APPENDIX E—NOISE REDUCTION RATING

[This appendix will be replaced when the new NRR scheme is promulgated]

Noise Reduction Ratings

When OSHA promulgated its Hearing Conservation Amendment in 1983, it incorporated the EPA labeling requirements for hearing protectors (40 CFR 211), which required manufacturers to identify the noise reduction capability of all hearing protectors on the hearing protector package. This measure is referred to as the noise reduction rating (NRR). It is a laboratory-derived numerical estimate of the attenuation achieved by the protector. It became evident that the amount of protection users were receiving in the workplace with the prescribed hearing protectors did not correlate with the attenuation indicated by the NRR. OSHA acknowledged that in most cases, this number overstated the protection afforded to workers and required the application for certain circumstances of a safety factor of 50% to the NRR, above and beyond the 7 dB subtraction called for when using A-weighted measurements. For example, consider a worker who is exposed to 98 dBA for 8 hours and whose hearing protectors have an NRR of 25 dB. We can estimate the worker's resultant exposure using the 50% safety factor. The worker's resultant exposure is 89 dBA in this case.

The 50% safety factor adjusts labeled NRR values for workplace conditions and is used when considering whether engineering controls are to be implemented.

Estimated dBA exposure = TWA(dBA) – [(25-7) x 50%] = 89 dBA

Though using the 50% safety factor produces the most reliable result, it is not used for enforcement purposes. For enforcement purposes, CSHOs should subtract 7 dB from the NRR without considering the 50% safety factor.

Single/Double Hearing Protection

Dual hearing protection involves wearing two forms of hearing protection simultaneously (e.g. earplugs and ear muffs). The noise exposure for workers wearing dual protection may be estimated by the following method: Determine the hearing protector with the higher rated NRR (NRRh) and subtract 7 dB if using A-weighted sound level data. Add 5 dB to this field-adjusted NRR to account for the use of the second hearing protector. Subtract the remainder from the TWA. It is important to note that using such double protection will add only 5 dB of attenuation. For an example of a calculation of dual hearing protection, see Appendix IV.C, Methods for Estimating HPD Attenuation of the OSHA Noise Safety and Health Topics Page.

For a more extensive discussion of how to use the NRR, see the NIOSH website. NIOSH has developed guidelines for calculating and using the NRR in various circumstances. (http://www2a.cdc.gov/hp-devices/pdfs/calculation.pdf: Method for Calculating and Using Noise Reduction Rating-NRR)