

Appendix 5-A - Additional Information on Health-Based Screening Values

This report uses health-based screening levels to determine which subset of pollutants considered in the ambient air monitoring program and dispersion modeling analysis warrant further consideration from a health perspective. The screening levels used for this purpose were originally published by the Agency for Toxic Substances and Disease Registry (ATSDR), the U.S. Environmental Protection Agency (EPA), and the Texas Commission on Environmental Quality (TCEQ). It is important to note that these agencies use their screening levels for different purposes and invoke different assumptions when deriving these values. For these and other reasons, one should not expect the different agencies' screening levels to be identical. It is also important to note that the agencies typically apply multiple health-protective assumptions to ensure that screening levels are adequately health protective. The agencies also develop separate sets of screening levels to reflect different exposure durations. The ATSDR and TCEQ screening levels considered in this report include "short-term" values (which were used for interpreting 1-hour and 24-hour average air concentrations) and "long-term" values (which were used for interpreting annual average air concentrations).

ERG applies the screening levels in this report as follows: When the highest ambient air concentrations of a given pollutant do not exceed the lowest health-based screening level, ERG concludes that the pollutant likely is not present at levels of health concern and does not evaluate the pollutant further. When concentrations are found above screening levels, the pollutant requires further evaluation. It is important to note that concentrations greater than screening levels do not necessarily imply that exposed individuals will experience adverse health effects, and this is primarily due to the multiple levels of protective assumptions built into the screening levels. When concentrations are above the screening levels, ERG looked across the different agency screening levels and considered the magnitude of the elevated concentration when reaching conclusions.

Following is additional background information on the different agencies' screening levels used in this report:

ATSDR's Health-Based Comparison Values

ATSDR has an internal publication titled "Air Comparison Values" that agency personnel use to screen ambient air monitoring data and identified pollutants of concern. Some of these comparison values are derived for acute exposures (exposure durations less than 14 days), intermediate exposure durations (exposures between 14 and 365 days), and chronic exposure durations (exposures of 1 year and longer). The agency derives some of its own comparison values, and also refers to certain screening levels published by EPA (e.g., inhalation reference concentrations). For carcinogens, ATSDR's comparison values are highly protective; they are theoretical values that are believed to cause no more than one in one million (1 in 1,000,000) cancer cases among populations exposed for a lifetime. This is a highly protective assumption that differs from other screening levels considered in this report. ERG obtained the ATSDR comparison values in March 2011. They are not published on the agency's website but can be obtained by contacting and6@cdc.gov.

EPA's Regional Screening Levels

EPA has published a wide range of screening levels that environmental scientists can use when evaluating ambient air monitoring data. One such resource is the screening levels published on

the agency's Integrated Risk Information System (IRIS) website. For this project, ERG accessed "Regional Screening Levels" published by EPA Region 6—the region in which Texas is located. Many of the Region 6 screening levels are based on IRIS values, but others are derived from other data sources. For example, some Regional Screening Levels are based on carcinogenicity assessments made by California's Office of Environmental Health Hazard Assessment. For this and other reasons, the Regional Screening Levels cover a broader list of pollutants than currently listed in IRIS.

The Regional Screening Levels used in this report were downloaded from the EPA Region 6 website in March, 2011 (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm). As this website notes, the Regional Screening Levels are designed to "...risk assessors and others involved in decision-making concerning [selected] hazardous waste sites and to determine whether levels of contamination found at the site may warrant further investigation or site cleanup, or whether no further investigation or action may be required."

TCEQ Effects Screening Levels (ESL) and Ambient Monitoring Comparison Values (AMCV)

TCEQ has published two sets of screening levels for use in environmental applications. First, the agency has for many years published a list of "Effects Screening Levels" (ESLs). These values are primarily used in the permitting process, particularly when reviewing dispersion modeling data. TCEQ has developed separate ESLs for short-term and long-term exposure durations, where short-term values are typically used for assessing 1-hour average concentrations and long-term values are typically used for assessing annual average concentrations. Most of TCEQ's ESLs were developed based on health effects, but some were developed to protect vegetation or based on odor detection. The ESLs are not regulatory standards, but are used to interpret exposures to concentrations of air pollutants.

In terms of how to interpret these screening levels, TCEQ states on its website for ESLs: "If predicted airborne levels of a constituent do not exceed the screening level, adverse health or welfare effects are not expected. If predicted ambient levels of constituents in air exceed the screening levels, it does not necessarily indicate a problem but rather triggers a review in more depth." For carcinogens, TCEQ's ESLs are ambient air concentrations associated with a 1 in 100,000 theoretical cancer risk following lifetime exposures. This assumption differs from that used in developing ATSDR's health-based comparison values. Therefore, the TCEQ ESLs for carcinogens are generally higher than ATSDR's corresponding health-based comparison values. That being said, the TCEQ ESL list is far more comprehensive in terms of pollutants covered and provides health screening insights for many pollutants not considered on ATSDR's list. TCEQ's ESLs are available online (<http://www.tceq.texas.gov/toxicology/esl/>).

In addition to ESLs, TCEQ has more recently developed Air Monitoring Comparison Values (AMCVs), which are pollutant-specific ambient air concentrations that the agency has established to protect human health and welfare. While ESLs are primarily used when evaluating concentrations predicted by dispersion models, AMCVs are used when conducting health-based screening evaluations of ambient air monitoring data. TCEQ's AMCVs are also available online (<http://www.tceq.texas.gov/toxicology/AirToxics.html#amcv>).