United States
Environmental Protection
Agency

Air Screening Assessment for Cook County, Illinois, and Lake County, Indiana

Region 5 Air and Radiation Division June 2004

U.S. Environmental Protection Agency recently completed an air screening assessment for Cook County, Ill., and Lake County, Ind. It is designed to help EPA, state and local governments, the scientific community, and the public better understand where air toxics come from and the inventory and monitoring information available for assessment.

The assessment focuses on estimates of cumulative hazard (not "risk" as typically defined by EPA) associated with inhalation of air toxics from sources in the two-county study area. As expected, EPA found air quality patterns typical of a major urban area.

This is one example of the many tools EPA has been creating to advance knowledge of air toxics. The Agency's knowledge of air quality recently led to the development of a suite of rues to dramatically reduce air pollution – the Clean Air Rules of 2004 (see box at left). These rules will lead to significant improvements in air quality, especially in addressing pollution that crosses state borders.

Background

In late 1995, EPA received a petition from 11 community organizations represented by the Chicago Legal Clinic Inc. requesting that pursuant to Section 21 of the Toxic Substances Control Act, EPA review the cumulative effects of seven proposed waste burning facilities in Cook County and one in Lake County. The petition focused on the cumulative effects of these facilities on this highly populated area and on the Great Lakes ecosystem.

In May 1996, EPA denied the petition but proposed the petitioners work with the Agency to plan and implement a community-based effort to investigate the cumulative issues (covering a wider range of pollutants and sources) faced by residents in the two-county area. The air screening assessment is a result of that effort.

The assessment was authored primarily by Argonne National Laboratory with input from a work group composed of petitioners, EPA, state and local government representatives. It relied on readily accesssible air pollutant emissions and toxicity information, including EPA's Toxics Release Inventory (TRI), the Cumulative Exposure Project (CEP), the states' Regional Air Pollutant Inventory Development System (RAPIDS) and outdoor air monitoring data to make comparisons and identify any consistently higher hazard areas, pollutants and sources. The TRI, RAPIDS and outdoor monitoring information was analyzed with 1996 as the base year, while the CEP was based on 1990 data.

How the assessment was conducted

This assessment is a snapshot involving several data sets and emissions factors that continue to be updated and evolve over time. Focus should be placed on the usefulness of the methodologies developed. Assumptions that simplify the real situation — but make the assessment possible given available information and resources — introduce uncertainties into the results. Individual findings, including identification of communities or industrial sources, may not represent current conditions. It is inappropriate to use the results to draw conclusions about the effect that emissions may have on the study area population.

This analysis is being conducted outside the scope of the traditional regulatory process. This assessment is both a hazard assessment and hazard mapping exercise designed to improve decision-making. The approach evolved over time through dialogue with the petitioners and other stakeholders and was shaped by the availability of data and methodology. Current air quality information is different than that of 1996, the base year of this assessment.

Clean Air Rules of 2004

The Clean Air Rules are a suite of actions that will dramatically improve America's air quality. They provide national tools to achieve significant improvement in air quality and the associated benefits of improved health, longevity and quality of life.

Together, they will make the next 15 years one of the most productive periods of air quality improvement in American history.

Nonroad Diesel Rule. Changes the way diesel engines function in construction and other nonroad diesel equipment will reduce emissions by more than 90 percent.

Ozone Rules. Designates areas where the air does not meet health-based standards for ground-level ozone.

Fine Particle Rules. Designates areas where the air does not meet health-based standards for fine-particle pollution.

Interstate Air Rule. Helps states solve the problem of power plant pollution that drifts from one state to another.

Mercury Rule. Regulates the emission of mercury from power plants for the first time.

For more information

To learn more about the Clean Air Rules, visit www.epa.gov/cleanair2004

To download the executive summary of the assessment from EPA's Web site, go to www.epa.gov/region5/air

For further information about the assessment, contact Carl Nash at EPA Region 5, at (312) 886-6030.

A unique feature of urban areas is the proximity of many emissions sources and their pollutants to each other and to the populations which live or work in these areas. While there may be local issues related to certain sources, generally, the assessment identified many of the same emissions source categories and pollutants that EPA identifies as a part of the Urban Air Toxics Strategy.

The assessment used two methods to estimate the relative inhalation hazard of outdoor toxic air pollutants in the study area: one for emissions mass (TRI and RAPIDS) and the other for outdoor air pollutant concentrations (CEP and monitored data).

Method 1. Emissions mass (pounds per year) was weighted by toxicity factors that provide an estimate of the relative hazard of each pollutant. Toxicity-weighted emissions were then summed over pollutants emitted by a specific facility, sector (e.g., chemical refining, metals production), or source group (e.g., mobile or area sources), or within a geographic area to indicate the cumulative hazard of emissions from that source or group of sources relative to others.

Method 2. Outdoor air concentrations of each pollutant (annual averages per cubic meter) either measured or modeled within each study unit were compared to reference value concentrations considered to provide adequate safety for long-term exposure (e.g., one-in-a-million excess cancer risk level). As with the toxicity-weighted emissions method, this approach can be used to compare hazards of individual pollutants within an area and, with the acceptance of simplifying assumptions, has the ability to assess the relative hazards of groups of pollutants.

Analytic limitations in the off-the-shelf emissions data include potentially inaccurate reporting, inherent uncertainty in emissions estimates, lack of available emissions and air concentrations for all pollutants or all categories of sources of emissions, and changing emissions over time. The toxicity screening tools used in the assessment (i.e., toxicity weighting factors and comparison levels) also have limitations. In general, the methods used to generate the toxicity factors incorporate methods to account for more sensitive subpopulations within the general population (i.e., children, the elderly).

Actions taken to address air toxics

Since 1996, the base year for much of the technical information used in the assessment, EPA and state and local agencies have implemented programs to reduce air toxics. Additional programs have also been implemented to reduce criteria pollutants which have the added benefit of reducing air toxics. Some of those programs are highlighted below.

Maximum Achievable Control Technology. MACTs generally require control technologies for specific sources of air toxics. Prior to 1996, only 16 MACTs had been promulgated; however, as of February 2004, all of the 92 MACT standards for major point-source categories have been promulgated. Typically, sources have three years to comply; thus, the majority of the MACT benefits will be realized during the time period 1996 through 2007. (www.epa.gov/ttn/atw/mactfnl.html)

Residual Risk. As a follow-up to the MACT program, EPA is required to assess the remaining risk after the implementation of MACT standards. In 1996, none of the residual risk standards had been initiated. Currently, all 20 of the two- and four-year MACT residual risk standards have been initiated, and five of the 24 seven-year MACT projects have initiated workgroups. (www.epa.gov/ttn/atw/rrisk/residriskpg.html)

Area Source Program. EPA is developing standards for area source categories, which address the highest risk categories first (based on toxicity-weighted emissions). As of February 2004, a total of 70 standards have been listed; of these standards, 25 have been initiated (15 completed) with all remaining standards to be initiated by October 2006. (www.epa.gov/ttn/atw/urban/arearules.html)

On-Road Diesel Standards. Heavy-duty trucks and buses will be required to use cleaner diesel fuel, which would enable modern pollution-control technology on new engines. The diesel rule cuts truck and bus pollution by as much as 95 percent. (www.epa.gov/otaq/hwy.htm)

Motor Vehicle Inspection and Maintenance. The I/M program implements periodic vehicle inspections and requires repairs for malfunctioning control devices. Both Cook and Lake Counties have I/M programs, and these programs encourage proper vehicle maintenance and discourage tampering with emission control devices.

Voluntary Diesel Retrofit Program. While EPA has rules in place to address new engines, a program was needed to provide options to address existing fleets. This program promotes anti-idling programs and encourages fleet owners to install pollution-reducing devices and use cleaner fuels in all on-road and off-road diesel applications. (www.epa.gov/otaq/retrofit/)

Integrated Urban Air Toxics Strategy. This strategy focuses on the 33 Urban Air Toxics that pose the greatest potential health threats in urban areas and identifies potential sources responsible for emitting these toxics. The goals of this strategy include reducing cancer risk and noncancer health effects due to air toxics from commercial/industrial sources, as well as addressing areas of disproportionate impacts from air toxics across urban areas. (www.epa.gov/ttn/atw/urban/urbanpg.html)

Region 5 Regional Air Toxics Program. As part of the Integrated Urban Air Toxics Strategy, Region 5 is involved in building capacity at the state and local level to address and characterize air toxics. Region 5 is actively collaborating with its six states — Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin — to assist in program development, negotiate air toxics commitments, and plan for future needs.(www.epa.gov/region5/air/toxics/toxics.htm)

National-Scale Air Toxics Assessment. The NATA study is a method of gauging the national relative risk from the 33 Urban Air Toxics. The assessment used 1996 data and included toxic emissions inventories, estimates of average outdoor air toxics concentrations, estimates of exposure concentrations, and risk characterization. (www.epa.gov/ttn/atw/nata/)