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Douglas County Safety
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DOUGLAS COUNTY

Noise Exposure and Hearing Conservation Policy

PURPOSE

Douglas County has adopted its Noise and Hearing Conservation Policy and Procedures to protect its work force from hearing loss and ensure compliance with the OSHA Noise regulations. The regulations require that each employer implement a hearing conservation program if employees noise exposure levels exceed 85 decibels for an average of 8 hours.

APPLICABLE LEGAL STANDARD

OAR 437 Division 2 Subdivision >G=. "Occupational noise exposure" 1910.95 and OAR 437 Division 2 Subdivision 'I'.

DEFINITIONS

Permissible Noise Exposure: There are actually two exposure levels that if exceeded required specific compliance activities.

- A Permissible Noise Exposure: eight hour time-weighted average level of 90 decibels on the A scale or a dose of 100%.
- B Action Level is an eight hour time-weighted average of 85 decibels on the A scale or a dose of 50%.

Representative Noise Exposure: Measurements of an employee=s noise dose or 8 hour time-weighted average sound level that the employers deem to be representative of the exposures of other employees in the workplace.

Sound measurements as taken by:

- A Noise dosimeter: An instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicate a noise dose.
- B Sound level meter: An instrument for the measurement of sound level.

Time-weighted average sound level: That sound level, which if constant over an 8-hour exposure, would result in the same noise dose as is measured.

GENERAL RESPONSIBILITIES & TRAINING

1. **Management** is responsible to see that noise controls are implemented and maintained and that all employees at noise exposures in excess of 85 dBA time-weighted average are part of an effect hearing conservation program. This includes auditing the on-going program and training employees in the hazards of noise and required controls.
2. **Supervisors** are responsible for maintenance of records, employee training and auditing the overall program.
3. **Human Resources** is responsible to maintain employee medical records and all past employee records per the OSHA standard.
4. **All Employees whose noise exposures exceed a time-weighted average of 85 dBA or greater** are responsible to wear appropriate hearing protection, take an active part in the annual training and take annual hearing tests.

NOTE: APPENDIX A PROVIDES THE NOISE SURVEY AND LISTING OF THE JOBS INCLUDED IN THIS PROGRAM.

PROCEDURES

A. Noise Surveys

1. Noise surveys are required to be done on work operations that have potentially high noise levels (85 dBA and above).
 - a. The noise measurements will be retained by the Section Managers or designees and will be part of this overall noise data maintained at each location.
 - b. Additional noise surveys will be taken when the Department introduces additional equipment or processes which could result in higher noise levels and periodically to re-verify the results.
 - c. Assistance with noise monitoring can be obtained from the Risk Manager through outside consultants.
2. The noise survey measurements are recorded on the employees hearing test records or reference the current noise exposure levels. The noise surveys are available for review by the employees by contacting their supervisor.
3. Each employee exposed to noise at or above the 85 dBA average is to be informed of the results. This will be done by posting the data and including the information at the employee initial and annual employee noise training classes.

B. Hearing Protection

1. Hearing protection is required to be worn during the operation of equipment or processes that exceed 85 dBA noise levels as a time weighted average exposure.
 - a. The hearing protection (ear barrier plugs and foam plugs) are available in variety of locations at Department facilities which will be pointed out to each new employee during their initial safety orientation.
- b. EMPLOYEES REQUIRED TO WEAR HEARING PROTECTION WHEN EXPOSED TO NOISE LEVELS ABOVE 85 dBA.**
2. Employees will be trained in how to properly fit the hearing protectors by their supervisor with assistance from the County Safety Manager or outside safety/health consultants. If anyone has problems with the devices please contact your supervisor.
3. Employees will be provided with at least two styles of protection - plugs or inserts to try on determining which device would be best for them. All the devices provided will be evaluated to determine that they provided adequate noise attenuation for the noise exposures levels.
4. Each employee will be responsible for the maintenance of his/her assigned hearing protection devices.
 - a. Disposable plugs will be discarded at end of shift or when they become excessively soiled.
 - b. Inserts or barriers will be checked prior to each use for any defectives. If barriers are used the head band needs to be checked to ensure that it is tight and the insert are not torn, disfigured or do not properly seal.

ALL DEFECTIVE EQUIPMENT MUST BE REPLACED.

- c. Follow manufacturer's recommendations on maintenance.

C. Audiometric (Hearing) Testing

1. New employees assigned to a noise area will be given an baseline hearing test and then will be tested annually thereafter. The Hearing Test will be given by an outside provider who has certified audiometric technicians.
 - a. Baseline or initial test will be given to new employees at the time of hire.
 - b. The baseline tests require that the employee not be in occupational noise area for 14 hours prior to the test. This test will be the reference for the further tests to determine if hearing levels change.
2. Annual hearing test can be taken any time during a work shift. These results will be compared with

the baseline tests.

- a. Annual audiograms will be given by the outside provider who has certified audiometric technicians.
- b. Significant threshold shift (STS) criterion: The hearing loss criterion is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 hertz (Hz) in either ear.

Oregon, does not permit age as a factor in hearing loss as does Federal OSHA.

The employee may be retested within 30 days and consider the results of the retest to determine if a permanent shift has occurred.

- c. Employees will be informed if their tests show significant changes in their hearing levels based on Oregon OSHA standards by written letter and follow-up by the Supervisor and/or the employees supervisor once notified of that change by our contract audiologists. The employee will be notified within 21 days of receipt of the information from Industrial Hearing Service.
 - d. In all cases of hearing loss the employee will be re-instructed on how to properly wear hearing protection. The supervisor will follow-up on all hearing tests that show a reduction in the employees hearing from the baseline.
3. Our contractor audiologist will determine if additional tests are needed and the status of the employee's hearing.

D. Employee Training

1. New employee will receive Hearing Conservation training at initial assignment to a noise area. The training will be repeated annually for all noise exposed employees. The specific training materials are provided in this manual and are to be a guideline for our supervisors and/or safety representatives to use.
2. A copy of the training materials will be available to our employees by contacting his/her supervisor.
3. A copy of the Oregon OSHA Noise & Hearing Conservation Rules are posted on the safety bulletin at each of our locations where employees are potentially exposed to hazardous noise levels.

E. Noise Engineering Controls

1. Management is responsible to determine if there are feasible engineering controls that could reduce noise levels to below 90 dBA as a time-weighted 8 hour average.
2. **Engineering Control Feasibility Studies:** In some cases there may be records of noise control studies done on pieces of equipment or processes. These records should be kept to show compliance with Oregon OSHA noise engineering control standard. The records should be maintained for the duration the equipment or process is in use.

F. Recordkeeping

Records must be maintained for the various elements of the program. This includes the following requirements:

1. Noise Exposure Measurement:

Time Frame: Current plus 2 years of results (note: the current record may represent measurements taken longer than 2 years ago, this is permitted long as the readings are reflective of noise exposure levels).

2. Audiogram records:

Time Frame: Duration of employment plus 5 years

3. Training Records

Time Frame: There is no time frame given in the rules but it is the policy to keep the training records for each employee the duration of employment and then forward all records to the Human Resources Section.

4. OSHA 300 Log Record

1. If an employee's hearing shift is permanent it must be recorded on the employer's OSHA 300 log.

2. Employee must be informed in writing within 21 days of the determination of permanent hearing shift.
3. Record Keeper: Human Resources and each Department has staff assigned responsibility for OSHA 300 Injury and Illness Log for each Department.

SUMMARY OF THE OSHA NOISE STANDARD

Oregon OSHA standards for Occupational Noise and Exposure requires that employers develop and implement a Hearing Conservation program where noise levels exceed an eight hour time weighted average (TWA) of 85 dBA or the equivalent of a 50% exposure dose. The rules also require that feasible engineering controls be implemented to reduce employee noise exposures to below 90 dBA as an eight hour average or the equivalent of a 100% exposure dose. The following provides an outline of the specific rule requirements. This should be reviewed by employees providing training or managing the hearing conservation program.

A. Hearing Conservation Program Elements:

1. Noise Exposure Monitoring: Employers are to monitor the noise levels in their operations and identify those employees whose exposures exceed the 85 dBA average. This can be done by noise survey and/or noise dosimetry. The overall monitoring goal is to ensure that all potentially overexposed employees are identified and the basic noise levels are determined for the proper selection of hearing protection.

a. Accuracy of the measurements: The monitoring is required to meet a " 2 decibels accuracy specifications. Noise equipment needs to be pre and post calibrated to verify that the readings are accurate.

b. Employee notification: Each employee exposed at or above the 85 dBA average is to be informed of the results. This can be done by posting the data and including the information in your initial and annual employee noise training.

c. Noise measurement record retention: At a minimum we are required to retain the noise measurement records for 2 years or for as long as they are representative of the noise exposure levels.

2. Audiometric Employee Testing Program: Employers are required to provide initial baseline test for all employees assigned to work in a noise area (85 dBA for eight hours). This test is required to be provided within 180 days of assignment to noise area. Then annual hearing test must be given which are compared to the baseline. Specific rules on who can give the tests and comparison data are found in the regulations and need to be carefully followed.

3. Hearing Protectors: Employers are to make available hearing protectors for employees exposed to noise at 85 dBA for an average over 8 hours. If the persons shows a hearing loss and the noise exposure is between 85 and 90 the protection must be mandatory worn. If the noise levels are above an average 90 dBA protection is always mandatory. It is a good practice to require hearing protection to be worn when noise levels are above 85 dBA.

a. Employees are required to be trained on how to wear hearing protective devices.

b. Employees are to be given an opportunity to select their hearing protectors from a variety of suitable devices. OSHA views this as at least two types of protective devices.

c. Employees need to be given initial fitting and supervised on the correct use of hearing protection.

d. The protectors must attenuate the noise level to below 85 dB or lower. This calculation is based on the Noise Reduction Rating (NRR) found on the packaging of the protectors, then subtracting at least 7 dB and comparing that number to the average noise level found.

(See rule 437-121-110(B))

An example is the noise level average of 95 dBA exposure:

95 - 85 = 10 minimum required noise reduction.

If the NRR for the hearing protection is 27 then the OSHA accepted protection would be:

27 - 7 = 20 dB, thus this be adequate hearing protection if worn properly. (95 - 20 = 75 dB)

4. Training program: Each employer is required to institute a training program for all employees who are exposed to noise at or above a TWA of 85 dB, and shall ensure employee participation in such program.

Training is required as an initial orientation and annually thereafter. The information provided is to be updated to be consistent with changes in the protective equipment and work processes. The elements of the training program include:

- a. The effects of noise on hearing.
- b. The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use and care.
- c. The purpose of hearing tests and the testing procedures.

5. Access to Information, Training Materials and Recordkeeping:

a. The employer is to make available copies of the noise standard and post a copy in the workplace.

b. All training materials are to be available to OSHA representative upon request.

c. Records are to be kept of the noise exposure measurements, training program, and audiogram.

The hearing tests are to be retained for the duration of the affected employee's employment plus five years. Exposure records are to be kept for 2 years and current exposure records are to always be available.

B. Noise Administrative and Engineering Controls (Rule 437-002-1910.95):

The standard requires that feasible administrative or engineering controls be implemented to reduce noise exposure to below a time-weighted average of 90 dBA.

1. Administrative controls involve the control of the employee's noise exposure time by job rotation in an area that has noise levels below 90 dBA. An example would be an employee who works in an area with an average of 95 dBA. If the employee worked in this area for 4 hours or less and then in an area below 90 dBA his/her noise exposure average would be below an average 90 dBA.

This type of control can be difficult to manage and often does not match with an employer's operation dealing with different levels of job skill and training. The use of administrative controls does involve close monitoring of employee work schedule and on-going noise monitoring to ensure that the rotation positions do not have noise levels over 90 dBA.

2. Engineering Controls - Noise controls usually involves three elements:

1. A source of noise.
2. A receiver of noise - one or more observation points at which noise might affect the employees in the noise path.
3. The various paths noise can travel between the source and the receiver.

If a given noise emission cannot be reduced at the source, noise control engineering entails the inhibiting the propagation of sound between source and receiver. This can involve enclosures of the source path or sound enclosure for the operator and other engineering changes.

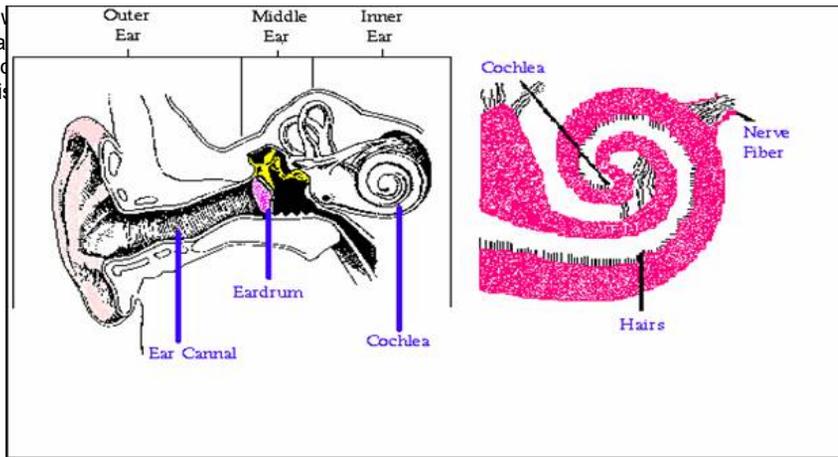
EMPLOYEE TRAINING NOISE EXPOSURE PROTECTION, HEALTH EFFECTS & HEARING TESTING

REQUIRED HEARING PROTECTION AREAS or EQUIPMENT

Hearing protection is required when an employee's eight hour average noise exposure exceeds OSHA's permitted exposure of 85 decibels or a noise dose of 50% as measured by a noise dosimeter. Douglas County employee noise exposure levels have been measured are based on the exposure during the use of equipment or processes.

HOW WE HEAR

Sound then travels through the ear (cochlea) and sound is



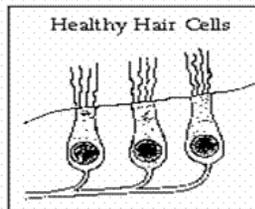
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EFFECTS OF NOISE ON HEARING

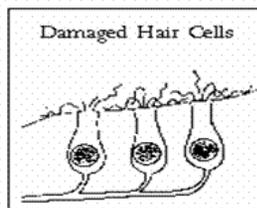
Prolonged exposure to excessive noise levels can cause a noise-induced hearing loss. When you are exposed to excessive noise levels, the first effect usually is a temporary hearing loss. You may have difficulty in hearing conversation or your ears may feel "plugged" and "ring." Over a period of time, an individual who experiences repeated temporary hearing loss will have some permanent, irreversible hearing loss.

Noise-induced hearing loss (or acoustic trauma) involves damage to the receptor cells in the inner ear and is classified as sensor-neural impairment (see Figure 2). A noise-induced hearing loss typically begins with a drop in hearing level at the higher frequencies of 3000 hertz (Hz), 4000 Hz, and 6000 Hz. As the hearing loss progresses, it can affect lower frequencies down to 2000 Hz.

Early noise-induced hearing loss is significant



the



HEARING PROTECTORS

There are three types of ear protectors: a muff which covers the entire ear, a plug which is inserted into the ear canal, and a stopper which covers the outer end of the ear canal. All three types are designed to reduce the amount of noise reaching the inner ear.

TYPE	ADVANTAGES	DISADVANTAGES
Muffs	Easy to fit in place and take on and off Easy for management to	Causes pressure on the head May not have a good

	monitor their use	seal with glasses or long hair
	Do not irritate the ear canal	Are hot to wear in the summer
Inserts & Foam Plugs	Inexpensive	Difficulty in fitting (must fit tightly to be effective)
	More readily accepted by workers	Tend to loosen with jaw movement
		Can irritate the ear canal
Stoppers	Easy and quick to fit in place	Cause pressure on the ear and may have low Level protection

SELECTION OF EAR PROTECTORS

The reduction of noise by hearing protectors is called attenuation. This is expressed in decibels. The manufacturer of each hearing protector will indicate the amount of attenuation for each type of protector. It will be listed on the package as the Noise Reduction Rating (NRR). The noise reduction levels needed for our employee exposures vary but in general require 20 to 30 dB attenuation level.

We have selected hearing protectors which are convenient and comfortable, and provide the proper amount of protection for the noise encountered. Under attenuating would lead to excessive noise exposure. Over attenuating in moderate noise levels can lead to excessive sound attenuation reducing the ability to hear and, consequently, poor acceptance of the protectors.

FITTING

Earplugs must fit tightly to provide a good seal. The earplug is inserted by grasping the ear with the opposite hand, pulling it up and out to open the ear canal, and then inserting the plug with the other hand.

Muffs will normally fit all people without any difficulty. Eyeglasses may interfere with the proper fitting of the muff. Muffs that attach directly to hard hats are also available.

Ear stoppers are usually easy to position. The headband can be worn on top of or behind the head, or under the chin.

When hearing protectors are initially worn, it may take a short time to adjust to the new sounds. The same noises are heard, but at a much lower level. After this adjustment period, voices, machinery noises, etc., can still be heard and understood the same as before, if not better.

CARE AND USE OF EAR PROTECTORS

The primary type of hearing protectors we use are disposable, however, they can be reused especially during the day as long as they are clean. If oil, dirt or other materials are embedded into the foam then it must be discarded.

Ear protectors must be maintained in sanitary condition. It is important that earplugs be clean when inserted into the ears. If plugs are dirty when inserted, they may cause irritation which could lead to infection of the ear canal. The same applies to stoppers.

Earplugs, when not in use, should be stored in some type of container which can be closed to seal out dust or dirt. Earplugs should be replaced when they no longer can be cleaned or lose their pliability. Ear muffs have a replaceable seal which should be kept clean. The seal should be replaced whenever it becomes stiff or cracked.

AUDIOMETRIC TESTING

Audiometric testing is a means of determining your hearing ability. "Normal" hearing is the median hearing level of a large group of American adults between 18 and 25 years of age, having no known history of ear disease and no appreciable high-level noise exposure. The accepted normal range of hearing is between 0 and 25 decibels.

The audiometric test consists of exposing each ear separately to sound at six different frequencies. The audiometric test will show the amount of hearing loss, if any, of an individual. The higher the decibel reading, the greater the hearing loss. As an individual ages, there is a natural hearing loss which takes place. This is called presbycusis. A cold, an ear infection, or recent high noise exposure can cause a temporary hearing loss which would produce poor test results.

The following issues were reviewed with the employee regarding noise exposure in their work area.

- Overexposure to noise can cause noise-induced hearing loss which and can be permanent.
- Noise damage is to the inner ear nerve cells.
- Hearing protection is required to protect your hearing.
- Loss due to noise is cumulative including on and off the job exposure
- Loss is not evident to you during the early states of hearing damage
- A person generally hears better in a noisy environment with hearing protection
- Noise exposure increases general fatigue and in some cases blood pressure during the noise exposure.

SUPERVISOR WHO REVIEWED THIS MATERIAL NAME

DATE

EMPLOYEE SIGNATURE

DATE

EMPLOYEE HEARING CONSERVATION & NOISE TEST

Employees Name: _____ Date: _____

Initial Training _____ Annual Refresher _____

True False QUESTIONS

- 1. Hearing protection is only required for the Finishers.
- 2. OSHA requires that hearing protection be worn when employees noise exposure exceeds 85 dBA for an eight hour average.
- 3. Best way to determine noise exposure level is to measure the levels using a noise dosimeter (meter that integrates the noise levels).
- 4. We hear when sound waves enter the ear and are transmitted through the middle ear into the inner ear which transfers the noise as an electrical signal to our brain that interprets the sound.
- 5. Prolonged exposure to excessive noise levels can cause a noise induced hearing loss.
- 6. When you are exposed to excessive noise levels, the first effect usually is a temporary hearing loss.
- 7. Noise-induced hearing loss involves damage to the inner ear.
- 8. Early noise-induced hearing loss normally is not detected by an individual, since it occurs above the speech range. By the time an individual is aware of a hearing loss, the amount of loss may be significant.
- 9. Muffs provide the highest level of protection as compared to foam plugs.
- 10. There are not disadvantage in using foam plugs.
- 11. The reduction of noise by hearing protectors is called attenuation.
- 12. Douglas County has selected hearing protectors which are convenient and comfortable, and provide the proper amount of protection for the noise encountered.
- 13. Earplugs including foam plugs must fit tightly to provide a good seal.
- 14. The reason we are generally not using earmuffs is because safety glasses interfere with the proper fitting of the muff over the ear.
- 15. When hearing protectors are initially worn, it may take a short time to adjust to the new sounds.
- 16. The primary type of hearing protectors we use are disposable, however they can be reused

especially during the day as long as they are clean.

- ___ ___ 17. Audiometric testing can protect your hearing.
- ___ ___ 18. Audiometric testing is a means of determining your hearing ability.
- ___ ___ 19. The accepted normal range of hearing is between 0 and 25 decibels.
- ___ ___ 20. The audiometric test will show the amount of hearing loss. The higher the decibel reading, the greater the hearing loss.

NOISE COMPLIANCE CHECKLIST

The following checklist can be used of management and safety committee members when conducting an overall audit on our noise and hearing conservation program.

Any areas not in compliance should be explained on the back of the checklist. Recommendations for corrections should also be made.

ISSUE	COMPLIANCE
A. Noise Exposure Monitoring	
	(Y - N)
1. Current noise exposure levels are available for all work positions that may be over 85 dBA as an 8 hour time weighted average.	_____
2. The noise readings were done with a calibrated instrument	_____
3. Noise measurement are retained and would be available to employees and OSHA inspectors.	_____
4. The noise readings are noted on employee audiogram record.	_____
5. Employees are notified of the noise exposure level results	_____
6. Employee representatives were allowed to observe noise exposure monitoring procedures.	_____
B. Noise Control Measures & Hearing Protection	
1. All feasible noise controls have been implemented for employees whose noise exposures exceed 90 dBA.	_____
2. Records of noise control measures are maintained and would be available for an OSHA inspector.	_____
3. All employees whose noise exposure exceeds 90 dBA or 85 dBA with hearing loss are wearing hearing protection.	_____
4. Employees were trained and fitted in hearing protectors.	_____
5. Employees were offered a variety of suitable protections to choose from	_____
6. Hearing protection attenuation was calculated and provides adequate protection for employee=s noise exposure (at least to less than 85 dBA TWA).	_____
7. Employees are wearing protection per manufacturer=s requirements.	_____

ISSUE	COMPLIANCE
C. Hearing Conservation Program	
	(Y - N)
1. All employees whose exposure exceeds 85 dBA TWA are part of the Hearing Conservation Program. (Includes hearing tests, noise protection, and annual employee training)	_____
2. Only audiometric technicians or audiologists, or physicians meeting state certification requirements are conducting the hearing tests.	_____
3. Baseline audiograms are obtained within 180 days of assignment to noise areas over 85 dBA.	_____
4. The Baseline audiogram is taken with the employee away from workplace noise for 14 hours.	_____
5. The employees are receiving annual audiograms which are compared to the baseline audiogram.	_____
6. The audiograms are taken with audiometers that are properly calibrated:	
A Functional before use test	_____
B Annual calibration	_____
C Exhaustive calibration every 2 years	_____

- 7. All significant threshold shift audiograms are evaluated by an audiologist, otolaryngologist, or a qualified physician. _____
- 8. Recommendations of professional reviewer were implemented _____
- 9. Proper follow-up is done for all employees showing an significant threshold shift:
 - A Employee is notified of the change within 21 calendar days _____
 - B Employee is retrained and refitted in hearing protection _____
 - C Employee is referred for medical attention as necessary _____
 - D The STS is recorded on the OSHA 200 injury/illness log _____

D. Employee Training Program

- 1. All employees with noise exposures equal to or greater than TWA of 85 dBA have received initial and annual noise training. _____
- 2. Training covers the following topics:
 - A Effects of noise on hearing _____
 - B Hearing protectors use, maintenance, advantages/disadvantages _____
 - C Purpose of hearing testing _____

E. Access to Information (Y-N)

- 1. The noise standard is posted and copies are available to employees or their representatives. _____
- 2. Training and educational materials are available to an OSHA inspector _____

F. Recordkeeping

- 1. Noise exposure monitoring records are maintained and available. _____
- 2. Audiometric test record must have following:
 - A Audiogram _____
 - B Name & job classification of the employee _____
 - C Date of audiogram _____
 - D Examiner=s name and certification number _____
 - E Date of last acoustic or exhaustive calibration _____
 - F Employee=s most recent noise exposure assessment _____
- 3. Sound readings as octave band levels in test room are available _____

APPENDIX A - PUBLIC WORKS NOISE SURVEY RESULTS

LOCATION/EQUIPMENT	NOISE LEVEL dBA
Street Maintenance	
Grader - 140 G CAT	84.9
Power Broom - RJ 300	86.9
Dump Truck	87.6
Front End Loader -International 530	85.1
Patching Roller C-33	95
Road/Vegation Clearing	
Chipper	111

Landfill

Cat D7H Open Cab	100.6
Grinder Chipper	88
Compacter Cat 826C	83.7

Note: All measurements were taken using a Metrosonic Noise Meter/Dosimeter as short term exposures to provide initial noise survey.

To submit comments or suggestions
please email the [Human Resources](#) department.

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