

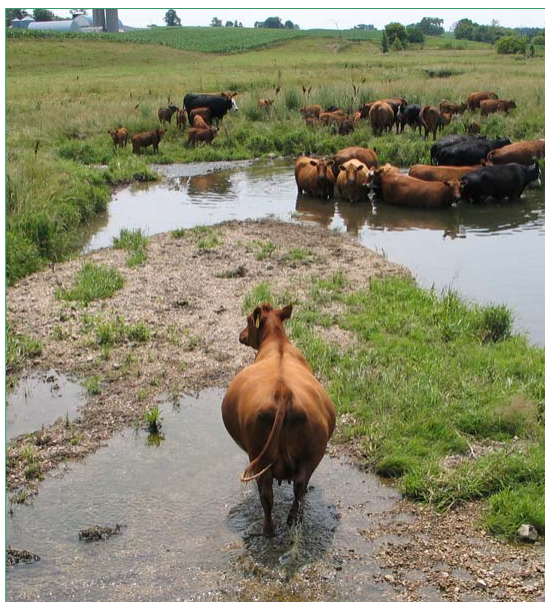
april 2008

An Introduction to Pharmaceutically Active Compounds (PhACs) in the Environment

David S. Liebl

Humans have always taken advantage of the beneficial effects of plants and minerals to cure disease and improve health. With the rise of the pharmaceutical industry at the beginning of the 20th century, synthetic drugs became widely available, so that today an \$800 billion industry supplies prescription and non-prescription drugs around the world.

However, it was not until the beginning of the 21st century that we began to have an understanding of the fate and impact of these chemical compounds on the environment. A 2002 report by the US Geological Survey⁽¹⁾ identified over seventy five different PhACs in surface waters across the United States, while in Wisconsin, a study of six large and small communities found PhACs in wastewater effluent and groundwater⁽²⁾.



PhACs enter the environment in several ways, the most common being via excretion into a public wastewater treatment systems. Expired drugs also are often flushed directly to the sewer, or enter indirectly in landfill leachate. Veterinary drugs can enter the soil or runoff into surface waters, when they are excreted by livestock. In many cases the drug in question has been altered (metabolized) as it passes through the body, creating new compounds of concern.

Publicly operated waste water treatment works (POTWs) are designed to remove solids and bacteria from sewerage prior to discharge to surface waters. While some PhACs are also destroyed by this process, POTWs are not designed to remove them from waste water. Thus a significant number are discharged to the environment. Bio-solids from POTWs and livestock facilities have also been shown to carry significant amounts of PhACs.

How serious is this problem? Certainly no one is suggesting that human and animal use of drugs be reduced. Likewise, there has not been a call for adopting expensive technology to destroy these compounds in wastewater effluent. However, recent studies show that PhACs persist in the environment and remain biologically active.



USGS research showed that hormonally active compounds can affect the reproductive physiology and behavior of fish, altering their natural populations. Bioaccumulation of PhACs has been documented in soil organisms, and there is evidence that bacteria develop resistance when exposed to low concentrations of antibiotics in the environment.

What can be done? It is possible to reduce the amount PhACs in wastewater by collecting expired or unused drugs, and disposing of them through incineration (rather than flushing or in a landfill). The Wisconsin Department of Trade and Consumer Protection now funds collection of pharmaceuticals as part of its Clean Sweep Program (contact: Roger Springman, 608-224-4545). For a list of upcoming events see:

<http://www4.uwm.edu//shwec/pharmaceuticalCollection/viewRecords.cfm>

The Wisconsin Department of Natural Resources also describes the problem at <http://dnr.wi.gov/org/aw/wm/pharm/pharm.htm> .

And, Calumet County UW-Extension CNRED agent Mary Kohrell is developing a regional education program for pharmaceutical collections (with support from SHWEC specialists Steve Brachman and David S. Liebl).

1. Kolpin, D.W., ET AL, *Pharmaceuticals, Hormones and Other Organic Wastewater Contaminants in U.S. Streams, 1999-2000: A National Reconnaissance*, Environmental Science and Technology, 36 (6) 2002 1202-1211

2. Karthikeyan, K.G., M.T. Meyers, *Occurrence of antibiotics in wastewater treatment facilities in Wisconsin, USA*, Science of the Total Environment, 361 (2006) 196-207.

2008 Prescription Drug Grant Application Process Open Through April 18

The Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) has announced that local governments interested in applying for prescription drug grants can do so through April 18. Application materials can be found by going to the Department's Clean Sweep website at <http://cleansweep.wi.gov/> . No hard copy mailings will occur with this call for proposals. Grants will be awarded by the end of April for the period of July 1 to December 31, 2008.

Grants of up to \$5,000 are available to individual units of government or up to \$14,000 for a group of municipalities. The Department can also fund demonstration collection projects up to \$10,000. \$80,525 has been reserved for pilot year grants and competition is expected to be keen. A 25% in-kind match must accompany all applications.

Unwanted drugs from people are the primary target of this new grant program. Residents of homes, apartments, condominiums, retirement centers, adult family homes, and other facilities can use program services. Open stock [unprescribed] drugs from clinics, hospitals, schools, nursing homes, and other businesses are not eligible for reimbursement through this program, but may still be accepted for collection and disposal through Department of Natural Resource regulations.

Local governments interested in applying for a 2008 grant are strongly encouraged to immediately convene a steering committee consisting of interested agencies, health organizations, pharmacists, local law enforcement, and hazardous waste companies serving the area. Contact Roger Springman, Manager, WI Clean Sweep Program, 608-224-4545.



Clean Energy Wisconsin, A Plan to Move Toward Energy Independence Through Business and Community Programs

Sherrie Gruder

Clean Energy Wisconsin was launched by Governor Doyle on March 25 to promote renewable energy, jobs creation energy security and efficiency, and a cleaner environment. The program has a \$15 million annual budget administered through the Department of Commerce. The first round of grants and loans is available April 1 through June 2, 2008 for business and research assistance. Funds are for research and development, commercialization or adoption of new technologies, and supply chain development that will move Wisconsin to generate 25 percent of our electricity and 25 of transportation fuels from renewable sources by 2025.

Meeting the locally-produced renewable energy goal is expected to generate nearly \$1 billion for the Wisconsin economy. Currently, Wisconsin spends \$19.5 billion on energy. Electricity accounts for \$5.7 billion annually, most of which comes from coal that is purchased out of state. Almost all Wisconsin's transportation fuel is purchased out of state where two-thirds of US petroleum is imported from other countries. Clean Energy Wisconsin is designed to keep energy dollars in the state and to generate new economic development capitalizing on Wisconsin's resources, manufacturing base and research capabilities.

For more information and applications materials for Clean Energy Wisconsin, visit:

www.wisgov.state.wi.us/docview.asp?docid=13459 .

Another part of this initiative is geared toward local government. The Wisconsin Energy Independent Communities (WEIC) program, formally launched on March 31, is administered through the Office of Energy Independence (OEI). This program encourages municipalities to sign on to the program at one of three levels:

- 1 Star: pass a resolution and work toward generating 25% of electricity and transportation fuels from renewables by 2025 and educate the community about it
- 2 Star: adopt resolutions based on state executive orders 141 and 145
 - purchase 20% of electricity for municipal facilities from renewable sources by 2011 and adopt energy standards for all municipally purchased energy consuming equipment;
 - Increase utilization of renewable fuels in municipal vehicles by 20% by 2010 and 50% by 2015
 - adopt High Performance Green Building and Energy Conservation standards for municipal buildings and operations
- 3 Star: engage in energy independence assessment and comprehensive energy planning; provide input for state energy independence policy, and designate a coordinator for the energy independence program.

Each community would examine its unique mix of potential local and regional renewable energy resources to develop a strategy to move toward generating renewable energy. The OEI will partner with the communities to provide technical assistance and increased access to state and federal funding. The partnership agreement and an overview and slide presentation about the program is posted on the OEI web site at

<http://power.wisconsin.gov/section.asp?linkid=1238&locid=131> The OEI was created by Governor Doyle in April 2007 to lead the State's effort to advance clean energy and bioproducts.

For more information about these clean energy programs and related grant and loan assistance, visit the Office of Energy Independence web site at <http://power.wisconsin.gov>.

22nd Annual Governor's Award for Excellence in Environmental Performance

Jack Annis



The annual Governor's Awards for Excellence in Environmental Performance were presented March 11, 2008 at the Federation of Environmental Technologists (FET) Environment 08 conference in Milwaukee. Projects are submitted to FET each November for judging based upon the following criteria:

- Reduction of the degree and amount of waste toxicity;
- Economic performance as measured by profits generated, costs reduced and payback period;
- Transferability of the processes or techniques to similar applications for use by other industries, organizations or institutions;
- Commitment by the applicant to help other industries, organizations or institutions by sharing information and expertise.

This year's award winners were the City of Racine, Green Bay Packaging, Green Bay and the Harley Davidson Museum & The Sigma Group, Milwaukee.



The City of Racine "North Beach Project" was recognized for actions to significantly improve Lake Michigan recreational water quality within their community through a team effort of Racine Health, Parks, Public Works and Wastewater Utility. As a result, North Beach went from 62 poor water quality days during the season in 2000 to only three in 2007. The improvements helped attract over 50,000 visitors in 2007 and the North Beach is the only "Blue Wave" designated beach in Wisconsin. www.cleanbeaches.org

Green Bay Packaging was recognized for efforts to significantly reduce wastes, water consumption and costs while improving the overall effectiveness of its wastewater pretreatment system with a new centrifuge system. The project, among other benefits, eliminated the use and disposal of over 500,000 pounds of diatomaceous earth at an expected cost savings of as much as \$190,000 annually, while also reducing water consumption from 5,000 gallons per use cycle to only a few hundred gallons of water.

The Harley Davidson Museum & The Sigma Group were recognized for their amazing reuse, salvage and recycling efforts which were completed during demolition of a mid-1800s era industrial facility in Milwaukee. Just a few of the materials salvaged from the building included 33,500 board feet of Douglas fir lumber, 40-40ft wood beams, 523 tons of steel, 2,720 pounds of copper, 5,450 pounds of aluminum. Also materials recovered from site were reused as aggregate materials the Marquette interchange while soil from the interchange project used as fill at the new site, saving approximately 10.88 tons of air emissions for transporting materials to and from the interchange area.

For more detail about these outstanding projects you can request a copy of the FET Governor's Awards booklet at their web site at www.fetinc.org or call 414-354-0700 for assistance. You can also get the nomination materials for the 2009 Governor's Awards applications.

DNR Proposes Mercury Reduction Rule for Power Plants

David S. Liebl

Ninety percent Mercury reduction by 2015? That is the goal for power plants under Department of Natural Resource's (DNR) proposed mercury rule. Large coal-fired power plants will be required to either meet a 90% mercury emission reduction or limit the concentration of mercury emissions to 0.0080 pounds of mercury per gigawatt-hour by January 1, 2015.

"The rule will address the January 2007 citizen's petition to the Department, and the Governor's directive to achieve mercury emission reductions of 90% from coal-fired power plants. The proposed rule includes a multi-pollutant option for large power plants and will achieve permanent, long-lasting improvements in Wisconsin's air quality.", said Kevin Kessler, Director of DNR's Bureau of Air Management .



Under the multi-pollutant option, large coal-fired power plants will be required to achieve nitrogen oxides (NOx) and sulfur dioxide (SO2) reductions beyond those currently required by federal and state regulations. Under the multi-pollutant approach, an additional six years will be allowed to achieve the 90% mercury emission reduction standard, with interim mercury reduction provisions of 70% or a mercury emission concentration of 0.0190 pounds per gigawatt-hour by January 1, 2015; 80% mercury emission reduction or an emission concentration limit of 0.0130 pounds of mercury per gigawatt-hour by January 1, 2018; with a 90% mercury emission reduction or an emission concentration limit of 0.0080 pounds of mercury per gigawatt-hour required by January 1, 2021.

More information on the proposed rule can be found at the following link to the DNR Air Management Bureau's webpage: <http://dnr.wi.gov/air/toxics/mercury/rule.htm>

There will be a public hearing on the proposed rule and on the Mercury Public Health and Welfare Finding document on Monday, April 7, 2008 at 9:00 a.m. in Room G09, GEF II, 101 S. Webster Street, Madison. Written public comments will be accepted through Monday, April 14, 2008. The proposed rule is scheduled to be considered for adoption by the Natural Resources Board at its May 2008 meeting.

The Great Lakes 2008 Earth Day Challenge

“Collect 1 million pounds of e-Waste and 1 million Unwanted Pills”

The U.S. Environmental Protection Agency is striving to mobilize hundreds of thousands of citizens in the Great Lakes basin to connect with their environment during April by helping address the environmental impact of electronic wastes and unwanted medicines. The Challenge is meant to galvanize public participation in collection events for those wastes so that one million pounds of electronic waste can be safely recycled and one million pills can be disposed responsibly. To find out more or to learn how to register a collection event, visit

www.epa.gov/greatlakes/earthday2008



International Compost Awareness Week – Be Part of the Solution

Across the United States and Canada, the UK, Europe and Australia, composting advocates will be encouraging everyone to compost during International Compost Awareness Week – May 4-10. Those who believe in the Compost Message will be planning events in their communities to promote the value of compost.

With the theme, “The Possibilities are Endless... Compost!” Compost Awareness Week is a fun and educational week of events that offers an opportunity to learn more about the many benefits of composting while enjoying the backdrop of fun activities. To find out what is going on in your area and for a list of resources to plan an event, visit www.compostingcouncil.org.

Presentations from the Wisconsin Renewable Energy Summit

Many of the excellent presentations from the *Wisconsin Renewable Energy Summit: Green Jobs Growing Wisconsin's Economy* held in Milwaukee in March are accessible via the following web site.

<http://www.renewableenergysummit.org/SummitSessionDetails/tabid/82/Default.aspx>. Even the keynotes are accessible. Learn about everything from solar, wind and biomass to jobs, policy and research.

Environmental News Briefs of Interest

National Vehicle Mercury Switch Recovery Program Reaches a Million

US-EPA recently announced that 1 million switches, over a ton of mercury, has been removed from scrapped vehicles through the National Vehicle Mercury Switch Recovery Program. The program is a partnership between EPA, automobile manufacturers, steel makers, scrap recyclers, automotive recyclers, states and environmental groups. Before model year 2003, some vehicles contained mercury switches for convenience lighting in hoods, trunks, and some anti-lock breaking systems. The program provides dismantlers with information, materials, support and incentives to remove these switches from end-of-life vehicles before they are crushed and sent to furnaces that recycle the steel. The goal of the program is to capture 80 to 90 percent of available vehicle mercury switches by 2017 when most pre-2003 vehicles are expected to be off the road and the program is scheduled to end. For information on the mercury switch program and directions on how to join go to <http://www.epa.gov/mercury/switch.htm> or <http://www.elvsolutions.org/>

Small Businesses Grow Big Environmental Technologies

The US-EPA announced \$1.75 million in Small Business Innovation Research (SBIR) program contracts with 25 small businesses to research and develop new environmental technologies. To participate in EPA's SBIR program, a small business must have fewer than 500 employees, and at least 51 percent of the business must be owned by U.S. citizens. This round of awards will help small businesses develop new technologies in five areas: nanotechnology and pollution prevention, bio-diesel and ethanol bio-fuels, solid and hazardous waste, air pollution control, and homeland security. Each company will receive \$70,000 for Phase I or "proof of concept" awards. If Phase I is successful, the companies can apply for Phase II awards to commercialize their technology. For more information on the SBIR program go to <http://www.epa.gov/ncer/sbir> and to view the 25 companies selected and their projects: <http://www.epa.gov/ncer/sbir/O8awards>

New Web Multimedia Portal Launched on EPA.gov

The U.S. Environmental Protection Agency recently launched its new web multimedia portal, a one-stop location for environmental video, audio/podcasts, and photography. This new multimedia portal is an important resource for the public, journalists, academia, local governments and the environmental community. The portal will help increase awareness of important news items through an intuitive, media-rich focus, rather than through traditional electronic print. Visit the portal at www.epa.gov/multimedia

EPA Seeks Public Comment on U.S. Greenhouse Gas Inventory

The EPA is seeking public comment on a draft annual report that analyzes sources of greenhouse gas emissions. The report, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006", will be open for public comment for 30 days after the Federal Register notice is published. The major finding in this year's draft report is that overall emissions during 2006 decreased by 1.5 percent from the previous year. This decrease was due primarily to a reduction in carbon dioxide emissions associated with fuel and electricity consumption. The inventory tracks annual greenhouse gas emissions at the national level and presents historical emissions from 1990 to 2006. The inventory also calculates carbon dioxide emissions that are removed from the atmosphere by "sinks," e.g., through the uptake of carbon by forests, vegetation, and soils. For information on the draft report and how to submit public comments go to: <http://www.epa.gov/climatechange/emissions/usinventoryreport.html>

EPA Proposing Additional Options for Animal Feeding Operation Rule

EPA is proposing additional options to a 2006 proposal for concentrated animal feeding operations (CAFOs) under the Clean Water Act. This supplemental proposal will be published soon in the Federal Register and open to public comment for 30 days. Under current law, if CAFOs do not discharge pollutants to waters of the United States they do not need a Clean Water Act permit. Today's proposal would, for the first time, allow CAFOs to certify that they do not discharge. EPA is also proposing three different approaches for nutrient management plans (NMPs) that could be used by permitting authorities and CAFOs to determine application rates of manure, litter and wastewater to be incorporated into the permit. An NMP specifies the amount of manure that can be applied to crops so nutrient runoff to water bodies is minimized. In response to a February 2005 federal court decision vacating some portions of a 2003 CAFO rule, EPA proposed a revised rule in June 2006. This proposed rule supplements the 2006 proposal by adding additional options. For information on Animal Feeding Operations go to: <http://www.epa.gov/npdes/afo/revisedrule>

EPA Tool Helps Communities Tap into Energy Savings

America's drinking water and wastewater facilities can now save energy and reduce their carbon footprint with expanded tools available from EPA's Energy Star Program. Enhancements to Portfolio Manager, the agency's popular energy tracking tool for commercial facilities, allow water utilities to track energy use and associated carbon emissions, set targets for investment priorities, and verify efficiency improvements. Water and wastewater facilities are energy intensive, accounting for more than one-third of municipal energy use. Improving the energy efficiency of America's drinking water and wastewater systems by 10 percent would save more than 5 billion kilowatt-hours each year representing a cost savings of about \$400 million annually. To learn more about Energy Star and Portfolio Manager for drinking water systems and wastewater plants at: <http://www.energystar.gov/waterwastewater> Other activities that explore the nexus between water and energy are described at:

http://www.epa.gov/waterinfrastructure/bettermanagement_energy.html

EPA Announces New 8 Hour Ozone Standards

EPA announced March 12 that the new primary 8-hour standard is 0.075 parts per million (ppm) and the new secondary standard is set at a form and level identical to the primary standard. The previous primary and secondary standards were identical 8-hour standards, set at 0.08 ppm. Because ozone is measured out to three decimal places, the standard effectively became 0.084 ppm: areas with ozone levels as high as 0.084 ppm was considered as meeting the 0.08 ppm standard, because of rounding. The United States has made significant progress reducing ground-level ozone across the country. Since 1980, ozone levels have dropped 21 percent as EPA, states and local governments have worked together to improve the quality of the nation's air. EPA expects improvement to continue, as a result of landmark regulations such as the Clean Air Interstate Rule, to reduce emissions from power plants in the East, and the Clean Diesel Program, to reduce emissions from highway, non-road and stationary diesel engines nationwide. EPA also announced it has updated the Air Quality Index (AQI) for ozone to reflect the change in the health standard. The AQI is EPA's color-coded tool for communicating daily air quality to the public. For more details on the revised standards, visit:

<http://www.epa.gov/groundlevelozone/actions.html> and for more on the AQI and to see daily air quality forecasts, visit: www.airnow.gov

Events, Training, Workshop and Tour Opportunities.....

April 9, 2008 **HazWoper Refresher**, Midway Hotel Brookfield. The Federation of Environmental Technologists (FET) one-day seminar, www.fetinc.org or call 414-354-0700 for assistance.

April 24-26, 2008 **WI Sustainable Business Conference**, Ashland, WI. Small Business owners and managers learn about sustainable business practices and hear practical examples of what can be done within a business. <http://www.wisustainablebusiness.org/>

May 8, 2008 **Hazardous Waste Training- Annual RCRA Refresher**, Midway Hotel Brookfield. The Federation of Environmental Technologists (FET) one-day seminar, www.fetinc.org or call 414-354-0700 for assistance.

June 20-22, 2008 **Renewable Energy and Sustainable Living Fair**, Custer, WI. For more information go to the Midwest Renewable Energy Association's web site www.the-mrea.org