Professional Engineering Seminar # 3: For Biodiesel Project

Speaker: Mr. Ken Edgell, Environmental Administrative Coordinator Hamilton County Environmental Services
Date: Thursday, June 24, 2010
Time: 1:00-3:00 PM.
Venue: University of Cincinnati, Baldwin Hall, room 641

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This presentation was given by Mr. Ken Edgell, an Environmental Administrative Coordinator at the Hamilton County Environmental Services. This presentation was given to the RET participants to inform them of the status of air quality in Southwest Ohio and of the EPA standards for the air quality. The picture on next page shows Mr. Edgell presenting.

Mr. Ken Edgell During the Hamilton County Air Quality Presentation

Mr. Edgell started the presentation with the history of the city of Cincinnati as ite relates to air quality testing. In 1881 the first smoke abatement ordinance was passed to reduce smoke emissions from many of the boilers in the city, which in turn started the Hamilton County Environment Services. The Environmental Services then became more organized and now serves two main branches: the Air Quality Division and the Solid Waste Division are composed of four counties in southwest Ohio, which include Butler County, Warren County, Clermont County, and Hamilton County. The air quality standards are State regulated by Ohio, but must have a minimum standard that is determined by the EPA.

The Air Quality Division is divided into two main sections: Permits and Enforcement section and Monitoring and Analysis section. The Permit and Enforcement section regulates over 2,000 facilities that have smoke stacks and they all must have permits to emit monitored substances released into the air. The Monitoring and Analysis section has 16 continuous instruments and 20 intermittent

instruments to record gases and particles in the air; they then report the air quality index as well as pollen and mold counts to the media.

Most people that live in the area have a bad perception of the air quality in Cincinnati. In agreement with this public perception, Cincinnati is below the standards in all types of air pollution monitored. The air pollutants monitored include: Ozone, Sulfur dioxide, Nitrites, particulate matter smaller than 10 microns, and particulate matter smaller than 2.5 microns. In 1997 the particulate matter smaller than 2.5 microns was set in place due the health issues that could not be explained by the monitoring of particulate matter 10 microns and smaller. The pictures below show filters used to measure the amounts of PM 2.5 and PM 10.

Filter Used: To Measure PM 2.5 (Left) and PM 10 (Right)

National Standards are set by the EPA, but no fines or punishments are currently enforced on industries or cities that are over the set standards, but the Permits Section of the Air Quality Division can regulate industry and permits given to companies and the city. Standards are also currently changing, in the next year the EPA is considering changing the PM 2.5 from 15 ug/m^3 to 12-14 ug/m^3, the ozone standards are currently set at 75PPB (parts-per-billion) but are considered to be lowered to 60-70PPB. The new ozone standards could be extremely hard for communities to reach since ozone is produced naturally from pine trees that produce turpines so background ozone can naturally occur at 50PPB. There are 660 toxic chemical compounds that must be regulated throughout the year. In the Cincinnati area our top five facilities that release TRIs (Toxics Release Inventory), which are Duke Miami Fort, Emery Oleochemicals, Procter & Gamble, Ineos, and Ingersoll-Rand/Steelcraft. Most of the TRIs released are due to aerosols formed, boilers, and the production of paint with Sulfuric Acid Aerosols accounting the largest part followed by Hydrochloric Acid Aerosols, Hydrogen Fluoride Aerosols, Ammonia, and Styrene.

There are three monitoring sites in Carthage, Lower Price Hill, and Winton Place, there is one Ohio EPA monitoring site in Middletown, and two special project sites in Addyston and Rumpke. The air toxic sampling networks go through an intermitted monitoring that collects data for a 24 hour period every 12 days so a representative sample can be taken for everyday of the week throughout the year. From the air toxics sampling, 4 compound classes were found in the air in the Cincinnati area: refrigerants

(freons), straight-chain hydrocarbons, mobile source compounds (from cars and trucks), and industrials solvents. All of these compound classes had very low levels in the surrounding air.

Hamilton County also conducts an analysis for four of six known cancer risk particles: Benzene, Carbon Tetrachloride, 1,3-Butadience, and Acrylonitrile. Although there are added risks of cancer from these particles in the air, the majority of cancer risk comes from non-road vehicles such as boats, trains, and planes; this is followed by cars and trucks. Diesel exhaust has been found to have 40 hazardous compounds, four of them being known carcinogens. Long term exposure to the exhaust can cause lung cancer, aggravate asthma as well as respiratory conditions, and has been implicated in premature death. The University of Cincinnati conducted an allergy and air pollution study which found the closer children live to highways and traffic areas and the nature of the traffic should an increase in infant wheezing. Due to these findings a grant was put in place to retrofit school busses with oxidizer reactors to reduce roughly 8 tons of pollutants per year.

In Cincinnati there is an overall decreasing trend in pollutants in the air showing that the air quality is getting better. However, the EPA is setting new lower standards to further improve air quality and reduce health problem thought to be caused by many toxins and diesel emissions.