



Minnesota
Pollution
Control
Agency

Air Emissions from Ethanol Plants

Update - October 2002

Air Quality/General/#1.21/October 2002

Minnesota has required gas stations to sell only ethanol-blended gasoline since 1997. Ethanol and other additives called “oxygenates” allow gasoline to burn more completely, which reduces tailpipe emissions from vehicles. As more states have required the use of ethanol-blended gasoline to fight air pollution, demand for ethanol has risen. Since Minnesota has an ample supply of corn—the raw material commonly used to make ethanol—the state’s industry has grown rapidly. Minnesota’s 14 ethanol plants now produce more than 400 million gallons a year.

Additional air pollutants found

In 2001, staff of the Minnesota Pollution Control Agency (MPCA) made a discovery that is having far-reaching effects in Minnesota and across the nation. In the course of investigating neighborhood complaints about a St. Paul ethanol plant, staff gathered emissions data that had never been tracked for ethanol plants anywhere in the nation. What they found was that ethanol plants emit certain air pollutants in far greater quantities than previously believed.

Originally, when the ethanol plants went through the permitting process, it was widely believed that ethanol and methanol were the only significant volatile organic compounds (VOCs) emitted from such facilities. The emissions test method used nationally measured only those two compounds. However, during the MPCA’s investigation, staff conducted additional emissions tests. The results showed

significant amounts of other VOCs, including acetaldehyde, acrolein, formaldehyde, 2-furaldehyde, acetic acid and lactic acid. When these emissions were added to the ethanol and methanol emissions reported by the plants, staff realized that total VOC emissions were actually 10 times higher than reported.

The Minnesota Department of Health’s follow-up investigation near this St. Paul plant indicated that levels of VOCs at the stacks do not exceed the health limits used to evaluate health impacts. For more information, see:

<http://www.health.state.mn.us/divs/eh/hazardous/gopher/>

After the MPCA reported these findings to the Environmental Protection Agency (EPA), the EPA carried out more emissions testing in other states. Test results from a plant in Illinois indicate that carbon monoxide (CO) emissions from ethanol plants may also have been significantly underestimated. Higher-than-expected levels of small particles have also been found in the air.

The EPA determined that, because of this underestimation of annual emissions, nearly every ethanol plant in the nation had applied for and received an incorrect air permit—a permit with pollution control measures intended for much lower emissions.

Choosing the right air permit to apply for can be compared to choosing the right tool for a job in an office. If you believe the job is small—say, one or two letters—you may





choose to use a typewriter. If the job turns out to be very large—one thousand letters, for instance—a typewriter would be entirely inadequate and you would need to upgrade to better technology, such as a computer.

Similarly, since the method commonly used by ethanol plants to assess their pollution-control needs proved inaccurate, the plants' real emissions levels were more than the plants' pollution control systems could handle. All ethanol plants in the nation will be required to apply for the correct permit and install new pollution control systems to handle emissions.

Civil settlement

On October 2, 2002, the MPCA, EPA, and U.S. Department of Justice announced a settlement with 12 Minnesota ethanol plants. These agreements are the first of their kind and will be followed by settlements with plants around the country.

The Minnesota settlements require that:

- the plants install extensive pollution control systems, costing upwards of one million dollars each. Some plants will install a thermal oxidizer, which uses extremely high heat to destroy at least 95 percent of VOC emissions. Other plants will put equivalent pollution controls into place. These must be installed and operating correctly at all 12 plants within a maximum of three years (sooner for most plants).
- the plants meet new restrictions on emissions of nitrogen oxides, small particles, carbon monoxide and many VOCs.
- the plants immediately apply for correct permits.
- the plants pay penalties ranging from \$19,000 to \$39,000 for violation of the Clean Air Act.

The EPA and DOJ continue to work with ethanol plants in other states to ensure their compliance with the Clean Air Act. The MPCA will continue to work with Minnesota plants to ensure that they meet air quality requirements while continuing to produce the ethanol needed to help keep Minnesota's air clean.

Odor

Much of the objectionable odor from ethanol plants comes from drying the leftover corn mash after the ethanol has been separated. While bad odor does not mean the emissions are hazardous to the health, the odor can be

irritating to some individuals. The pollution control equipment that will be installed at these plants is expected to be quite effective in reducing odors as it reduces emissions.

For more information

About air permits:

MPCA Customer Assistance Center
(651) 297-2274 (Metro and outside Minnesota)
1-800-646-6247 (Minnesota only)

About specific ethanol plants:

Rhonda Land, MPCA
(651) 297-7707 (Metro)
1-800-657-3864 (ask for Rhonda Land)

MPCA Web site: <http://www.pca.state.mn.us>

MN Department of Health ethanol health information:
<http://www.health.state.mn.us/divs/eh/hazardous/gopher/>