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Updated law boosts EPA regulatory power over chemicals

Source: [Chemical & Engineering News, June 28, 2016](#)

Author: Cheryl Hogue

Armed with new powers from Congress, the Environmental Protection Agency is readying for action on chemicals. EPA is training its regulatory sights on three long-used solvents that agency scientists determined may pose a serious risk to consumers' health.

What's unusual is that for the first time in more than a quarter of a century, EPA is poised to restrict chemicals that have long been on the market. And in a striking change from the past, the likelihood of a federal court knocking down these regulations is much lower.

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See U.S. Environmental Protection Agency page on ['The Frank R. Lautenberg Chemical Safety for the 21st Century Act'](#).

TURI's NOTE: See our [brief overview](#) of the legislation and a [fact sheet](#) on the preemption provisions in the Lautenberg Act.

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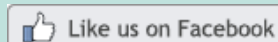
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Council and Parliament reach deal on medical devices Regulations

Source: [Chemical Watch, June 21, 2016](#)

Author: Geraint Roberts

The endorsed text for the medical devices Regulation includes a 0.1% concentration limit for category 1A and 1B CMRs and endocrine disrupting chemicals (EDCs) in devices that:

- are invasive and come into direct contact with the body; or
- (re)administer, transport or store medicines, body liquids or other substances, including gases, to/from the body.

EDCs are defined as those identified in accordance with the REACH candidate list procedure or according to the criteria set under the biocidal products Regulation. The European Commission's proposed criteria for the latter were issued last week -- and met widespread criticism from NGOs and industry.

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Also see from *Chemical Watch*, "[Member states discuss ideas for future of REACH](#)".

Biobased Ionic Liquids: Solvents for a Green Processing Industry?

Source: ACS Sustainable Chemistry & Engineering, May 3, 2016

Authors: Joris Hulsbosch, Dirk E. De Vos, Koen Binnemans, and Rob Ameloot

Replacing conventional solvents by ionic liquids is often suggested as a possible route to greener industrial processes. However, ionic liquids are typically petroleum-derived. This critical perspective discusses the syntheses, applications and limitations of biobased ionic liquids synthesized from amino acids, carbohydrates, lignin and other renewable sources. The practical aspects of applying such ionic liquids in lignocellulose processing, as a reaction solvent, organocatalyst or as metal extraction medium are highlighted.

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Spotlight on Award Winners: Domtar Plymouth K-Lime

Source: Environmental Leader, June 29, 2016

Domtar designs, manufactures, markets and distributes pulp, paper, and personal care products. The company's mill in Plymouth, North Carolina, implemented a project to reduce waste to landfill by more than 90% and create a new product for the local agricultural community.

The pulp and paper making process generates significant amounts of manufacturing waste, including wood ash, causticizing residuals, and wastewater treatment residuals. These waste streams are typically managed separately, and can have individual characteristics such as high pH that make them difficult to handle and reuse, Domtar says.

Domtar has a goal to reduce total waste to landfill from its pulp and paper mills 40% by 2020 from 2013 levels. The company's Plymouth mill recognized the potential value of several of their individual manufacturing byproducts. In partnership with North Carolina State University's local agricultural research station and affiliated consultants, the mill conducted extensive laboratory and field studies to find the optimal blend of residual byproducts for improving local agricultural soils and crops.

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Hydraulic Fracturing Operations Using Quantitative Structure-Activity Relationship Modeling

Source: *Environmental Science & Technology*, May 12, 2016

Authors: Erin E. Yost, John Stanek, Robert S. DeWoskin, and Lyle D. Burgoon

The United States Environmental Protection Agency (EPA) identified 1,173 chemicals associated with hydraulic fracturing fluids, flowback, or produced water, of which 1,026 (87%) lack chronic oral toxicity values for human health assessments. To facilitate the ranking and prioritization of chemicals that lack toxicity values, it may be useful to employ toxicity estimates from quantitative structure-activity relationship (QSAR) models. Here we describe an approach for applying the results of a QSAR model from the TOPKAT program suite, which provides estimates of the rat chronic oral lowest-observed-adverse-effect level (LOAEL). Of the 1,173 chemicals, TOPKAT was able to generate LOAEL estimates for 515 (44%). To address the uncertainty associated with these estimates, we assigned qualitative confidence scores (high, medium, or low) to each TOPKAT LOAEL estimate, and found 481 to be high-confidence. For 48 chemicals that had both a high-confidence TOPKAT LOAEL estimate and a chronic oral reference dose from EPA's Integrated Risk Information System (IRIS) database, Spearman rank correlation identified 68% agreement between the two values (permutation p-value = 1×10^{-11}). These results provide support for the use of TOPKAT LOAEL estimates in identifying and prioritizing potentially hazardous chemicals. High-confidence TOPKAT LOAEL estimates were available for 389 of 1,026 hydraulic fracturing-related chemicals that lack chronic oral RfVs and OSFs from EPA-identified sources, including a subset of chemicals that are frequently used in hydraulic fracturing fluids.

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Can everything old be made new again?

Source: *Chemical & Engineering News*, June 27, 2016

Author: Melody M. Bomgardner

Styles change, and that can be a good thing -- remember super-low-rise jeans? Still, over a consumer's lifetime, all those unworn and unwanted jeans can add up to a lot of waste. Meanwhile, the manufacture of those wardrobe staples uses a huge amount of water, not to mention chemicals that can pollute rivers and streams in places as far away as Bangladesh.

But what if jeans could be made in a nonpolluting way and their raw materials recycled over and over to make new pairs in the latest fashion? That is the promise of the circular economy, the process of turning waste into a resource by reusing and recycling products at the end of their useful life. ...

Some large companies are collaborating to ensure that tomorrow's styles are created with the circular economy in mind. They are doing this by replacing hazardous ingredients and developing technologies that enable the use of more recycled material. At the same time, individual brands hope that their sustainability efforts will help them stand out in a crowded marketplace piled with inexpensive, mass-produced goods.

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On Tire Wastes in Playgrounds

Source: *Healthy Building Network*, June 16, 2016

Author: Jim Vallette

As temperatures rise on ballfields across America, so do concerns over the piles of tire waste upon which children play. Synthetic turf playing fields lie atop heaps of finely

ground recycled rubber from old tires. In playgrounds, chopped up tire mulch is becoming as common as dirt. In the United States between 2007 and 2013, enough ground tire waste was used as playground mulch to leave the equivalent of two 4"-deep wheel-wide tracks along Earth's equator.

In the 1990s, over one billion waste tires were piled high across the country, in tire dumps that frequently caught fire, sometimes for weeks. The tire industry launched an innovative solution: it began promoting the use of tire waste as a safe alternative to dirt in playgrounds. Now, at a rate of 25 million tires per year, the industry diverts ground rubber from tires into athletic and other playing surfaces. At any given moment, four million children in the United States may be playing atop tire waste.

Industry and government agencies have produced little hard data about the contents of crumb rubber. They have failed to examine the impacts of shifting the burden of tire waste pollution into playing grounds. A growing chorus is raising concerns about what crumb rubber might be doing to children's health. From Virginia to Minnesota to California, people are trying to obtain state moratoria on using tire wastes to fill ballfields and playgrounds while regulators and scientists try to answer these questions. In recent weeks, agencies in Europe and the United States launched investigations into this industry's potential impacts on children, adults, and workers.

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TURI's Note: See [our page on artificial turf](#) which includes preliminary results for a Sports Turf Alternatives Assessment.

Control Measures Critical for 3D Printers

[Source: CDC - National Institute for Occupational Safety and Health, June 2016](#)

Working with university partners, NIOSH investigators measured emissions from a desktop 3D printer in a specially designed test chamber that simulates real-world conditions. They found that the tested desktop 3D printer released high numbers of particles as it printed. The emissions peaked a few minutes after printing began, and they did not return to baseline until about 100 minutes after printing ended.

The emissions also varied by filament type and color. Filaments made from natural materials like corn emitted smaller particles than plastic filaments did. This could be because the oil-based plastic particles were more likely to form clumps, according to the investigators. Calculations showed that the risk of the particles lodging in the lungs was 3 times higher for the small particles made from natural substances compared with the larger plastic particles. Color also affected particle size, with natural corn-based filaments in the color true red emitting the smallest particles, on average. In contrast, blue plastic filaments emitted the largest particles. ...

In a related, ongoing study, investigators found that a desktop 3D printer emitted smaller particles than those from laser printers that use plastic toner and far greater amounts of certain chemicals linked to asthma. In what they believe is the first discovery of its kind, the investigators also found that 3D printers emit chemicals that combine to form new compounds, including a chemical linked to asthma. These findings, like those of the preceding study, suggest the need to take precautions to reduce emissions from desktop 3D printers in the home and office.

[Read more...](#)

See one of the studies in the [Journal of Toxicology and Environmental Health, Part A: Current Issues](#), "[Emission of particulate matter from a desktop three-dimensional \(3D\) printer](#)".

Long-Term Exposure to Air Pollution and Increased Risk of Membranous Nephropathy in China

Source: Journal of the American Society of Nephrology, June 30, 2016

Authors: Xin Xu, Guobao Wang, Nan Chen, Tao Lu, Sheng Nie, Gang Xu, Ping Zhang, Yang Luo, Yongping Wang, Xiaobin Wang, Joel Schwartz, Jian Geng and Fan Fan Hou

The effect of air pollution on the changing pattern of glomerulopathy has not been studied. We estimated the profile of and temporal change in glomerular diseases in an 11-year renal biopsy series including 71,151 native biopsies at 938 hospitals spanning 282 cities in China from 2004 to 2014, and examined the association of long-term exposure to fine particulate matter of $<2.5 \mu\text{m}$ ($\text{PM}_{2.5}$) with glomerulopathy. After age and region standardization, we identified IgA nephropathy as the leading type of glomerulopathy, with a frequency of 28.1%, followed by membranous nephropathy (MN), with a frequency of 23.4%. Notably, the adjusted odds for MN increased 13% annually over the 11-year study period, whereas the proportions of other major glomerulopathies remained stable. During the study period, 3-year average $\text{PM}_{2.5}$ exposure varied among the 282 cities, ranging from 6 to $114 \mu\text{g}/\text{m}^3$ (mean, $52.6 \mu\text{g}/\text{m}^3$). Each $10 \mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$ concentration associated with 14% higher odds for MN (odds ratio, 1.14; 95% confidence interval, 1.10 to 1.18) in regions with $\text{PM}_{2.5}$ concentration $>70 \mu\text{g}/\text{m}^3$. We also found that higher 3-year average air quality index was associated with increased risk of MN. In conclusion, in this large renal biopsy series, the frequency of MN increased over the study period, and long-term exposure to high levels of $\text{PM}_{2.5}$ was associated with an increased risk of MN.

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Also see from OECD, "[Air pollution to cause 6-9 million premature deaths and cost 1% GDP by 2060](#)".

IBM Researchers Develop New Plastics Recycling Process

Source: Environmental Leader, June 29, 2016

Author: Jessica Lyons Hardcastle

IBM researchers say they have discovered a recycling process that converts BPA-leaching plastics into environmentally safe material for water purification and medical devices -- a technological advance that could lead to less plastic waste and cheaper recycled materials manufacturers can use to produce a wide range of products.

Globally, about 2.7 million tons of polycarbonate plastic is produced annually and used to make CDs, baby bottles, eyeglass lenses and smartphones, among other items. Over time, polycarbonates decompose and leach BPA, a chemical that, in 2008, caused retailers to pull plastic baby bottles from store shelves due to concerns about the potential effects of BPA on the brain. Four years later, the EPA banned BPA in baby bottles and children's cups.

Yesterday, IBM Research said scientists at its Almaden lab in San Jose, California said they have discovered a new, one-step chemical process that converts polycarbonates into plastics safe for water purification, fiber optics and medical equipment.

In the study, IBM Researchers added a fluoride reactant, a base (similar to baking powder) and heat to old CDs to produce a new plastic with temperature and chemical resistance superior to the original substance. When the powder is reconstructed into new forms, its strength prevents the decomposition process that causes BPA leaching, IBM says.

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Also see in *Chemical & Engineering News*, "[Metathesis is a degrading experience for plastics](#)" and "[Cleaning up tar-contaminated sediments using renewable and recycled materials](#)".

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