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Assessing the Occupational Nosie Exposure of Bartenders

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Assessing the Occupational Noise Exposure of Bartenders

by

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Dedication

This thesis is dedicated to my late father, Allan John Woltman. Thank you for supporting my decision to further my education. Look how far I've come! I miss you everyday. I love you.

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I would like to take the opportunity to first thank my thesis advisor, Dr. Steven Mlynarek, for guiding me through this process and also being a confidant and father figure to me during my time at University of South Florida. I would also like to recognize Dr.'s Thomas Bernard, Yehia Hammad, Rene Salazar, and John Smyth for providing me with an amazing education and preparing me to become an industrial hygienist. I would also like to thank CDC/NIOSH (T42-008438) for providing the funding for my education at USF. Lastly, and most importantly, I would like to thank my mother, Wendy Woltman, and my brother, Andrew Woltman for always being proud of me. I love you both.

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List of Abbreviations & Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
dBA	Decibels, A-weighting
NIHL	Noise-Induced Hearing Loss
NIOSH	National Institutes for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
SLM	Sound Level Meter
TLV	Threshold Limit Value
TTS	Temporary Threshold Shift
TWA	Time Weighted Average

Abstract

The Occupational Safety and Health Administration estimates that each year, approximately 30 million people are occupationally exposed to hazardous noise. While many are aware of the noise exposure associated with industrial occupations, there has been little research conducted on bartenders who often work in environments that have high levels of noise. The majority of current published research on occupational noise exposure of bartenders has only evaluated noise levels on one night of business. Bartenders often work multiple days per week, which vary in the amount of patrons and entertainment provided, this variation in business leads to variation in the amount of noise to which they are exposed.

The purpose of this research study was to gather occupational noise exposure data for bartenders during a workweek at a Tampa Bay bar establishment that hosts live music on weekends. Personal noise dosimeters were used to collect personal noise exposure data. Area noise level data were collected using a sound level meter. While several bar establishments were approached, one bar establishment part pated as the study site and noise data were collected for seven consecutive days (Thursday-Wednesday). Personal noise exposure data were collected for an entire 8-hour work shift for the Thursday-Sunday portion of the study, and for 6 hours for the Monday-Wednesday portion of the study. Area noise data were collected for the Thursday-Saturday portion of the study.

Results of this study indicate that the highest noise exposure for either bartender occurred on Saturday (Bartender 1: 93.1 dBA; Bartender 2: 83.6 dBA) when a live band was performing

in the establishment. Using the OSHA Hearing Conversation and OSHA PEL measurement methods, Bartender 1 was exposed to excessive noise levels (>85 dBA) on four (4) nights of the study, while Bartender 2 had no exposures over 85 dBA. However, using the ACGIH measurement method, Bartender 1 was exposed to excessive noise levels six (6) nights of the study, while Bartender 2 was exposed to excessive noise levels two (2) nights of the study.

Introduction and Background

Occupational noise exposure is one of the most common occupational hazards present in the workplace (OSHA, 2012). The National Institutes for Occupational Safety and Health (NIOSH) reports that every year, approximately 22 million workers are exposed to hazardous noise levels (NIOSH, 2015). Repeated noise exposures can lead to noise induced hearing loss (NIHL), which according to NIOSH is the third most common occupational illness.

Most are aware of the noise exposure associated with industrial occupations, however noise is present in all occupations. Bartenders often work in environments that have high levels of noise. There has been minimal research conducted on bartender's exposure to noise in their work environment. The majority of current published research on occupational noise exposure of bartenders has only collected noise data on one night of business. Bartenders often work multiple days per week, which vary in the amount of patrons and entertainment provided. Subsequently, this variation in business leads to variations in the level of noise to which they are exposed.

The purpose of this research was to gather occupational noise exposure data for bartenders during a workweek at a bar establishment to determine the excessive noise levels to which they were exposed. A total of four bars were contacted requesting participation in this study. Three of the contacted businesses expressed concern about possible legal consequences associated with collecting the noise data. It was explained that the establishments and their employees would remain anonymous and the data collected would only be used for academic

research purposes. Of those four, one responded and agreed to be apart of this research. Sampling was conducted at one establishment that hosted live and pre-recorded entertainment. One of the conditions agreed upon for this study was that the study site and its employees would remain anonymous.

The study site (referred to as "the establishment") self-identifies as a "dive-bar" that has been in business for over 60 years in the Tampa Bay area. Square footage of the establishment is approximately 1970 ft^2. Total volume of the establishment was estimated to be 29,550 ft^3. The interior of the establishment contains painted plaster walls with tile flooring. The bar is located along the longest wall in the establishment. The establishment contains a total of four speakers. Two speakers are located on the wall behind the bar on each side. The other two speakers are hung from columns located in the main seating area.

The establishment's operating hours at the time of this study were from 11 am to 3 am Monday – Saturday and 12 pm – 3 am on Sunday. The establishment is frequented by a variety of patrons from various backgrounds. The establishment hosts live music approximately 2-3 times per month, usually on Saturday nights. There is also a jukebox located within the establishment that plays a variety of music, with the prevailing genre to be rock and roll, and a game area that contains pinball machines and a foosball table.

The establishment schedules two bartenders to work during evening business hours. One bartender primarily remains behind the bar to serve customers, clean glassware, and stock the bar. The other bartender, in addition to the above duties, moves around the establishment collecting dirty glassware, emptying ashtrays, retrieving items from the stock room, and checking on the condition of the bathrooms. Both bartenders share equal duty in dumping glass recycling into the receptacle as needed during the course of their shift.

The specific objectives of this study were:

1. To collect personal noise exposure data for the bartenders in this establishment for multiple consecutive nights and compare the results to the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) of 90 dBA for an 8-hour TWA, and to the 1983 Hearing Conservation Amendment action limit of 85 dBA for an 8-hour TWA.
2. To collect area noise data at this establishment with recorded and live music playing.
3. To determine sources of peak noise within the establishment.

The University of South Florida's Institutional Review Board (IRB) determined that this study did not require their oversight since there was no intervention with human subjects.

Literature Review

Occupational Noise Exposure and its Affect on Hearing

Simply defined, noise is unwanted sound and is one of the most common occupational hazards in the workplace (OSHA, 2013). Sound is created by the rapid variation of atmospheric pressure caused by a disturbance in the air (OSHA, 2013). Sound transmits in the form of longitudinal waves, involving a succession of positive pressure disturbances (compressions) and negative pressure disturbances (rarefactions) in an elastic medium (ex. air, water, metal) (OSHA, 2013).

The human ear detects the variations in atmospheric pressure and processes the information into what we hear as sound (Suter, 1998). Sound waves enter the outer ear and cause the movement of the tympanic membrane (ear drum) (Suter, 1998). The vibrations from the tympanic membrane then travel to the middle ear where three small bones (malleus, incus, stapes) amplify and transmit the vibrations to the inner ear, which contains the cochlea (Suter, 1998). The cochlea is a small snail-like structure that is filled with fluid and lined with microscopic hairs (OSHA, 2012). These hairs move with the vibrations cause by sound waves and convert the vibrations into nerve impulses, which results in the sound we hear (OSHA, 2012).

Exposure to loud noise can destroy the microscopic hairs in the cochlea and can result in Noise Induced Hearing Loss (NIHL) (Suter, 1998). NIHL is typically considered an occupational disease rather than injury due to its gradual progression (Suter, 1998). In rare

cases, an employee may have immediate, permanent hearing loss from a very loud event, such as an explosion or a very noisy process, like riveting (Suter, 1998). These sudden, loud events are referred to as "impact" or "peak" noise (Suter, 1998). The amount of hearing loss depends on the level of the noise, duration of exposure and the susceptibility of the individual worker (Suter, 1998). Hearing loss from noise typically starts off as temporary. Over the course of a noisy day, the ear becomes fatigued which causes a reduction in hearing known as a temporary threshold shift (TTS) (Suter, 1998). The ear usually recovers from the majority of the TTS in the time between work shifts, however some of the loss remains (Suter, 1998). After repeated exposures (over months and years), the TTS leads to permanent loss and new amounts of TTS begin to build onto the permanent loss (Suter, 1998).

OSHA's 29 CFR 1910.95 Occupational Noise Exposure Standard establishes a Permissible Exposure Limit (PEL) of 90 dBA for an 8-hour TWA (OSHA). OSHA uses the following criteria to assess noise levels for compliance: A-weighting, 90 dBA criteria threshold, 5 dB exchange rate, slow response (OSHA, 2012). OSHA defines exchange rate as, "the increase or decrease in decibels (db) corresponding to twice (or half) the noise dose. For example, when using a 5 dB exchange rate, a dose of 90 dB is twice the dose of 85 dB, assuming that the duration of exposure is the same" (OSHA, 2012). The American Conference of Governmental Industrial Hygienists (ACGIH) recommends a threshold limit value (TLV) for noise exposure of 85 dBA for an 8-hour TWA (ACGIH). ACGIH recommends the following parameters when measuring noise: A-weighting, 80 dBA criteria threshold, 3 dB exchange rate, slow response (ACGIH, 2015). ACGIH recommends the 3 dB exchange rate because it considers it to be the actual representation of exposure conditions (Nims, 1999).

The standard also outlines and defines the requirements of a hearing conservation program, along with requiring an employer to reduce workplace noise levels through the use of engineering and administrative controls (OSHA, 2012). OSHA requires that an employer enact a hearing conversation program when employees noise exposure equal or exceeds the action limit of 85 dBA for an 8-hour TWA using the following measurement criteria: A-weighting, 80 dBA criteria threshold, 5 dB exchange rate, slow response (OSHA, 2012). OSHA requires that a workplace hearing conservation program must include a noise-monitoring program; annual audiometric testing of employees who are exposed to noise levels at or above the action limit; and requires employers to provide hearing protection to employees who exceed the action limit (OSHA, 2012).

Related Studies

Gunderson et al. (1997) conducted noise exposure assessments in eight New York City nightclubs that hosted various music genres and found average sound levels ranged from 94.9 dBA to 106.7 dBA. Each nightclub was visited three to four times from 9pm to 2am during live musical performances. Personal noise exposure for the bartenders was approximated by having the investigator wearing the personal noise dosimeter for a minimum of 30 minutes during the live musical performance. The authors of this study indicated that they did not wear the dosimeters for a continuous period of time. To validate their research protocol, they had one bartender wear a personal noise dosimeter on one occasion. The authors did not indicate which nightclub where this occasion occurred. There were no TWA's calculated for any of the study sites.

Lawrence & Turrentine (2008) conducted a noise exposure assessment in eight different bars in a small town. The study involve taking noise measurements during peak operating hours on either a Friday or Saturday night from 10pm to 2am at each study site using personal noise dosimeters worn by each investigator. The data collected were using to calculate a projected 8-hour TWA for each study site, which ranged from 91.2 dBA to 96.9 dBA. Similar to Gunderson, the authors did not collect data from any employees at study sites.

Henehan, G. et al. (2012) assessed current bar employee noise exposure in Irish nightclubs and to examine nightclub compliance with their obligations under the Noise Regulations, 2007 legislation. This study measured the noise exposure of 19 employees in 9 nightclubs using 2 logging personal noise dosimeters and area noise of the club with a Type 1 fixed position sound level meter (Henehan, 2012). Data were collected for one night at each nightclub during their operating hours. The authors found: the overall mean 8-hour TWA was 92.2 dBA and that all the nightclub employees exceeded the lower action limit of 80 dBA and the upper of 85 dBA (Henehan, 2012). This study found that area noise increased during operating hours with the highest area noise levels measured at 01:00.

Smeatham (2002) performed an extensive literature review of studies that research pub employee's personal noise exposure and their risk of developing NIHL. The main findings from this report found that it was difficult to form definitive conclusions regarding the risk of developing NIHL due to the varied opinions, experimental rigor, and derived conclusions from the studies reviewed (Smeatham, 2002). It was determined that there is a potential for harm to employees who work in these types of environments (Smeatham, 2002).

Methods

Study Site Selection

The exposure assessment dates were selected based on the live entertainment schedule and convenience for the business and its employees. Sampling at the establishment took place from January 22, 2015 to January 28, 2015. A band was scheduled to perform at 10 pm on Saturday, January 24, 2015.

The participants from this study site included two female bartenders. The participants are identified in this study as "Bartender 1" and "Bartender 2". Bartender 1's job duties include: serving and mixing drinks, retrieving items from stockroom, moving around establishment and collecting dirty glassware along with emptying ashtrays, and checking on the conditions of rest rooms. Bartender 2's job duties include: serving and mixing drinks, stocking items behind the bar, cleaning dirty glassware. Bartender 2 stayed primarily behind the bar the entire night while Bartender 1 remained mobile. Both bartenders shared equal responsibility in dumping glass recycling into the recycling bin as needed throughout the shift.

Personal Noise Assessment

Personal noise exposure of the employees was measured using personal noise dosimeters (The Edge Model eg5 Dosimeter, 3M, Oconomowoc, WI). These dosimeters have the capability to be programmed to collect noise information with three different sets of measurement parameters. Each dosimeter was programmed to collect noise levels using OSHA Noise

Standard compliance parameters: A weighting, slow response, 90 dB criteria threshold, and 5 dB exchange rate. In addition to these parameters, each dosimeter was also programmed to collect data using OSHA Hearing Conservation Amendment measurement parameters: A weighting, slow response, 80 dB criteria threshold, and 5 dB exchange rate. Taking advantage of the dosimeters third measurement capability, each dosimeter was programmed to collect data using the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) measurement parameters: A weighting, slow response, 80 dB criteria threshold, and 3 dB exchange rate. Programming of each dosimeter was achieved using a manufacturer docking station and manufacturer software (Detection Management Software, 3M, Oconomowoc, WI). Prior to the start of each assessment, each dosimeter was calibrated at 1000 hertz (hZ) and 114.0 dBA using a manufacturer calibrator (AcoustiCal AC-300, 3M, Oconomowoc, WI). At the conclusion of each session, the dosimeters were post-calibrated to confirm the dosimeters were registering sound levels correctly.

The dosimeters were affixed to the collar of each participant per manufacturer guidelines. The dosimeters were turned on at the start of each shift and left to run for 8 hours Thursday-Sunday and 6 hours on Monday-Wednesday. To ensure that the participants could not interfere with the dosimeters, the investigator "locked" the dosimeter per manufacturer instructions before affixing the dosimeter to their collar. At the end of each session, the principal investigator collected the dosimeters from the participants and ended the study on the instruments. The noise data recorded on each dosimeter were downloaded and saved using the manufacturer software.

Area Noise Assessment

Area noise levels were measured using a Type 1 sound level meter (Precision Integrating & Logging Sound Level Meter, Quest Technologies, Oconomowoc, WI). According to the

manufacturers instructions, a Type 1 instrument is used for precision measurements in the field and has an accuracy of ±1 dB. The SLM was programmed to measure area noise levels using the OSHA Noise Standard compliance method listed in the manufacturers instructions: A-weighting, slow response, 90 dB threshold, and 5 dB exchange rate. Calibration of the instrument was performed using a manufacturer calibrator (Model QC-20 Sound Calibrator, Quest Technologies, Oconomowoc, WI). The SLM was calibrated at 250 Hz and 94 dB prior to the start of each study night. A post-calibration of the instrument occurred at the conclusion of each night to confirm the instrument was registering sound levels correctly.

Area noise levels were measured at pre-determined areas within the establishment: entrance, band/seating area, game area, restroom corridor, jukebox area, and mural area. Figure 1 is a schematic of the establishment's layout that identifies the list areas and approximate locations where area noise samples where collected. Area noise levels were measured at the start of each night, with additional measurements collected approximately every 2 hours thereafter, with the last measurement collected approximately 1 hour before the end of the night.

The sound level meter was hand-held by the principal investigator when performing noise measurements due to the impracticality of using a tripod in a crowded environment. To ensure the instrument produced accurate measurements, the SLM was held to the side and away from the torso of the principal investigator. Area noise measurements were recorded and logged into a data table created by the principal investigator. Area sampling was conducted during the Thursday-Sunday portion of the study.

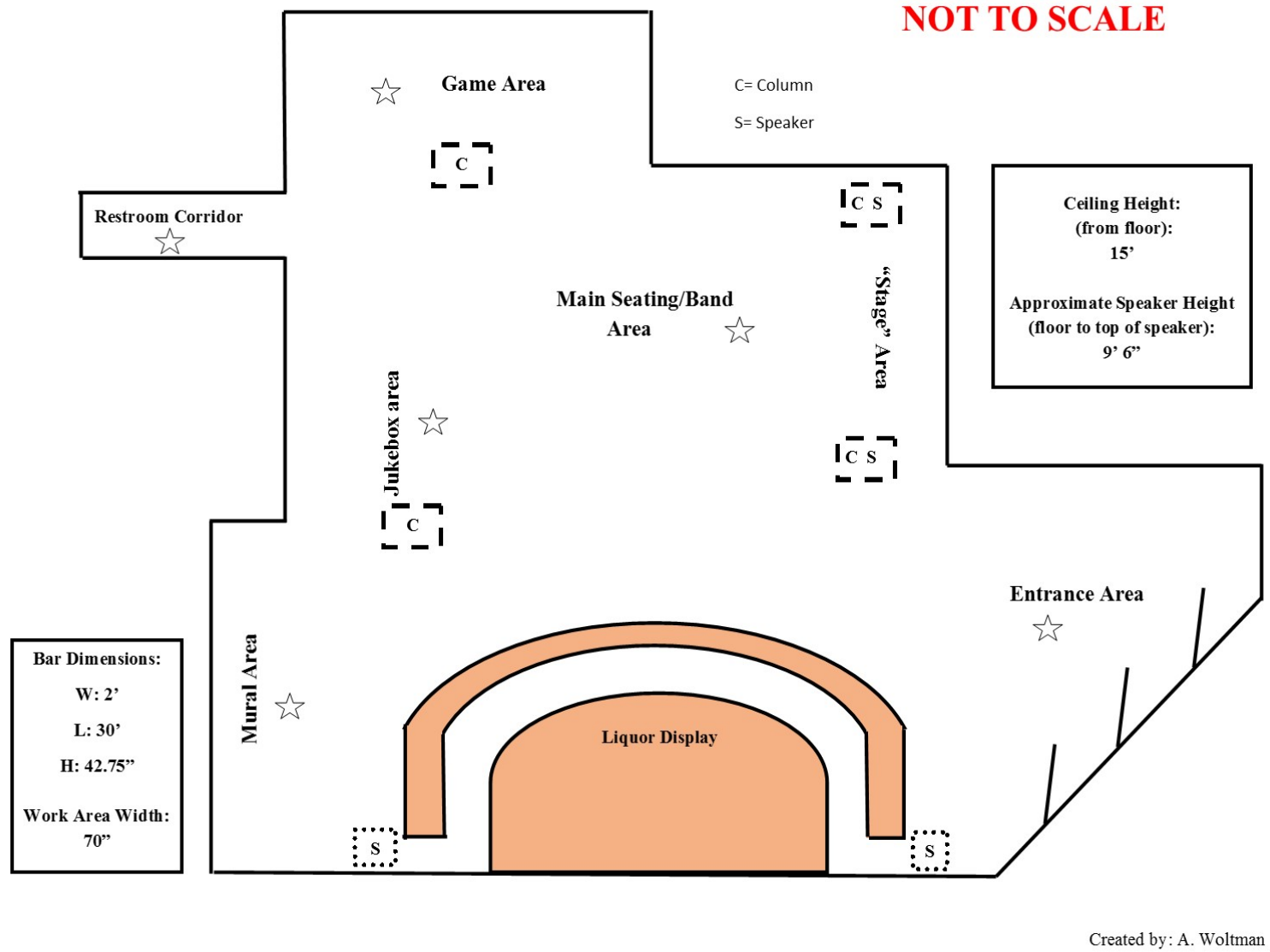

Figure 1- Schematic of Establishment Layout.
(*Stars indicate approximate location of area measurement*)

Results

Personal Noise Exposure Results

The results from personal sampling for each day of the study session are presented in the tables and figures below.

Bartender 1

Table I: Bartender 1 OSHA Hearing Conservation Method Personal Noise Exposure*

	Day of Study						
	Thursday	**Friday**	**Saturday**	**Sunday**	**Monday****	**Tuesday****	**Wednesday****
8-hour TWA (dBA)	87.3	89.1	93.1	90.2	82.1	75.2	82.8
% of Dose (8:00)	70.2%	88.7%	154.4%	104.0%	41.3%	17.2%	57.1%

**Measurement Parameters: A-weighting, 80 dBA criteria threshold, 5 dB exchange rate, slow response*
***Projected from 6 hours*

Bartender 1's 8-hr TWA OSHA Action Limit personal noise exposures ranged from 75.2 dBA and 93.1 dBA, with an overall mean 8-hour TWA of 85.7 dBA for the week. Bartender 1's % of dose ranged from 17.2 % and 154.4 %, with an overall average of 76.1 %. Bartender 1's highest exposure during the study was 93.1 dBA, which occurred on Saturday when a live band was present. Under this measurement method, Bartender 1 exceeded the 85 dBA for an 8-hour TWA OSHA Action Limit on Thursday and Friday, and exceeded the OSHA PEL of 90 dBA for an 8-hour TWA on Saturday and Sunday.

Table II: Bartender 1 OSHA PEL Method Personal Noise Exposure*

	Day of Study						
	Thursday	**Friday**	**Saturday**	**Sunday**	**Monday****	**Tuesday****	**Wednesday****
8-hour TWA (dBA)	83.5	86.9	92.4	88.2	77.7	69.7	79.6
% of Dose (8:00)	41.5%	65.2%	140.8%	79.0%	22.4%	8.0%	36.6%

**Measurement Parameters: A-weighting, 90 dBA criteria threshold, 5 dB exchange rate, slow response*
***Projected from 6 hours*

Bartender 1's 8-hr TWA OSHA PEL personal noise exposures ranged from 69.7 dBA and 92.4 dBA, with an overall mean 8-hour TWA of 82.6 dBA for the week. Bartender 1's % of dose ranged from 8.0 % and 140.8 %, with an overall average of 56.2 %. Under this measurement method, Bartender 1 exceeded the OSHA Hearing Conservation Amendment requirements on Friday and Sunday of the study. However, Bartender 1 only exceeded the OSHA PEL on Saturday.

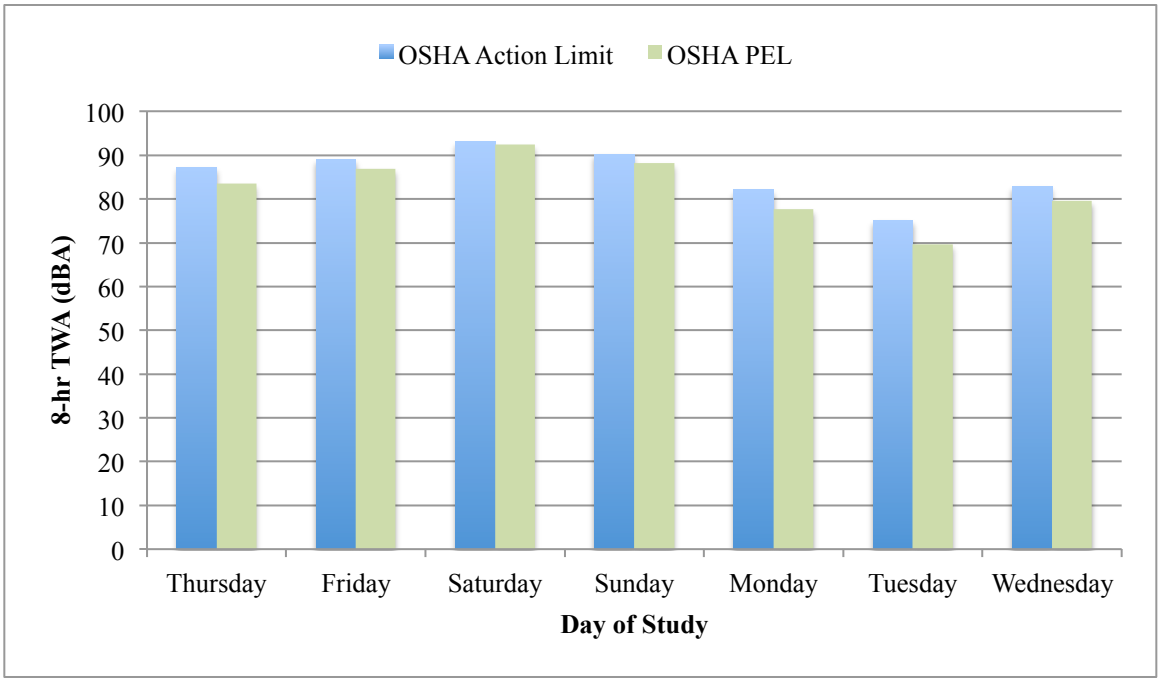

Figure 2: Comparison of 8-hr TWAs for Bartender 1.

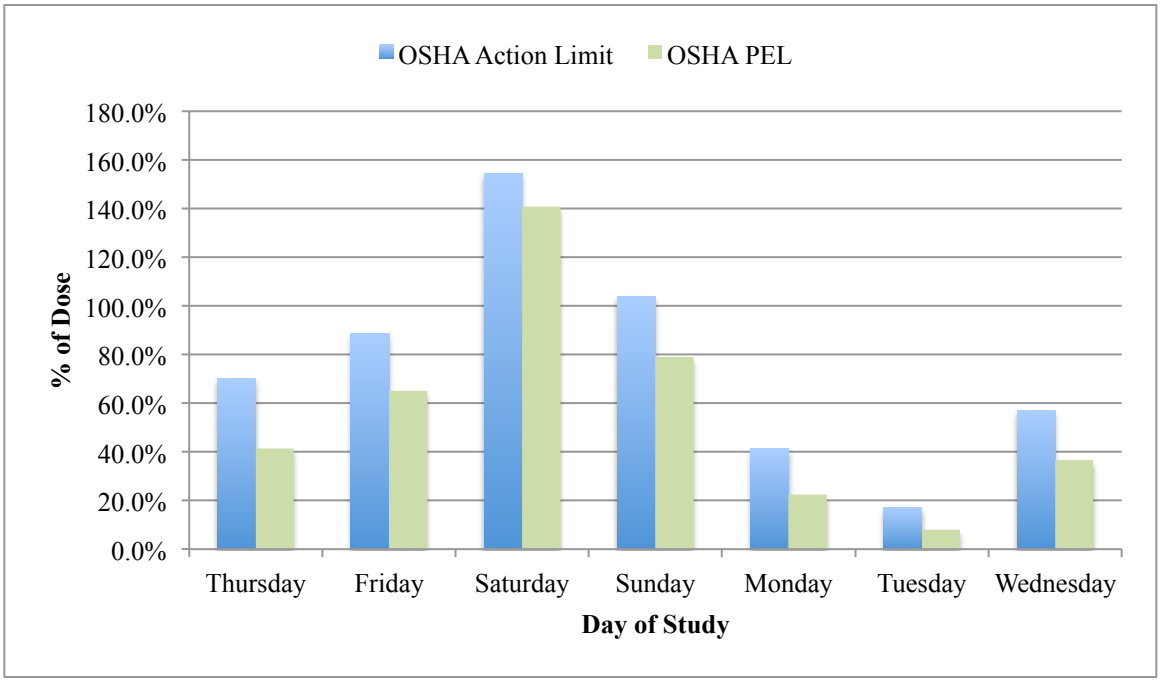

Figure 3: Comparison of % of Dose for Bartender 1.

Table III: Bartender 1 Peak Noise Exposure

	Day of Study						
	Thursday	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**
Peak Noise Level (dBA)	137.7	138.8	126.1	129.2	124.7	124.7	110.1

Bartender 1's peak noise exposures ranged from 110.1 dBA to 138.8 dBA. The highest peak noise level measured for Bartender 1 during this study occurred on the Friday of this study. Peak noise exposures were observed to occur when glass recycling was dumped.

Bartender 2

Table IV: Bartender 2 OSHA Hearing Conservation Method Personal Noise Exposure*

	Day of Study						
	Thursday	**Friday**	**Saturday**	**Sunday**	**Monday****	**Tuesday****	**Wednesday****
8-hour TWA (dBA)	83.3	81.2	83.6	78.2	61.0	53.2	65.9
% of Dose (8:00)	40.6%	29.3%	41.2%	19.6%	2.2%	0.8%	5.4%

**Measurement Parameters: A-weighting, 80 dBA criteria threshold, 5 dB exchange rate, slow response*
***Projected from 6 hours*

Bartender 2's 8-hr TWA OSHA Action Limit personal noise exposures ranged from 53.2 dBA and 83.6 dBA, with an overall mean 8-hour TWA of 72.3 dBA for the week. Bartender 2's % of dose ranged from 0.8% and 41.2 %, with an overall average of 19.9 %. Bartender 2's highest exposure during the study was 83.6 dBA, which occurred on Saturday when a live band was present.

Table V: Bartender 2 OSHA PEL Method Personal Noise Exposure*

	Day of Study						
	Thursday	**Friday**	**Saturday**	**Sunday**	**Monday****	**Tuesday****	**Wednesday****
8-hour TWA (dBA)	76.2	57.5	81.0	49.5	39.6	26.6	40.5
% of Dose (8:00)	15.1%	1.1%	28.9%	0.3%	0.1%	0.0%	0.1%

**Measurement Parameters: A-weighting, 90 dBA criteria threshold, 5 dB exchange rate, slow response*
***Projected 8-hour TWA from 6 hours*

Bartender's 2 8-hr TWA OSHA PEL personal noise exposures ranged from 26.2 dBA and 81.0 dBA, with an overall mean 8-hour TWA of 53.0 dBA for the week. Bartender 2's % of dose ranged from 0.0 % and 28.9 %, with an overall average of 6.5 %. It is important to note that Bartender 2 did not exceed the OSHA Action Limit or OSHA PEL during the study.

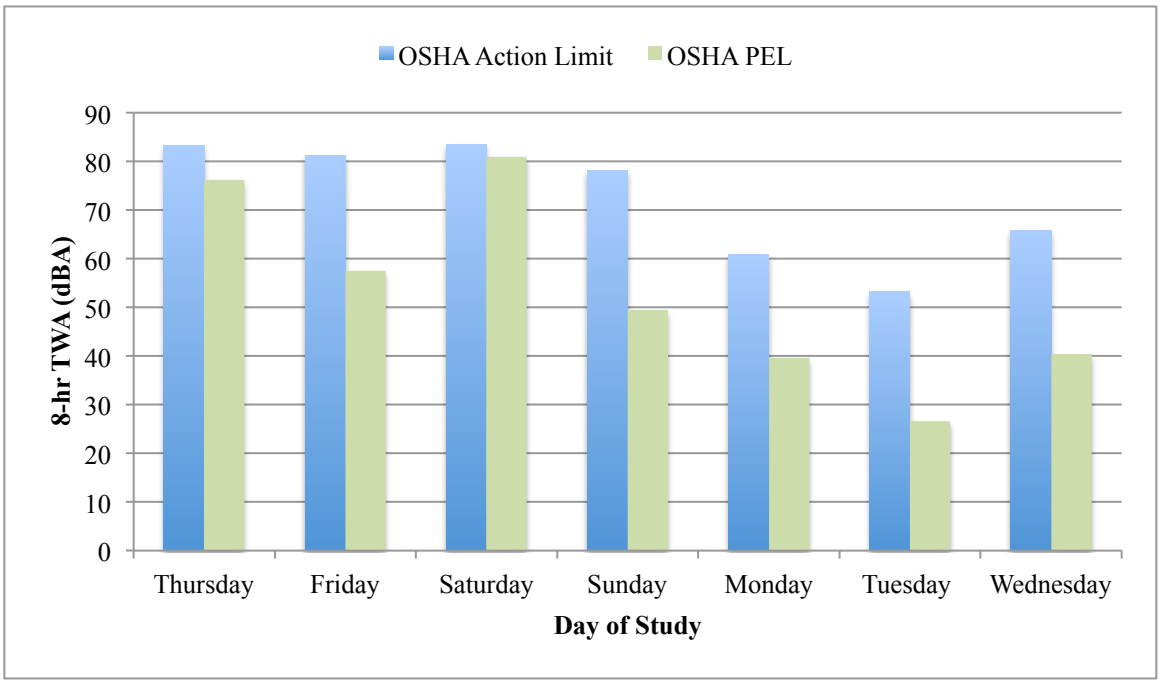

Figure 4: Comparison of 8-hr TWA for Bartender 2.

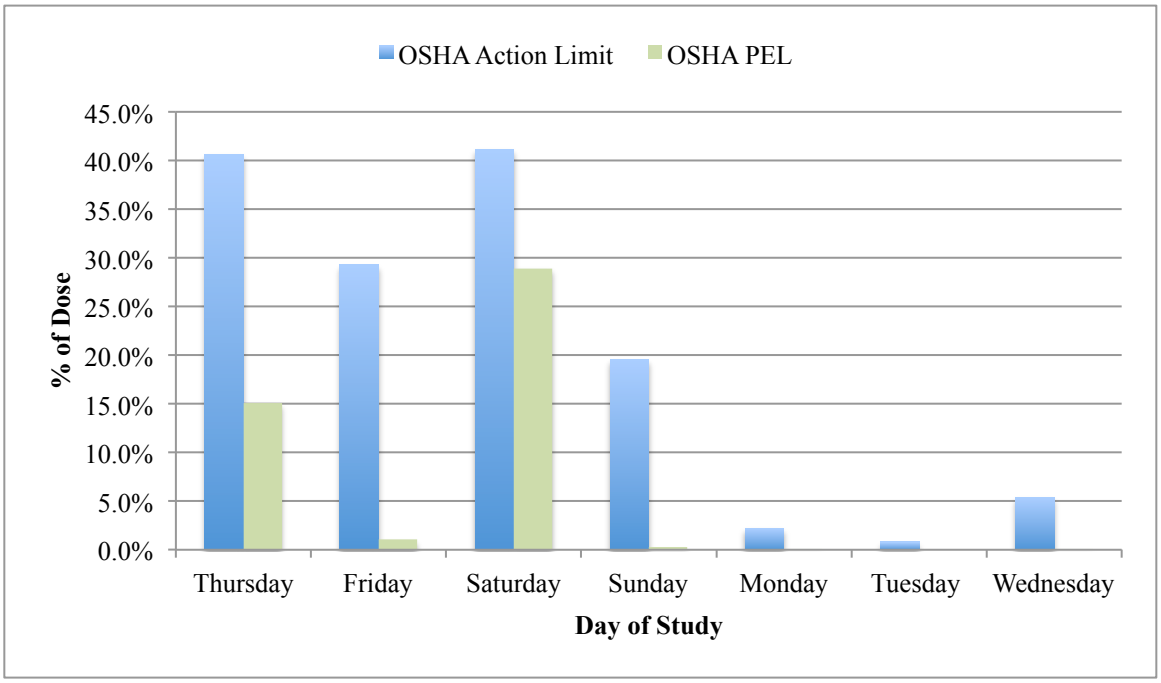

Figure 5: Comparison of % of Dose for Bartender 2.

Table VI: Bartender 2 Peak Noise Exposure

	Day of Week						
	Thursday	**Friday**	**Saturday**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**
Peak Noise (dBA)	128.1	122	124.8	125.6	131.7	126.4	101.6

Bartender 2's peak noise exposures ranged from 101.6 dBA to 128.8 dBA. The highest peak noise level measured for Bartender 2 during this study occurred on the Thursday of this study. Similar to Bartender 1, peak noise exposures were observed to occur when glass recycling was dumped.

Area Noise Results

Table VII: Average Area Noise Data for Thursday-Saturday

Night of Study	**Area in Establishment (all in dBA)**					
	Entrance	**Main Seating**	**Game Area**	**Restroom Corridor**	**Jukebox Area**	**Mural Area**
Thursday	79.6	82.5	74.1	72.2	83.7	75.4
Friday	78.1	81.2	80.2	76.8	80.2	81.6
Saturday	84.0	89.0	84.4	81.2	88.4	84.5

The highest levels of area noise occurred on Saturday night when a live band was performing. The area of the establishment that experienced the lowest levels of area noise on any night was the restroom corridor. The main seating and jukebox area both experienced similar levels of high area noise.

Discussion

Business at the establishment varied on each day of the study. While no exact headcounts were made, Thursday-Sunday had the highest number of customers in attendance (approximately 60-70 customers in the establishment at any given time). It was observed that there were a set of regular customers that came in around the same time every evening who stayed for an approximate set time. Business did vary based on events that were either happening in the establishment or on events at other locations located near the establishment. Business on Friday was high due to an event that was being held inside the establishment, as well as Saturday when the live band was performing. Monday-Wednesday had a lower number of customers compared to Thursday-Sunday, with Monday and Tuesday having the lowest number of customers in attendance (approximately 10-20 customers in the establishment at any given time).

The live band that performed on Saturday night played music that was described as a local "jam band". The band performed original songs and also played covers of popular classic rock songs. The band did have a manager present onsite who was responsible for managing their sound throughout their performance. An informal interview with the band manager revealed that the band manager is aware of the levels of noise that the band's music can produce. He stated that he observes customers during performances and, "watches to see if people can hold a conversation". He explained that he looks for certain behaviors (turning away from the band; cupping hands around the mouth and speaking directly into the ear) and adjusts the sound levels of the sound system if he notices customers struggling to have conversation. His reasoning for

adjusting sound levels is that, “If people are unable to talk to their friends then that means they aren’t having a good time”.

Personal Noise Exposure

Bartender 1

Bartender 1’s job duties are as follows: serving and mixing drinks, retrieving items from stockroom, moving around establishment and collecting dirty glassware along with emptying ashtrays, checking on the conditions of rest rooms, and sharing glass disposal duty with Bartender 2. Bartender 1 was considered a “floater” since she spent less time behind the bar than Bartender 2.

Using the OSHA Hearing Conservation method, Bartender 1’s 8-hr TWA personal noise exposures ranged from 75.2 dBA and 93.1 dBA. Bartender 1 was exposed to the highest noise levels on Saturday night with an 8-hr TWA of 93.1 dBA, which exceeds the PEL of 90 dBA 8-hr TWA. Bartender 1 also exceeded the PEL on Sunday night of the study, with an 8-hr TWA of 90.2 dBA.

However, using the the OSHA PEL method, Bartender 1’s 8-hr TWA personal noise exposures ranged from 69.7 dBA and 92.4 dBA. Bartender 1’s Saturday 8-hr TWA reduced from 93.1 dBA to 92.4 dBA. This difference could be attributed to the difference in criteria threshold. The criteria threshold for the OSHA Hearing Conservation Amendment is 80 dBA, meaning all noise exposures of 80 dBA or greater were used in calculating the 8-hour TWA. The threshold criteria for the OSHA PEL is 90 dBA, meaning all noise exposures of 90 dBA or greater were used in calculating the 8-hour TWA.

It has been argued that OSHA regulatory requirements are outdated and are not considered adequate in protecting against hearing loss (AIHA, 2011). The current standard is

virtually the same as the original standard, except for the addition of the Hearing Conversation Amendment (AIHA, 2011). The current TLV recommended by ACGIH for noise exposure is 85 dBA for an 8-hour TWA (ACGIH, 2015). ACGIH recommends the following measurement parameters to assess noise: A-weighting, 80 dBA criteria threshold, 3 dB exchange rate, slow response (ACGIH, 2015). Table VIII contains Bartender 1's personal noise exposure under ACGIH parameters.

Table VIII: Bartender 1 ACGIH Method Personal Noise Exposure

	Day of Study						
	Thursday	**Friday**	**Saturday**	**Sunday**	**Monday***	**Tuesday***	**Wednesday***
8-hour TWA (dBA)	89.3	93.3	95.5	92.1	85.8	81.3	86.8
% of Dose (8:00)	86.2%	213.0%	358.3%	164.3%	46.8%	18.3%	74.5%

**Projected 8-hour TWA from 6 hr*

Using the ACGIH measurement method, Bartender 1 exceeded the OSHA Hearing Conversation Action Limit on Thursday, Monday, and Wednesday. Bartender 1 exceeded the OSHA PEL on Friday, Saturday, and Sunday. Using this method, Bartender 1 was exposed to excessive noise levels on 6 nights during the study versus 4 nights using OSHA measurement methods.

Bartender 2

Bartender 2's job duties include: serving and mixing drinks, stocking items behind the bar, cleaning dirty glassware, and sharing glass disposal duty with Bartender 1. Bartender 2 remained behind the bar the majority of each night during the study, occasionally stepping out for a break or to dispose of glass recycling.

Using the OSHA Hearing Conservation measurement method, Bartender 2's 8-hr TWA personal noise exposures ranged from 53.2 dBA and 83.6 dBA. Like Bartender 1, Bartender 2's highest noise exposure occurred on Saturday. However, Bartender 2 did not exceed the PEL of 90 dBA for an 8-hr TWA on any night of the study. Using the OSHA PEL measurement method, Bartender 2's 8-hr TWA's ranged from 26.6 dBA to 81.0 dBA. Similar to Bartender 1, Bartender 2's personal noise exposure differences could be attributed to the difference in criteria threshold.

Using the OSHA measurement methods, Bartender 2 was not exposed to excessive levels of noise on any night of the study. However, as mentioned before, the OSHA method have been considered to be outdated. Table IX contains Bartender 2's personal noise exposure using the ACGIH method.

Table IX: Bartender 2 ACGIH Method Personal Noise Exposure

	Day of Study						
	Thursday	**Friday**	**Saturday**	**Sunday**	**Monday***	**Tuesday***	**Wednesday***
8-hour TWA (dBA)	85.9	82.7	86.6	80.3	70.1	65.4	72.8
% of Dose (8:00)	40.1%	18.7%	45.7%	10.9%	1.2%	0.4%	2.9%

**Projected 8-hour TWA from 6 hours*

Using the ACGIH method, Bartender 2 exceeded the OSHA Hearing Conversation Action Limit on Thursday and Saturday.

Comparison of Personal Noise Exposure

The differences in personal noise exposure experienced by Bartender 1 and Bartender to could be attributed to their job duties and locations throughout the bar. Bartender 1 was mobile most of the night and spent less time behind the bar than Bartender 2. Bartender 1 also mingled

with customers and took drink orders when moving around the establishment. On nights with increased business, Bartender 1 encouraged customers to speak louder to ensure they served the customer with the correct drink order.

The lower 8-hr TWA's for Monday and Tuesday for both bartender's could be attributed to the amount of business on Monday and Tuesday nights, which are typically considered to be "slow" nights. Also, the customers who came in on these nights were observed to be less "rowdy" than the customers who came in during the Thursday-Sunday portion of the study.

An informal interview with both bartenders revealed that they experience ringing in the ears and muffled hearing after their work shift on certain nights of the week (Friday/Saturday). They also commented that the symptoms were worse when there was a live band performing in the establishment. Both bartenders were asked if they knew that their symptoms were a known as a temporary threshold shift (TTS), to which they replied that they did not know the actual term for their symptoms.

When asked if they would wear hearing protection if offered they both declined, stating that it would interfere with their ability to provide customer good service. Both bartenders did point out that the band that performed during this study did not worsen their symptoms. When asked to clarify, they informed the principal investigator that there are other bands that have performed there that generated noise levels so high that the bartenders would have customers write drink orders down on paper. Both bartenders stated that they felt that the noise generated from the disposal of glass recycling indoors impacted their hearing the most.

Peak Noise

Both bartenders experienced peak noise randomly throughout their shifts during this study. Bartender 1's highest peak noise was 138.8 dBA on Friday night, which is 1.2 dB less

than the threshold of pain (140 dBA). Bartender 2's highest peak noise was 131.7 dBA, which is typical to an exposure at a gun range. The principal investigator observed that the peak noise was generated when glass recycling was disposed of indoors. When asked about the placement of the recycling receptacle, the owner stated that there was no outdoor area available for the establishment to store the recycling containers, as well as to ensure the bartender's personal safety. The owner indicated that the area the establishment was located in was not safe to be alone during late nights. By keeping the receptacles indoors, he and his employees could ensure their personal safety.

Area Noise

Area noise levels were recorded on the Thursday-Saturday portion of the study using a sound level meter. As feasible, area noise levels were recorded at the start of each day, and approximately every two hours after the initial measurement. Due to the impractically of using a tripod in a crowded bar environment, the SLM was hand-held by the investigator, who positioned the instrument to their right side and away from their torso to ensure accurate measurement readings from the instrument.

The area with the highest level of noise during the study was the main seating/band area, which had an average noise level of 84.2 dBA. This area is an open space with a small amount of tables and chairs. On nights with live entertainment, the right side of the main seating area acts as a temporary "stage". The area where bands perform is located in-between two columns that have speakers attached. The high level of noise in this area could be attributed to the location of the speakers and their placement. The second highest level of noise is in the jukebox area, with an average of 84.1 dBA. This area was arbitrarily determined by the investigator, and could be considered to be apart of the main seating area. The noise level in this area could be

attributed to the music playing from the jukebox. Both of these areas were in a large "open" area and free from any major obstructions like walls.

The area with the lowest level of noise was the restroom corridor, with an overall average of 77.4 dBA. This noise level could be attributed to the corridor being separated from the main bar area. The low noise level could also be attributed to the dimensions of the corridor. The length of the corridor was 15' with a width of 39.5". It is possible that the sound waves generated from the speakers and patrons were not able to travel into the corridor. The second lowest level of noise was in the game area, which had an average of 79.6 dBA. While this area was not completely isolated like the corridor, it was only open to one side of the main seating area and had a column that acted as a barrier to the main seating area. The entrance and mural area both had averages at 80.5 dBA, which could be attributed to similar characteristics both areas shared. There were no customers seated in this area and both had exits that lead outdoors. These data provide evidence that sound levels decrease further from the source of noise.

The loudest night for any of the areas in the bar was Saturday night when live music was playing. The two areas with the highest noise levels were the main seating and jukebox area (89.0 dBA and 88.4 dBA respectively). These data provide evidence that this establishment the employees in this establishment may be exposed to excessive noise levels.

Comparison with Previous Studies

While other studies have focused on noise exposure of bartenders during peak nights of business (Friday or Saturday), they did not consider noise levels experienced during other nights of the week. This study is unique in the fact that it collected noise levels for a consecutive set of seven days, as well as collected area noise data in several locations within the establishment. Personal sampling results for this study were generally below the reported findings by

Gunderson et al. (1997), Lawrence & Turrentine (2008), and Henehan, G. et al (2012). However, unlike the methods used in this study, those authors collected noise data on expected nights of high business and for shorter periods of time, which is a possible source of bias. Those authors also did not outfit any employees of the bars that they included in their studies with a personal noise dosimeter and wore the dosimeter themselves. This study also discovered that the disposal of glass recycling should be considered as a potential source of peak noise.

Study Limitations

This study was limited due to the low number of bartenders participating in this study. Collecting data from more than two bartenders would provide a better idea of what noise exposures levels are like for an average bartender. Another limitation to this study was the inability to secure another bar to participate in this study. A comparison of the noise data gathered from the bar in this study to a bar with different characteristics could have determined if noise levels vary due to music and/or customer base, and identify any peak noise sources.

Future Research

Future research should involve a larger sample size of bars and workers in order to verify previous research. Long-term epidemiological studies involving audiograms could also be conducted to determine if employees experience permanent hearing loss from being exposed to similar levels of noise. Additional research could also be done for multiple weeks at one location with various live entertainment to determine if different musical acts and/or events have influence on the noise levels within an establishment. Further research into peak noise and its combination with continuous hazardous noise should be done to assess the potential hearing loss from the combination of continuous and peak noise.

Conclusions

The purpose of this research was to gather occupational noise exposure data for bartenders during a workweek at a Tampa Bay bar establishment, and to determine if they were exposed to excessive noise levels. The data presented in this study suggests that one bartender did exceed the OSHA PEL on Saturday and Sunday night. The range of exposures for Bartender 1 Bartender 2's personal noise exposure did not exceed the PEL or HCA requirement. Bartender 2's range of exposures. The relatively large differences between Bartender 1 and Bartender 2 suggest that their location within the establishment affected the noise levels they experienced during their work shift. It is concluded that bartenders in moderately-sized establishments that host live music are exposed to excessive noise levels. While area noise measurement is not indicative of personal noise exposure, it is concluded that customers in this type of establishment are potentially exposed to excessive noise levels during live musical performances. This study also identified the disposal of glass recycling as a source of peak noise within this establishment, however this noise hazard is intermittent and not continuous.

The majority of bars are not obligated to be in compliance with OSHA standards due to their size of workforce (<10). However, bars should inform their employees about potential hearing loss from exposure to high levels of noise. If feasible, hearing protection should be offered to employees to reduce the levels of noise they are exposed to, as well as simple noise monitoring during live musical performances.

Reference List

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Appendix A:

IRB Determination Letter

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

December 18, 2014

Adrianna Woltman
Environmental and Occupational Health
13201 Bruce B. Downs Blvd.
MDC56
Tampa, FL 33617

RE: **NOT Human Research Activities Determination**
IRB#: Pro00020095
Title: Assessing Occupational Noise Exposure of Bartenders in the Tampa Bay Area

Dear Ms. Woltman:

The Institutional Review Board (IRB) has reviewed the information you provided regarding the above referenced project and has determined the activities do not meet the definition of human subjects research. Therefore, IRB approval is not required. If, in the future, you change this activity such that it becomes human subjects research, IRB approval will be required. If you wish to obtain a determination about whether the activity, with the proposed changes, will be human subjects research, please contact the IRB for further guidance.

All research activities, regardless of the level of IRB oversight, must be conducted in a manner that is consistent with the ethical principles of your profession and the ethical guidelines for the protection of human subjects. As principal investigator, it is your responsibility to ensure subjects' rights and welfare are protected during the execution of this project

Also, please note that there may be requirements under the HIPAA Privacy Rule that apply to the information/data you will use in your activities. For further information about any existing HIPAA requirements for this project, please contact a HIPAA Program administrator at 813-974-5638.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

Kristen Salomon, Ph.D., Vice Chairperson
USF Institutional Review Board

Appendix B:

List of Equipment and Instrumentation

3M AcoustiCal AC-300 Calibrator
Model No.: AC-300
Serial No.: AC300004123
Calibration Date: 08/22/2014
3M Detection Solutions
1060 Corporate Center Drive
Oconomowoc, WI 53066

3M Edge 5 Personal Noise Dosimeter (5)
Model No: eg5
Serial No.: ESN080199, ESN080200, ESN080201, ESN080202, ESN080203
Manufacturer Calibration Date: 08/20/2014
3M Detection Solutions
1060 Corporate Center Drive
Oconomowoc, WI 53066

Precision Integrating & Logging Sound Level Meter
Model No.: 1900
Serial No.: CC7040023
Quest Technologies (a division of 3M)
1060 Corporate Center Drive
Oconomowoc, WI 53066

Sound Calibrator
Model No.: QC-20
Serial No.: QF-7050032
Quest Technologies (a division of 3M)
1060 Corporate Center Drive
Oconomowoc, WI 53066

Appendix C:

Personal Noise Monitoring Reports

Session Report

4/30/2015

General Information

Name	ESN080199_20150123_082500
Comments	Bartender1
Start Time	1/22/2015 6:10:17 PM
Stop Time	1/23/2015 2:05:55 AM
Run Time	07:55:38
Model Type	Edge eg-5
Serial Number	ESN080199
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	69.6 %	Pdose (8:00)	1	70.2 %
Lavg	1	87.4 dB	Leq	1	--
TWA	1	87.3 dB	UL Time	1	00:00:00
SEL	1	161.4 dB	ProjectedTWA (8:00)	1	87.4 dB
Mntime	1	1/22/2015 7:21:04 PM	Mxtime	1	1/23/2015 12:18:21 AM
PKtime	1	1/22/2015 11:25:42 PM	Lasmx	1	111 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	62.9 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	137.7 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	41.1 %	Pdose (8:00)	2	41.5 %
Lavg	2	83.6 dB	Leq	2	--
TWA	2	83.5 dB	UL Time	2	00:00:00
SEL	2	157.6 dB	ProjectedTWA (8:00)	2	83.6 dB
Mntime	2	1/22/2015 7:21:04 PM	Mxtime	2	1/23/2015 12:18:21 AM
PKtime	2	1/22/2015 11:25:42 PM	Lasmx	2	111 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	62.9 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	137.7 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	85.4 %	Pdose (8:00)	3	86.2 %
Lavg	3	89.3 dB	Leq	3	--
TWA	3	89.3 dB	UL Time	3	00:00:00
SEL	3	133.9 dB	ProjectedTWA (8:00)	3	89.3 dB
Mntime	3	1/22/2015 7:21:04 PM	Mxtime	3	1/23/2015 12:18:21 AM
PKtime	3	1/22/2015 11:25:42 PM	Lasmx	3	111 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	62.9 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	137.7 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080201_20150123_082537
Comments	b2
Start Time	1/22/2015 6:14:39 PM
Stop Time	1/23/2015 2:05:41 AM
Run Time	07:50:41
Model Type	Edge eg-5
Serial Number	ESN080201
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	39.8 %	Pdose (8:00)	1	40.6 %
Lavg	1	83.5 dB	Leq	1	--
TWA	1	83.3 dB	UL Time	1	00:00:00
SEL	1	157.4 dB	ProjectedTWA (8:00)	1	83.5 dB
Mntime	1	1/23/2015 12:25:13 AM	Mxtime	1	1/23/2015 12:31:09 AM
PKtime	1	1/22/2015 6:22:37 PM	Lasmx	1	106.3 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	60.8 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	128.1 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	14.8 %	Pdose (8:00)	2	15.1 %
Lavg	2	76.4 dB	Leq	2	--
TWA	2	76.2 dB	UL Time	2	00:00:00
SEL	2	150.3 dB	ProjectedTWA (8:00)	2	76.4 dB
Mntime	2	1/23/2015 12:25:13 AM	Mxtime	2	1/23/2015 12:31:09 AM
PKtime	2	1/22/2015 6:22:37 PM	Lasmx	2	106.3 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	60.8 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	128.1 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	39.3 %	Pdose (8:00)	3	40.1 %
Lavg	3	86 dB	Leq	3	--
TWA	3	85.9 dB	UL Time	3	00:00:00
SEL	3	130.5 dB	ProjectedTWA (8:00)	3	86 dB
Mntime	3	1/23/2015 12:25:13 AM	Mxtime	3	1/23/2015 12:31:09 AM
PKtime	3	1/22/2015 6:22:37 PM	Lasmx	3	106.3 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	60.8 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	128.1 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080199_20150124_120541
Comments	
Start Time	1/23/2015 6:06:27 PM
Stop Time	1/24/2015 2:09:39 AM
Run Time	08:03:12
Model Type	Edge eg-5
Serial Number	ESN080199
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	89.3 %	Pdose (8:00)	1	88.7 %
Lavg	1	89.1 dB	Leq	1	--
TWA	1	89.1 dB	UL Time	1	00:00:05
SEL	1	163.2 dB	ProjectedTWA (8:00)	1	89.1 dB
Mntime	1	1/23/2015 7:14:58 PM	Mxtime	1	1/23/2015 10:13:48 PM
PKtime	1	1/23/2015 10:13:48 PM	Lasmx	1	130.5 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	63.8 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	138.8 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	65.6 %	Pdose (8:00)	2	65.2 %
Lavg	2	86.9 dB	Leq	2	--
TWA	2	86.9 dB	UL Time	2	00:00:05
SEL	2	161 dB	ProjectedTWA (8:00)	2	86.9 dB
Mntime	2	1/23/2015 7:14:58 PM	Mxtime	2	1/23/2015 10:13:48 PM
PKtime	2	1/23/2015 10:13:48 PM	Lasmx	2	130.5 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	63.8 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	138.8 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	214.4 %	Pdose (8:00)	3	213 %
Lavg	3	93.2 dB	Leq	3	--
TWA	3	93.3 dB	UL Time	3	00:00:05
SEL	3	137.9 dB	ProjectedTWA (8:00)	3	93.2 dB
Mntime	3	1/23/2015 7:14:58 PM	Mxtime	3	1/23/2015 10:13:48 PM
PKtime	3	1/23/2015 10:13:48 PM	Lasmx	3	130.5 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	63.8 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	138.8 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080202_20150124_120559
Comments	
Start Time	1/23/2015 6:09:54 PM
Stop Time	1/24/2015 2:13:52 AM
Run Time	08:03:58
Model Type	Edge eg-5
Serial Number	ESN080202
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	29.6 %	Pdose (8:00)	1	29.3 %
Lavg	1	81.1 dB	Leq	1	--
TWA	1	81.2 dB	UL Time	1	00:00:00
SEL	1	155.2 dB	ProjectedTWA (8:00)	1	81.1 dB
Mntime	1	1/23/2015 7:14:57 PM	Mxtime	1	1/23/2015 11:00:28 PM
PKtime	1	1/23/2015 8:49:25 PM	Lasmx	1	99.5 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	64.5 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	122 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	1.1 %	Pdose (8:00)	2	1.1 %
Lavg	2	57.5 dB	Leq	2	--
TWA	2	57.5 dB	UL Time	2	00:00:00
SEL	2	131.6 dB	ProjectedTWA (8:00)	2	57.5 dB
Mntime	2	1/23/2015 7:14:57 PM	Mxtime	2	1/23/2015 11:00:28 PM
PKtime	2	1/23/2015 8:49:25 PM	Lasmx	2	99.5 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	64.5 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	122 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	18.9 %	Pdose (8:00)	3	18.7 %
Lavg	3	82.7 dB	Leq	3	--
TWA	3	82.7 dB	UL Time	3	00:00:00
SEL	3	127.3 dB	ProjectedTWA (8:00)	3	82.7 dB
Mntime	3	1/23/2015 7:14:57 PM	Mxtime	3	1/23/2015 11:00:28 PM
PKtime	3	1/23/2015 8:49:25 PM	Lasmx	3	99.5 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	64.5 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	122 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080200_20150125_102123
Comments	
Start Time	1/24/2015 5:38:29 PM
Stop Time	1/25/2015 1:40:02 AM
Run Time	08:01:33
Model Type	Edge eg-5
Serial Number	ESN080200
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	154.9 %	Pdose (8:00)	1	154.4 %
Lavg	1	93.1 dB	Leq	1	--
TWA	1	93.1 dB	UL Time	1	00:00:00
SEL	1	167.2 dB	ProjectedTWA (8:00)	1	93.1 dB
Mntime	1	1/24/2015 8:08:48 PM	Mxtime	1	1/25/2015 1:04:44 AM
PKtime	1	1/25/2015 1:02:55 AM	Lasmx	1	112.6 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	62.3 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	126.1 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	141.3 %	Pdose (8:00)	2	140.8 %
Lavg	2	92.4 dB	Leq	2	--
TWA	2	92.4 dB	UL Time	2	00:00:00
SEL	2	166.5 dB	ProjectedTWA (8:00)	2	92.4 dB
Mntime	2	1/24/2015 8:08:48 PM	Mxtime	2	1/25/2015 1:04:44 AM
PKtime	2	1/25/2015 1:02:55 AM	Lasmx	2	112.6 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	62.3 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	126.1 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	359.5 %	Pdose (8:00)	3	358.3 %
Lavg	3	95.5 dB	Leq	3	--
TWA	3	95.5 dB	UL Time	3	00:00:00
SEL	3	140.1 dB	ProjectedTWA (8:00)	3	95.5 dB
Mntime	3	1/24/2015 8:08:48 PM	Mxtime	3	1/25/2015 1:04:44 AM
PKtime	3	1/25/2015 1:02:55 AM	Lasmx	3	112.6 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	62.3 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	126.1 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080203_20150125_102146
Comments	
Start Time	1/24/2015 5:38:29 PM
Stop Time	1/25/2015 1:40:17 AM
Run Time	08:01:48
Model Type	Edge eg-5
Serial Number	ESN080203
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	41.4 %	Pdose (8:00)	1	41.2 %
Lavg	1	83.6 dB	Leq	1	--
TWA	1	83.6 dB	UL Time	1	00:00:00
SEL	1	157.7 dB	ProjectedTWA (8:00)	1	83.6 dB
Mntime	1	1/24/2015 6:40:52 PM	Mxtime	1	1/24/2015 11:26:47 PM
PKtime	1	1/24/2015 5:43:04 PM	Lasmx	1	101.5 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	63.1 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	124.8 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	29 %	Pdose (8:00)	2	28.9 %
Lavg	2	81 dB	Leq	2	--
TWA	2	81 dB	UL Time	2	00:00:00
SEL	2	155.1 dB	ProjectedTWA (8:00)	2	81 dB
Mntime	2	1/24/2015 6:40:52 PM	Mxtime	2	1/24/2015 11:26:47 PM
PKtime	2	1/24/2015 5:43:04 PM	Lasmx	2	101.5 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	63.1 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	124.8 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	45.9 %	Pdose (8:00)	3	45.7 %
Lavg	3	86.6 dB	Leq	3	--
TWA	3	86.6 dB	UL Time	3	00:00:00
SEL	3	131.2 dB	ProjectedTWA (8:00)	3	86.6 dB
Mntime	3	1/24/2015 6:40:52 PM	Mxtime	3	1/24/2015 11:26:47 PM
PKtime	3	1/24/2015 5:43:04 PM	Lasmx	3	101.5 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	63.1 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	124.8 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080200_20150126_130405
Comments	
Start Time	1/25/2015 4:02:16 PM
Stop Time	1/25/2015 11:59:24 PM
Run Time	07:57:08
Model Type	Edge eg-5
Serial Number	ESN080200
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	103.4 %	Pdose (8:00)	1	104 %
Lavg	1	90.2 dB	Leq	1	--
TWA	1	90.2 dB	UL Time	1	00:00:00
SEL	1	164.3 dB	ProjectedTWA (8:00)	1	90.2 dB
Mntime	1	1/25/2015 4:09:42 PM	Mxtime	1	1/25/2015 7:45:31 PM
PKtime	1	1/25/2015 7:45:27 PM	Lasmx	1	115.4 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	63.3 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	129.2 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	78.6 %	Pdose (8:00)	2	79 %
Lavg	2	88.3 dB	Leq	2	--
TWA	2	88.2 dB	UL Time	2	00:00:00
SEL	2	162.3 dB	ProjectedTWA (8:00)	2	88.3 dB
Mntime	2	1/25/2015 4:09:42 PM	Mxtime	2	1/25/2015 7:45:31 PM
PKtime	2	1/25/2015 7:45:27 PM	Lasmx	2	115.4 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	63.3 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	129.2 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	163.3 %	Pdose (8:00)	3	164.3 %
Lavg	3	92.1 dB	Leq	3	--
TWA	3	92.1 dB	UL Time	3	00:00:00
SEL	3	136.7 dB	ProjectedTWA (8:00)	3	92.1 dB
Mntime	3	1/25/2015 4:09:42 PM	Mxtime	3	1/25/2015 7:45:31 PM
PKtime	3	1/25/2015 7:45:27 PM	Lasmx	3	115.4 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	63.3 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	129.2 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080203_20150126_130423
Comments	
Start Time	1/25/2015 4:03:03 PM
Stop Time	1/26/2015 12:00:29 AM
Run Time	07:57:21
Model Type	Edge eg-5
Serial Number	ESN080203
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	19.5 %	Pdose (8:00)	1	19.6 %
Lavg	1	78.2 dB	Leq	1	--
TWA	1	78.2 dB	UL Time	1	00:00:00
SEL	1	152.3 dB	ProjectedTWA (8:00)	1	78.2 dB
Mntime	1	1/25/2015 4:09:28 PM	Mxtime	1	1/25/2015 5:26:57 PM
PKtime	1	1/25/2015 9:19:02 PM	Lasmx	1	98.3 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	63.5 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	125.6 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	0.3 %	Pdose (8:00)	2	0.3 %
Lavg	2	49.5 dB	Leq	2	--
TWA	2	49.5 dB	UL Time	2	00:00:00
SEL	2	123.6 dB	ProjectedTWA (8:00)	2	49.5 dB
Mntime	2	1/25/2015 4:09:28 PM	Mxtime	2	1/25/2015 5:26:57 PM
PKtime	2	1/25/2015 9:19:02 PM	Lasmx	2	98.3 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	63.5 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	125.6 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	10.8 %	Pdose (8:00)	3	10.9 %
Lavg	3	80.3 dB	Leq	3	--
TWA	3	80.3 dB	UL Time	3	00:00:00
SEL	3	124.9 dB	ProjectedTWA (8:00)	3	80.3 dB
Mntime	3	1/25/2015 4:09:28 PM	Mxtime	3	1/25/2015 5:26:57 PM
PKtime	3	1/25/2015 9:19:02 PM	Lasmx	3	98.3 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	63.5 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	125.6 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080199_20150128_133352
Comments	
Start Time	1/26/2015 3:51:01 PM
Stop Time	1/26/2015 10:21:12 PM
Run Time	06:30:11
Model Type	Edge eg-5
Serial Number	ESN080199
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	33.6 %	Pdose (8:00)	1	41.3 %
Lavg	1	83.6 dB	Leq	1	--
TWA	1	82.1 dB	UL Time	1	00:00:00
SEL	1	156.2 dB	ProjectedTWA (8:00)	1	83.6 dB
Mntime	1	1/26/2015 9:13:58 PM	Mxtime	1	1/26/2015 7:20:09 PM
PKtime	1	1/26/2015 5:53:55 PM	Lasmx	1	109.4 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	61 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	124.7 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	18.2 %	Pdose (8:00)	2	22.4 %
Lavg	2	79.2 dB	Leq	2	--
TWA	2	77.7 dB	UL Time	2	00:00:00
SEL	2	151.8 dB	ProjectedTWA (8:00)	2	79.2 dB
Mntime	2	1/26/2015 9:13:58 PM	Mxtime	2	1/26/2015 7:20:09 PM
PKtime	2	1/26/2015 5:53:55 PM	Lasmx	2	109.4 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	61 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	124.7 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	38 %	Pdose (8:00)	3	46.8 %
Lavg	3	86.7 dB	Leq	3	--
TWA	3	85.8 dB	UL Time	3	00:00:00
SEL	3	130.3 dB	ProjectedTWA (8:00)	3	86.7 dB
Mntime	3	1/26/2015 9:13:58 PM	Mxtime	3	1/26/2015 7:20:09 PM
PKtime	3	1/26/2015 5:53:55 PM	Lasmx	3	109.4 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	61 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	124.7 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080200_20150128_133406
Comments	
Start Time	1/26/2015 3:52:32 PM
Stop Time	1/26/2015 10:24:51 PM
Run Time	06:32:19
Model Type	Edge eg-5
Serial Number	ESN080200
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	1.8 %	Pdose (8:00)	1	2.2 %
Lavg	1	62.5 dB	Leq	1	--
TWA	1	61 dB	UL Time	1	00:00:00
SEL	1	135.1 dB	ProjectedTWA (8:00)	1	62.5 dB
Mntime	1	1/26/2015 9:43:24 PM	Mxtime	1	1/26/2015 7:23:52 PM
PKtime	1	1/26/2015 5:25:25 PM	Lasmx	1	97.1 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	61.6 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	131.7 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	0 %	Pdose (8:00)	2	0.1 %
Lavg	2	41.1 dB	Leq	2	--
TWA	2	39.6 dB	UL Time	2	00:00:00
SEL	2	113.7 dB	ProjectedTWA (8:00)	2	41.1 dB
Mntime	2	1/26/2015 9:43:24 PM	Mxtime	2	1/26/2015 7:23:52 PM
PKtime	2	1/26/2015 5:25:25 PM	Lasmx	2	97.1 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	61.6 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	131.7 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	1 %	Pdose (8:00)	3	1.2 %
Lavg	3	71 dB	Leq	3	--
TWA	3	70.1 dB	UL Time	3	00:00:00
SEL	3	114.7 dB	ProjectedTWA (8:00)	3	71 dB
Mntime	3	1/26/2015 9:43:24 PM	Mxtime	3	1/26/2015 7:23:52 PM
PKtime	3	1/26/2015 5:25:25 PM	Lasmx	3	97.1 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	61.6 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	131.7 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080202_20150128_133340
Comments	
Start Time	1/27/2015 3:46:05 PM
Stop Time	1/27/2015 9:46:23 PM
Run Time	06:00:18
Model Type	Edge eg-5
Serial Number	ESN080202
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	12.9 %	Pdose (8:00)	1	17.2 %
Lavg	1	77.3 dB	Leq	1	--
TWA	1	75.2 dB	UL Time	1	00:00:00
SEL	1	149.3 dB	ProjectedTWA (8:00)	1	77.3 dB
Mntime	1	1/27/2015 7:18:23 PM	Mxtime	1	1/27/2015 9:35:35 PM
PKtime	1	1/27/2015 9:35:36 PM	Lasmx	1	108.1 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	62.3 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	124.7 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	6 %	Pdose (8:00)	2	8 %
Lavg	2	71.8 dB	Leq	2	--
TWA	2	69.7 dB	UL Time	2	00:00:00
SEL	2	143.8 dB	ProjectedTWA (8:00)	2	71.8 dB
Mntime	2	1/27/2015 7:18:23 PM	Mxtime	2	1/27/2015 9:35:35 PM
PKtime	2	1/27/2015 9:35:36 PM	Lasmx	2	108.1 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	62.3 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	124.7 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	13.7 %	Pdose (8:00)	3	18.3 %
Lavg	3	82.6 dB	Leq	3	--
TWA	3	81.3 dB	UL Time	3	00:00:00
SEL	3	125.9 dB	ProjectedTWA (8:00)	3	82.6 dB
Mntime	3	1/27/2015 7:18:23 PM	Mxtime	3	1/27/2015 9:35:35 PM
PKtime	3	1/27/2015 9:35:36 PM	Lasmx	3	108.1 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	62.3 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	124.7 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080203_20150128_133322
Comments	
Start Time	1/27/2015 3:46:28 PM
Stop Time	1/27/2015 9:47:00 PM
Run Time	06:00:32
Model Type	Edge eg-5
Serial Number	ESN080203
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	0.6 %	Pdose (8:00)	1	0.8 %
Lavg	1	55.3 dB	Leq	1	--
TWA	1	53.2 dB	UL Time	1	00:00:00
SEL	1	127.3 dB	ProjectedTWA (8:00)	1	55.3 dB
Mntime	1	1/27/2015 3:52:01 PM	Mxtime	1	1/27/2015 5:38:01 PM
PKtime	1	1/27/2015 5:38:02 PM	Lasmx	1	93.4 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	63.1 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	126.4 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	0 %	Pdose (8:00)	2	0 %
Lavg	2	28.6 dB	Leq	2	--
TWA	2	26.6 dB	UL Time	2	00:00:00
SEL	2	100.7 dB	ProjectedTWA (8:00)	2	28.6 dB
Mntime	2	1/27/2015 3:52:01 PM	Mxtime	2	1/27/2015 5:38:01 PM
PKtime	2	1/27/2015 5:38:02 PM	Lasmx	2	93.4 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	63.1 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	126.4 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	0.3 %	Pdose (8:00)	3	0.4 %
Lavg	3	66.6 dB	Leq	3	--
TWA	3	65.4 dB	UL Time	3	00:00:00
SEL	3	110 dB	ProjectedTWA (8:00)	3	66.6 dB
Mntime	3	1/27/2015 3:52:01 PM	Mxtime	3	1/27/2015 5:38:01 PM
PKtime	3	1/27/2015 5:38:02 PM	Lasmx	3	93.4 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	63.1 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	126.4 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			

Session Report

4/30/2015

General Information

Name	ESN080199_20150130_111215
Comments	
Start Time	1/28/2015 3:14:04 PM
Stop Time	1/28/2015 8:27:02 PM
Run Time	05:12:58
Model Type	Edge eg-5
Serial Number	ESN080199
Device Firmware Rev	R.22C
Company Name	
Description	
Location	
User Name	

Summary Data

Description	Meter	Value	Description	Meter	Value
Dose	1	37.2 %	Pdose (8:00)	1	57.1 %
Lavg	1	85.9 dB	Leq	1	--
TWA	1	82.8 dB	UL Time	1	00:00:00
SEL	1	156.9 dB	ProjectedTWA (8:00)	1	85.9 dB
Mntime	1	1/28/2015 3:22:37 PM	Mxtime	1	1/28/2015 6:54:59 PM
PKtime	1	1/28/2015 7:34:33 PM	Lasmx	1	110.1 dB
Lafmx	1	--	Lcsmx	1	--
Lcfmx	1	--	Lasmn	1	61.7 dB
Lafmn	1	--	Lcsmn	1	--
Lcfmn	1	--	Lcpk	1	--
Lzpk	1	--	Lapk	1	125 dB
Weighting	1	A	RangeCeiling	1	140 dB
Criterion Level	1	90 dB	ULL	1	115 dB
Dynamic Range	1	80 dB	Exchange Rate	1	5 dB
Response	1	SLOW	Integrating Threshold	1	80 dB
Alarm Level 1	1	--	AlarmLevel2	1	--

Dosimeter Name	1	OSHA HC			
Dose	2	23.8 %	Pdose (8:00)	2	36.6 %
Lavg	2	82.7 dB	Leq	2	--
TWA	2	79.6 dB	UL Time	2	00:00:00
SEL	2	153.7 dB	ProjectedTWA (8:00)	2	82.7 dB
Mntime	2	1/28/2015 3:22:37 PM	Mxtime	2	1/28/2015 6:54:59 PM
PKtime	2	1/28/2015 7:34:33 PM	Lasmx	2	110.1 dB
Lafmx	2	--	Lcsmx	2	--
Lcfmx	2	--	Lasmn	2	61.7 dB
Lafmn	2	--	Lcsmn	2	--
Lcfmn	2	--	Lcpk	2	--
Lzpk	2	--	Lapk	2	125 dB
Weighting	2	A	Range Ceiling	2	--
Criterion Level	2	90 dB	ULL	2	115 dB
Dynamic Range	2	--	Exchange Rate	2	5 dB
Response	2	SLOW	Integrating Threshold	2	90 dB
Alarm Level 1	2	--	AlarmLevel2	2	--
Dosimeter Name	2	OSHA PEL			
Dose	3	48.5 %	Pdose (8:00)	3	74.5 %
Lavg	3	88.7 dB	Leq	3	--
TWA	3	86.8 dB	UL Time	3	00:00:00
SEL	3	131.4 dB	ProjectedTWA (8:00)	3	88.7 dB
Mntime	3	1/28/2015 3:22:37 PM	Mxtime	3	1/28/2015 6:54:59 PM
PKtime	3	1/28/2015 7:34:33 PM	Lasmx	3	110.1 dB
Lafmx	3	--	Lcsmx	3	--
Lcfmx	3	--	Lasmn	3	61.7 dB
Lafmn	3	--	Lcsmn	3	--
Lcfmn	3	--	Lcpk	3	--
Lzpk	3	--	Lapk	3	125 dB
Weighting	3	A	Range Ceiling	3	--
Criterion Level	3	90 dB	ULL	3	115 dB
Dynamic Range	3	--	Exchange Rate	3	3 dB
Response	3	SLOW	Integrating Threshold	3	80 dB
Alarm Level 1	3	--	AlarmLevel2	3	--
Dosimeter Name	3	ACGIH			