSIBILITIES

### 2.1 Senior Management shall:

- Be committed to protect and preserve the hearing of its employees.
- Ensure that the UPEI Hearing Conservation Program and all its components are funded, implemented, administered, and enforced.

### 2.2 Health and Safety Advisor or Alternate shall:

- Develop the written Hearing Conservation Program with consultation of Facilities Management and a consultant.
- Ensure the program gets revised as necessary with input from Facilities Management.
- Establish services preferably with one audiometric testing clinic for occupationally exposed employees.
- Ensure audiometric testing is scheduled and takes place annually (Area Leaders provide notification for new employees who require this).
- Ensure training takes place at a minimum of once per year.
- Co-review the Hearing Conservation Program on an annual basis with Facilities Management. Maintain documentation of reviews for 5 years.

### 2.3 Facilities Management shall:

- Assist with the development of the Hearing Conservation Program
- According to the CSA standard, evaluate areas or operations to determine if they require inclusion in a hearing conservation program.
- According to the CSA standard, conduct noise testing/area noise surveys and document. Engage a trained consultant to do testing, as necessary.
- Communicate noise testing results to the applicable Area Leader(s), affected employees, and the Health and Safety Advisor.
- Review and recommend noise control measures (engineering controls, replacement of equipment, etc.) where possible.
- Oversee calibration and servicing of monitoring equipment as manufacture’s guides and ANSI standards require.

- Co-review the Hearing Conservation Program on an annual basis with the Health and Safety Advisor.

**2.4 Area Leaders shall:**

- Identify potentially hazardous noise locations and operations and contact Facilities Management for evaluations.
- Receive noise testing results from Facilities Management and communicate the results to all applicable employees in your area/department.
- Ensure noise control measures are implemented when possible.
- Ensure that employees required to participate in the hearing conservation program complete their required training annually and annual audiometric testing with the University's chosen provider.
- Ensure that new hires who require audiometric testing have it done within their first 6 months at the University. Contact the Health and Safety Advisor as notification.
- Ensure that employees wear appropriate hearing protection devices as necessary.
- Ensure warning signage is in place where recommended/necessary.
- Departments/areas pay the costs of required hearing protection devices for employees. They shall also pay any fees for audiometric testing as well as noise testing/surveys.

**2.5 Employees shall:**

- Assist the Area Leader in identifying potentially hazardous noise locations or operations to which they may be exposed.
- Complete audiometric testing or exposure assessments as instructed.
- Attend required hearing conservation training as necessary.
- Use hearing protection as required and in accordance with training received.
- Maintain hearing protection in sanitary condition and proper working order.

**2.6 Procurement Manager shall:**

- Review new equipment selection to ensure it is within allowable noise limits when possible.

## 3. EXPOSURE LIMITS & NOISE MEASUREMENTS

The Regulation requires that the employer protect his/her employees from daily **exposures above the equivalent (Leq) of 85 dBA for 8 hours** Leq or when sound levels exceed 115 dBA. Section 8.7 (1) of the Regulation states that if noise levels in the workplace exceed these limits, then the employer must develop a Hearing Conservation Program (HCP). Appendix B, Section 8.8 indicates what a program must include.

Noise Measurements - Refer to Appendix B for Regulations (Sections 8.3-8.5)

The success of the University's HCP depends on an accurate knowledge of the existing noise environment. **Noise measurement surveys** define areas within acceptable guidelines for noise exposure and those areas where potentially harmful noise exposure exists. Effective noise exposure measurements prevents possible loss of hearing by identifying work areas where

employees must wear hearing protection and, therefore, must have their hearing tested. Facilities Management or a consultant conducts detailed noise surveys using sound level meters that meet the appropriate CSA or ANSI standard and are calibrated acoustically before and after each survey.

Initial area **noise measurement surveys** are performed using measurement techniques acceptable to the regulations (CSA standard). Measurements are made at employees' normal working positions. This procedure allows an accurate estimation of the employees' daily exposure except in instances where an employee is required to move from one working location to another in his/her daily routine, or when an employee's instantaneous noise exposure levels vary markedly during the shift because of machine cycling. In these cases, **noise dosimetry** is performed whereby an employee wears a small device that measures noise levels encountered throughout the workday.

Follow-up measurements must be made whenever changes in work practices, equipment, facilities or methods may change workplace noise exposures. The results of all measurements are recorded, and employees are notified of their exposure level.

As with any exposure measurements, noise measurement results must be recorded, specifying the date of measurement, the workers or occupations being evaluated and the measuring equipment used. Refer to Appendix C and D for forms that may be used.

## 4. EDUCATION AND TRAINING

An effective Hearing Conservation Program must also have a strong educational component. The employer must provide education and training to all employees who are exposed to noise levels at or above 85 dBA Leq . The educational program shall inform the workers of the results of any noise exposure measurement, the potential effect of noise on hearing, and components of a Hearing Conservation Program. Employees working in environments where exposure levels are exceeded must also receive education on the advantages, disadvantages, and attenuation of various types of hearing protection, and instruction on proper selection, fitting, use, and care. The purpose and procedures of audiometric testing shall also be discussed. The educational phase begins when employees are hired and continues annually thereafter.

Employees not exposed to noise levels exceeding the accepted guidelines should be encouraged to participate whenever possible in the educational programs provided.

## 5. ENGINEERED NOISE CONTROL

Controlling existing noise levels by engineering controls is the most preferable course of action. Therefore, the feasibility of such controls should be carefully considered. Due to the complexity of some machinery used by University personnel, and in view of economic limitations, some noise levels cannot be reduced to below acceptable limits. In these cases, suppliers of machinery purchased which produces noise levels exceeding the accepted guidelines should be notified of the high noise levels. The suppliers should be requested to redesign machinery where possible to

meet the defined regulations. Consider the design and construction of partial or total enclosures, and other engineering noise control procedures for reducing the existing noise levels, where such procedures are deemed technologically and economically feasible.

## 6. HEARING PROTECTION

Until engineering controls reduce the amount of noise exposure to or below the allowed limits, the employer must make available appropriate personal hearing protection to noise-exposed employees. The employer must also ensure that the hearing protection is worn effectively. It is recognized that the use of these devices is considered a temporary solution to the problem of over-exposure until feasible controls are provided.

As with all safety equipment, the wearing of hearing protection in required areas is mandatory. All Area Leaders and supervisors must enforce hearing protection requirements.

Individuals responsible for issuing and fitting hearing protection must be appropriately trained. Fitting and issuing of hearing protective devices begins when employees are hired.

The criteria for the selection of hearing protection should comply with *Standard Z94.2-02, Hearing Protection Devices – Performance, Selection, Care, and Use*. Consideration when choosing particular hearing protectors should include: the level of daily worker exposure, the workers' hearing and communication requirements, use of other personal protective equipment, temperature and climate, and physical constraints of the worker or work activity.

## 7. POSTING OF NOISE HAZARD AREAS

Where noise levels cannot be reduced to or below the exposure limits by engineered noise controls, warning signs must be posted stating that a noise hazard exists and that hearing protection must be worn by all workers entering the area. All workers required to enter these areas must be supplied hearing protection and the employer must ensure that any worker in these areas wears hearing protection.

## 8. HEARING TESTS

The objective of this Hearing Conservation Program is the preservation of the hearing of University employees. In order to achieve this goal, an effective audiometric testing program must also be implemented. This program includes audiograms at the time of hire, an initial survey of the existing work force whose exposures equal or exceed the Leq of 85 dBA or greater in order to establish baselines, and termination audiograms when possible.

Based on the Regulations, the employer is required to perform an initial hearing test as soon as possible but no later than 6 months after the time of hire. From there on, the test must be done annually.

An Audiologist or a person who is certified to conduct audiometric testing, must administer the

hearing test. They must:

(a) record the hearing tests in a manner required by the regulations,
(b) advise the workers of their test results,
(c) counsel the workers on the use and maintenance of hearing protection,
(d) on request, provide a copy of the test results to the workers.

The employer must keep copies of the initial and annual hearing test results for each required employee. These will be housed within the Human Resources Department. Records will be kept for life. All hearing tests must be treated as confidential.

The success of the Hearing Conservation Program, with regard to each individual employee, is evaluated by comparing annual audiograms to the baseline audiogram. Audiogram review is performed by an audiologist/certified tester, and recommendations regarding the audiometric results are followed. This procedure, among others, helps to determine the effectiveness of the hearing protection program, and, therefore, ensures the protection of employees' hearing. The audiologist/certified tester will determine when to refer employees for further testing and consultation, including hearing conservation case history information.

**The standard threshold shift (STS)** is defined as the least amount of threshold change that is considered significant. For the purposes of UPEI's Hearing Conservation Program, a change in threshold of 15 dB or more in either ear, at one of more of the following frequencies, is considered to be a significant standard threshold shift: 3000Hz/4000Hz and/or 6000Hz. If this STS is met or exceeded then further testing/consultation will be required.

## 9. ANNUAL PROGRAM REVIEW

To ensure that the Hearing Conservation Program is effective in reducing workplace induced hearing loss, the program must be reviewed yearly. This review must focus on the selection and use of hearing protection by workers. For example, is the hearing protection comfortable, is it easy to maintain, and does it make communication difficult?

The review must also cover issues such as technological advances that resulted in quieter machines being available, adequate maintenance of equipment, and changes in the workplace such as new processes or machines that have changed the noise levels.

The education and training elements must also be reviewed to determine if workers understand the risks to their hearing posed by noisy environments. They must also be using and maintaining hearing protection correctly.

Lastly, the program must also review the hearing testing information which will indicate whether noise-related hearing loss is still occurring. Based on NIOSH recommendations, 5% or less of employees are allowed to experience a change before further review of the program is required. If more than 5% of the employees present with a change that could be due to noise then a more in- depth review would be required to determine why. An audiologist or trained consultant will likely be involved with this review.

The annual review must involve participation from the Health and Safety Advisor and an individual from Facilities Management who is involved with the noise testing. The review may also involve an audiologist or consultant. The review will be communicated to the UPEI Health and Safety Steering Committee and appropriate local health and safety committees.

## 10. REFERENCES/LINKS

- PEI Occupational Health and Safety Act and Regulations (www.wcb.pe.ca)

- Centers for Disease Control and Prevention Office of Health and Safety Hearing Conservation Program (http://cardaccessgsa.com/hearing.htm)

- National Institute for Occupational Safety and Health (NIOSH): Preventing Occupational Hearing Loss - A Practical Guide (http://www.cdc.gov/niosh/docs/96-110/)

- University of Victoria, Hearing Conservation Program (http://ohs.uvic.ca/occupational_health/hearing_manual.pdf)

- Canadian Standards Association (CSA), Procedures for the Measurement of Occupational Noise Exposure, CAN/CSA-Z107.56-06 (www.csa.ca)

- American National Standards Institute (ANSI), related to noise: http://asastore.aip.org/shop.do?cID=10

## APPENDIX A – DEFINITIONS

**Action Level:** an 8-hour time weighted average (TWA) of 85 decibels measured on the A-weighted scale, slow response, or equivalently a dose of 50%. This is the level of sound exposure at which employee participation in UPEI's Hearing Conservation Program is mandatory.

**Audiometric test**: is a hearing test to determine the extent of any existing hearing loss and to monitor for ongoing changes in hearing ability.

**A-weighted Sound Level (dBA):** the weighting of sound levels that represents the function of the human ear. Decibels of noise, measured with an A-weighted filter

**daily exposure**: the amount of noise, stated in dBA Leq, to which a worker is exposed during the workday

**decibel (dB):** unit of measure of sound level.

**dBA Leq (Equivalent Continuous Level):** when a noise varies over time, the Leq is the equivalent continuous sound which would contain the same sound energy as the time varying sound. the level of a worker's total exposure to noise in dBA when the hours worked are more or less than the standard 8 hour day. The Leq average is adjusted to an equivalent 8 hour exposure.

**3 dBA exchange rate**: means that when the sound energy doubles, the decibel (dB) level increases by 3

**Dosimeter:** a personnel-worn device that measures sound exposure at the ear level of the employee. This is good for employees whose job noise changes significantly during the shift.

**Hearing Conservation Program (HCP):** a formal program that consists of several components intended to prevent worker hearing loss. An HCP must include noise evaluations, hearing testing, etc.

**Hearing protector**: is a device that is worn to reduce the effect of noise on the auditory system.

**Monitoring**: the sampling of noise levels using a sound level meter, octave band analyzer, or personal noise dosimeter.

**noise**: sound energy in the workplace

**noise survey:** conducted using a sound level meter (SLM). Noise levels are measured throughout a workplace and recorded on a floor plan or in a table/form. Noise levels above 85 dB often require further investigation.

**Noise Reduction Rating (NRR):** the theoretical maximum amount of noise reduction that can be achieved using a hearing protection device.

**Permissible Noise Exposure**: the maximum daily noise exposure which may be experience by employees not using hearing protectors from a continuous 8-hour exposure to a sound level of 90 dBA or equivalent dose of 100%

**Standard threshold shift (STS)** is defined as the least amount of threshold change that is considered significant, relative to the most recent audiogram for that employee.

**Time Weighted Average (TWA):** The noise level, in dB, based on an 8-hour exposure time frame. If the noise is not constant over an 8-hour exposure, then a calculated 8-hour TWA must be made.

**APPENDIX B - PEI OH&S REGULATIONS (www.wcb.pe.ca)**

PART 8 – NOISE

**8.1.** (1) In this Part,

(a) "noise exposure limit" means a noise exposure limit established under section 8.3;

(b) "practicable" means that which is reasonably capable of being done.

(2) Noise terminology and measurements used or described in this Part have the same meaning that they have in:

(a) CSA Standard Z107.56-06, Procedures for the Measurement of Occupational Noise Exposure, as amended from time to time; and

(b) ANSI Standard S1.25-1991, Specification for Personal Noise Dosimeters, as amended from time to time. (EC180/87; 652/07)

**8.2** An employer shall ensure that practicable means are used to reduce the noise to which workers are exposed in areas at the workplace where workers may be present. (EC180/87; 652/07)

**8.3** An employer shall ensure that a worker's noise exposure does not exceed any of the following noise exposure limits:

| **Exposure level (dBA)** | **Exposure duration** |
|---|---|
| 80 | 24 hours |
| 82 | 16 hours |
| 85 | 8 hours |
| 88 | 4 hours |
| 91 | 2 hours |
| 94 | 1 hour |
| 97 | 30 minutes |
| 100 | 15 minutes |
| 103 | 7.50 minutes |
| 106 | 3.75 minutes |
| 109 | 1.88 minutes |
| 112 | 0.94 minutes |
| 115 and greater | 0 minutes |

**8.4** (1) Unless otherwise provided in this Part, where:

(a) a worker of an employer is exposed to noise at the workplace of the employer in excess of any noise exposure limit; or

(b) an employer or worker of an employer has reason to believe that a worker of the employer may be exposed to noise at the workplace of the employer in excess of any noise exposure limit, the employer shall cause the noise exposure of a worker at the workplace to be measured without delay.

(2) Where, in accordance with subsection (1), an employer causes a noise exposure measurement to be made at a workplace of the employer, the employer shall cause the measurement to be repeated without delay after a change in equipment or process affects

the exposure level, or the exposure duration, at the workplace.

(3) Where, in accordance with subsection (1) or (2), an employer causes a noise exposure measurement to be made at a workplace of the employer, the employer shall ensure that:

(a) the noise exposure measurement is performed in accordance with *CSA Standard Z107.56-06, Procedures for the Measurement of Occupational Noise Exposure*, as amended from time to time; and

(b) the noise dosimeters and sound level meters used in the noise exposure measurement meet the requirements of *ANSI Standard S1.25-1991, Specification for Personal Noise Dosimeters*, as amended from time to time.

(4) The employer shall as soon as possible after a noise exposure measurement is conducted at a workplace of the employer inform affected workers of

(a) the results of the noise exposure measurement; and

(b) the significance of the results in terms of their risk of hearing loss at the workplace. (EC180/87; 652/07)

**8.5** Notwithstanding anything to the contrary in section 8.4, an employer is not required to measure the noise exposure of a worker of the employer at the workplace of the employer, if the employer can reasonably determine, without a noise exposure measurement, that the worker is exposed to noise at the workplace in excess of any noise exposure limit. (EC652/07)

**8.6** Where a worker of an employer is exposed to noise in the workplace in excess of any noise exposure limit, the employer shall:

(a) investigate options for engineered noise control; and

(b) if practicable, implement one or more of those options to reduce noise exposure of workers to or below the noise exposure limit. (EC652/07)

**8.7** (1) If it is not practicable for an employer to reduce the noise exposure of a worker of the employer at the workplace to or below any noise exposure limit, the employer shall

(a) reduce the noise exposure of the worker to the lowest level practicable;

(b) establish a noise control and hearing conservation program that complies with the requirements of Section 8.8;

(c) post warning signs in the noise hazard areas;

(d) give to affected workers hearing protection that meets the requirements of *CSA Standard Z94.2-02, Hearing Protection Devices – Performance, Selection, Care, and Use*, as amended from time to time, provide training to the affected workers in the use and care of the hearing protection and maintain the hearing protection so that it continues to meet those requirements; and

(e) ensure that hearing protection required by clause (d), is worn properly by workers of the employer in noise hazard areas.

(2) Every worker in a posted noise hazard area shall wear hearing protection. (EC652/07)

**8.8** A noise control and hearing conservation program required under subsection 8.7 (1) shall include provisions on:

(a) noise measurement;

(b) education and training;

(c) engineered noise control;
(d) hearing protection;
(e) posting of noise hazard areas;
(f) hearing tests; and
(g) annual program review. (EC652/07)

**8.9** (1) An employer shall ensure that workers of the employer who are exposed to noise in the workplace that exceeds a noise exposure limit are given:

(a) an initial hearing test without delay after employment starts, but not later than 6 months after the start of employment; and

(b) a hearing test at least once every 12 months after the initial test if the worker continues to be employed with the employer.

(2) An employer shall ensure that hearing tests required under subsection (1) shall be administered by:

(a) an audiologist or;

(b) a person who is certified to conduct audiometric testing.

(3) The employer shall be responsible for paying for hearing tests administered under this section. (EC652/07)

**8.10** The employer shall keep records of:

(a) the initial and annual hearing test results for each worker, which shall:

(i) be kept as long as the worker is employed by the employer, and

(ii) be kept confidential and not released to anyone without the written permission of the worker, or as otherwise required by law.

(b) the education and training provided to workers and;

(c) the results of noise exposure measurements taken under Section 8.4. (EC652/07)

**Reference: CHAPTER O-1.1 OCCUPATIONAL HEALTH AND SAFETY ACT GENERAL REGULATIONS**

Pursuant to Section 34 of the *Occupational Health and Safety Act,* R.S.P.E.I. 1988, Cap. O-1.1, Council made the following regulations: Updated 2008

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**APPENDIX C**
**NOISE DOSIMETRY**
**DATA SHEET**

Monitoring Conducted by: _____ Date: _____

Job Title: _____

Observer (for area monitoring): _____ Job Title: _____

Dosimeter Manufacturer: _____ Model & Serial #: _____

Work Location Description:

_____

_____

Threshold: 75 dBA Criterion Level: 85 dBA Exchange Rate: 3 dBA

Microphone Location: _____

Monitoring Conducted: ❑ Personal ❑Area

If Personal monitoring, name & title of person: _____

Are Hearing Protectors Used? ❑Yes ❑No
If yes, what percent of the workday? _____ %

**Exposure Description**

_____

_____

_____

**Calibration Check**

| Date | Time | Initial Reading | Time | Final Reading |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| Calibrator: _____ @ _____ Hz @ _____dBA<br>Serial #: _____ | | | | |

## Dosimetry Data

| Date | 115 dBA Exceeded | Start Time | Stop Time | Display Reading (%) | Leq (t) |
|---|---|---|---|---|---|
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**Noise Dosimetry Additional Information:**

1. Reason for monitoring?

   Please circle:

   a. Random selection in area above the action level.
   b. Because of mobility or intermittent exposure.
   c. Has experienced temporary threshold shift (TTS).
   d. Other explanation:

   _____

2. Indicate the degree of reliability in the data collection.

   Circle one: Very Unreliable.....Very Reliable

   1 2 3 4 5 6 7 8 9 10

3. Were there any adverse environmental conditions that might have affected the readings during the wearing period? If yes, explain:

_____
_____

4. Do you suspect any tampering with the dosimeter during the time period it was worn?

_____
_____

5. Does this individual currently use any type of hearing protection device? ☐ Yes ☐ No
If yes, what is the type, manufacturer and Noise Reduction Rating (NRR)?

_____
_____
_____

6. Calculate the attenuation using NRR.

_____
_____
_____

7. Other Comments:

_____
_____
_____
_____

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**APPENDIX D**
**AREA NOISE SURVEY DATA FORM**
**Sound Level/Octave Band Data**

Monitoring conducted by: _____ Date: _____

Observer: _____ Job Title: _____

Location: _____

☐ Sketch the noise sources and room layout on the back of this sheet.

Manufacturer: _____ Model/Serial #: _____

Threshold: 75 dBA Criterion Level: 85 dBA Exchange Rate: 3 dBA

Are Hearing Protectors Used? ❑Yes ❑No

If yes, what percent of the workday? _____ %

**Calibration Checks**

| Date/Time | Frequency (Hz) | Initial Setting | Date/Time | Frequency (Hz) | Final Setting |
|---|---|---|---|---|---|
| | **125** | | | | **125** |
| | **250** | | | | **250** |
| | **500** | | | | **500** |
| | **1000** | | | | **1000** |
| | **2000** | | | | **2000** |
| **Calibrator type:** _____ **Serial #:** _____ | | | | | |

## Testing Results

| Sample Location | Result | Sample Location | Result |
|---|---|---|---|
| | dBA | | dBA |
| | dBA | | dBA |
| | dBA | | dBA |
| | dBA | | dBA |
| | dBA | | dBA |
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| | dBA | | dBA |
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Comments:

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