

NOISE WORKSHOP

History and Use of EPA's Hearing Protector Labeling Regulation

**Alice H. Suter, Ph.D.
March 27, 2003**

Who Uses What:

- Europe
 - SNR (Single Number Rating)
 - HML (High, Middle, Low)
- Canada and Australia
 - Class System
- United States
 - NRR

How the NRR's Use Causes Problems

- Bigger is Better Mentality
- NRR is Gospel
- Failure to Match the NRR to TWA
- NRR Overestimates Attenuation
- Discourages Tailoring to Individual Needs

Modifications to the NRR

- **OSHA's Compliance Policy**

- Derating by 50 % when assessing the relative effectiveness of hearing protectors and engineering controls
- OSHA Technical Manual mentions NRR(SF) for informational purposes

- **NIOSH Criteria Document Recommendation**

- Earmuffs NRR minus 25%
- Foam Earplugs NRR minus 50%
- All Other Earplugs NRR minus 70%

- **Some Employers**

Noise Control Act of 1972

Congressional Declaration of U.S. Policy

“to promote an environment for all Americans *free from noise* that jeopardizes their health or welfare. To that end, it is the purpose of the Act to establish a means for effective coordination of Federal research and activities in noise control, to *authorize the establishment* of Federal noise emission standards for products distributed in commerce, and to provide information to the public respecting the *noise emission and noise reduction characteristics* of such products.”

Noise Control Act - Section 8

- Gives EPA the Responsibility to Regulate the Labeling of:
 - Products Emitting Noise
 - Products Reducing Noise

Noise Control Act - Section 8

- (a) The EPA Administrator must designate any product or class of products which:
1. Emits noise capable of adversely affecting the public health or welfare, or
 2. Is sold wholly or in part on the basis of its effectiveness in reducing noise.

Noise Control Act - Section 8

(b) For each product or class of products EPA shall require that notice be given to the prospective user of the level of noise the product emits, or of its effectiveness in reducing noise. The regulation must specify:

1. Whether such notice shall be affixed to the product or to the outside of its container (or both), at the time of its sale to the ultimate purchaser, or whether such notice shall be given to the prospective user in some other manner,
2. The form of the notice,
3. The methods and units of measurement to be used.

Rationale for Labeling Hearing Protectors

- Section 6 of the Noise Control Act mandates regulations for major sources of noise
- Too many noisy new products would take too long to regulate
- Technical and economic feasibility problems
- Need to protect against noise of in-use products

Background Leading up to the Regulation

- ANSI Z24.22-1957
- ANSI S3.19-1974
- NIOSH Methods #1, #2, and #3
 - Subtracting 2 SDs “should rarely overestimate the degree of protection”

EPA-1979 Hearing Protector Labeling Requirements - Subpart B

211.204 Information content of primary label

- Includes requirements for primary label size, print and color, label location and type, and supporting information.

211.205 Special claims and exceptions

211.206 Methods for measurement of sound attenuation

- Real ear method in ANSI S3.19-1974 (as modified in this section)

211.207 Computation of the noise reduction rating (NRR)

211.208 Export provisions

211.209 Maintenance of records and submittal of information

211.210 Labeling verification requirements

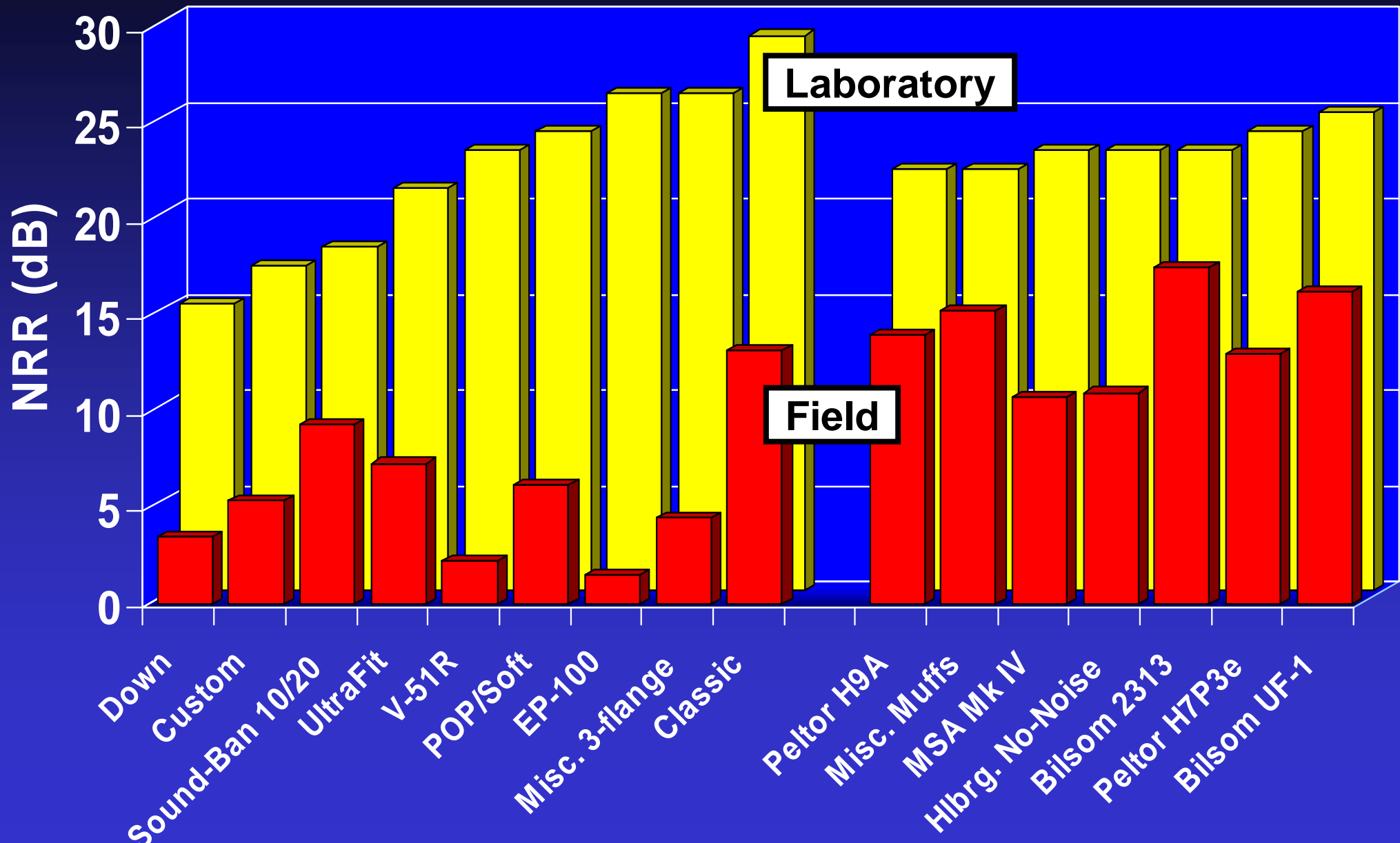
211.211 Compliance with labeling requirements

211.212 Compliance audit testing

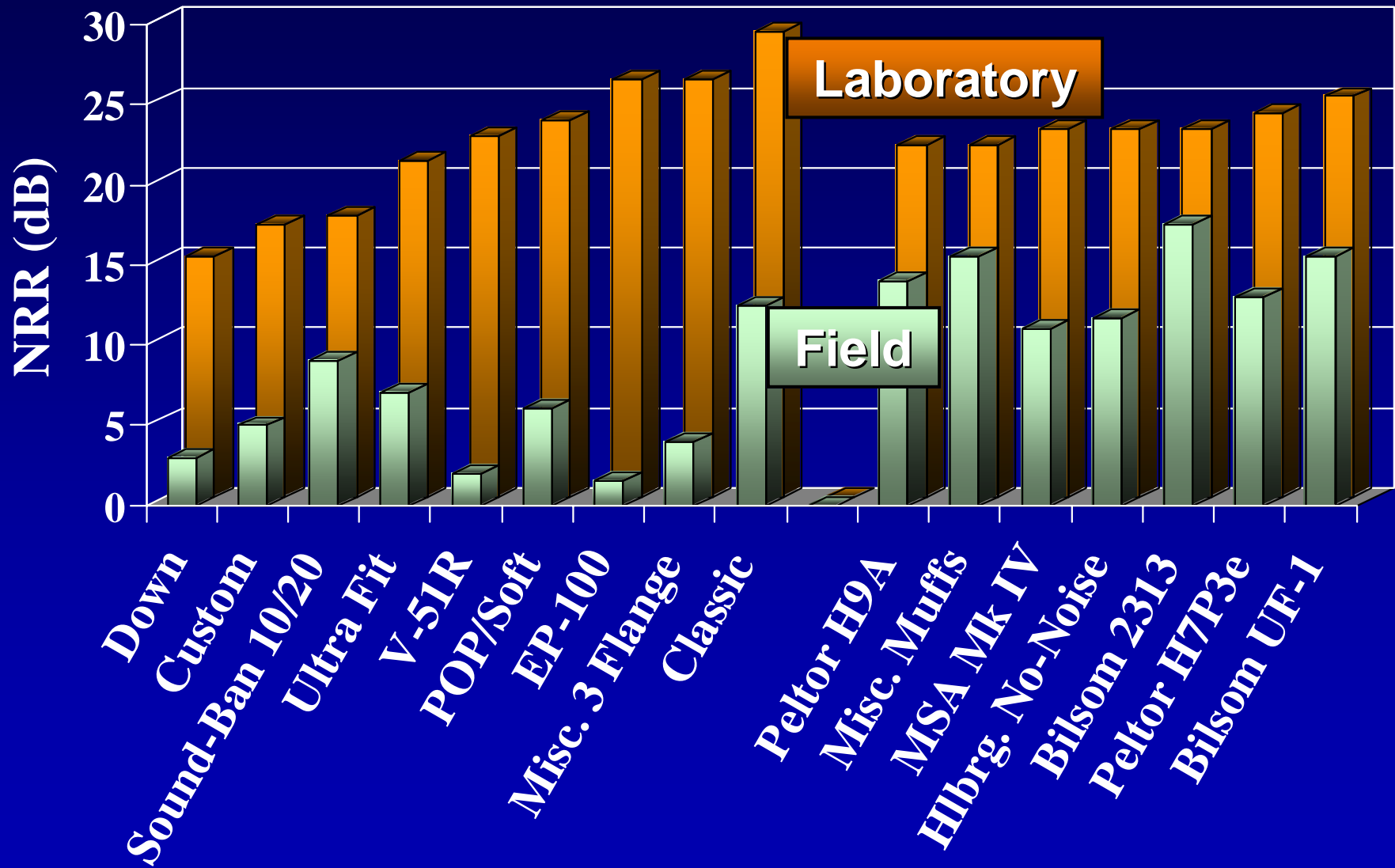
OSHA's Hearing Conservation Amendment

- Appendix G (1981) now Appendix B (1983)
 - Noise Reduction Rating
 - NIOSH #1, #2, or #3
- Using the NRR to estimate the A-weighted level under the ear protector:
 - C-weighted TWA – NRR
 - A-weighted TWA - (NRR-7)

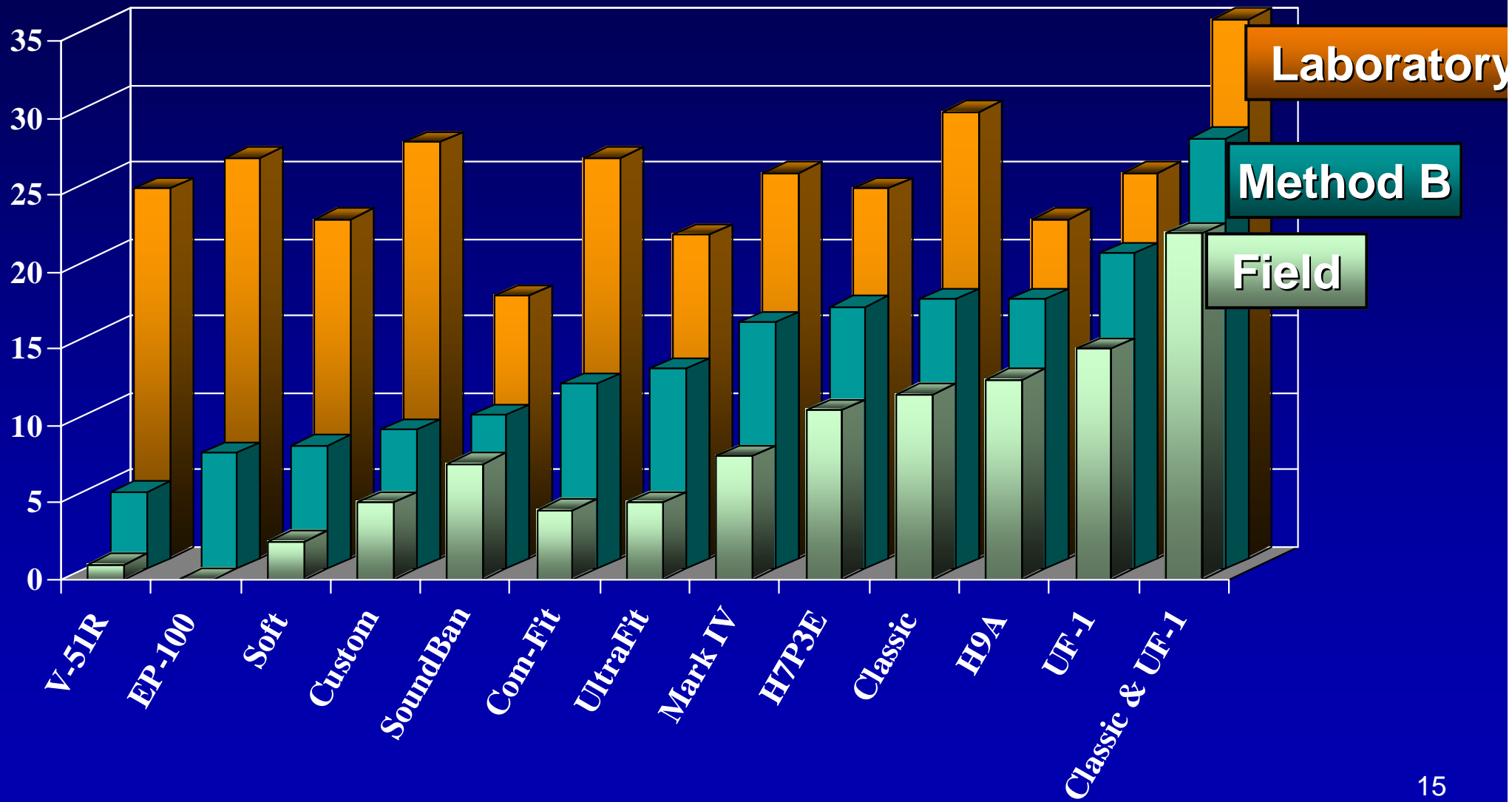
Labeled vs. Field Values



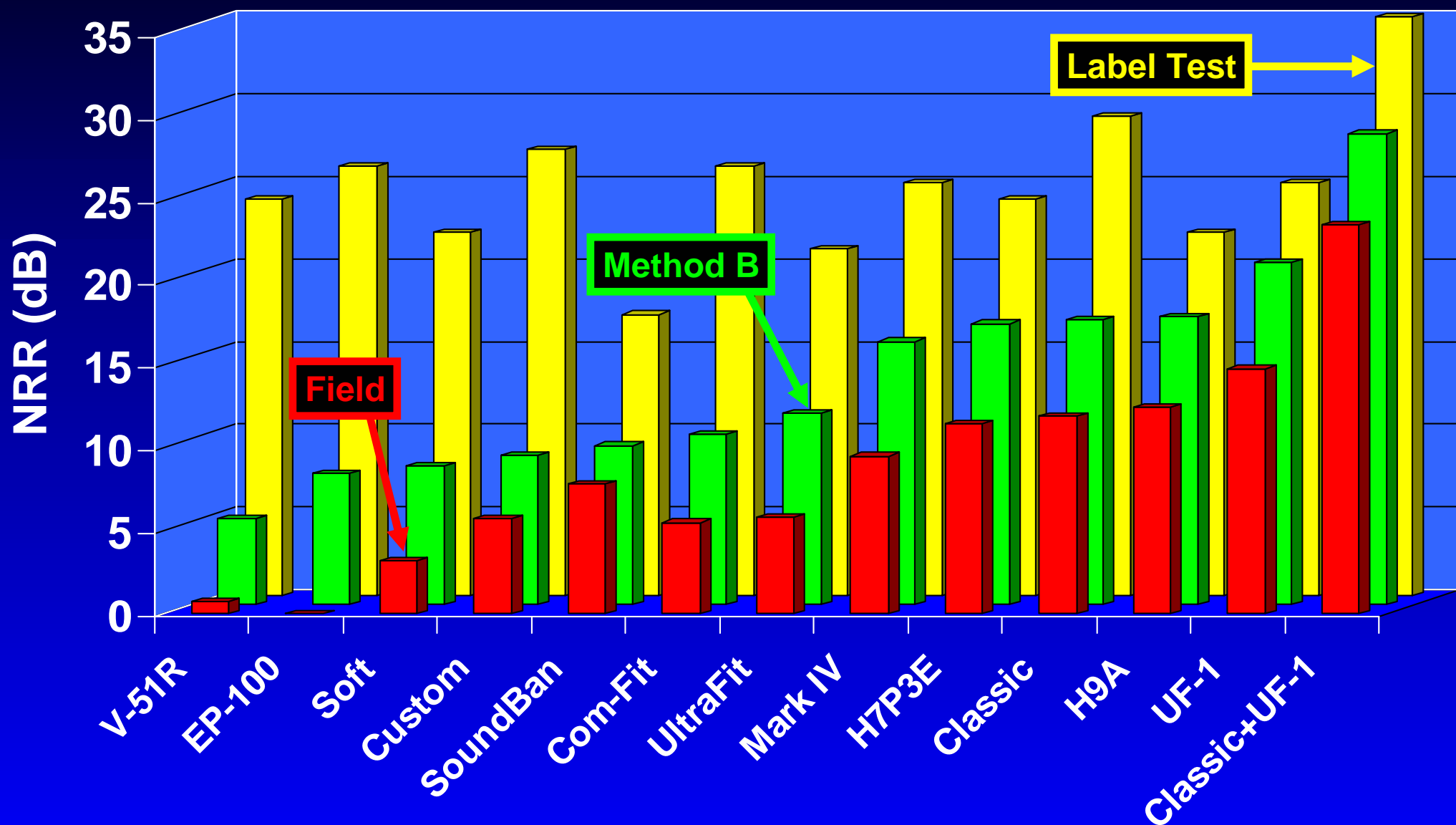
Labeled vs. Field Values



Predicted vs. Field Values



Predicted vs. Field Values



NHCA Task Force HPD Effectiveness

- AAOHN, Barbara Panhorst
- AAO-HNS, Robert Dobie
- ACOEM, Tom Markham
- AIHA, Dennis Driscoll
- ASA, Jim Patterson
- ASHA, Rena Glaser
- CAOHC, Rena Glaser
- ISEA, Jeff Birkner
- NHCA, Larry Royster
- NSC, Jill Niland
- EPA, Ken Feith
- MAA, Doug Ohlin
- MSHA, Leonard Marraccini
- NIOSH, John Franks
- OSHA, Deborah Gabry
- WG10, Charles Nixon
- WG11, Elliott Berger
- WG12, Julia Royster
- WG35, Ed Toothman

HPD Task Force's Mission

1. Guidelines for labeling hearing protection devices
2. Recommendations for educational materials that should be provided
3. General guidelines for hearing protector selection and use

Administrative Issues

- Use Method B from ANSI 12.6-1997
- Test facilities meet NVLAP requirements
- Retesting at least every 10 years but not more often than every 5 years

Proposed Primary Label

Noise Reduction Rating (SF)	16 DECIBELS
When worn as directed, most users (84%) can obtain at least this much protection. Range of NRR (SF)s for existing products is about 0 to 25. (Higher numbers denote greater protection.)	
XYZ Corporation Anytown, USA	Model EXP 579
Federal law prohibits removal of this label prior to purchase.	EPA LABEL REQUIRED BY U.S. EPA REG. 40CFR PART 211

Secondary Label Format

Instructions for use

This section may contain unlimited text and pictures at the discretion of the manufacturer.

Secondary Label Format

Selecting Hearing Protectors

The most critical consideration in selecting and dispensing a hearing protector is the ability of the wearer to achieve a comfortable noise-blocking seal which can be consistently maintained during all noise exposures.

Secondary Label Format

Additional Issues

1. Hearing protector's noise reduction
2. Wearer's daily equivalent noise exposure
3. Variations in noise level
4. User preference
5. Communication needs
6. Hearing ability
7. Compatibility with other safety equipment
8. Wearer's physical limitations
9. Climate and other working conditions
10. Replacement, care and use requirements

Secondary Label Format Attenuation Values

Test Frequency (Hz)	125	250	500	1000	2000	4000	8000	H	M	L	NRR(SF)
Mean Attenuation (dB)	17.9	19.0	21.0	24.7	29.9	35.6	34.6	25	18	14	16
Standard Deviation (dB)	7.3	6.3	7.3	6.4	5.3	5.0	5.4				

Secondary Label Format

How to Use NRR(SF)

The NRR(SF) may be subtracted from an A-weighted sound level or TWA

1. For example, the noise level is 92 dBA.
2. The NRR(SF) is 16 dB.
3. Most users (84%) should be protected to a level of 76 dBA.

Tip: A better estimate of the protected level can be obtained by adding 5 dB to the NRR(SF) and subtracting it from a measurement made using C- instead of A-weighting.

Secondary Label Format Applicability

- **FAILURE TO FIT THIS HEARING PROTECTOR ACCORDING TO INSTRUCTIONS WILL REDUCE ITS EFFECTIVENESS.** When used as directed, this hearing protector is expected to provide between 16 and 30 dB of noise reduction for about 66% of the users. Of those remaining, 17% will be likely to obtain less than 16 dB of protection, and the other 17% will be likely to obtain more than 30 dB.
- **Differences between hearing protector ratings of less than 3 dB are not important.**

Secondary Label Format

Estimating Noise Reduction for Individual Users

The labeled values of noise reduction are based on laboratory tests. It is not possible to use these data to reliably predict levels of protection achieved by a given individual in a particular environment. To ensure protection, those wearing hearing protectors for occupational exposures must be enrolled in a hearing conservation program. Non-occupational users should have hearing evaluations by an audiologist, qualified physician, or other qualified professional, on a regular basis.

Secondary Label Format

Impulse Noise

Although hearing protectors are useful for protection from impulsive noise, the noise reduction measurements are based on tests in *continuous* noise and may not be an accurate indicator of the device's performance for *impulsive* sounds, such as gunfire.

Secondary Label Format Additional Information

- For additional information, call NIOSH at 800-35-NIOSH to obtain document 9X-XXX (www.cdc.gov/niosh), or contact the EPA at phone/address (www.epa.gov).

Summary

- Current NRR is not useful to purchasers and users of hearing protectors
- Modifications to NRR vary and are less than ideal
- EPA developed its hearing protector regulation with the idea that the NRR would be beneficial information for hearing protector users
- NIOSH believed that the two standard deviation adjustment would prevent overestimates
- OSHA cast the NRR in concrete
- Field studies provided a wake-up call
- NHCA Task Force responded, made recommendations
- Something needs to change.....