CAOHC

Summer 2000

UPDATE

VOLUME 11 • ISSUE 2

The Newsletter of the Council for Accreditation in Occupational Hearing Conservation

Chair's Message

by Peter Weber, MD FACS
CAOHC Chair,
Representative of the American Academy of Otolaryngology Head and Neck Surgery

Hi! I hope that you enjoy the Summer edition of the UPDATE. We are always concerned about noise in the workplace and how we can measure and protect our employees from the unwanted effects of noise. This UPDATE issue will help us become more attuned to the definitions of noise and what constitutes unwanted and even unlawful noise in the workplace. It starts with an excellent comparison of United States Hearing Conservation regulations and recommendations. The review article by Elliott Berger, begining on this page, compares OSHA and MSHA regulations and NIOSH recommendations for action level, permissible exposure limit, exchange rate, ceiling levels and impulse noise.

Your hearing conservation library and training video repertoire could be enhanced with the video reviewed on page nine. This video really emphasizes and demonstrates the hazards of noise and how to prevent the unwanted effects of hearing loss and tinnitus from noise exposure. In addition to the video review, we also have a book review of the Noise Manual, 5th edition, a project of the American Industrial Hygiene Association (AIHA), a component organization of CAOHC. This is an excellent resource on all aspects of noise and hearing conservation. For more information on this excellent resource, I direct you to the book review on page three.

Finally, Michael Holthouser has written an excellent article on noise monitoring and what is required documentation for the monitoring of noise in the workplace. This article can be found in the *OHC Corner* on page five.

I think you will find this a very enjoyable issue of the UPDATE with solid information for your practice.

Comparison of U. S. Hearing Conservation Regulations and Recommendations

by Elliott H. Berger, MS INCE, Brd.Cert
Representative of the American Industrial Hygiene Association

Comparison of the various regulatory and "best practice" publications developed by agencies of the federal government may be valuable to OHCs. In the Spring 2000 issue of the UPDATE, Council member Jim Banach provided an overview of the recently issued Mine Safety and Health Administration (MSHA) regulation that will become effective in September 2000. This article provides additional information by comparing the MSHA regulation (MSHA, 1999) to existing OSHA regulations in effect since 1983 (OSHA, 1983), and to a recent guidance document published by the National Institute for Occupational Safety and Health (NIOSH, 1998). The following table (developed originally for inclusion in the upcoming 5th edition of the AIHA *Noise Manual* (see article page 3) is intended to provide a quick comparison of the requirements of the OSHA, MSHA, and NIOSH policies. Please note the following caveats:

* Recordable or reportable hearing loss is addressed under OSHA in 29 CFR 1904, and directly in the MSHA rule.

* The MSHA regulation was published September 13, 1999 with an effective date of September 13, 2000. This table is current as of Spring 2000, but litigation could cause changes before implementation. Check with MSHA (see web address below) for latest status.

* The NIOSH Criteria Document is a recommendation, not a compliance document, but can be construed as a "best practices" guide.

This analysis is not intended to be all-inclusive. Please refer to the actual documents and check with the applicable agency for updates and current status. The agencies can be located on the worldwide web addresses following:

OSHA at: http://www.osha.gov
MSHA at: http://www.msha.gov
NIOSH at: http://www.cdc.gov/niosh

continued on page 6

What's Inside?

CAOHC UPDATE

Published by the Council for Accreditation in Occupational Hearing Conservation, a not-for-profit organization dedicated to the establishment and maintenance of training standards for those who safeguard hearing in the workplace.

Articles should be submitted, with a black and white photograph of the author. The *UPDATE* is available to individuals not certified by CAOHC at an annual subscription rate of $15. Payment must accompany request:

611 E. Wells Street
Milwaukee, WI 53202-3816
Phone (414) 276-5338
Fax (414) 276-3349
E-mail: info@caohc.org

OHC Certification

CAOHC Certification is valid 5 years from the date of the original 20-hour course. Recertification through an 8-hour course must be made by the expiration date of your CAOHC issued certificate. Your application must be filed with the CAOHC office to be valid. Contact CAOHC staff to verify certification or to locate an approved CAOHC course by calling 414/276-5338...or locate courses at CAOHC's website: www.caohc.org.

If you wish to have your name removed from mail solicitations from vendors who have purchased the CAOHC database, please notify CAOHC staff via fax at 414/276-3349; or e-mail to info@caohc.org.

New National Safety Council Representative Appointed to CAOHC Council

George Krafcisin, CIH CSP, will represent the National Safety Council through the fall of 2003, replacing Sara Joswiak, MPH. He is currently the Manager of Sales and Marketing, OSH Business Unit of the National Safety Council in Itasca, IL.

Krafcisin has over 35 years of experience in the occupational health and safety arena. His professional experience also includes quality programs, marketing consultation, and education program development. He has served on numerous technical and management committees of the American Industrial Hygiene Association and the American National Standards Institute and designed and taught courses at four colleges.

CAOHC Council Spring Meeting Held in Philadelphia, PA

Peter Weber, CAOHC Chair, welcomes George Krafcisin new NSC representative.

The Council conducted its semi-annual Spring meeting at the Embassy Suites Airport Hotel in Philadelphia, PA, on April 13, 2000. After welcoming new Council member, George Krafcisin who will represent the National Safety Council (see photo on this page), the Council proceeded to prioritize future plans that were previously determined at the Fall 1999 meeting. Various committees on the Council have been assigned projects that will determine enhancements to the educational process of occupational hearing technicians through CAOHC courses. The Professional Supervisor Course, currently being offered annually at the American Occupational Health Conference (AOHC), will continue to be refined. More information will be provided in future editions of this newsletter.

CERTIFICATION & RECERTIFICATION FEES FOR OHCs
Fees for any course completed on or after June 1, 2000:
$60.00: Initial Certification upon completion of a 20-hour course
$25.00: Recertification upon completion of an 8-hour course

Announcement - *The Noise Manual, 5th Edition* Available This Summer

For the past decade, the dedicated hearing conservationist has had at his or her disposal two primary references in the field, the CAOHC *Hearing Conservation Manual, 3rd Edition*, and the AIHA *Noise Manual, 4th Edition*. The AIHA manual, last published in 1986, will as of this summer, be available in a new 5th edition. The following article highlights the new text and its value to the OHC and his or her professional supervisor, as well as for other colleagues on the hearing conservation team.

The Noise Manual first appeared in 1958. Subsequent editions were published in 1966, 1975, 1986, and the new 5th edition, in 2000. *The Noise Manual* is a project of the American Industrial Hygiene Association's Noise Committee, but the actual work was planned and managed by its five editors, Elliott Berger (AIHA representative to CAOHC), Larry Royster, Julie Royster, Dennis Driscoll (former CAOHC Council member), and Marty Layne. Additionally, a dozen other authors and 21 reviewers participated in the project, which yielded an 800+ page text with 18 chapters and 4 appendices.

The materials of the text are grouped into four sections - I: Fundamentals of sound, vibration, and hearing; II: Elements of a hearing conservation program; III: Noise interference and annoyance; and IV: Regulations, standards, and laws. Within each section one finds extensive coverage by recognized experts in their respective fields. Appendices are provided that include the OSHA Noise Standard and Hearing Conservation Amendment, over 200 references for good practice, properties of materials and engineering conversions, and a copy of the newly released National Hearing Conservation Association (NHCA) guide to revision of baseline audiograms (for STS or for apparent hearing improvements). This last annex is especially noteworthy, as all program supervisors (audiologists or physicians) should implement these procedures to bring a level of uniformity and professionalism to this key practice.

Section I on fundamentals includes 5 chapters that begin with a unique call to arms for the hearing conservationist, a chapter entitled "Noise control and hearing conservation: why do it?" written by the Chief Editor, Elliott Berger. The chapter contains a broad and varied collection of information about noise and its effects, and the value, beauty, and importance of preserving our sense of hearing. The next two chapters in this section review basic sound and vibration concepts and noise measurement instrumentation. Two excellent chapters on anatomy and physiology, and auditory and nonauditory effects, conclude this section. They were written by the late renowned W. Dixon Ward, and posthumously edited by Larry and Julie Royster.

Section II begins with an overview chapter (by Andrew Stewart, former CAOHC Council member) that integrates all the elements of a hearing conservation program, and then continues with chapters on each of those elements - noise surveys, education and motivation, noise control engineering, hearing protection, audiometry, and program evaluation. The noise control, hearing protection, and audiometry chapters have been completely rewritten since the last edition and in the case of the noise control and audiometry chapters, the authors, Dennis Driscoll and Larry Royster (former chapter), and Julie Royster (latter chapter), are new as well. The materials, although covered in depth, are all practical in content and well grounded in a realistic appreciation of actual occupational applications. For example, the noise control chapter includes a unique algorithm to compute a noise control priority factor to help determine which noise problems should first be addressed, and the hearing protection chapter contains extensive discussions of the real-world performance of hearing protection devices and how to best estimate those values.

Section III on noise interference and annoyance provides materials that are all new to the manual. They address concerns that are often expressed in industry with respect to criteria for the habitability of occupied spaces (such as, "Can I use a phone in the guard station, or is it too noisy?"), communication and signal detection in noise (algorithms for predicting speech intelligibility), and the impact that an industrial plant might have on those in the surrounding communities ("Are we going to annoy our neighbors?").

Finally, Section IV begins by looking at standards and regulations, including the recently promulgated and soon-to-be-implemented Mine Safety & Health Administration (MSHA) noise regulation. Attention is then turned to the contentious issue of how to predict the effect of noise on hearing, using as a basis, the recent ANSI standard, S3.44-1996. Finally, Section IV concludes with an update of the prior edition's workers' compensation chapter by new authors Robert Dobie (former CAOHC Council member) and Susan Cooper Megerson (ASHA representative to CAOHC and currently Immediate Past Chair to CAOHC). The chapter contains a table summarizing the statutes in all 50 states and in Canada, based on a new survey conducted in 1998 through the fall of 1999.

For those of you who read the 4th edition, you will find the expanded and updated coverage of the 5th edition to be a welcome complement to your library. Those of you who are unfamiliar with the prior editions will, of course, benefit as well. The book may be ordered by contacting the American Industrial Hygiene Association (AIHA) at 703-849-8888 or visiting their web site at **www.aiha.org.**

CAOHC Participates at AOHC Conference

The AOHC, an annual conference of the American Association of Occupational Health Nurses and the American College of Occupational & Environmental Medicine attended by occupational health professionals, was held May 12-19, 2000, at the Pennsylvania Convention Center in Philadelphia.

CAOHC previewed the new *Anatomy, Physiology & Diseases of the Ear Video Curriculum Package* at the CAOHC booth in the exhibit hall.This curriculum provides audiometric technicians, industrial workers and CAOHC students with solid background information about the anatomy and physiology of the human ear. This curriculum will also increase your knowledge about the effects of noise - helping you motivate workers to be more receptive to hearing conservation programs. *(CAOHC Course Directors may utilize this curriculum package as a substitute for one required professional discipline instructor at a CAOHC approved course.)*

For more information about this video package, or to place an order, please contact the CAOHC office at 414/276-5338. You may also download an order form from our website at: **http://www.caohc.org**

NHCA to Sponsor Excellence Seminar

The National Hearing Conservation Association (NHCA) will host its 11th annual Excellence in Hearing Conservation Seminar on November 1, 2000 in Indianapolis, IN at the Adams Mark Hotel. The seminar will focus on practical aspects of implementing and overseeing an occupational hearing conservation program. Objectives of the seminar include promoting excellence in hearing conservation services, educating professionals who may not have the opportunity to attend the annual conference and attracting new members to the association. Attendees include hearing conservation program coordinators, occupational hearing conservationists, industrial hygienists, safety directors, audiologists and other related professionals.

NHCA is a national organization dedicated to the prevention of hearing loss due to noise and other environmental factors in all sectors of society. It has been organized specifically to provide professional development, education, standardization/guidelines, and the exchange of information to hearing conservation professionals. For further information access the NHCA website at: **http://www.hearingconservation.org**

We look forward to seeing you there!

Course Director Workshop Scheduled for Fall 2000 & Spring 2001

The Fall Course Director Workshop will be held in Rosemont (Chicago), IL on Monday, October 2, 2000 at the Sheraton Gateway Suites O'Hare.

If you are interested in becoming a Course Director and meet the qualifications described in the "Course Director Certification and Recertification Requirements" brochure and have your application approved by the Screening Committee, you must then complete a one-day Course Director workshop.

You may contact Barbara Lechner at the CAOHC office at 414/276-5338 for more information, or access the CAOHC website at **http://www.caohc.org**

Course Directors presently certified who wish to recertify via the workshop method may also attend.

The Spring 2001 Course Director Workshop has been scheduled for Friday, March 9, 2001 at the Embassy Suites Hotel in Salt Lake City, UT. More information about this workshop will be available in the next issue of the UPDATE.

Philadelphia Workshop Certifies New Course Directors

Congratulations to the ten new Course Directors who met CAOHC's education and experience requirements and completed the 8-hour workshop conducted by CAOHC Council members on April 14, 2000 at the Embassy Suites Hotel/ Airport, in Philadelphia, PA.

H. Gregory Adams, PhD - Roanoke, VA
C.Barton Anderson, MS CCC-A - Cedar City, UT
Beth A.Cooper, PE INCE. Bd.Cert. - Cleveland, OH
Franklin C. Froman, MS CCC-A - Fort Sill, OK
Joyce Houston, MA CCC-A - San Diego, CA
Louise C. Johnson, RN BSN COHN - Plainfield, IN
Karen Landry Mills, MS CCC-A - Longview, TX
Donald W. Paul, MS PC CCC-A - Boston, MA
Eva Saffer, PhD CCC-A - Summerville, SC
Nathan Smith - Killeen, TX

Congratulations are also extended to the three CAOHC Course Directors who recertified by completing the workshop on April 14, 2000.

John M. Page, PhD CCC-A - Allentown, PA
Robert H. Saltsman, Jr., MS CCC-A - Lutherville, MD
Gordon L. Stanfield, PhD - Biloxi, MS

OHC Corner

Noise Assessment in a Hearing Conservation Program– Meeting the Requirements of the OSHA Occupational Noise Exposure Standard, 29 CFR 1910.95

by Michael Holthouser, MD MPH
Representative of the American College of Occupational & Environmental Medicine

Occupational hearing conservationists (OHC) who have attended a course sanctioned by the Council for Accreditation in Occupational Hearing Conservation (CAOHC) know that there are seven basic components to a hearing conservation program (HCP) conducted as required by the Occupational Safety and Health Administration (OSHA). Those components are noise measurement, engineering noise control, audiometric testing, hearing protection, employee training and education, record keeping and program evaluation. While most OHCs are quite familiar with many components of the HCP, most are probably not significantly involved in noise measurement and control to be as knowledgeable about these components as they are about the ones in which they are frequently involved. The fundamental thrust of a HCP is to limit an employee's exposure to hazardous noise levels so that noise induced hearing loss (NIHL) does not occur. Recognition of hazardous noise is the point at which hearing conservation begins. Thus, understanding at least how this is done is essential to the proper functioning of a HCP.

The word "noise" is derived from the Latin word "nausea" and is defined as sound that is loud, disagreeable or unwanted. Whether sound is too loud, disagreeable or unwanted often depends on the tastes of the listener and the context in which it is heard. What is pleasant music to some is unwanted noise to others. Sound can be unwanted noise at certain times, such as when one is trying to communicate or concentrate, but very desirable at others, such as at a rock concert. Our hearing is not as discriminating as our musical tastes. Hearing can be harmed by hazardous noise whether or not the person subjected to it enjoys the sound. The OSHA standard focuses on occupational noise exposure and prevention of NIHL. However, noise that occurs outside the workplace and unmeasured workplace noise (such as the blaring boom box that reappears in the workplace just after a noise survey is completed) can result in identical NIHL, called sociocusis. In reviewing an audiogram, it is not possible to distinguish between work-related NIHL and the NIHL of sociocusis without good information about real workplace noise exposure.

The normal ear can hear sounds produced by acoustic pressures ranging from 20 micropascals to the maximum tolerable level of more than 20,000,000 micropascals. Because such a wide range is too cumbersome to work with conveniently, a logarithmic or compressed scale is used to describe the noise level (which, for this range of acoustic pressures, is from 0 dB to above 120 dB), where the unit of measurement is called a decibel (dB). Since sound level is a logarithmic quantity, sound levels are not arithmetically additive (e.g., two 80-dB sources operating together do not produce a sound level of 160 dB, but rather 83 dB).

The human ear is most sensitive, at medium intensity sound levels, to sound frequencies between 1 and 5 kilohertz (kHz, 1000 cycles per second) due to the combined resonances of the ear canal and the middle ear bones. Because of this built-in frequency sensitivity of the human ear, the damaging effects of excessive noise exposure are most prominent in the 3-6 kHz hearing frequency range. Because of this fact, when taking noise measurements, it is important to measure the noise that is most hazardous to human hearing. Measurement devices have network filters, called "weighting scales," incorporated into them that exclude some low frequency and very high frequency sounds, similar to the way a human ear would perceive sound. The two most commonly used scales are the A-and C-weighted scales. The A scale is used to assess employee noise exposure for the purpose of hazard recognition, evaluation and control. Noise measurements in the context of a HCP are usually expressed as dBA. The C-weighted scale may be used to determine protection derived from the use of hearing protectors, for assessing impulse noise and for certain manufacturing equipment specifications.

In addition to sound pressure level, the length of time over which employees are exposed to the sound helps determine the amount of energy that the ears receive. Both level and time must be considered in calculating the "dose" of noise to which employees are exposed, and all time periods of exposure to varying noise levels must be integrated to calculate the total dose of noise. OSHA defines a doubling of noise exposure, called the "exchange rate," as 5 dB, although according to the equal energy principle, it should be 3 dB. In other words, halving the amount of time during which an employee is exposed to a given level of noise decreases the total exposure to half. For example, an employee who works in an area with an 85-dBA sound level, but who is there for only four hours, actually has an 80-dBA 8-hour TWA exposure, using the 5-dB exchange rate. (Other governmental departments and agencies use different exchange rates, e.g., the EPA, the Department of Defense, and the European Community all use 3 dB.

continued on page 8

ISSUE	DESCRIPTION & DEFINITION	OSHA 29 CFR 1910.95	MSHA 30 CFR PART 62	NIOSH PUB. NO. 98-126
Action Level (AL)	The time-weighted average (TWA) exposure which requires program inclusion, hearing tests, training, and optional hearing protection	AL = 85 dBA TWA. AL is exceeded when TWA $\geq$ 85 dBA, integrating all sounds from 80 - 130 dBA.	Similar to OSHA, except integration is for all sounds from 80 to at *least* 130 dBA.	Does not have AL; rather has a single Recommended Exposure Limit (REL, see next row) for hearing loss prevention, noise controls, and HPDs.
Permissible Exposure Limit (PEL)	The TWA, which when exceeded, requires feasible engineering and (MSHA)/or (OSHA) administrative controls, and mandatory hearing protection.	PEL = 90 dBA TWA. PEL is exceeded when TWA > 90 dBA, integrating all sounds from 90 - 140 dBA, as inferred from Table G-16 of 1910.95(b).	Similar to OSHA, except integration range is explicit in the reg. (62.101, Definitions), and is for all sounds from 90 to at *least* 140 dBA.	REL = 85 dBA TWA. REL is exceeded when TWA $\geq$ 85 dBA, integrating all sounds from 80 - 140 dBA.
Exchange Rate	The rate at which exposure accumulates; the change in dB TWA for halving/doubling of allowable exposure time.	5 dB	Same as OSHA.	3 dB
Ceiling Level	The limiting sound level above which employees cannot be exposed.	No exposures > 115 dBA SPL; generally interpreted as "no unprotected exposures" to give credit for HCP, HPDs and feasible engineering controls.	"P" code violation issued for any protected or unprotected exposures > 115 dBA SPL.	No protected or unprotected exposure to continuous, varying, intermittent, or impulsive noise > 140 dBA.
Impulse Noise	Noise with sharp rise and rapid decay in level, $\leq$ 1 sec. in duration, and if repeated, occurring at intervals > 1 sec.	To be integrated with measurements of all other noise, but *should* not exceed 140 dB peak SPL.	To be integrated with measurements of all other noise.	To be integrated with measurements of all other noise, but not to exceed 140 dBA.
Monitoring	Assessment of noise exposure.	Once to determine risk and HCP inclusion; from there as conditions change resulting in potential for more exposure.	Mine operator must establish system to evaluate each miner's exposure sufficiently to determine continuing compliance with rule.	Every 2 years if any exposure $\geq$ 85 dBA TWA.
Noise Control	Investigation and implementation of feasible engineering and administrative control measures.	Feasible controls required where TWA > 90 dBA; subsequent compliance policy (which may be changed/ revoked by OSHA at any time) permits proven effective HCP in lieu of engineering where TWA < 100 dBA.	Feasible engineering and administrative controls required for TWA > 90 dBA; even if controls do not reduce exposure to the PEL, they are required if feasible (i.e. $\geq$ 3-dBA reduction). Administrative controls must be provided to the miner in writing and posted.	Feasible controls to 85 dBA TWA. Administrative controls must not expose more workers to noise.
Hearing Protection	Exposure requirements and conditions for use of hearing protection devices (HPDs).	Optional for $\geq$ 85 dBA TWA; mandatory for > 90 dBA TWA, or for $\geq$ 85 dBA TWA for workers with STS. Protect to 90 or to 85 with STS. Choices must include a "variety" which is interpreted as at least 1 type of plug and 1 type of muff.	Use requirements same as OSHA, but amount of protection not specified, and choices must include 2 plugs and 2 muffs. Double hearing protection (muff plus plug) required at exposures >105 dBA TWA.	Mandatory for $\geq$ 85 dBA TWA; must protect to 85. Double hearing protection (muff plus plug) recommended at exposures > 100 dBA TWA.
Evaluation of Hearing Protector Effectiveness	Method of assessing adequacy of HPDs	Use manufacturers' labeled NRRs to assess adequacy, but subsequent compliance policy stipulates 50% derating of NRRs to compare relative effectiveness of HPDs and engineering controls.	No method included in standard. Preamble to regulation indicates that compliance guide will follow with suggested procedures.	Labeled NRRs must be derated by 25% for muffs, 50% for foam plugs, and 70% for other earplugs unless data available from ANSI S12.6-1997 Method B.
Supervisor of Audiometric Testing	The person who is responsible for the conduct of audiometric testing, and is the reviewer of audiograms.	Licensed or certified audiologist, otolaryngologist, or other physician.	Licensed or certified audiologist, or physician.	Audiologist or physician.
Audiometric Technician	The person who conducts audiometric testing and review.	Must be responsible to supervisor (see above). CAOHC certified, or has demonstrated competence to supervisor. When microprocessor audiometers used, certification not required.	Must be under direction of supervisor (see above). Must be certified by CAOHC or equivalent certification organization.	Must be under direction of supervisor (see above). Must be certified by CAOHC or equivalent certification organization.

ISSUE	DESCRIPTION & DEFINITION	OSHA 29 CFR 1910.95	MSHA 30 CFR PART 62	NIOSH PUB. NO. 98-126
Audiometry	Initial and ongoing hearing tests used to assess the efficacy of hearing conservation measures.	Required annually for all workers exposed ≥ 85 dBA TWA. Baseline test within 6 months of exposure; 12 months if using mobile testing service, with HPD in the interim.	Same as OSHA but choice of whether or not to take an audiogram is at miner's discretion.	Required for all workers exposed ≥ 85 dBA TWA. Baseline test pre-placement or within 30 days of exposure. Best practice is to test workers exposed > 100 dBA TWA twice per year.
Quiet Period Prior to Baseline Audiogram.	Period of non-exposure to workplace noise required prior to baseline audiogram.	14 hrs; use of HPDs acceptable as alternative.	Same as OSHA.	No exposure to noise ≥ 85 dBA for 12 hrs.; HPDs can not be used as alternative.
Background Noise	Permissible noise in audiometric test chamber during testing.	Levels specified as 40 dB @ 500 and 1000 Hz, 47 dB @ 2000 Hz, 57 dB @ 4000 Hz, and 62 dB @ 8000 Hz	According to scientifically validated procedures.	Per ANSI S3.1-1999 or latest revision; 19 dB more stringent than OSHA at 500 Hz, and 13 to 25 dB more stringent at other frequencies.
Audiogram Review and Employee Notification	Required actions following audiograms.	Not specified unless STS is detected; see STS follow up.	Audiograms must be reviewed within 30 days and feedback in writing for each miner within 10 days thereafter.	Not specified unless STS is detected; see STS follow up.
STS (OSHA/MSHA - *Standard* Threshold Shift; NIOSH - *Significant* Threshold Shift)	A change in hearing compared to an earlier (baseline) hearing test that requires follow-up action.	≥ 10-dB average shift from baseline hearing levels at 2000, 3000 and 4000 Hz in either ear.	Same as OSHA.	≥ 15-dB shift for the worse from baseline at any test frequency, in either ear, confirmed with follow-up test for same ear/frequency.
STS Retests	Follow-up audiogram that is permitted or required when initial STS is detected.	May obtain retest within 30 days and substitute for annual audiogram.	Same as OSHA.	Must provide confirmation audiogram within 30 days.
STS Follow-up	Required actions when an STS is detected.	Notify worker within 21 days; unless STS is not work-related, must fit or re-fit employee with HPDs and select higher attenuation if necessary, refer for audio/otological exam if more testing needed or problem due to HPDs, and inform employee of need for exam if problem unrelated to HPD usage is suspected.	Notify worker within 10 days; unless STS is not work-related, must retrain the miner, provide miner an HPD or a different HPD, and review effectiveness of any engineering and administrative controls to correct deficiencies.	Notify worker within 30 days; must take action such as explain effects of noise, reinstruct and refit with HPDs, provide additional training in hearing loss prevention, or reassign to quieter area.
Baseline Revision	Procedures for revising the baseline audiogram to reflect changes in hearing.	Annual audio substituted for baseline when STS is *persistent* or thresholds show significant improvement.	Annual audio substituted for baseline when STS is *permanent* or thresholds show significant improvement.	Annual audio substituted for baseline when confirming audiogram validates an STS
Presbycusis or Age Correction	Adjustments for hearing levels for anticipated effects of age.	Allowed.	Same as OSHA.	Not Allowed.
Recordable or Reportable Hearing Loss	Amount of hearing loss triggering reporting requirements on workplace injury/illness logs.	By OSHA directive, ≥ 25-dB average shift from original baseline at 2000, 3000, and 4000 Hz, in either ear, w/ age correction; rule change pending.	≥ 25-dB average shift from baseline, or revised baseline, at 2000, 3000, and 4000 Hz in either ear.	Not indicated.
Training and Education	Description of the annual training and educational component of the hearing conservation program.	Annual for all employees exposed ≥ 85 dB TWA on effects of noise, HPDs, and purpose and explanation of audiometry.	Same as OSHA, except must begin within 30 days of enrollment in HCP, and include description of mine operator and miner's responsibilities for maintaining noise controls.	Same as OSHA, but must also include psychological effects of noise, and roles and responsibilities of both employers and workers in program.
Warning Signs and Postings	Requirements to post signs for noisy areas or to post regulations.	Hearing conservation amendment shall be posted in workplace.	No requirements for posting reg., but when administrative controls are utilized the procedures must be posted.	Signs must be posted at entrance to areas with TWAs routinely ≥ 85 dBA.
Record Retention	Specification on retention of data, and transfer requirements if employer goes out of business.	Noise surveys for at least 2 yrs., hearing tests for duration of employment, with requirement to transfer records to successor if employer goes out of business.	Employee noise exposure notices and training records for duration of enrollment in HCP + 6 months, and hearing tests for duration of employment + 6 months, with requirement to transfer records to successor mine operator.	Noise surveys for 30 yrs., hearing tests for duration of employment + 30 yrs., calibration records for 5 yrs, with record transfer per 29CFR1910.20(h).

REFERENCES

* MSHA (1999). "Health Standards for Occupational Noise Exposure; Final Rule," 30 CFR Part 62, Vol. 64 (176), Fed. Reg., 49548-49634, 49636-49637.
* NIOSH (1998). "Criteria for a Recommended Standard - Occupational Noise Exposure, Revised Criteria 1998," U. S. Dept. HHS (NIOSH) Pub. No. 98-126, Cincinnati, OH.
* OSHA (1983). "Occupational Noise Exposure; Hearing Conservation Amendment; Final Rule," 29CFR1910.95 Fed. Regist. 46(162) 42622-42639.

Noise Assessment

continued from page 5

The reasons for this are related to the empirical models used by the respective regulatory agencies to relate hearing damage to sound energy.)

The distance that an employee is from a source of noise is also significant in determining and limiting exposure. Noise behaves according to the *inverse square law* so that the measured sound pressure level is a function of the inverse square of the distance between the source of the noise and the employee. A small initial increase in distance significantly decreases noise level, but further decreases of the same magnitude require increasingly larger and larger increases in distance. This results in a 6 dB decrease in sound level for each doubling of the distance from the source. This relationship does not always completely hold (because in enclosed areas like factories or rooms, noise reflection causes reverberation, and because some noise energy is absorbed by the air molecules through which it travels), but it is useful for general purposes.

There are three basic types of noise: continuous or steady state noise, which maintains a relatively constant level; intermittent noise, in which large differences in sound level occur throughout exposure periods; and impact or impulse noise, in which there are short-duration peaks of high sound level. All three forms of noise, ranging in levels from 80-130 dBA, must be included and integrated into employee noise exposure measurements. This could be an arduous data collection and analytical chore. Thankfully, modern noise measurement instruments make this process much easier.

The basic instruments used to measure noise are sound pressure level meters (SLM), dosimeters and octave band analyzers (all of which also require the use of acoustic calibrators). Although there are various types of SLMs, the general purpose or Type 2 SLM is commonly used. (Type 1 or Type 0 instruments have a higher level of accuracy than is required for use in a HCP.) SLMs are used for conducting area noise measurements to determine the noise levels between particular machines, in aisles between machines, or in certain noisy locations that may be posted as "high noise areas." A "noise map" of an industrial plant, similar to an altitude contour map, may be constructed using area measurements to determine where hazards may exist and to identify employees who will need further noise exposure assessments. In continuous noise exposure situations, in which there is little-to-no employee mobility, SLM measurements can be used to determine employee exposures. They can also be used to assess the effectiveness of an "administrative control" of the noise hazard, i.e., moving an employee away from the noise source so that his or her working position affords a permissible exposure level without the use of personal hearing protectors. Good noise exposure characterization can be very helpful in the selection of hearing protection. This is especially true for employees with existing significant hearing loss, as over-protection can interfere with communication and hearing critical signals.

Although most HCP noise measurements require the use of A-weighted sound levels, octave band analyzers enable a person to measure the sound energy in each octave band or one-third-octave band (a fraction of the frequency spectrum). This is useful in hearing conservation programs for the purpose of assessing the background levels in audiometer rooms or to identify the noisiest frequencies emitted by a particular machine for engineering noise control purposes.

Sound level meters have a "slow" and a "fast" response setting. For most purposes, OSHA requires the use of the slow meter response. However, using the "peak" or "instantaneous" setting on the SLM may allow the user to accurately measure impulse noise. The OSHA standard forbids any (unprotected) employee exposure to noise above 115 dBA and to impulse noise above 140-dB peak SPL. As there are a variety of microphones used in SLMs produced by the various equipment manufacturers, it is very important to carefully review the manufacturer's instructions prior to use. For accurate measurements, the microphone on the sound level meter must be held at the proper incidence angle to the noise source (this is a function of the type of microphone). There are also attachments available for SLMs such as windscreens to reduce the effects of wind over the face of the microphone.

The easiest and most accurate method for determining time-weighted exposure is with a dosimeter, particularly if there is any significant degree of employee mobility and/or intermittent noise exposure. However, it is technically possible to determine a time-weighted noise exposure by using a SLM, a stopwatch and close following of a monitored employee to measure all of the various noise levels to which he or she is exposed. Dosimeters integrate all the noise and variable exposure periods, as required by the OSHA standard. They are called "dosimeters" because they present results of measurements as a percent of the permissible noise dose. The OSHA permissible exposure limit (PEL) is 90 dBA 8-hour TWA. Recalling what was mentioned above about the characteristics of sound, if a person is exposed to 95 dBA for 4 hours, he or she would receive 100% of the permissible dose, as would an employee who is exposed to 90 dBA for 8 hours. An employee who is exposed to 85 dBA for 8 hours would receive 50% of the permissible dose. Dosimeters must be calibrated before use, and many experts also recommend a calibration check after the noise measurement is taken to assure measurement accuracy. They must be properly placed on the individual whose exposure is being monitored. This placement is usually with the microphone on the shoulder, near the ear, but not touching anything and the dosimetry unit attached to the belt or well secured in a pocket. When downloaded to a computer, dosimeters can provide very informative statistics and profiles of an employee's noise exposure. OSHA inspectors rely on dosimeters to assess compliance with the noise standard, using the SLM mainly as a back-up instrument.

OSHA requires noise-measuring instruments to comply with certain standards. Sound level meters must comply with the American National Standard Specification for Sound Level Meters [ANSI S1.40 1983(R1997)]; dosimeters with the American National

continued on page 9

Video Review - "The Hearing Video"

Submitted by: Elliott Berger, MS INCE, Brd.Cert.
Representative of the American Industrial Hygiene Association

Hot! This film is very hot and au courant (circa 1997). If a safety video, produced in the style of a TV science show, can actually be fun to watch - this one's it - tightly edited, humorous to the point of truly funny (well, at least it is for those who live and breathe hearing conservation), and accurate. As its flyer suggests, the film addresses the questions of who's affected by hazardous noise, how do you choose the right hearing protection, and what's the deal with the annual hearing test?

The narrator begins with a dramatic claim, one often expounded by the well-known hearing conservationist and motivational speaker, Don Gasaway; hearing is more precious than vision, and its layers of sound, and its complexities and subtleties, are often overlooked by those possessing this remarkable sense. In short order, we are then presented with sounds and their hazardousness, excellent ear animation/ computer graphics to illustrate the innards of the hearing mechanism, and the oft used hair cell/lawn-of-grass analogy, but executed quite nicely.

Hazardous noise is defined as >85 dBA for 8 hours, and we are presented with many good industrial examples of such noises in terms of their L_{ex} values (A-weighted average sound levels with a 3-dB exchange rate). Reference is also made to off-job exposures and how a combination of moderate on- and off-job exposures can lead to a hazardous situation. In between other useful information such as the shout-to-be-heard at arm's length indicator of dangerous sound and early signs of hearing loss, we view some funny stuff such as a clip of the Hearing Cops with an excellent audio simulation of hearing loss, and a Kelvin Climb ad for Safer Hearing, which is a truly funny parody. Throughout the film the director has interspersed old movie clips, some with amusing voice-overs, and others just for the apropos images they portray.

Although the film does not specifically demonstrate how to fit HPDs in the ear, it provides practical information for selection of protectors, such as current hearing levels, noise, need to communicate, other personal protective equipment in use, temperature, climate, physical constraints, and anatomical differences. An interesting analogy is drawn between acoustically sealing an earcanal and sealing a plumbing drain, whereby a small leak can circumvent the effectiveness of the stopper and likewise, a small acoustical leak can seriously degrade the performance of the hearing protector. The film concludes with a fun review of the highlights of audiometric testing.

These pros have done their homework, and the promotional materials assure us that "no one's hearing was damaged in the making of this video, although the director did get a couple of headaches." *The Hearing Video* will be a useful and enjoyable addition to your hearing conservation library and training repertoire, whether it's north or south of the border (the Canadian border that is).

To order, contact:
Workers' Compensation Board
of British Columbia
Films and Posters
Box 5350 Station Terminal
Vancouver, BC V6B 5L5
CANADA
Phone: (604) 276 3068

Free previews are available with a credit card guarantee.
The Hearing Video (17, 1/2 min., 1997) $149.99 (Canadian)

Noise Assessment

continued from page 8

Standard Specification for Personal Noise Dosimeters [ANSI S1.25-1991(R1997)]; and acoustic calibrators with the American National Standard Specification for Acoustical Calibrators [ANSI S1.40-1984(R1997)].

Noise levels should be measured periodically. There is no specified time period in the OSHA standard, but measurements should be taken whenever there is a change in the process that may result in a change in noise exposure (e.g., increased line speeds, new or additional pieces of equipment added or a new process or material). Construction projects and some ventilation changes can alter the acoustical "noisescape" of a facility. Also, machines tend to become louder as they age because moving parts like bearings wear and become louder. Maintenance employees may have removed engineering controls for their convenience, rendering the sound louder than the engineers believe it to be. Annual measurements are recommended as a minimum time period between measurements, as there is really no static workplace.

Learning to take noise measurements is not difficult. Measuring noise will give OHCs a broader perspective on the noise hazards that exist in their hearing conservation programs and will help them develop more pertinent training materials for the employees they monitor. It will also broaden the OHCs role on the hearing conservation program team. And, since noise measurement is a fundamental component of a hearing conservation program, the OHC will have greater visibility in the program.

Letter to the Editor

The UPDATE Editor received this letter in response to an "OHC Corner" article published in the Winter 1999-2000, Volume 10, Issue 4, Page 3 inviting contributions on training techniques. This suggestion was submitted by Aaron Priddy, a CAOHC Certified Occupational Hearing Conservationist from Tennessee.

Dear Editor:

Last year was my first year starting and managing a large hearing conservation program. I have found several things that help with educating the employees on the front lines.

The first thing that has really helped is education, education, education! I had to take the time to inform the employees what it means to have a 20-dB hearing loss. When they realize what the numbers mean they receive the full impact and understanding of the loss.

The second method that I like to use is personal association. I work in the aviation industry with employees who have been around aircraft for 20 and 30 years. A large number have tinnitus. When I ask how many have a ringing in their ears and they raise their hands, I let them know they probably have a noise-induced hearing loss (NIHL). I like to ask, "does anyone have trouble understanding what other people say? You know that person is talking to you, you can hear it, but you can't quite make out what it is that they are saying." You have lost that clarity of speech. Or, "How many of you find yourselves having to look at someone to really understand what it is they are saying?" I always get several hands raised.

I then relate some of the personal problems that people experience. Your spouse gets irritated with you because, you never listen. There is increased marital stress and strain because of the breakdown of communication. You avoid public places with a lot of background noise because you can't hear what people are talking about, so you never take your wife out dancing or to social functions. I then let them know that this is all caused by NIHL.

Another association that almost everyone can relate to is the restaurant scene when they overhear a spouse, normally the wife, having to yell at her husband because he can't hear what the waiter is saying. When I ask, "how many of you want to be like them in 5 years?" I don't ever get a response.

The third and probably most meaningful training method I like to use is hands-on experience. If you can show people what it's like to have a NIHL you can make a definite impact on their life and work practices. Various programs are available such as Scott Bradley's simulation of normal speech, and various degrees of hearing loss including distorted speech (available for download for Mac or PC from http://facstaff.uww.edu/commdis/ftpsite.html). When you can let people actually hear what it means to have a hearing loss it becomes very real. Other available hearing loss demonstrations include **http://mvf.neurophys.wisc.edu/animations/ and http://www.aearo.com/html/industrial/tech01.htm#audiodemo.** Giving the employee the education about NIHL is the best way to prevent it from happening. Taking the time to make the education process informative, personal and fun will provide you future rewards and benefits in reducing your amount of NIHL.

EDITOR'S NOTE: Additional demonstrations on acoustics and hearing conservation may be found at: http://acousticaltest.grc.nasa.gov/

The UPDATE Editor also received this comment from Ferman Weedon, COHC from Texas regarding the article "Eye Contact: linking eye color and hearing loss" published in the Winter 1999-2000, Volume 10, Issue 4, Page 2.

Dear Editor:

Your article linking eye color and hearing loss supports my records. In my work for a federal contractor, we test a range of personnel from retirees to three-year staffers who have a common link as aircraft mechanics in the military. I have test results too that indicate African-American personnel have better test results in the range of 10dB to 20dB in the higher frequencies. Thank you for this substantiating information.

Upcoming OHC Certification and Recertification Courses*

2000

Approved as of May 2000 (for a complete list of courses visit our website at www.caohc.org)

**The listed dates indicate day one of the scheduled classes; certification courses are 20 hours in length; recertification classes are 8 hours.*

Date	City	State	Course Director	Phone
7/10	St.Croix	VI	Deppensmith, Kathryn	713/869-6664
7/10	Owensboro	KY	Etienne, Joseph	270/926-0418
7/11	Seattle	WA	McCall, Kirsten	310/314-9957
7/11	Greensboro	NC	Newman, Valerie	704/525-0999
7/12	Ft.Lauderdale	FL	Elmore, John	800/357-5759
7/12	Brookfield	WI	Hase, Meredy	262/547-2227
7/12	Houston	TX	Meloy, Melette	678/363-9897
7/17	Houston	TX	Deppensmith, Kathryn	713/869-6664
7/18	Kansas City	MO	Bloyer, Cindy	816/471-3900
7/18	Atlanta	GA	Moore, Gregg	336/665-1818
7/18	Atlanta	GA	Newman, Valerie	Private (NR)
7/18	Liberty	MO	Ratliff-Hober, Linda	816/781-9268
7/19	San Antonio	TX	Elmore, John	800/357-5759
7/19	Portland	OR	Fairchild, Michael	503/232-1646
7/19	Dallas	TX	Harris, Dean	970/586-0702
7/19	New Brunswick	NJ	Kelly, Ellen	732/238-1664
7/19	Birmingham	AL	Meloy, Melette	678/363-9897
7/19	Albany	NY	Swisher, Timothy	412/367-8690
7/19	Cleveland	OH	Synderwine, Carol	216/491-6104
7/21	Brooks AFB	TX	Edris, Maj. Robert	(Air Force)
7/25	Charlotte	NC	Russell, Charles	610/667-1711
7/26	San Franciso	CA	Meloy, Melette	678/363-9897
7/27	Kittanning	PA	Callen, Douglas	724/543-7068
7/27	New Orleans	LA	Elmore, John	800/357-5759
7/31	Chicago	IL	Rhodes, Robert	713/869-6664
8/2	Williamsburg	VA	Elmore, John	800/357-5759
8/2	Greeley	CO	Kastner-Wells, Laurie	970/454-1110
8/2	Chapel Hill	NC	Stewart, Andy	919/493-4471
8/3	Brooks AFB	TX	Edris, Maj Robert	(Air Force)
8/3	Montgomery	AL	Smith, Curtis	334/887-6302
8/4	Oklahoma City	OK	Allison, Tracie	(Army)
8/7	Portland	OR	Atack, Rodney	503/614-8465
8/8	St.Louis	MO	Bellamy, McKenna	314/968-4710
8/8	Anchorage	AK	Deppensmith, Kathryn	713/869-6664
8/8	Brooks AFB	TX	Edris, Maj Robert	(Air Force)
8/9	Marlboro	MA	Gordon, Pamela	508/481-5819
8/9	Jacksonville	FL	Green, Nancy	904/399-3370
8/9	Birmingham	AL	Meloy, Melette	678/363-9897
8/9	Greenville	SC	Panhorst Lassiter, Barbara	864/250-8461
8/9	Cincinnati	OH	Swisher, Timothy	513/421-6515
8/11	Knoxville	TN	Ferrell, Charles	423/974-5453
8/11	St.Louis	MO	Thiele, Natalie	314/968-4710
8/14	Hattiesburg	MS	Oshrin, Stephen	601/266-5216
8/14	Oakbrook Terrace	IL	Thunder, Thomas	847/359-1068
8/15	Los Angeles	CA	McCall, Kirsten	310/314-9957
8/16	Boca Raton	FL	Greenberg, Herbert	561/750-2100
8/16	Jacksonville	FL	Meloy, Melette	678/363-9897
8/16	Shreveport	LA	Rhodes, Robert	713/869-6664
8/16	Oakbrook Terrace	IL	Thunder, Thomas	847/359-1068
8/21	Cincinnati	OH	Elmore, John	800/357-5759
8/22	Detroit	MI	Meloy, Melette	678/363-9897
8/22	Atlanta	GA	Moore, A.Gregg	770/933-9236
8/24	Albuquerque	NM	Deppensmith, Kathryn	713/869-6664
8/24	Louisville	KY	Elmore, John	800/357-5759
8/28	Knoxville	TN	Elmore, John	800/357-5759
8/29	Bellevue	WA	McDaniel, Mary	206/706-7352
8/30	Jasper	IN	Smith, Teresa	317/398-7402
9/6	Brooks AFB	TX	Edris, Maj Robert	(Air Force)
9/11	Lexington	KY	Green, William	606/323-5840
9/11	Liberty	MO	Ratliff-Hober, Linda	816/781-9268
9/12	Indianapolis	IN	Jerome, James	317/841-1065
9/12	San Francisco	CA	McCall, Kirsten	310/314-9957
9/12	Birmingham	AL	Meloy, Melette	678/363-9897
9/12	Greensboro	NC	Newman, Valerie	704/525-0999
9/12	Bala Cynwyd	PA	Patcherezov, Debra	610/667-1711
9/13	Glens Falls	NY	Elmore, John	800/357-5759
9/13	Cedar Rapids	IA	Garrett, Barbara	319/369-7569
9/13	Houston	TX	Rhodes, Robert	713/869-6664
9/13	Kenner	LA	Seidemann, Michael	504/443-5670
9/13	Valley Forge	PA	Swisher, Timothy	412/367-8690
9/14	Pittsburgh	PA	Angelelli, Roger	412/831-0430
9/15	Ft.Hood	TX	Johnson, Maj Jennifer	(Army)
9/18	Salt Lake City		Cronin, Pamela	801/566-8304
9/18	Hillside	IL	Stukas, Natalie	630/241-0990
9/19	Chapel Hill	NC	Stewart, Andy	919/493-4471
9/20	Brooks AFB	TX	Edris, Maj Robert	(Air Force)
9/20	Phoenix	AZ	Elmore, John	800/357-5759
9/20	Portland	OR	Fairchild, Michael	503/232-1646
9/20	Dallas	TX	Harris, Dean	970/586-0702
9/20	Houston	TX	Meloy, Melette	978/363-9897
9/20	Atlanta	GA	Vaughn, Cecelia	770/632-9007
9/20	Atlanta	GA	Wolfe, William	770/475-2055
9/21	Waterville	ME	Giroux, Anne	207/873-7434
9/25	Oklahoma City	OK	Rhodes, Robert	713/869-6664
9/26	Kansas City	MO	Bloyer, Cindy	816/471-3900
9/27	Phoenix	AZ	Deppensmith, Kathryn	713/869-6664
9/27	San Antonio	TX	Elmore, John	800/357-5759
9/27	Little Rock	AR	Rimmer, Thomas	501/663-4742
10/2	Portland	OR	Atack, Rodney	503/614-8465
10/3	Greenville	SC	Carroll, Tara	864/235-9689
10/4	St. Paul	MN	Cary, Carolyn	651/736-2089
10/4	Owensboro	KY	Etienne, Joseph	270/926-0418
10/4	Waterville	ME	Giroux, Anne	207/873-7434
10/4	Cleveland	OH	Snyderwine, Carol	216/491-6104
10/10	Chicago	IL	Meloy, Melette	678/363-9897
10/10	Charlotte	NC	Newman, Valerie	336/665-1818
10/10	Detroit	MI	Simpson, Thomas	313/577-6754
10/10	Bloomington	IL	Thompson, Tamara	309/888-8888
10/11	Denver	CO	Harris, Dean	970/586-0702
10/11	Brookfield	WI	Korabic, Edward	414/288-3428
10/11	Buffalo	NY	Swisher, Timothy	412/367-8690
10/12	Columbus	OH	Elmore, John	800/357-5759
10/16	Cleveland	OH	Deppensmith, Kathryn	713/869-6664
10/16	Detroit	MI	Elmore, John	800/357-5759
10/17	Los Angeles	CA	McCall, Kirsten	310/314-9957
10/17	Oakbrook Terrace	IL	Thunder, Thomas	847/359-1068
10/18	Concord	NH	Gordon, Pamela	508/481-5819
10/18	Boca Raton	FL	Greenberg, Herbert	561/750-2100
10/18	Ft.Walton Beach	FL	Meloy, Melette	678/363-9897
10/18	Shelton	CT	Sochrin, Phyllis	203/735-4327
10/18	Atlanta	GA	Vaughn, Cecelia	770/632-9007
10/18	Cleveland	OH	Wolfe, William	770/475-2055
10/19	Indianapolis	IN	Elmore, John	800/357-5759
10/19	New Orleans	LA	Rhodes, Robert	713/869-6664
10/23	Dallas	TX	Deppensmith, Kathryn	713/869-6664
10/23	Omaha	NE	Norris, Thomas	402/391-3982
10/24	Atlanta	GA	Russell, Charles	610/667-1711
10/25	Tampa	FL	Abrams, Harvey	727/398-9395
11/1	Baltimore	MD	Doyle, Mary Lynette	410/955-4082
11/1	Worcester	MA	Hengen, Garth	508/832-8484
11/1	Houston	TX	Meloy, Melette	678/363-9897
11/6	Houston	TX	Deppensmith, Kathryn	713/869-6664
11/6	Liberty	MO	Ratliff-Hober, Linda	816/781-9268
11/7	Atlanta	GA	Moore, A. Gregg	770/933-9236
11/7	St.Louis	MO	Thiele, Natalie	314/968-4710
11/8	Greenville	SC	Panhorst Lassiter, Barbara	864/250-8461
11/8	Pittsburgh	PA	Swisher, Timothy	412/367-8690
11/8	Atlanta	GA	Vaughn, Cecelia	770/632-9007
11/9	Nashville	TN	Rhodes, Robert	713/869-6664
11/13	Hillside	IL	Stukas, Natalie	630/241-0990
11/13	Bloomington	IL	Thompson, Tamara	309/888-8888
11/14	Houston	TX	Bloyer, Cindy	816/471-3900
11/14	Seattle	WA	McCall, Kirsten	310/314-9957
11/14	Chapel Hill	NC	Stewart, Andy	919/493-4471
11/15	Chicago	IL	Elmore, John	800/357-5759
11/15	Portland	OR	Fairchild, Michael	503/232-1646
11/15	Dallas	TX	Harris, Dean	970/586-0702
11/16	Pittsburgh	PA	Angelelli, Roger	412/831-0430
11/29	Atlanta	GA	Wolfe, William	770/475-2055
12/1	New Brunswick	NJ	Kelly, Ellen	732/238-1664
12/4	Portland	OR	Atack, Rodney	503/614-8465
12/4	San Antonio	TX	Deppensmith, Kathryn	713/869-6664
12/4	New Brunswick	NJ	Kelly, Ellen	732/238-1664
12/5	Kansas City	MO	Bloyer, Cindy	816/471-3900
12/5	Bala Cynwyd	PA	Chiarello, Joseph	610/667-1711
12/5	Greensboro	NC	Newman, Valerie	704/525-0999
12/6	Houston	TX	Elmore, John	800/357-5759
12/6	Cedar Rapids	IA	Garrett, Barbara	319/369-7569
12/6	Marlboro	MA	Gordon, Pamela	508/481-5819
12/6	Boca Raton	FL	Greenberg, Herbert	561/750-2100
12/6	Birmingham	AL	Meloy, Melette	678/363-9897
12/6	Kenner	LA	Seidemann, Michael	504/443-5670
12/6	Oakbrook Terrace	IL	Thunder, Thomas	847/359-1068
12/6	Atlanta	GA	Vaughn, Cecelia	770/632-9007
12/8	Brooks AFB	TX	Edris, Maj Robert	(Air Force)
12/13	San Antonio	TX	Elmore, John	800/357-5759
12/13	Los Angeles	CA	Meloy, Melette	678/363-9897
12/13	Jackson	MS	Rhodes, Robert	713/869-6664

PLEASE CONTACT THE CAOHC OFFICE AT 414/276-5338 FOR ADDITIONAL COURSE AVAILABILITY. PUBLICATION DATES MAY HAVE PRECLUDED SOME COURSE DATES.

For your convenience, you may now update your mailing name, address, company name, phone number, fax number, etc. via CAOHC's website address at www.caohc.org. Click on the button titled "ADDRESS UPDATE". Your mailing changes will be forwarded directly to our office e-mail system. For those of you without internet access, please see page 2 for CAOHC's address, phone, or fax number when forwarding address changes to the CAOHC office.

CAOHC®
Council for Accreditation in
Occupational Hearing Conservation
611 East Wells Street Milwaukee, WI 53202-3816

Address Service Requested

Look for CAOHC
on the
INTERNET

http://www.caohc.org
or e-mail our office
at info@caohc.org

CAOHC Council Members and Their Represented Organizations