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UPDATE

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The Newsletter of the Council for Accreditation in Occupational Hearing Conservation

Chair's Message

By Theresa Y. Schulz, PhD
Representative of the Military Audiology Association

Do you ever get lost in the "voice mail jungle"? It's happened to me a couple of times recently when I've called a large company for assistance or information. I dial in, then get a lengthy choice of 5 or 6 items, none of which sounds like one that will answer my question (but who can be sure, since some of them use jargon that I don't understand). And, there is not an option to speak to a real person.

As I thought about why this is so frustrating, I decided that there are a few basic things I expect when I make that call. One is for someone to be **attentive** to my question. Even when I get to a real person, he or she sometimes absent-mindedly transfers me to someone else or gives me a canned answer that doesn't really address my concerns. The second is for **clarity**. I want choices and answers that I can understand that are not filled with jargon. The third is for **enthusiasm**, or at least a desire to meet my needs rather than giving me the feeling that I'm intruding by wanting to speak with someone.

Then it occurred to me that what I want is an **ACE** (attentive, clear, enthusiastic) response. We should all strive to provide ACE service. As a certified Occupational Hearing Conservationist (COHC) don't *you* want to provide ACE service? Here's how…

A – Be **attentive** during your interactions. Connect with each patient and make sure you listen and address his or her concerns. Doesn't it bother you when *you* are ignored when you arrive and are waiting for service? Acknowledge the presence of people as soon as possible. Even the way you get the worker seated and give the audiometric test instructions can help or hinder your ability to relate to that person. Don't be a robot shuttling people in and out of the booth. Make sure they understand what they are supposed to do.

C – Make your comments and explanations **clear** and understandable. Don't use jargon or, even worse, don't just say, "You passed, see you next year." After the audiometric test, the patient usually wants to know, "How'd I do?" Use that opportunity to explain the audiogram and also to give the person information that will help him or her prevent noise-induced hearing loss. Ask questions about hearing protection use and possible ways to reduce exposure to loud noise.

E – Be **enthusiastic**. Show that you care about your employees' hearing health. If you're not enthused about preventing noise-induced hearing loss, it's guaranteed that workers will not be enthused either. Someone has to get noise-exposed employees motivated to protect themselves and keep that motivation going. Workers would never stand for over-exposure to asbestos, for instance, and they ought to feel the same way about over-exposure to noise.

So now you can go out and be an **ACE** hearing conservationist and make a real difference!

Insert Earphones for Hearing Conservation Audiometric Testing

By Allan H. Gross, MA

Insert earphones have proven their value for a variety of reasons over the past decade in the clinical setting, but can you use them for audiometric baseline and monitoring hearing tests in an occupational hearing conservation program (HCP)? If so, is there any "value added" over the supra-aural earphone? Without fear of becoming the "weakest link," the simple answer to both questions is yes. There are, however, (OSHA) requirements and implications associated with insert earphones in HCPs that you should be aware of before you switch from a supra-aural to an insert earphone.

The contentious issues that exist primarily arise from the fact that the audiometric testing standard used as the basis for the OSHA Amendment was quite specific, and developed when many currently practicing OHCs were working on their first books, with crayons in hand, i.e., long before insert earphones existed commercially. Although the ANSI standard for audiometers has evolved since 1969 (to ANSI S3.6-1989 and currently S3.6-1996) to include new information and technological advances, the OSHA Amendment remains linked to the 1969 ANSI document.

Paragraph (h) (2) of 29 CFR 1910.95, Occupational Noise Exposure; Hearing Conservation Amendment; Final Rule states, "*Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969.*" The General Requirements section of

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UPDATE

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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 $20. Payment must accompany request:*

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When you are registering for a recertification course (or if your fellow staff member is registering for the first time at a certification course), please confirm with the registrar that "this is a CAOHC approved" course. Only certified Course Directors, who have received a course approval certificate from the CAOHC Executive office, can conduct an occupational hearing conservation course that leads to CAOHC certification. Course Directors must display this certificate of approval in view of their students. If you don't see it, please ask your Course Director.

If you are uncertain whether the course you are planning to attend is certified by CAOHC, please contact Chris Whiting at the CAOHC office at 414/276-5338 or e-mail info@CAOHC.org

In Memoriam

Daniel L. Johnson, 1936-2002

Just a few short years ago in 1999 the hearing conservation community recognized Daniel L. Johnson for his contributions by presenting him the Outstanding Hearing Conservationist Award of the National Hearing Conservation Association (NHCA); today we mourn his passing. As we recall his service to science and remember how Dan brightened our lives with his sunny smile, memorable wit, out-of-the-box thinking, and endless enthusiasm… perhaps a moment of story telling is in order.

It was in 1958 that Dan graduated from the US Military Academy, West Point, and commenced a 26-year career of distinction in the US Air Force. However, it was not until mid-point in his career that he became involved in hearing conservation when he joined the Biological Acoustics Branch of the Aerospace Medical Research Laboratory at Wright-Patterson, AFB, Ohio. His first task was project officer and liaison with the US EPA's Office of Noise Abatement and Control, and one of his first reports was a critical review of the worldwide studies relating occupational noise exposure to hearing loss. The eventual outcome of his work led to an international standard that has become the basis for numerous noise-exposure criteria worldwide.

In 1977 Dan received the Air Force's Award for Scientific Excellence. When he retired in 1984 he received the Legion of Merit, the second-highest non-combat award conferred by the US Air Force. Then Dan turned his attention to a second career in industry while continuing and expanding his advisory role with numerous scientific and professional organizations. In 1989 his preeminence led to his appointment as the director of the largest ever US government-funded research project on the effects of noise on hearing, specifically blast noise.

Of equal note was Dan's service to the standards programs of the Acoustical Society of America (ASA), which culminated in his appointment as the ASA Standards Director, only one of a myriad of volunteer activities in which he participated within the acoustical community.

Dan's theoretical and applied research and his work on acoustic standards and committees have created a remarkable scientific legacy. However, of all his accomplishments, he was most proud of his six children and twelve grandchildren for whom grandpa was always a happy, cheerful, and forever optimistic presence. He loved to tell silly jokes, dance jigs in the kitchen, and wake up sleepyheads with loud (but not harmful) classical music and homemade pancakes. In addition to his children, Dan is survived by his wife, Dorothy Chandler Johnson, and his brother Malvin. All of their lives and ours were enriched by that which he shared.

Submitted by Elliott H. Berger

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 this page for CAOHC's address, phone, or fax number, when forwarding address changes to the CAOHC office.

OHC Corner

You Know You're a Hearing Conservationist When. . .

By Richard Danielson, PhD

My heart felt a twinge as I saw it there, pitifully abandoned and neglected. Dozens of people had been carelessly stepping over it, unconscious of its presence and value. When I saw it, though, it triggered both sympathy and dismay. HOW could this happen? WHERE *was* its owner and WHAT terrible risks were going on somewhere? WHY was I so distressed at seeing a single ***earplug*** (dropped and left behind by an airline crewperson) on the floor of the tram as I disembarked from my flight? Once again, I was reminded… I've become what might be classified as a new type of OHC (or Obsessive Hearing Conservationist), a progressive and permanent condition that's common among lots of people I know (although apparently not that common or understood among the general population).

Recently, I met with a group of such friends and found the conversation centered on topics that confirmed our conditions. (Of course, we had decided to sit at a table in the open lobby, rather than subject ourselves to the earsplitting, thudding music in the hotel's club). Like old veterans who recount war ailments, we sat there musing on the progressive influence of hearing conservation on our daily lives. We all had stories that confirmed that we saw things in a different light or perhaps more to the point heard things in a different key, now that we had become so united in the crusade for eliminating noise-related hearing loss. We all admitted that we stare out airplane windows to observe whether luggage crews wear hearing protection (where was the mournful person who'd lost his earplug?). One mom carries earplugs in her purse for her one-year-old baby "just in case." Another provides hearing protection to her teenager and boyfriend as they leave for a date at a rock concert. If such stories seem reasonable and don't surprise you, maybe you, too, have this syndrome… As a test, consider these examples. For example, ***YOU KNOW YOU'RE A HEARING CONSERVATIONIST WHEN YOU…***

- Incorporate hearing conservation into holidays (e.g., make jack-o-lanterns with ears or even earmuffs, add earplugs to chocolate Easter bunnies, or choose where to picnic on the 4th of July fireworks so you aren't near the cannons during the 1812 Overture).
- Can smile graciously when giving audiometric instructions (for your 20th test of the day), as yet another clever worker mischievously retorts "Huhhhh? Whaddyasayyyy?" just to see your reaction.
- Celebrate when you see a newspaper photo of America's President putting on earmuffs before he starts a chain saw during a back-home photo shoot.
- Wince when you see a newspaper photo of soldiers firing a combat weapon without hearing protection.
- Cringe when a member of your own family (especially your dad) disdainfully pooh-poohs your heartfelt offer of earplugs.
- Smirk when your teenager winces AND cringes because you've stopped the car and jumped out to offer earplugs to road construction laborers when you see they're working without protection. ("Really, Dad, how embarrassing!").
- Fearlessly swerve across three lanes of traffic to take a photo of a highway billboard with a great image of an ear or a nifty noise theme (once more, prompting your teenager to wince, cringe and criticize).
- Know exactly when your audiometer was last calibrated, but can't recall when you had your last physical exam.
- Get distracted, when visiting a place of worship, by the acoustics of the building (or worse, get offended because the music is too loud).
- Haven't got a photo of your loved ones at your workplace, but have TWO illustrations of an ear prominently displayed.(By the way, can anyone tell me why it's always the right ear in those photos? Does that have anything to do with the abandoned earplug that I saw… could it have been for a left ear?)
- Know exactly what your firm's STS rate was last year, but have forgotten what your car loan interest rate is.
- Are more impressed by a person's large earcanal than by his large biceps.

I suspect that there are more examples out there, and that there are worse cases of Obsessive Hearing Conservation. There are rumors, for example, of someone who makes homemade fudge in the shape of ears. Someone else is believed to have moved into an old mobile audiometric testing van in an Arizona trailer park. I've even heard of someone who has a tattoo of earmuffs (although others have told me that it looks more like two musical quarter notes tied together… and then again, someone else says it looks like a badly-tattooed Harley Davidson motorcycle). I frankly don't want to investigate it myself.

In the end, you know you're a hearing conservationist when others say you're one… have you ever been called "Ms. Earplug" or "Mr. Hearing"? Consider that success! Your role modeling matters, and your presence at your job can make a difference! Keep spreading this valuable affliction, making it visible, personal and global. For as people work, play and travel, they deserve to hear your fervor and desire for evangelizing hearing conservation… and then become carriers themselves for the Obsessive Hearing Conservation virus. If you ever get temporarily discouraged, push on with the motivation of thinking of my little earplug, smiling back and thinking, "You're such a hearing conservationist!"

Richard Danielson, PhD is a former CAOHC Council member. He is Director of Audiology at Madigan Army Medical Center, Tacoma, WA.

The Publications Committee and Editor would like to remind you that this newsletter is for you! We welcome your ideas for topics to cover in the "OHC Corner." Please contact Barbara Lechner at info@caohc.org or phone 414/276-5338

Twenty-Five "Most Active" Course Directors for 2001 Announced

The CAOHC Council is pleased to announce the twenty-five most active Course Directors for 2001. These CDs taught 2,441 students who were then certified as Occupational Hearing Conservationists by CAOHC. This represents 59% of ALL students who certified or recertified that year. 16 of these Course Directors were in CAOHC's Top 25 last year, too. Congratulations to all!

1. **John H. Elmore, MA MBA**
   (Precision Hearing Conservation - Helotes (Houston), TX)
1. **Timothy A. Swisher, MA CCC-A** (Hearing Safety - Pittsburgh, PA)

   Tied as #1 since they both taught the same number of certifying students!
3. **Thomas D. Thunder, MA FAAA INCE Bd.Cert**
   (Acoustic Associates, Ltd. - Palatine, IL)
4. **Melette L. Meloy, MS CCC-A** (Sound Solutions - Dallas, GA)
5. **Robert C. Rhodes, PhD**
   (Occupational Marketing, Inc. - Houston, TX)
6. **William K. Wolfe, MA** (ETC - Roswell, GA)
7. **Rodney M. Atack, PhD**
   (Hearing & Speech Health Care - Portland, OR)
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   (Gordon Hearing Conservation, Inc - Danvers, MA)
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   (Gunter Audiological Services - Marion, IN)
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    (Deep South Center -AUM Speech & Hearing Clinic - Montgomery, AL)
11. **Kirsten R. McCall, MS CCC-A** (Center for Hearing Health - San Ramon, CA)
12. **Charles E. Fankhauser, PhD** (MEDI - Benicia, CA)
13. **Kathryn M. Deppensmith, MS CCC-A**
    (Occupational Marketing, Inc. - Houston, TX)
14. **Mary M. McDaniel, MS CCC-A**
    (Pacific Hearing Conservation, Inc. - Seattle, WA)
15. **Cynthia J. Bloyer, MS CCC-A** (Exemplar, International - Kansas City, MO)
16. **Roger M. Angelelli, PhD** (Audiometric Baseline Consulting - Bethel Park, PA)
17. **Mark A. Cheple, MS FAAA**
    (Associated Hearing & Audiology - West St. Paul, MN)
18. **Rebecca F. Moreland, PhD, MPH BSN**
    (Chesapeake Occupational Health Services - Baltimore, MD)
19. **Thomas W. Norris, PhD** (The Hearing Center - Omaha, NE)
20. **George R. Cook, Jr., BS MEd CCC-A**
    (Workplace Hearing, LLC - Greensboro, NC)
21. **Dean A. Harris, PhD** (Dean A. Harris Assoc., Inc. - Estes Park, CO)
22. **Dale Robinson, PhD CCC A/SP**
    (Wayne State University/Dept.Of Audiology - Detroit, MI)
23. **Andrew P. Stewart, MA CCC-A** (E.I. Inc - Durham, NC)
24. **William W. Green, PhD CCC-A** (University of Kentucky - Lexington, KY)
25. **Carolyn M. Cary, CCC A/SLP** (3M Occupational Medicine - St. Paul, MN)

Think Twice About Using Passive Noise-Reducing Earphone Enclosures for Hearing Testing


By Tom Frank, PhD and Suzanne Sklaney Sainclair, MS

There is no doubt that high levels of background noise will create an elevation in hearing thresholds due to masking. As such, OSHA[1] has specified maximum permissible ambient noise levels (MPANLs) allowed during hearing testing so that thresholds obtained with a supra-aural earphone can be measured correctly. A supra-aural earphone consists of an earphone (typically a TDH) mounted in a rubber cushion. When fitted with a headband, the earphone cushion rests on the outer ear. Unfortunately, the MPANLs specified by OSHA are much higher than those specified by the ANSI.[2] Research[3,4] has consistently demonstrated that thresholds for normally hearing listeners using a supra-aural earphone will be elevated if testing is done in noise equal to the OSHA MPANLs, but will not be elevated if testing is done in noise equal to the ANSI MPANLs. This occurs because a supra-aural earphone provides very little attenuation of ambient noise, especially for the lower frequencies.

As an alternative to a supra-aural earphone, the use of a passive noise-reducing earphone enclosure (PNREE) has been suggested when hearing tests are conducted in excessive ambient noise. Typically, a PNREE contains a supra-aural earphone and its cushion mounted in a domed plastic enclosure that fits over and around the outer ear, similar to an earmuff used for hearing protection. In theory, a PNREE should attenuate excessive ambient noise reaching the listener's ear so that hearing thresholds will not be elevated due to ambient noise masking. PNREEs such as the Audiocup, Auraldome II, AudioMate, and Madsen ME-70 are commonly used in industrial testing programs. However, all PNREEs are not the same since they vary in reference to (a) how the supra-aural earphone is mounted in the enclosure (spring-loaded or held in place by pliable rubber or molded open-cell foam), (b) the position of the supra-aural earphone relative to the cushion of the enclosure (flush or recessed), (c) the opening of the enclosure (round or oval), and (d) the static force of the headband holding the PNREE to the head.

Even though the use of PNREEs sounds like a good idea, their use has been questioned because ANSI[5] has not standardized reference threshold levels when a supra-aural earphone is mounted in an enclosure and because of uncertainties regarding the amount of attenuation they provide. Consequently, we conducted several studies to determine if a PNREE could be used as an alternative to a supra-aural earphone. We reasoned that, for a PNREE to be used as an alternative to a supra-aural earphone, hearing thresholds and the repeatability of the thresholds should be similar to a supra-aural earphone, and that a PNREE should attenuate more ambient noise than a supra-aural earphone.

In one study[6] we determined hearing thresholds for 30 normally hearing young adults from 500 to 6000 Hz using a supra-aural earphone and four PNREEs. The subjects' mean hearing level thresholds averaged over the four sessions for each earphone type

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Think Twice About Using Passive Noise-Reducing Earphone. . . . .

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are shown in Table 1. Ideally, all of the mean thresholds should equal 0 dB HL. The mean thresholds for the supra-aural earphone, Audiocup, and Auraldome II were very similar and close to 0 dB HL. However, the thresholds for the AudioMate and Madsen ME-70 were higher than those obtained with the standard supra-aural earphone, especially for the AudioMate.

We then calculated the repeatability of each subject's thresholds by determining their thresholds' differences for all of the possible test session comparisons for each earphone type. This was done to quantify the variability of hearing thresholds across repeated testing. The mean percentage of the subjects' thresholds across all of the test session comparisons falling within ±5 dB for each earphone type is shown in Table 1. Ideally, 100% of the thresholds should be within ±5 dB, which would indicate an acceptable range of threshold variability. Ninety to ninety-two percent of supra-aural earphone thresholds from 500 to 4000 Hz were within ±5 dB. The percent of thresholds within ±5 dB for the Audiocup and Auraldome II were similar and slightly less than for the supra-aural earphone. However, the percent of thresholds within ±5 dB for the AudioMate and Madsen ME-70 were lower than for the supra-aural earphone, Audiocup, and Auraldome II.

Table 1. Mean hearing thresholds, threshold repeatability, and attenuation values for a earphone and for four passive noise-reducing earphone enclosures.

Measure	Earphone	125	250	500	1000	2000	3000	4000	6000	8000
Threshold in dB HL	Type									
	Supra-aural	-	-	-0.4	-0.8	-1.3	-0.7	0.9	1.5	-_
	Audiocup	-	-	-0.8	-1.2	-1.9	-0.6	0.6	2.0	-_
	Auraldome II	-	-	-0.5	-0.4	-1.7	-0.9	0.8	2.6	-_
	AudioMate	-	-	9.5	7.5	5.9	4.5	4.8	7.0	-_
	Madsen ME-70	-	-	6.8	4.9	3.8	3.6	3.9	4.8	-_
Threshold Variability in Percent within ±5 dB	Supra-aural	-	-	92	91	91	90	90	82	-_
	Audiocup	-	-	92	89	89	91	88	80	-_
	Auraldome II	-	-	90	88	88	89	86	80	-_
	AudioMate	-	-	70	76	90	86	74	68	-_
	Madsen ME-70	-	-	76	82	87	84	76	64	-_
Attenuation in dB	Supra-aural	6.0	4.0	5.0	12.5	19.5	25.0	25.5	24.0	23.0
	Audiocup	4.1	1.6	15.6	27.8	32.0	36.8	38.5	34.7	34.0
	Auraldome II	4.4	10.1	13.0	22.1	32.2	37.9	34.3	34.6	35.7
	AudioMate	14.6	13.4	21.6	23.7	28.8	34.0	37.7	38.4	37.4
	Madsen ME-70	9.1	15.6	18.3	23.1	30.4	36.6	38.5	32.7	31.0

In another study[6] we determined the attenuation of the PNREEs using a real-ear attenuation threshold (REAT) method[7] for 24 normally hearing young adults from 125 to 8000 Hz. Table 1 shows the mean attenuation for each PNREE and the ANSI attenuation values[2] for a supra-aural earphone. At frequencies above 500 Hz all of the PNREEs had about the same amount of attenuation, about 8 to 15 dB more attenuation than for a supra-aural earphone. However, the AudioMate and Madsen ME-70 provided more attenuation from 125 to 500 Hz than the Audiocup and Auraldome II.

The results of these studies can be related to the physical characteristics of the PNREEs and have important implications for their use in industrial hearing testing. Because the supra-aural earphone cushion in the Audiocup and Auraldome II is mounted flush with the enclosure's cushion, the supra-aural earphone cushion rests on the listener's ear in a manner that is similar to wearing just a supra-aural earphone. As such, thresholds, and for the most part threshold repeatability, for an Audiocup and Auraldome II were similar to those obtained with a supra-aural earphone. One the other hand, the supra-aural earphone cushion in the AudioMate and Madsen ME-70 is recessed within the enclosure so that when fitted, the supra-aural earphone may not be fully resting on a listener's ear; consequently, thresholds are higher and threshold variability is increased compared with a supra-aural earphone. The obvious practical implication is that an employee's hearing thresholds will be overestimated when obtain with an AudioMate or Madsen ME-70 compared with a supra-aural earphone, Audiocup, or Auraldome II. Another practical implication is that an annual audiogram obtained with an AudioMate or Madsen ME-70, when compared with a baseline audiogram obtained with a supra-aural earphone, might show a threshold shift because different earphones were used, even though the employee's hearing has stayed the same. Further, since thresholds obtained with an AudioMate or Madsen ME-70 are more variable, a threshold shift would be more likely to occur using these PNREEs than using a supra-aural earphone, Audiocup, or Auraldome II even though an employee's hearing has remained stable.

Recall that the Audiocup and Auraldome II provided less attenuation than the AudioMate and Madsen ME-70 for the lower frequencies. This finding can be related to the fit of the PNREE. Because the supra-aural earphone cushion in the Audiocup and Auraldome II is flush with the enclosure's cushion and both the Audiocup and Auraldome II have a round opening, the enclosures' cushions probably do not create a tight seal on the irregular surfaces of the head around the ear, creating a leak so that low frequency signals are not attenuated. For the AudioMate and Madsen ME-70 the supra-aural earphone cushion is recessed in the enclosure, and they both have an oval opening. Thus, when fitted these PNREEs have a more efficient seal creating more low frequency attenuation. This is important because most industrial ambient noise contains more low than high frequency energy and because high levels of low frequency ambient noise can mask hearing thresholds at higher frequencies. The practical implication is that, if hearing testing is done in excessive low frequency (125 to 500) ambient noise, hearing thresholds obtained at 500 Hz might be elevated due to masking if testing is done with an Audiocup or Auraldome II but might not be elevated if an AudioMate or Madsen ME-70 was used.

Given these mixed results, hearing testing with a PNREE should not automatically be viewed as an alternative to a supra-aural earphone. We would not recommend the PNREEs used in this study for hearing testing. The two models that provided worthwhile increases in attenuation at the low frequencies (AudioMate and Madsen) produced threshold data that corresponded poorly with the standard supra-aural audiometric earphones that are commonly utilized, and the two models that provided suitable threshold data (Audiocup and Auraldome) did not provide useful low-frequency attenuation

On the other hand, hearing tests in industry are typically administered in ambient noise levels higher than specified by ANSI.[2] Therefore, we would recommend that all industrial hearing testing be conducted in an audiometric test booth. Further, the booth should be located in a very quiet area, the fan in the booth should be as quiet as possible, and the test booth door should seal as tightly as possible. Another alternative might be the use of insert earphones that couple to the ear using a foam eartip similar to a foam earplug used for hearing protection. Reference threshold levels for insert earphones have been specified by ANSI[5], and the attenuation they provide is much higher than both a supra-aural earphone and the PNREEs in the lower frequencies.[2]

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Insert Earphones . . .

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that ANSI Standard, in paragraph *3.2* "Earphones" states that "*Each earphone shall be equipped with an earphone cushion for contact with the head of the subject,*" and paragraph *3.3* "Headbands" of the same document specifies that "*There shall be provided a spring headband which is adequate to hold the earphones against the ears to provide a satisfactory seal*."

Insert earphones have neither an "earphone cushion" nor a "spring headband" and do not meet the criteria specified in the (1969) ANSI Standard for Audiometers. Although the current standard has a section in the body of the document devoted exclusively to the use and calibration of insert earphones, that status has no effect with regard to the OSHA Amendment.

Example of an insert audiometric earphone

An intended loophole, however, within OSHA regulations does allow for the use of technology not realized at the time the Standard was promulgated. Under an OSHA policy for "de minimis violations" employers are allowed to comply with the most current consensus standard applicable to their operations, rather than with the standard in effect at the time of inspection, when the employer's action provides equal or greater employee protection. "De minimis" violations are violations of existing OSHA standards that have no direct or immediate relationship to safety or health and **result in no citation or penalty; they do not have to be abated.**

On August 31, 1993 Mr. Roger A. Clark, Director, Directorate of Compliance Programs for OSHA responded to the licensed manufacturer of insert earphones, regarding their use for audiometric testing. The complete text of this letter of interpretation is available on the OSHA web site **www.OSHA.gov.** under "Standards Interpretation and Compliance Letters, Use of insert earphones for audiometric testing." Nine bulleted paragraphs outline specific conditions that must be implemented by employers who intend to use insert earphones with their audiometers in order to meet the criteria of a de minimis violation of OSHA's noise standard. If the nine conditions are met then only a de minimis violation exists, however, failure to meet each of the conditions could result in issuance of a citation.

The "final answer" therefore is yes, you can use insert earphones for hearing conservation testing without concern about possible citation if you follow the points addressed in the 1993 compliance letter. The nine points are not particularly burdensome, with one exception. That paragraph of the compliance letter states, "*At the time of conversion from supra-aural to insert earphones, testing must be performed with both types of earphones. The test subject must have a quiet period of at least 14 hours before testing. Hearing protectors may be used as a substitute for this requirement. The supra-aural earphone audiogram shall be compared to the baseline audiogram, or the revised baseline audiogram if appropriate, to check for a Standard Threshold Shift (STS). In accordance with 29 CFR 1910.95 (g) (7) (ii), if the audiogram shows an STS, re-testing with supra-aural earphones may be performed within 30 days and the resulting audiogram adopted instead of the prior one. If re-testing with supra-aural earphones is performed, then re-testing with insert earphones must be performed in conjunction.*"

If the above is followed, subsequent annual testing can be performed with a single (insert earphone) audiogram, with the original insert earphone test designated as the "new reference audiogram for all future hearing tests performed with insert earphones." If no baseline testing has been done, i.e., a new program is initiated, then insert earphones can be employed without concern for the above, as long the other conditions are met. The other eight conditions, for the most part, amount to precautions that any prudent examiner would normally follow, e.g., technician training, (foam) coupler fit, calibration, and dutiful record keeping. It is hoped that OSHA may eventually eliminate the double testing requirement, but for now it remains as a formidable, but not insurmountable, barrier to insert earphone use in HCPs.

In answer to the "value added" part of the initial question, and in spite of the above, there are several reasons why you might consider using insert earphones. Essentially all of the clinical advantages of coupling the earphone directly to the earcanal are transferable to the threshold testing performed for baseline and monitoring hearing conservation testing. Those advantages are detailed in the following sections.

➤ Reduction of Background Noise

The sound attenuation of a supra-aural earphone with an MX-41/AR cushion is weak in the low frequency range (attenuation values of 5-6 dB at frequencies below 1 kHz) where problems related to high ambient noise levels are predominant (Arlinger, 1986; Michael & Bienvenue, 1981; Poulsen, 1988; Lindgren, 1990). With a foam plug as the coupler, however, an insert earphone has an overall NRR of approximately 25-dB, considerably greater than supra-aurals with or without an added circumaural enclosure. The greatest difference is in the frequency range below 1 kHz, where the effect is most needed.

Although one must use the OSHA "Maximum Allowable Octave-Band Sound Pressure Levels For Audiometric Test Rooms (Table D-1) that are less restrictive than the ANSI Standards now specify, the added margin of safety can be valuable particularly if the measured ambient levels are borderline relative to the guidelines, and the sound environment is not stable. Table 1 illustrates the difference between the ears-covered ambient attenuation for supra-aural and insert earphones.

Table 1. Mean attenuation values for supra-aural (SA) and insert (IE) earphones from ANSI S3.1-1999

Earphone	*Frequency in Hertz*								
Type	*125*	*250*	*500*	*1000*	*2000*	*3000*	*4000*	*6000*	8000
SA	6.0	4.0	5.0	12.5	19.5	25.0	25.5	24.0	23.0
IE	29.9	31.4	33.7	34.0	34.1	37.9	38.6	40.7	42.7

➤ Greater Interaural Attenuation

In subjects with large threshold differences between the right and left ears there is a chance when testing the poorer ear that the pure tone will be perceived by the non-test (better) ear. In a clinical setting that situation would be resolved by using clinical masking to prevent the non-test ear's participation. Although masking is not a part of routine industrial audiometry, the incidence of crossover will be effectively reduced with an insert earphone, thereby decreasing the need for follow-up testing by an audiologist.

➤ Elimination of Collapsed Canal Artifact and Greater Subject Comfort

The lateral pressure that supra-aural earphones apply to the test subject's head can result in a collapsed canal artifact. This closing of the external canal in some subjects may cause a false threshold shift that is not always detected initially. Audiological follow-up testing would employ one of several methods to circumvent this effect and establish true thresholds. With an insert earphone's foam tip properly placed in the external canal for testing, canal collapse ceases to be an

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Audiometric Distinctions

By Deanna Meinke, MA FAAA

The distinctions between a standard threshold shift (STS), regulatory recordability/reportablity and workers' compensation claim status are often difficult concepts to convey. How can an employee show an STS, need audiological rehabilitation but not be considered impaired for workers' compensation purposes? The answers are in the math, the timelines and the underlying definitions used in federal and state regulations or guidelines. So, first, let's consider each of the concepts and its definition.

Standard Threshold Shift (STS): This *administrative* determination is dependent on the average *change* in hearing between the baseline test and an annual test, at the frequencies of 2000, 3000 and 4000 Hz, which must be 10 dB or greater, with or without the use of age corrections. These test frequencies were targeted for monitoring because of the intent to identify an individual with an *early* indicator of a temporary noise-induced hearing loss and to allow early intervention *before* the hearing loss becomes permanent.

Recordable or Reportable Shift: This *administrative* determination is calculated in the same manner as an STS, except that the degree of *change* must be 25 dB or greater, with or without the use of age corrections. This amount of change in hearing is currently required to be recorded on the OSHA 300 log or reported on the MSHA 7000-1 form if the hearing loss is work-related. Again, the average of 2000-4000 Hz is targeted as an indicator of a noise-induced hearing loss, since noise damages this frequency range before others.

Compensable Hearing Impairment: Impairment means that there is an objectively measurable loss of function (as opposed to *change* in function) and it is a *medical* determination. Usually, it relies on a state-specific mathematical formula to calculate a percentage of hearing loss and is heavily weighted toward the lower "speech" frequencies. For instance, the more common 1979 American Academy of Otolaryngology (AAO-1979) impairment rating formula uses the following threshold calculation;

Monaural (one ear): Average of 500, 1000, 2000 and 3000 Hz thresholds, minus 25 dB and multiplied by 1.5%

Binaural (both ears): 5 times the better monaural percentage + the poorer ear percentage divided by 6.

The amount of financial compensation is directly related to the percentage of hearing impairment. For a noise-induced hearing loss to become compensable, it must progress well into the speech frequencies of 500-3000 Hz, an uncommon occurrence for most industrial noise exposures. There are a number of other factors that may further impact compensation such as age corrections and

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Insert Earphones . . .

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issue. Most test subjects report as well that comfort is greater with a soft foam tip in the canal as opposed to the weight and pressure that a TDH-type earphone exerts.

➤ Improved Hygiene / Less Maintenance

The disposable foam tips used with an insert earphone prevent any cross contamination between subjects. There are no headbands or cushions to adjust, clean and periodically replace. Most subjects are actually more comfortable with a foam tip in their earcanal than they are with a supra-aural set-up. The foam tips are not unlike the HPDs that many employees are used to wearing for much longer periods than the monitoring audiogram.

Insert earphones can make a valuable contribution to our efforts in the prevention of occupational hearing loss. With an initial sacrifice in time and effort you can take advantage of a clinically accepted tool that will enhance both test reliability and program effectiveness.

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Think Twice About Using Passive Noise-Reducing Earphone. . . .

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100% CLUB

The CAOHC Council recently established the 100% Club for Course Directors (CD). That means, when 100% of students taught by a CD apply for CAOHC certification, the CD will be recognized as a member of the **100% Club**. The initial entry list is impressive. You'll find almost 70 CAOHC Course Directors listed below whom qualified from all around the country.

These CDs are being recognized because of their commitment to CAOHC's mission to prevent hearing loss. And, these CDs have encouraged YOU to enhance your training by becoming CAOHC certified. Please join us in thanking all of the members of the new 100% Club!

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Spearfish, SD

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Audiometric Distinctions

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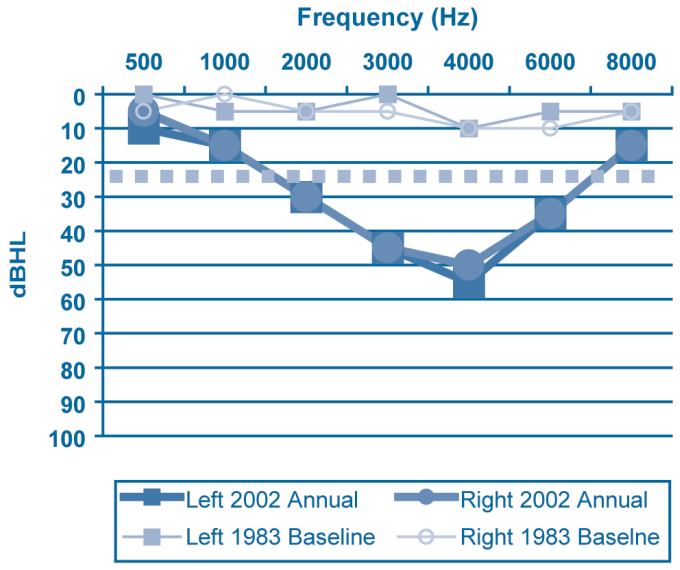
tinnitus. For further information, the interested reader can find an excellent resource in Dobie and Megerson (2000).

Disability: The decrease in a person's ability to "earn a living" due to the presence of an impairment. A disability is an *administrative* determination based on the results of the audiogram and job expectations. This is a separate determination from workers compensation claims. Typically a noise-induced hearing loss does not qualify for a disability, since hearing loss seldom keeps an individual from being able to work. The advancement in assistive listening technology also affords opportunities to accommodate hearing impaired workers in most job situations.

The differentiation between these concepts arises in many hearing conservation program situations: counseling an individual employee, providing management summary reports, responding to risk management inquiries and facilitating physician and audiologist referrals. The occupational hearing conservationist (OHC) can team with his or her professional supervisor to help unravel these complex concepts and provide clear answers for an inquiring employee. Let's take a case example with a fictitious employee (Tim) whose hearing tests began in 1983 when the hearing conservation amendment took effect.

Tim was 22 years old when he was hired into a noise-exposed job in 1983. (For the purposes of this audiometric example, we will not consider actual noise exposures or hearing protector effectiveness and assume the hearing loss is work-related). He has shown two 10-dB STS's, using age corrections for each ear. The hearing loss exceeded the 25-dB age-corrected average change at 2000, 3000 and 4000 Hz in the left ear in 1997 and in the right ear in 2002. So, we have an employee with a significant bilateral hearing loss that is OSHA recordable as evidenced in the audiogram shown below.

Sample Employee Audiogram



The amount of hearing loss exhibited in this audiogram has a significant impact on Tim's daily communication. While he can easily detect voices, Tim would not be able to understand many specific words without repetition or requesting that the speaker raise his or her voice. These problems would increase when conversing in noisy places such as restaurants, lunchrooms and group social events. Listening to a child's voice might require even greater listening effort on Tim's part. An articulation index (a measure of a person's ability to hear the sounds found in speech) calculated from this audiogram indicates that the employee hears 51% of the necessary speech spectrum in a *quiet* listening location (Mueller and Killion 1990). An audiologist and/or a physician would recommend a hearing aid fitting for both ears. Tim might also benefit from a high frequency phone amplifier and will have significant communication problems while wearing traditional passive hearing protection devices.

Although Tim has significant difficulty communicating, the AAO-1979 impairment rating for this employee would be 0% left ear, 0% right ear and 0% binaural (Dobie and Megerson 2000). In many jurisdictions, this hearing loss does not result in any financial award to the employee. Traditional hearing aids retail for an average of $1200 each. The cost is even higher for hearing aids with advanced digital technology and multiple microphones (Kochkin 2001). Add to this the expense of batteries, occasional repairs, repeat hearing tests and the need to replace a hearing aid approximately every five years, and it becomes evident that the financial impact of the noise-induced hearing loss (on the individual employee) may exceed $5000 every five years for the remainder of his life. Considering Kochin's (2001) report that only about 22% of persons with hearing impairment use a hearing aid, it can be inferred that many workers with noise-induced hearing loss who need hearing aids are not taking advantage of them. Ultimately, they are living and struggling with their day to day communication dysfunction.

Employees deserve to understand the circumstances and the conditions under which decisions are made regarding their hearing loss status. Understanding the distinctions between an STS, recordable/reportable hearing loss and compensable hearing loss, as well as the systems and regulatory constraints we function within, is helpful for the OHC and others with whom the employee will interact. Working with your professional program supervisor can facilitate accurate and honest discussions with the workers you encounter.

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Fall 2002 Course Director Workshop

The Council will conduct the fall Course Director workshop in October 2002 in Rosemont, IL. This workshop is a requirement for Course Director certification upon application approval by the CAOHC Screening Committee.

Course Directors may also choose the workshop method for recertification. All questions may be directed to Barbara Lechner, Executive Director, at 414/276-5338. Application forms are available on-line at **www.caohc.org** as well as the workshop registration form.

The Spring 2003 CD Workshop will be held in the Atlanta, GA area – more information on this in the next UPDATE.

Occupational Hearing Conservationists "Market Yourself"

Congratulations on your successful certification or recertification as a CAOHC Certified Occupational Hearing Conservationist (COHC). We want to help you announce this achievement. The following is a sample you may copy to send to your local and business newspapers, professional newsletters and magazines, or anywhere that readers would benefit from learning of your CAOHC certification. (or you can access this from the CAOHC web site at **www.caohc.org** click on "Market Yourself."

NEWS

SAMPLE ANNOUNCEMENT: The Council for Accreditation in Occupational Hearing Conservation (CAOHC) is pleased to announce that **(insert your name here)** has successfully completed a CAOHC approved course to become certified as an Occupational Hearing Conservationist (COHC). **(Insert your name here with credentials)** has joined over 21,000 Certified Occupational Hearing Conservationists throughout the world. Industry depends on its certified technicians who conduct audiometric testing as part of the hearing conservation team, to help prevent hearing loss among industrial, mining, or military workers. Congratulations to **(insert name here)**!

The Council for Accreditation in Occupational Hearing Conservation (CAOHC) is a non-profit organization whose mission is promoting the conservation of hearing by enhancing the quality of occupational hearing conservation programs. Find us on the worldwide web at ***www.caohc.org****.*

UPCOMING OHC CERTIFICATION AND RECERTIFICATION COURSES* 2002

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

Current as of May 25, 2002 (for a complete list of courses visit our website at www.caohc.org); for the most current list of courses contact the CAOHC office at 414/276-5338.

Begin Date	City	State	Course Director	Phone
6/10/2002	Omaha	NE	NORRIS, THOMAS	402/391-3982
6/10/2002	Portland	OR	DOLAN, THOMAS	503/725-3264
6/10/2002	Norfolk	VA	ROVIG, GLEN	Navy
6/11/2002	LaGrange,	GA	WOLFE, WILLIAM	770/475-2055
6/12/2002	Birmingham	AL	HOLMES, GEORGIA	205/934-7178
6/12/2002	Denver	CO	ELMORE, JOHN	800/357-5759
6/12/2002	Greeley	CO	WELLS, LAURIE	970/593-6339
6/12/2002	Chicago/Woodfield	IL	THUNDER, THOMAS	847/359-1068
6/12/2002	Greensboro	NC	COOK, GEORGE	336/931-0178
6/12/2002	Harrisburg	PA	SWISHER, TIMOTHY	412/367-8690
6/17/2002	Rota	_	ROSS, ALAN	Navy
6/17/2002	Iwakuni	Japan	MELTMAR, PHILIP	Navy
6/17/2002	Lafayette	LA	RHODES, ROBERT	713/468-3201
6/17/2002	Ft. Hood	TX	TUTEN, VICKIE	Army
6/18/2002	Brooks AFB	TX	EDRIS, ROBERT	Air Force
6/19/2002	Marlboro	MA	GORDON, PAMELA	978/750-8955
6/19/2002	Amherst	NY	NELSON, DAVID	716/633-7210
6/19/2002	Johnson City	TN	SCHUMAIER, DANIEL	423/928-5771
6/20/2002	Trinidad	West Indies	ELMORE, JOHN	800/357-5759
6/21/2002	Brooks AFB	TX	EDRIS, ROBERT	Air Force
6/24/2002	Landstuhl	Germany	MCILWAIN, DAVID	Army
6/24/2002	Bethesda	MD	COOK, LYNN	Navy
6/25/2002	Twentynine Palms	CA	GULLICKSON, KIMBERLY	Navy
6/26/2002	Charlotte	NC	MELOY, MELETTE	678/363-9897
6/26/2002	Cleveland	OH	WOLFE, WILLIAM	770/475-2055
6/28/2002	Las Vegas	NV	ELMORE, JOHN	800/357-5759
7/2/2002	Durham	NC	STEWART, ANDREW	919/425-2889
7/9/2002	Fort Stewart	GA	STEVENS, MARC	Army
7/9/2002	Brooks AFB	TX	EDRIS, ROBERT	Air Force
7/10/2002	Dearborn	MI	RHODES, ROBERT	713/468-3201
7/10/2002	Durham	NC	STEWART, ANDREW	919/425-2889
7/10/2002	Cleveland	OH	SNYDERWINE, CAROL	216/491-6104
7/10/2002	Houston	TX	ELMORE, JOHN	800/357-5759
7/10/2002	Brookfield	WI	HASE, MEREDY	262/547-2227
7/12/2002	Charleston	SC	COHEN, STUART	843/797-0275
7/13/2002	Ft. Hood	TX	TUTEN, VICKIE	Army
7/15/2002	Ft. Sam Houston	TX	BYRNE, CLYDE	Army
7/15/2002	Houston	TX	DEPPENSMITH, KATHRYN	713/468-3201
7/16/2002	Philadelphia	PA	ROBERTSON, JAMES	215/922-1126
7/17/2002	Birmingham	AL	MELOY, MELETTE	678/363-9897
7/17/2002	Albany	NY	SWISHER, TIMOTHY	412/367-8690
7/17/2002	Rochester	NY	ELMORE, JOHN	800/357-5759
7/17/2002	Dallas	TX	HARRIS, DEAN	970/586-0702
7/18/2002	Mandeville	LA	ISTRE, CLIFTON	337-233-4081
7/22/2002	New Brunswick	NJ	KELLY, ELLEN	732/238-1664
7/22/2002	Ft. Lewis	WA	GRANTHAM, MARJORIE	Army
7/23/2002	N. Kansas City	MO	RATLIFF-HOBER, LINDA	913/268-0928
7/23/2002	Brooks AFB	TX	EDRIS, ROBERT	Air Force
7/24/2002	Atlanta	GA	WOLFE, WILLIAM	770/475-2055
7/24/2002	Aloha	OR	FAIRCHILD, MICHAEL	503/259-2685
7/24/2002	Portland	OR	ELMORE, JOHN	800/357-5759
7/25/2002	Kittanning	PA	CALLEN, DOUGLAS	724/543-7068
8/1/2002	Montgomery	AL	ERGLE, BRIAN	205/391-9876
8/6/2002	St. Louis	MO	THIELE, NATALIE	314/968-4710
8/6/2002	Greenville	SC	CARROLL, TARA	864/331-1400
8/7/2002	Birmingham	AL	HOLMES, GEORGIA	205/934-7178
8/7/2002	Jacksonville	FL	GREEN, NANCY	904/880-1710
8/7/2002	Cincinnati	OH	SWISHER, TIMOTHY	412/367-8690
8/7/2002	Memphs	TN	PRINCE, JANE	870/972-1166
8/7/2002	Austin	TX	DEPPENSMITH, KATHRYN	713/468-3201
8/7/2002	Norfolk	VA	ELMORE, JOHN	800/357-5759
8/8/2002	Greensboro	NC	COOK, GEORGE	336/931-0178
8/14/2002	W. Palm Beach	FL	GREENBERG, HERBERT	561/968-3536
8/14/2002	Pittsburgh	PA	SWISHER, TIMOTHY	412/367-8690
8/14/2002	San Antonio	TX	ELMORE, JOHN	800/357-5759
8/16/2002	Knoxville	TN	FERRELL, CHARLES	865/974-5453
8/19/2002	Little Rock	AR	RHODES, ROBERT	713/468-3201
8/19/2002	Cincinnati	OH	ELMORE, JOHN	800/357-5759
8/20/2002	Chicago/Woodfield	IL	THUNDER, THOMAS	847/359-1068
8/20/2002	Erie	PA	NUTTER, JAMES	814/453-4716
8/20/2002	Brooks AFB	TX	EDRIS, ROBERT	Air Force
8/21/2002	Durham	NC	STEWART, ANDREW	919/425-2889
8/21/2002	Toledo	OH	WOLFE, BASIL	216/289-0112
8/21/2002	Columbia	SC	MELOY, MELETTE	678/363-9897
8/22/2002	Louisville	KY	ELMORE, JOHN	800/357-5759
8/26/2002	Ft. Hood	TX	TUTEN, VICKIE	Army
8/26/2002	Bellevue	WA	MCDANIEL, MARY	206/706-7352
8/28/2002	Dayton	OH	PAVLAKOS, CHRIS	937/436-1161
8/28/2002	Brooks AFB	TX	EDRIS, ROBERT	Air Force
9/4/2002	Durham	NC	STEWART, ANDREW	919/425-2889
9/9/2002	New Brunswick	NJ	KELLY, ELLEN	732/238-1664
9/10/2002	Santa Clara	CA	MCCALL, KIRSTEN	425/254-3833
9/10/2002	Kenner	LA	SEIDEMANN, MICHAEL	504/443-5670
9/10/2002	Kansas City	MO	COLVILLE, CASSANDRA	816/471-3900
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9/11/2002	Philadelphia	PA	SWISHER, TIMOTHY	412/367-8690
9/11/2002	Houston	TX	RHODES, ROBERT	713/468-3201
9/11/2002	Salt Lake City	UT	CRONIN, PAMELA	801/566-8304
9/13/2002	Atlanta	GA	MELOY, MELETTE	678/363-9897(R)
9/16/2002	Lexington	KY	GREEN, WILLIAM	859/269-1526
9/16/2002	Omaha	NE	NORRIS, THOMAS	402-391-3982
9/17/2002	N. Kansas City	MO	RATLIFF-HOBER, LINDA	913/268-0928
9/17/2002	Durham	NC	STEWART, ANDREW	919/425-2889
9/17/2002	Philadelphia	PA	ROBERTSON, JAMES	215/922-1126
9/18/2002	Anchorage	AK	RHODES, ROBERT	713/468-3201
9/18/2002	Greensboro	NC	COOK, GEORGE	336/931-0178
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9/18/2002	Brooks AFB	TX	EDRIS, ROBERT	Air Force
9/18/2002	Dallas	TX	HARRIS, DEAN	970/586-0702
9/20/2002	Dallas	TX	ELMORE, JOHN	800/357-5759
9/23/2002	Las Vegas	NV	DEPPENSMITH, KATHRYN	713/468-3201
9/23/2002	Ft. Lewis	WA	GRANTHAM, MARJORIE	Army
9/25/2002	Huntsville	AL	MELOY, MELETTE	678/363-9897
9/25/2002	Lindenwold	NJ	STEPKIN, RICHARD	856/435-7200
9/25/2002	Aloha	OR	FAIRCHILD, MICHAEL	503/259-2685
9/26/2002	Bethel Park	PA	ANGELELLI, ROGER	412/831-0430
9/30/2002	Washington	DC	BREWER, DIANE	202/994-7167
9/30/2002	Tampa	FL	ABRAMS, HARVEY	727/398-9395
9/30/2002	New Orleans	LA	RHODES, ROBERT	713/468-3201
10/2/2002	Phoenix	AZ	DEPPENSMITH, KATHRYN	713/468-3201
10/2/2002	Ft. Walton Beach	FL	HOLMES, GEORGIA	205-934-7178
10/2/2002	Atlanta	GA	WOLFE, WILLIAM	770/475-2055
10/2/2002	Durham	NC	STEWART, ANDREW	919/425-2889
10/7/2002	Waterville	ME	GIROUX, ANNE LOUISE	207/872-0320
10/7/2002	St. Paul	MN	CARY, CAROLYN	651/736-2089
10/7/2002	Philadelphia	PA	ROBERTSON, JAMES	Navy
10/8/2002	Chicago/Woodfield	IL	THUNDER, THOMAS	847-359-1068
10/9/2002	W. Palm Beach	FL	GREENBERG, HERBERT	561/968-3536
10/9/2002	Owensboro	KY	ETIENNE, JOSEPH	270/926-0418
10/9/2002	Amherst	NY	NELSON, DAVID	716/633-7210
10/9/2002	Dallas	TX	HARRIS, DEAN	970/586-0702
10/9/2002	Houston	TX	MELOY, MELETTE	678/363-9897
10/14/2002	Albuquerque	NM	DEPPENSMITH, KATHRYN	713/468-3201
10/14/2002	Ft. Hood	TX	TUTEN, VICKIE	Army
10/15/2002	Irvine	CA	MCCALL, KIRSTEN	425/254-3833
10/16/2002	Little Rock	AR	PRINCE, JANE	870/972-1166
10/16/2002	Cleveland	OH	WOLFE, WILLIAM	770/475-2055
10/16/2002	Brookfield	WI	KORABIC, EDWARD	414/288-3428
10/18/2002	Birmingham	AL	MELOY, MELETTE	678/363-9897
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10/23/2002	Shelton	CT	SOCHRIN, PHYLLIS	203/735-4327
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11/13/2002	Baltimore	MD	DOYLE, MARY	410/955-4088
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11/13/2002	Dallas	TX	HARRIS, DEAN	970/586-0702
11/18/2002	Ft. Hood	TX	TUTEN, VICKIE	Army
11/19/2002	Durham	NC	STEWART, ANDREW	919/425-2889
11/20/2002	New Brunswick	NJ	KELLY, ELLEN	732/238-1664
11/21/2002	Aloha	OR	FAIRCHILD, MICHAEL	503/259-2685
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12/2/2002	San Antonio	TX	RHODES, ROBERT	713/468-3201
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12/4/2002	Chicago	IL	ELMORE, JOHN	800/357-5759
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