The day-night average sound level (DNL) (also written as L_{dn} in equations) was developed to evaluate the total community noise environment. The DNL is the average A-weighted sound level during a 24-hour period with 10 dB added to nighttime levels (between 10:00 p.m. and 7:00 a.m.). This adjustment is added to account for the increased human sensitivity to nighttime noise events. The DNL was endorsed by the Environmental Protection Agency and is mandated by the U.S. Department of Housing and Urban Development, the Federal Aviation Administration, and the Department of Defense for land use assessments.

The DNL is sometimes supplemented with other metrics, primarily the equivalent sound level (L_{eq}). The L_{eq} is the equivalent, steady state level that would contain the same acoustical energy as the time-varying level during the same time interval.

Frequently, statistical values of noise levels are used to describe a time-varying noise measured in dBA. The noise variation is described in terms of the percentage of time a given noise level is exceeded. The L_{eq} values usually used are L_{10}, L_{50}, and L_{90}, the noise levels that are exceeded 10, 50, and 90 percent of the time, respectively. L_{10} gives an indication of the top end of the level range though it can still be substantially less than the occasional peak (L_{max}). L_{90} corresponds to the background noise level in the absence of nearby noise sources. L_{50} is the median noise level.

Table 4.8.1–1 shows how differences in sound magnitudes are perceived. Differences over long timespans, such as before and after a project requiring several years to complete, are more difficult to judge. Consequently, for changes that take place over a long period of time, sound level shifts of 5 dBA or more may be "barely perceptible."

Except for the prohibition of nuisance noise, neither the State of Texas nor its local governments have established specific numerical environmental noise standards applicable to Pantex Plant. However, community annoyance surveys have provided a basis for establishing guidelines for sound levels compatible with various land uses. Table 4.8.1–2 shows land uses that are defined by the Federal Aviation Administration and the Federal Interagency Committee on Urban Noise as normally compatible with various noise exposures. This table is used to ensure compatible planning around airports and is appropriate for evaluating exposures from other noise sources. The guidelines define

TABLE 4.8.1–1.—*Subjective Response to Changes in Sound Level*[1]

CHANGE IN SOUND LEVEL	PERCEIVED CHANGE IN LOUDNESS
±1 dB	Requires close attention to notice
±3 dB	Barely perceptible
±5 dB	Quite noticeable[2]
±10 dB	Dramatic; sounds nearly twice or half as loud
±20 dB	Striking; fourfold change in loudness

[1]Comparative judgments of sounds presented within a short timespan
[2]OSHA considers a 5 dB increase to represent a doubling of acoustic energy effects on hearing.

Source: GSA 1995:3-58