Air Quality Analysis Overview

Air quality in the U.S. is governed primarily by the federal Clean Air Act (CAA) and is administered by the U.S. Environmental Protection Agency (USEPA). USEPA has established the National Ambient Air Quality Standards (NAAQS) for six principal air pollutants. These pollutants are:

- Carbon monoxide (CO)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)
- Particulate matter ($PM_{2.5}$ and PM_{10})
- Sulfur dioxide (SO_2)
- Lead (Pb)

Since 1970, significant progress has been made in reducing mobile source emissions, which includes motor vehicles. Most of these reductions have resulted from cleaner vehicles and cleaner fuels. In most urban areas though, motor vehicles are still important contributors to carbon monoxide, nitrogen dioxide, ozone, and particulate matter levels. Transportation sources account for a small percentage of regional emissions of sulfur dioxide and lead, so a detailed analysis of these pollutants is not required for transportation projects.

For the northeast Illinois region, transportation conformity, as required by the CAA, ensures that federally-funded or approved transportation plans, programs, and projects conform to air quality standards. The most recent regional conformity analysis (which included the I-290 improvement project) found that air quality standards are met.

At the project level, the following types of air quality analyses have been performed:

- Pollutant burden analysis
- Carbon monoxide intersection analysis

A pollutant burden analysis estimates the transportation-related emissions for the future no build and the future build conditions. USEPA's mobile vehicle emissions simulator (MOVES) model is used to estimate the transportation-related emissions, based on vehicle fleet make-up (number and types of vehicles), fleet age, vehicle miles and speeds, and meteorological conditions.

Carbon monoxide is typically addressed as part of NEPA by modeling carbon monoxide levels high-volume signalized intersections. Signalized intersections, because of the idling and acceleration that occurs in these locations, result in the highest levels of carbon monoxide vehicle emissions. The predicted carbon monoxide levels at these intersections, is compared against the appropriate carbon monoxide NAAQS. IDOT's carbon monoxide screen for intersection modeling (COSIM) is used to estimate CO emissions. A high-volume intersection is defined by IDOT for their COSIM procedure as an intersection with an approach that exceeds 62,500 average daily traffic or 5,000 vehicles per hour. The intersections in the I-290 study area are not high enough to meet this traffic level threshold, and is not required to be evaluated.

However, evaluations were conducted as a sensitivity analysis to compare build versus no build conditions and it was found that this project does not exceed the carbon monoxide NAAQS.

A mobile source air toxic (MSAT) analysis is also being prepared for the remaining alternatives. The MSAT analysis will measure acrolein, benzene, 1,3-butadiene, naphthalene, formaldehyde, and diesel particulate matter, which are emitted from highway vehicles.