Minnesota Department of Health

Environmental Health Information

Gopher State Ethanol

May 1, 2002

This sheet provides general information about public health issues related to the Gopher State Ethanol plant in St. Paul –for people living near the plant and others who may be interested. It does not provide a comprehensive discussion of all available technical information about the site, or all health issues that have been raised in connection with the site. More detailed information can be found in technical reports available from the Minnesota Department of Health and the Minnesota Pollution Control Agency.

What is the history of the site?

In the fall of 2000 the Minnesota Brewing Company expanded its facility located in the West Seventh Street neighborhood near downtown to include ethanol production. Ethanol, or grain alcohol, can be made from corn and can be added to gasoline for use as fuel. In response to numerous community complaints about odors and reported health effects, the Minnesota Pollution Control Agency requested that the Minnesota Department of Health investigate and evaluate the possibility of health effects caused by emissions from ethanol production. MDH has made a number of site visits to both the brewery and ethanol plant, including roof top observations of various emission points. The plant is located in a densely populated area of the city with several schools nearby.

How is ethanol made? Where do the emissions come from in the ethanol process?

Trucks transport corn to the ethanol plant. Dust generated by the unloading process is drawn into a pit and removed by a fabric filter. The corn is then cleaned, milled, and cooked. The resulting mash is pumped to the fermentation tank where the sugars are changed to ethanol. The gases coming from the fermentation tanks are sent through a water scrubber that removes ethanol and separates out carbon dioxide. Two carbon bed units remove impurities in the carbon dioxide. The mash is distilled to remove the ethanol from the mash. This process vents through a scrubber but still produces odor. The final step is to concentrate the ethanol by removing water.

After removing 90% of the ethanol and water from the mash, the remaining liquids are separated from the solids by spinning. The solids are heated with hot air in the Distillers Dried Grain Solids (DDGS) dryer. Several cyclones (a device that spins the air and dried grain to force dust out) reduce the amount of particulates released into the air. The gasses from the cyclones are sent to the thermal oxidizer to be burned and then released into the air.

What are the health concerns? What is being done in response?

Citizens have complained about health effects that they believe are from odorous or irritating volatile gaseous emissions and dust particles.

Volatile organic compound emissions
Volatile organic compounds (VOCs) are a group of chemicals that evaporate easily into the air. The ethanol production process gives off a complex mixture of VOCs. VOCs from the DDGS dryer, cooling cyclone, centrifuge and carbon beds are sent through a control device called a thermal oxidizer that destroys greater than 90% of the emissions at 1400 °F. Though people are exposed to stack emissions through the air, the amounts of VOCs found in the tested stacks at the plant do not exceed health limits used by MDH to evaluate possible health impacts. The testing shows the maximum amount of chemicals that would be released into the air when every part of the control system was functioning properly. MDH is concerned that if there are periods of operation when the control system malfunctions or is bypassed then health limits may be exceeded. Another concern is that other sources of VOCs have been added to the intake to the control system since the first testing, and the testing results of that change are not yet available. it is also possible that some gasses could escape through the fresh air intake unintentionally. Because of these concerns, MDH would like to see more frequent testing than the current five-year cycle.

Odors
Odor is not always related to a chemical's toxicity. Some chemicals can be detected by the human nose at levels far below where there could be any adverse health effect. Other chemicals are harmful before they can be detected by smell. Amounts of chemicals in the air that can cause harm to health may or may not be accompanied by odor. Aside from other effects of the chemical, the odor itself can cause health effects such as headaches, nausea, cough, congestion, shortness of breath and eye, nose and throat irritation. Odors can also become associated with health effects even when a toxin is not present; for reasons not fully understood, odors can still produce health effects. The thermal oxidizer reduces but does not eliminate odors.

Fugitive emissions and Accidents
Fugitive emissions are gasses that escape without any controls or evaluation. The Minnesota Brewery and the Gopher State Ethanol plant have stacks and roof vents that have not been evaluated by the MDH or MPCA. Extensive plumbing and pipes have been added and modified through the years. Gasses that accumulate in buildings may drift across the street. These fugitive emissions are also a continuing source of odors. A long-term plan is needed to systematically document and control fugitive emissions.

On two occasions, there have been accidental releases of anhydrous ammonia. One required evacuation of the buildings and 18 people were taken to the hospital. A risk management plan that includes both the brewery and the new ethanol plant needs to be developed and placed on file with the Minnesota Department of Public Safety.

Particulates
Testing of the grain cooler stack and the baghouse stack during normal operation found them to be in compliance with the facility permit. However, area residents occasionally complain of yellow dust on windowsills, roofs and cars in the morning after they have been parked outside overnight. There have been several "eruptions" of the cooling cyclone that blew grain across the street to a distance of several blocks. There is an

accumulation of corn dust on the roof of the plant, especially around the cooling cyclone. Process design changes have eliminated the cooling cyclone as a source of particulates.

Noise
The plant has a history of violations of the nighttime noise standard. The city and the plant have agreed to a settlement that requires the sources of noise to be identified and the city nighttime noise standards to be met. Efforts have been made to reduce the noise, but the plant is still not meeting the nighttime standard.

What does MDH recommend?

1. The thermal oxidizer should be tested at least two separate times before the next required test in five years.
2. A careful study of fugitive emissions should be done to identify sources of chemical irritants, odors and particulates from both the plant and the brewery.
3. Known sources of odorous gases and particulates should be sent through the thermal oxidizer, or otherwise mitigated.
4. A risk management plan that includes the new ethanol plant should be submitted to the city of St. Paul and the Minnesota Department of Public Safety.
5. Noise violations should be eliminated.
6. Reports submitted to the MPCA and the MDH should also be given to the West 7th Federation, a citizens' group.

Where can I get more information?
A copy of the Gopher State Ethanol Public Health Assessment is available for public comment until June 30, 2002. You may request a copy from the MDH by contacting Tannie Eshenaur at the phone number listed below. Your comments should be sent to Daniel Peña at 121. East Seventh Place, Suite 220, St. Paul, MN 55101.

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