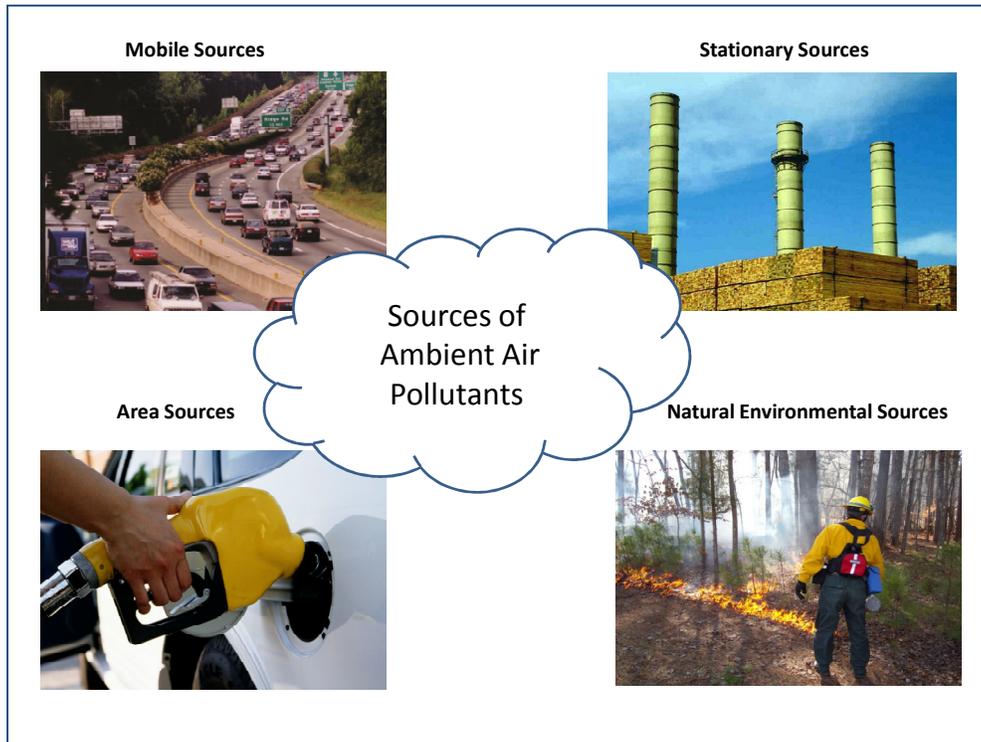


Acceptable Ambient Levels (AALs)

What is an Acceptable Ambient Level?

Air pollutants originate from many different sources. They may be emitted from mobile sources (such as automobiles or trains), stationary sources (such as a manufacturing facility or utility), area sources (such as a gas station or dry cleaner), or natural sources (such as a forest fire).



An **Acceptable Ambient Level (AAL)** is an airborne chemical concentration level established to protect human health. North Carolina AALs are state-specific limits used in the regulation of air toxics. They are used exclusively in pollution permitting to calculate emission volumes and rates from industrial stationary sources. They are not applicable for emissions from mobile sources, area sources, or natural background sources nor should they be compared with measured ambient pollutant concentrations.

Airborne chemical concentration levels exceeding the AAL at or beyond a facility property boundary may adversely impact human health. North Carolina has established AALs for 97 **toxic air pollutants (TAPs)**. North Carolina AALs, with one exception, are expressed in units of mass of TAP per unit volume of air and are generally reported in milligrams per cubic meter (mg/m^3). The AAL for asbestos is expressed as fibers/mL (fibers per milliliter).

How are AAL's calculated?

Historically	Currently
<p>AALs were originally recommended by the North Carolina Academy of Sciences, Air Toxics Panel in 1986/1987.</p> <p><i>For chemicals known or suspected of causing adverse health effects other than cancer:</i> AALs were calculated using a “factored TLV” approach. Established occupational exposure levels (such as those recommended by OSHA or ACGIH) were divided by “safety factors” of 10 to 160.</p> <p><i>For chemicals known or suspected of causing cancer:</i> AALs for known human carcinogens were calculated using a “one in one million” risk estimate. This means that if one million people were continuously exposed to the chemical for 70 years at the AAL, one additional person would be expected to contract cancer as a result of the exposure. For “probable” human carcinogens, the risk levels increased to “one in one hundred thousand.”</p>	<p>Candidate AALs are recommended by the North Carolina Science Advisory Board on Toxic Air Pollutants (NCSAB) following a comprehensive review of animal and human toxicological data for specific chemicals. Current AALs are periodically reviewed to determine if new and relevant information has been published in peer-reviewed journals which may influence the AAL determination.</p> <p><i>For chemicals known or suspected of causing adverse health effects other than cancer:</i> The NCSAB identifies a relevant inhalation No Observed Adverse Effect Level (NOAEL) from animal or human studies. The NOAEL is divided by “uncertainty factors” of 10 to 400.</p> <p><i>For chemicals known or suspected of causing cancer:</i> The NCSAB utilizes current dose-response models and statistical methods to calculate a range of risks for AAL determination. A “one in one million” risk estimate is used for known human carcinogens and a “one in one hundred thousand” risk estimate is used for suspected human carcinogens.</p>

What is the difference between a North Carolina AAL and a National Ambient Air Quality Standard (NAAQS)?

National ambient air quality standards (NAAQS) are established by the EPA for ambient concentrations of specific air pollutants referred to as “criteria pollutants.” The six criteria pollutants are:

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|------------------------------------|-------------------------|
| Ozone (O ₃) | Carbon Monoxide (CO) |
| Nitrogen oxides (NO _x) | Lead (Pb) |
| Sulfur oxides (SO _x) | Particulate matter (PM) |

States must meet the national standards for criteria pollutants by implementing pollution control strategies and air monitoring programs. States routinely measure and report ambient concentrations of criteria air pollutants to ensure compliance with the national standards. NAAQS apply to the total concentration of each criteria pollutant in ambient air, regardless of their respective source. Hence, measured ambient concentrations of criteria pollutants must not exceed the national standards.

AALs, established for 97 North Carolina TAPs, are used exclusively in air pollution permitting. AALs are used to calculate acceptable **toxic pollution emission rates (TPERS)** for emission permits. Industrial stationary sources must not emit concentrations of TAPs that exceed the AAL at or beyond the source property boundary. Dispersion models are used to confirm adherence to AALs at and beyond the property boundary.

Ambient air monitoring for TAPs in North Carolina is generally limited to specific areas and specific pollutants. Measured ambient air concentrations of TAPs are not comparable to AALs since TAPs in the ambient air are the result of contributions from stationary sources, mobile sources, area sources and natural background sources. AALs are relevant only for stationary source emissions.

NAAQS	North Carolina AALs
National Level	State Level
Values for 6 Criteria Pollutants	Values for 97 Toxic Air Pollutants
Ambient monitoring results must meet standards	Ambient monitoring results not applicable to AALs
Applies to sum of all pollutant sources	Applies only to stationary source emissions