Amendments

Improving Awareness & Advocacy of the Michigan Biosolids Program

Volume 15, First Quarter January 2011

MBT News

Biosolids Land Application Fees

By Kari Saganski, Synagro Central, LLC
ksaganski@synagro.com

In 2010, the Michigan Biosolids Land Application fee reached an all-time high. Having recently received your land application invoice from MDNRE, you may have noted that the tonnage fee is significantly higher than in years past. There are several factors which led to the increase, some of which can be possibly be remedied.

Since it's inception in the late 90's, the fees paid to the biosolids fund had always been in excess of expenses, which allowed for a carry-forward into the next year's budget. This buffered against the effects of fluctuation in tonnages and kept fees low. However, in recent years the State began pulling an assortment of exorbitant "administrative" fees from the biosolids fund, for various expenses such as cubicle rental and computers. A combination of several years of these fees along with decreased tonnage in 2010 has nearly depleted the fund. This budget year, the fund has very minimal carry-forward which has led to the higher per ton rate.

The MWEA Biosolids Team has been working to address the administrative fee with the State. In a meeting with the Auditor Generals office this spring, we learned that this is not a budgetary issue. It is an issue with the language of the Natural Resources and Environmental Protection Act 451 (NREPA). The intent of the Act 29 Biosolids Bill of 1997 was for fees to only be used for administration of the biosolids program, the vague nature of the language in the NREPA does not address the re-appropriations that have occurred.

The MWEA Biosolids Team has attempted to communicate the urgency of the issue to the fee-paying community. If this issue is to be addressed, it needs support from fee-payers like you. The Rule needs to be re-opened and re-written to protect program funds. A few legislators have been identified that are willing to champion the cause, but more legislative support is needed. Please contact your local state representatives and speak up!

One thing you can do now is to leave a message for our Governor Elect Rick Snyder regarding this matter at:

https://www.governorelectricksnyder.com/get-involved/submit-idea-reinvent-mi

The paragraph below meets the 500 character requirement and you are welcome to copy the message.

> *As a fee-payer, I'm concerned how recent budgeting practices have affected our MI Biosolids Program. The Part 24 Land Application rule was intended to be self-sustaining. In recent years, Management has taken a 25% administrative fee from the fund. Our fund has been depleted, resulting in increased costs to fee-payers. Higher fees equal undue burden on small communities & promote landfilling or incineration. Land application is the greenest option. Without action our biosolids program will fail.*

If the biosolids program is unable to fund itself, regulation will eventually turn over to the EPA. A simple phone call or letter to your local representative may be all it takes to prevent this from happening. Though there is cause for concern at the present time, with enough effort and state-wide support we can correct this. However, by pulling out of the land application program prematurely, you are sure to seal the fate of the biosolids program in Michigan. Contact the MWEA Biosolids Team by looking us up on Facebook or by emailing the chairperson at kunsts@cityofgrandville.com if you have any additional questions or would like to join the fight!

2011 Joint Conference

As written in the last newsletter, The MWEA Biosolids Committee has teamed up with the MWEA Industrial Pretreatment Committee to have a two-day joint conference. The conference is scheduled for September 27 and 28, 2011, at the Clarion Hotel in Kalamazoo. Our Theme: ***Improving Opportunities for Beneficial Use: An Aerial Perspective.*** We are proposing two track tours, one tour track to the Coca-Cola Bottling Plant and St. Julian Winery in Paw Paw, and the other track will include the Plainwell WWTP and Bell's Brewery in Kalamazoo. We will all meet together to have dinner under the *Lockheed Blackbird* and entertainment at the Air Zoo.

Topics covered will be relevant to both committees, as well as breakouts to cover Biosolids or IPP specific areas.

Facebook

The Michigan Biosolids Team has a Facebook Page!

Become a fan and "Like" our page to get timely and relevant updates to local and national biosolids news, meeting dates, locations and schedules and to view pictures and videos of Michigan Biosolids Team events!

Vision: To make Michigan a national leader in environmentally sound Biosolids processes and products.

Mission: To provide leadership and promote beneficial uses of Biosolids.

To learn more, search Facebook for Michigan Biosolids Team and click the "Like" button.

Biosolids Education: At Home and on the Road

The Michigan Biosolids Team, in conjunction with the Michigan Department of Agriculture, displayed at the Michigan Association of Conservation Districts (MACD) Annual Conference at the Soaring Eagle Conference Center in Mt. Pleasant, MI. Even though traffic wasn't heavy at our display booth, we feel that it's important to remain a viable presence at this function to provide educational materials to attendees. As usual, the biosolids raised popcorn was a hit to the attendees.

The Michigan Biosolids Team will be displaying at the Michigan Townships Association Annual Conference on January 26 and 27, 2011 at the DeVos Place in Grand Rapids. The MBT will also be displaying at the AWWA/MWEA Joint Expo on February 8 and 9, 2011, at the Lansing Center, the Michigan Science Teachers Association Annual Conference set for February 25 and 26, 2011 at the Amway Grand Plaza Hotel in Grand Rapids. Other events include Earth Day in Constitution Hall where MDA and DNRE collaborate efforts in April, and at the MSU Ag Expo in July.

National News

ScienceDaily
Your source for the latest research news

Web address: http://www.sciencedaily.com/releases/2011/01/110103121020.htm

Wastewater Treatment Lowers Pathogen Levels

ScienceDaily (Jan. 3, 2011) — A recent study by a team of researchers at the University of Arizona has tracked the incident of pathogens in biosolids over a 19 year period in one major U.S. city. In the same study, the researchers also analyzed pathogen levels in biosolids at 18 wastewater treatment plants in the United States.

Their analysis indicates pathogens levels have dropped since the implementation of federal regulations on treating sewage in 1993. These treatment guidelines have proven to be extremely effective with 94% to 99% of all pathogens in biosolids eliminated after wastewater treatment.

"This is the first major study of its kind since federal regulations for wastewater treatment were implemented in

Continued on Page 3

Continued from Page 2

1993," says Dr. Ian Pepper, one of the authors of the study and the director of the University of Arizona's Environmental Research Laboratory.

The term biosolid refers to sewage sludge that has under gone a certain level of treatment and is divided into two classifications. Class A biosolids undergo a high level treatment and do not show any signs of pathogens. In contrast, Class B biosolids receive a lower amount of treatment and have been found to contain bacterial, parasitic, and viral pathogens.

Around 5.5 billion kilograms of biosolids are produced annually in the United States, with the vast majority being Class B. Approximately 60% of the annual production of biosolids is used as agricultural fertilizer.

Pepper adds, "By analyzing the data before and after 1993, the Arizona group was able to determine the influence of the regulations on the incidence of pathogens in Class B biosolids. The study showed that fecal coliforms and virus concentrations are now generally lower than before the 1993 regulations."

Class B biosolids from the Pima County Ina Road Wastewater Treatment Plant in Tucson were analyzed from 1988 to 2006. Additional samples were collected between 2005 and 2008 from wastewater treatment plants in California, Florida, Arizona, Michigan, Minnesota, Wisconsin, Nevada, Oregon, Washington and Wyoming. ALL the samples were analyzed at the University of Arizona.

The study is published in the November-December 2010 issue of the *Journal of Environmental Quality*.

Email or share this story:
| More

Story Source:

The above story is reprinted (with editorial adaptations by Science*Daily* staff) from materials provided by **American Society of Agronomy**, via EurekAlert!, a service of AAAS.

Long-Lasting Chemicals Threaten the Environment and Human Health

ScienceDaily (Dec. 21, 2010) — Every hour, an enormous quantity and variety of human-made chemicals, having reached the end of their useful lifespan, flood into wastewater treatment plants. These large-scale processing facilities, however, are designed only to remove nutrients, turbidity and oxygen-depleting human waste, and not the multitude of chemicals put to residential, institutional, commercial and industrial use.

So what happens to these chemicals, some of which may be toxic to humans and the environment? Do they get destroyed during wastewater treatment or do they wind up in the environment with unknown consequences?

New research by Rolf Halden and colleagues at the Biodesign Institute at Arizona State University seeks to address such questions. The group's results, reported recently in the *Journal of Environmental Monitoring*, suggest that a number of high production volume (HPV) chemicals -- that is, those used in the U.S. at rates exceeding 1 million pounds per year, are likely to become sequestered in post-treatment sludge and from there, enter the environment when these so-called biosolids are deposited on land.

As Halden notes, over 4000 chemicals in common usage in the U.S. qualify as HPV chemicals, the vast majority of which have never been evaluated in terms of exotoxicity (their potential to adversely affect ecosystems), or for the risks they may pose to humans. "With each of these compounds, we are engaged in an experiment conducted on a nationwide scale," says Halden; "Odds are, some of these chemicals will turn out to be bad players and will pose problems for ecosystems, public health or both."

Unfortunately, it is neither technically nor economically feasible to perform the kind of detailed analyses necessary to declare this vast swirl of chemicals safe for humans or environmentally benign following wastewater treatment. Instead, Halden's efforts are aimed at narrowing the field of potentially troublesome chemicals, by defining traits likely to cause some chemicals to persist in the environment.To do this, the group applied a new empirical model for estimating the fraction of mass loading of chemicals in raw sewage expected to endure in digested sludge.

Chemicals which become sequestered in digested sewage sludge are a potential cause for concern in part because the treated sludge is often subsequently applied to land, including land designated for agricultural use. Halden's group screened some 207 HPV chemicals, using a model that predicted that two thirds of these compounds are likely to accumulate in digested sludge to greater than fifty percent of their initial mass loading in raw sewage. Eleven of these chemicals were flagged as compounds of special concern and deemed potential hazards to human and environmental health.

Three principal criteria dictated the selection of these problem chemicals: (a) their propensity to accumulate and

persist in sludge in large amounts (b) structural characteristics suggestive of environmental persistence on land following biosolids recycling, and (c) unfavorable ecotoxicity threshold values, whether these have been experimentally determined or were forecasted with computer models.

As Halden explains, certain classes of chemicals possess physical characteristics that make them likelier to resist breakdown during wastewater treatment. Of particular concern are hydrophobic organic chemicals. As their name implies, such chemicals are 'afraid' of water and preferentially attach themselves to particulate matter, thereby becoming part of the primary and secondary sludge. This characteristic trait limits the availability of hydrophobic chemicals to aerobic and anaerobic microorganisms during sewage treatment and sludge digestion.

Rather than being broken down, such chemicals can become enriched in municipal biosolids by several orders of

Continued on Page 4

Continued from Page 3

magnitude. Through this process, substances in heavy usage, like HPV chemicals, can accumulate as pollutants in municipal sludge to parts per million (ppm) concentrations. "It's like vacuum cleaning your home," says Halden. "When the carpet is clean, the vacuum bag holds a concentrated burden of dirt. By anology, the generation of biosolids enriched in non-biodegradable pollutants are the price you pay when purifying domestic sewage for water reuse."

In order to better gauge which chemicals may go on to present human health and environmental risks following sequestration in sludge, the group conducted a computer or *in silico* analysis. The method provides a streamlined and economically attractive means of isolating those chemicals deserving more in-depth field analysis. The group applied a new empirical model able to predict the fraction of total mass of a hydrophobic chemical likely to persist in biosolids after wastewater treatment.

Another advantage of the new model, applied by Halden and Assistant Professor Randhir Deo from the University of Guam, is simplicity. The model only requires two input values in order to estimate a chemical's environmental persistence. The chemicals to be screened were taken from the High Production Volume Information System database maintained by the EPA to monitor the environmental fate of chemicals produced in amounts exceeding 1 million pounds per year.

The empirical model was developed and tweaked to produce the best agreement between the mathematical framework based on a given chemical's physical properties and actual measurements derived from large sewage treatment plants. The physical characteristic found to play the largest role in a chemical's persistence in sludge was its sorption potential -- the tendency of molecules of the chemical to adhere to the surface of other molecules. In the case of the HPV chemicals under consideration, high sorption values among hydrophobic chemicals caused them to stick to other particles and be sequestered from the degradative processes used to treat wastewater.

The bulk of the chemicals included in the HPV study were used for industrial purposes and included antidegradants, antioxidants, metal chelators, intermediates, by-products, catalysts, flame retardants, phenylating agents, plasticizers, heat storage and transfer agents, lubricants, solvents, anticorrosive agents, and others. The study also identified five mass-produced chemicals used as flavors and fragrances that were predicted to persist in sludge in fifty percent or greater amounts of their initial mass loading in raw sewage.

Once chemicals likely to persist in sludge were identified, estimates of their toxicity were examined. Those with high persistence levels and high environmental toxicity made the enemies list of chemicals posing the greatest potential hazard. Prominent among the toxic chemicals were the so-called organohalogen compounds, seven of which were found to accumulate in substantial quantity in treated sludge and displayed half-lives in soil estimated to range from 120 to 360 days.

Perhaps of greatest concern are halogenated chemicals known as organobromines -- popular ingredients in a range of flame retardant products, which have subsequently been identified in bird tissues,in egg pools of herring gulls,and in dust samples. Halden insists that better monitoring of just such chemicals is essential for understanding their trajectory and mitigating risks to human health and the environment.

"Our work is directed at identifying problematic compounds before they cause harm to the environment and people. Environmental chemists often can foretell adverse outcomes. What's lacking are regulations to translate that knowledge into pollution prevention," says Halden. "Cleaning up after the fact, is costly and hard to do."

***Disclaimer**: Views expressed in this article do not necessarily reflect those of ScienceDaily or its staff.*

Nanoparticles in Sewage Sludge May End Up in the Food Chain

- By Dave Mosher ✉ January 5, 2011 |

Plants and microbes can absorb nano-sized synthetic particles that magnify in concentration within predators up the food chain, according to two new studies.

Nanoparticles can be made of countless different materials, and their safety isn't well-understood. Yet the minuscule specks are infused into hundreds of consumer products ranging from transparent suncreens to odor-eating socks.

From there, they can wash down drains, ultimately ending up in the sewage sludge of wastewater treatment plants. About 3 million tons of dried-out sludge is subsequently mixed into agricultural soil each year.

"We wanted to look into the possibility of nanoparticles getting into the food chain in this way," said environmental toxicologist Paul Bertsch of the University of Kentucky. "What we found really surprised us."

Continued on Page 5

Continued from Page 4

Synthetic nanoparticles are about 1 to 100 nanometers in size (as small as some viruses) and made of silver, titanium dioxide, zinc oxide and other substances. By virtue of their small size and stability, they can nullify odors, prevent food spoilage and absorb harmful ultraviolet radiation, among other feats.

But knowledge about their impacts to the environment is still in a state of infancy, Bertsch said.

To explore nanoparticle absorption in the food chain, Bertsch's team raised tobacco plants in a hydroponic greenhouse. While the plants grew, the team added super-stable gold nanoparticles to the water to mimic consumer nanoparticles in wastewater sludge.

Gold nanoparticles built up in tobacco leaf tissue, and tobacco hornworms that ate the plants accumulated concentrations of the nanomaterials about 6 to 12 times higher than in the plant.

"We expected [nanoparticles] to accumulate, but not biomagnify like that," said Bertsch, co-author of the Dec. 3 study in *Environmental Science & Technology*.

Predatory microbes in a separate study, published Dec. 19 in *Nature Nanotechnology*, also built up concentrated levels of cadmium selenide nanoparticles after eating smaller microbes that ingested them.

"For me, it's really interesting to see two different models using two different nanoparticles arrive at conclusions reinforcing each other," said Patricia Holden, an environmental microbiologist at University of California, Santa Barbara who co-authored the microbe-based study.

At least five government agencies (EPA, FDA, NIH, NIOSH and NIST) host efforts to investigate nanotechnology's risks to health and the environment, and their funding is increasing each year. And while heavy metals and other toxins in sludge are federally regulated, manmade nanoparticles are not. That may be cause concern as farms increasingly mix sludge into their soils, where nanoparticles may build up over time.

"At this point, the science right now is not saying 'stop using nanoparticles,'" said David Holbrook, a chemical engineer at NIST who wasn't involved in either study. Holbrook said the new research is important and creates new avenues for nanotechnology safety research. "We've got to continue this kind of work," he said.

There's some evidence that nanoparticles are toxic under lab-controlled conditions, Bertsch said, but realistically assessing risks to health and the environment demands more advanced models. He and other scientists are already collaborating on an experiment at Cranfield Univeristy in England that will use the institution's wastewater stream to gauge nanoparticle effects on earthworms and nematodes.

"I expect the results may not be as dramatic," Bertsch said. "But so far, the jury is still out on safety."

Image: A tobacco hornworm. Credit: Flickr/cbede

Sludge suit sent to pasture -- for now

By JAMES BURGER and GRETCHEN WENNER, Californian staff writers jburger@bakersfield.com, gwenner@bakersfield.com | Tuesday, Nov 09 2010 02:48 PM

Last Updated Tuesday, Nov 09 2010 07:37 PM

Kern County on Tuesday won a 4-year-old federal court battle with the city of Los Angeles over the dumping of southland sewage sludge on local fields.

But Los Angeles is already gearing up to start a new battle over Kern County's Measure E sludge ban.

U.S. District Court Judge Gary Feess dismissed what was left of a 2006 federal case on Tuesday, leaving the city of Los Angeles and other plaintiffs with the option of filing a new lawsuit in state court.

"The city of Los Angeles is evaluating its options in light of today's ruling," said John Franklin, spokesman for the Los Angeles City Attorney's Office. "The city looks forward to working with Kern County in a constructive manner to assess the next steps in the legal proceedings, taking into account the interests of all affected parties."

Kern County Counsel Theresa Goldner said Los Angeles attorneys have already informed county attorneys they will sue in state court.

Still, local officials enjoyed their victory Tuesday.

"This ruling means Los Angeles and other sanitation districts cannot challenge Kern County's ordinance under federal law," Goldner said in a statement.

She said Kern County has the legal right to begin enforcing Measure E immediately. But it is likely Kern will wait before stopping the procession of trucks that drives into Kern County each day.

Measure E gave Los Angeles and Orange County a six-month grace period in which to end the land application of sludge. When Feess stopped enforcement of Measure E in November 2006, Goldner said, there were still roughly two months left in that grace period.

Kern County staff will likely let those two months expire before asking the Board of Supervisors whether to enforce Measure E, Goldner said.

When asked if Los Angeles had another place to dispose of its sludge if Kern County starts enforcing the ban, Franklin said: "I don't think we have another place to take biosolids at this time."

Southern California's sludge lawsuit was filed in response to Measure E, Kern County's voter-approved ban on the land application of treated human and industrial sewage sludge.

Continued on Page 6

Continued from Page 5

Voters here overwhelmingly approved the measure in June 2006, with more than 83 percent voting "yes."

Feess had originally ruled in favor of Los Angeles on some matters, but the Ninth Circuit Court of Appeals overturned those rulings last year and sent the case back to Feess. This summer, the U.S. Supreme Court refused to hear the case.

On Tuesday, over the protests of Los Angeles attorneys, Feess said Los Angeles' two remaining legal arguments -- that Kern County overstepped its police powers and violated the intentions of the California Integrated Waste Management Act -- do not belong in federal court. His order dismissed the federal case against Measure E.

Kern had already been in sludge-related legal battles for years after establishing rules in the 1990s saying only the most highly treated sewage sludge could be spread on county land.

After Measure E passed, the city of Los Angeles, along with sanitation districts in Los Angeles and Orange counties and other industry interests, filed a federal suit against Kern in August 2006.

State Sen. Dean Florez, the Shafter Democrat who spearheaded Measure E, said Tuesday's dismissal "makes it clear leaders in Los Angeles need to do the right thing and stop dumping sludge in Kern County.

"It's a vindication that the people of Kern County had it right when they overwhelmingly voted in favor of Measure E," Florez said in an e-mail.

Kern County has long been the final destination for sewage sludge -- also called by the industry-coined term "biosolids" -- trucked in from Los Angeles, Orange County and other locales. Land application of sludge became popular after ocean dumping was outlawed and landfill disposal proved more expensive.

Proponents equate land application with beneficial recycling of organic matter and say sludge makes excellent fertilizer.

Critics say pathogens, heavy metals, pharmaceuticals, household chemicals and varying contents of industrial waste streams aren't completely eradicated by treatment, making sludge a threat to soil, groundwater and potentially to human health.

Some soil scientists have also expressed concern over the sheer quantity spread over and over again on the same spots at sludge farms like the ones in Kern County.

The city of Los Angeles owns and operates its Green Acres farm south of Bakersfield, where most of that city's sewage sludge continues to be trucked on a daily basis. Farmer Shaen Magan owns a private operation in northern Kern that takes sludge from Orange and Los Angeles counties as well as Valencia, Goleta and Ventura, county records show.

Kern's ban only applies to property in unincorporated areas of the county. Entities can and do land apply treated sludge in cities within Kern.

The city of Bakersfield applies its treated sludge to city-owned land. The county's Kern Sanitation Authority treats its sewage sludge to the "exceptional quality" standard and sends it to a composting facility.

There are other independently operated sanitation districts in the county.

Calendar of Events

2011 MBT Meetings

Wednesday, January 19, 2011
Location: SCCMUA CWF, DeWitt
10:00 a.m. to 12:00 p.m.

Thursday, March 10, 2011
Location: Wyoming CWP
10:00 a.m. to 12:00 p.m.

Thursday, May 12, 2011
Location: Chippewa Indian Tribe WWTP, Mt. Pleasant
10:00 a.m. to 12:00 p.m.

Thursday, July 21, 2011
Location: MSU Agricultural Expo Grounds
MBT Tent
10:00 a.m. to 12:00 p.m.

Thursday, November 10, 2011
Location: Bavarian Inn Restaurant, Frankenmuth
10:00 a.m. to 12:00 p.m.
Holiday Party

Other Events

Joint IPP/Biosolids Conference
September 27 & 28, 2011
Clarion Hotel
Kalamazoo, Michigan