ENVIS ON HAZARDOUS WASTES

Newsletter

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Current News

Toxics Release Inventory (TRI) Program

US EPA finalized a rule to provide communities with additional information about toxic chemicals being released to the environment. The rule, which has become effective on November 30, 2010, adds 16 chemicals to the TRI list of reportable chemicals. This action is part of EPA's ongoing efforts to examine the scope of TRI chemical coverage and provide more complete information on toxic chemical releases, and it is the first TRI program chemical expansion in over a decade. Each chemical that EPA is adding has been classified as "reasonably anticipated to be a human carcinogen" by the National Toxicology Program (NTP) in their Report on Carcinogens (RoC) document. EPA has concluded, based on a review of available studies, that these 16 chemicals could cause cancer in humans and therefore meet the EPCRA section 313(d)(2)(B) statutory listing criteria. Four of the chemicals are being added to TRI under the polycyclic aromatic compounds (PACs) category. The PACs category is of special concern because PACs are persistent, bioaccumulative, toxic (PBT) chemicals and as such, they are likely to remain in the environment for a very long time, are not readily destroyed, and may build up or accumulate in body.

(Source: http://www2.epa.gov/toxics-release-inventory-tri-program)

Co-processing: A clean idea for the Indian cement sector?

One fine day in 2007, three trucks from Hindustan Unilever Ltd. (HUL), laden with shampoos, powders, creams and assortments for the body beautiful, arrived at the gates of ACC's Kymore cement plant, near Jabalpur. The Plant Head was foxed and wondered why shampoos had come to him. He quickly configured it perhaps had something to do with the company's employee welfare initiatives. But then, how was he to distribute the huge quantities; and how much for each worker? He was awestruck by the sudden bounty. He called up headquarters, only to be told that the stuff — all past their expiry date — was to be burned in the kilns of the cement plant to generate energy. It was then a small trial. And the technical staff had no inkling about the immense potential of waste to replace coal in cement kilns. Since then, HUL has hauled 13,700 tonnes of its waste products to ACC's Kymore plant for 'co-processing', a term commonplace in the cement sector across the globe and now in India too. "HUL's trade rejects, till date, have replaced 0.3% of the total heat requirement at ACC's Kymore plant," says Pradeep Banerjee, Executive Director, supply chain, HUL, who is planning to send out more waste, especially of the hazardous variety, from its units.

The project and ACC-HUL partnership are flowering. It is in keeping with the tenets of industrial ecology, where one industry's waste becomes another's raw material. Co-processing is basically the use of waste materials in industrial processes as alternative fuels and raw materials (AFR) to recover energy and material value from them. It's of critical import to the cement sector because energy costs account for 40% of its cost of production, which involves heating and blending of raw meal at temperatures as high as 1,400 degrees Celsius. ACC, of Switzerland's Holcim Group, with 16 plants and an installed capacity of 26 million tonnes of cement, has acquired a degree of expertise in co-processing even hazardous waste like no other Indian company. It has set up an AFR division to oversee this activity.

The company has invested Rs 8 crore in four laboratories for AFR testing. It is also endeavouring to build a countrywide co-processing ecosystem by working with various stakeholders — industry waste-generators, NGOs, municipal bodies, and also the government. "We look at this activity from two perspectives: sorting out issues around waste disposal, which is a menace to society, especially to a growing economy like ours," says Ulhas Parlikar, Director-AFR Business, ACC. "And of course, from the value addition and cost benefits that accrue."
In 2009, the AFR push saved Rs 41 crore for ACC, up from Rs 22.8 crore in 2008. Last year, ACC gorged 22,000 tonnes of waste —paint sludge, refinery sludge, spent alumina, plastics and old tyres, among others — in its kilns as alternative fuel. This excludes fly ash and slag, which account for 6-7 million tonnes and are known as mineral components in cement parlance. The Indian cement sector, led by ACC, is beginning to scratch the surface of the potential of alternative fuels. The thermal substitution rate at ACC — the amount of energy used from alternative fuels as a percentage of the total energy used from coal and other sources — is 0.59%. The substitution at UltraTech, an Aditya Birla Group company, is 0.47%, through the use of biomass fuels. For cement makers in the US, the figure is around 25%. Europe has a better record, with Switzerland achieving 47% thermal-energy substitution, Norway 45% and Germany 42%.

(Source: http://articles.economictimes.indiatimes.com/2011-02-01/news/28423618_1_cement-plant-cement-sector-hazardous-waste)

Govt. of India calls for strengthening hazardous waste management rules

The Govt. of India has called for strengthening hazardous waste management rules especially at the port level to ensure that such material was not dumped in the country. There has been a heightened level of concern over the dumping of hazardous waste in the aftermath of the Mayapuri radiation incident. Ministry of Environment and Forests has written to the Ministry of Finance to set up a joint mechanism to sensitize customs department on the import of wastes. Ministry of Environment and Forests has also written to the Ministry of Commerce to ensure that if hazardous waste import should not be allowed under an Open General Licence (OGL), and that its import be done only as per the Hazardous Waste Management Rules 2008.

India generates roughly six million tonnes of hazardous waste per year, of which about 50 per cent goes in for re-cycling. There are 25 treatment, storage and disposal facilities across the country and eight more are in the pipeline.

(Source:http://articles.economictimes.indiatimes.com/2010-04-29/news/28469789_1_e-waste-hazardous-waste-management-rules-bio-medical-wastes)

Hazardous waste management: Analysis of Indian scenario and perspective governance

Hazardous Waste Management (HWM) is of global significance. The adverse impacts caused due to the indiscriminate disposal of Hazardous Wastes (HWs) are considered as technological disasters. There was no proper secured landfill facility available in India to dispose of Hazardous Waste (HW) till 1997. Very few industries in India, mostly in large scale and a few in medium scale, own proper treatment and disposal facilities. A common waste treatment and disposal facility such as Treatment, Storage and Disposal Facility (TSDF) for management of HWs generated from industries is one of the useful options under such conditions. Few Guidelines issued by Ministry of Environment and Forests under Hazardous Wastes (Management & Handling) Rules, 1989 promulgated under Environment (Protection) Act, 1986 are available in India for selection of best site for TSDF. The planning for HWM comprises of several aspects ranging from identification and quantification of HW to development and monitoring of TSDF. This paper focuses on the basic steps involved in the Comprehensive HWM. The physical models developed by the authors for ranking of TSDF sites based on the Guidelines available are discussed. The current status in India pertaining to generation of HW and the TSDF sites is also addressed.

(Source: http://www.vsrdjournals.com/vsrd/Issue/2011_9_Sep/Web/9_Divya_Agrawal_Research_Communication_Sep_2011.pdf)

How much hazardous waste is recycled in the U.S.?

EPA and States collect and report data on hazardous waste recycling as part of the National Biennial Report, which provides data on the generation, management, and final disposition of hazardous wastes regulated under RCRA. In 2011, about 1.5 million tons of hazardous wastes were managed by recycling (metals, solvent, or other recovery). This amount is just under four percent of all hazardous waste managed in 2011. The table below shows the tons of hazardous waste managed through recycling in 2011 as reported to the National Biennial Report by facilities receiving waste for management.

Tons of Hazardous Waste Recycled in 2011*

Recycling Management Method	Tons Managed	Percentage of Total Managed
METALS RECOVERY	1,039,554	2.7%
OTHER RECOVERY	184,533	0.5%
SOLVENTS RECOVERY	255,219	0.7%
Total Recycled	*1,479,306*	*3.8%*
Total Managed	**39,027,932**	**100%**

*Table includes rounding error.
*Table includes wastes generated by large quantity generators (LQGs), small quantity generators (SQGs), and conditionally-exempt small quantity generators (CESQGs) that were received for recycling by facilities reporting to the National Biennial Report.

(Source: http://www.epa.gov/solidwaste/hazard/recycling/index.htm)

EPA proposes safeguards for hazardous waste recycling

The U.S. Environmental Protection Agency (EPA) is proposing new safeguards for recycling hazardous materials to protect public health and the environment. The new proposal modifies EPA's 2008 Definition of Solid Waste (DSW) rule, which revised hazardous waste regulations to encourage recycling of hazardous materials. The new proposal will improve accountability and oversight of hazardous materials recycling, while allowing for important flexibilities that will promote its economic and environmental benefits. EPA is opening up this proposal for public comment. EPA is also releasing for public comment its draft expanded environmental justice analysis of the 2008 DSW final rule, which evaluates the rule's potential impact on low-income and minority communities. EPA is also requesting public comment on the environmental justice analysis as well as on suggested changes received from peer review. The analysis and peer review comments will be available in the docket for this rulemaking once the proposal is published.

According to EPA, "Safe recycling of hazardous materials conserves vital resources while protecting the environmental and economic health of communities. The new proposed enhancements show EPA's commitment to achieving sustainable materials management through increased recycling, while retaining safeguards to protect vulnerable communities and the environment."

EPA's re-examination of the 2008 DSW final rule identified areas in the regulations that could be improved to better protect public health and the environment with a particular focus on adjacent communities by ensuring better management of hazardous waste. Today's proposal includes provisions to address those areas through increased transparency and oversight and accountability for hazardous materials recycling. Facilities that recycle onsite or within the same company under the reduced regulatory requirements retained under the proposal would be subject to enhanced storage and recordkeeping requirements as compared to the 2008 rule. Companies that send their hazardous materials offsite for recycling would have tailored storage standards, while being required to send their materials to a permitted hazardous waste recycling facility. The proposed rule also creates a level playing field by requiring all forms of hazardous waste recycling to meet requirements designed to ensure materials are legitimately recycled and not being disposed of illegally.

EPA will accept comment on this proposal for 60 days after publication in the Federal Register. The docket for the rulemaking is EPA-HQ-RCRA-2010-0742 and can be accessed at http://www.regulations.gov once the proposal is published.

(Source:http://yosemite.epa.gov/opa/admpress.nsf/1e5ab1124055f3b28525781f0042ed40/e2da508933b86fbc852578c5004ee990!OpenDocument)

Water disinfection byproducts linked to adverse health effects

"University of Illinois scientists report the first identification of a cellular mechanism linked to the toxicity of a major class of drinking water disinfection byproducts. This study, published in *Environmental Science & Technology*, suggests a possible connection to adverse health effects, including neurological diseases such as Alzheimer's."

Certainly, the disinfection of drinking water was one of the most significant public health achievements of the 20th century. But the adverse effects of disinfection byproducts (DBPs) that are unintentionally formed during this process are causing concerns as researchers unveil their toxicity. More than 600 DBPs have been discovered. Although researchers know some DBPs are toxic, little biological information is available on the majority of these water contaminants. The Environmental Protection Agency regulates only 11 of these DBPs. Plewa's laboratory investigated the biological mechanism, or the cellular target that leads to toxicity, in the second-most prevalent DBP class generated in disinfected water -- haloacetic acids (HAAs). The EPA has regulated HAAs for nearly 15 years. However, nobody knew how they caused toxicity. Now the scientists have uncovered the mechanism for HAAs and can make sense of past data that can lead to new studies relating to adverse pregnancy outcomes, different types of cancer, and neurological dysfunction. Plewa believes this will assist the EPA in establishing regulations based on science. Their research will also help the water treatment community develop new methods to prevent the generation of the most toxic DBPs. According to the researchers, to increase the health benefits of disinfected water, we must reduce the most toxic DBPs. "If we understand their biological mechanisms, we can come up with more rational ways to disinfect drinking water without generating toxic DBPs," the researchers opined. In this study, researchers focused on three HAAs -- iodoacetic acid, bromoacetic acid and chloroacetic acid. After they rejected their first hypothesis that the HAAs directly damaged DNA, they looked at research in a different area -- neuroscience. In neurotoxicology, iodoacetic acid reduces the availability of nutrients or oxygen in neurons by inhibiting glyceraldehyde-3-phosphate dehydrogenase (GAPDH). Researchers are interested in understanding how to prevent damage after a stroke or other neurological damage. Iodoacetic acid kills these cells. One of the targets they found was that iodoacetic acid inhibited GAPDH. Plewa's lab conducted quantitative GAPDH enzyme kinetics and discovered that the data were highly correlated with a diversity of adverse health markers. All the pieces of the puzzle fell into place in an instant. We had discovered our cellular target -- GAPDH. Never before had this type of research been done with this level of precision and associated with a large body of adverse biological impacts. They discovered that the HAA disinfection byproducts were toxic because the cells cannot make ATP, and this causes oxidative stress. Cells treated with HAAs experience DNA damage. So they start expressing DNA repair systems. HAAs are not directly damaging DNA, rather they are inhibiting GAPDH, which is involved in increasing the oxidative stress that we are observing. A growing body of information has shown that GAPDH is associated with the onset of neurological diseases.

"If someone carries a natural mutation for GAPDH and exposed to high levels of these disinfection byproducts, could be more susceptible to adverse health effects such as Alzheimer's," the researchers said. More research is needed to study iodinated disinfection byproducts because they are the most reactive in inhibiting GAPDH function and are currently not regulated by the EPA. "We replaced the standard working model of direct DNA damage with a new working model based on a cellular target molecule," the researchers said. "This discovery is a fundamental contribution to the field of drinking water science." This research was published in *Environmental Science & Technology*. Scientists include Michael Plewa, Justin Pals, Justin Ang and Elizabeth Wagner, all of the University of Illinois. Research was supported by the WaterCAMPWS Center NSF Award CTS-0120978.

(Source: http://www.sciencedaily.com/releases/2011/10/111024153450.htm)

Home Washing Machines: Source of Potentially Harmful Ocean 'Microplastic' Pollution

"Scientists reported that household washing machines seem to be a major source of so-called "microplastic" pollution -- bits of polyester and acrylic smaller than the head of a pin -- that they now have detected on ocean shorelines worldwide"

Their report describing this potentially harmful material appears in ACS' Journal of *Environmental Science & Technology*. Mark Browne and colleagues explain that the accumulation of microplastic debris in marine environments has raised health and safety concerns. The bits of plastic contain potentially harmful ingredients which go into the bodies of animals and could be transferred to people who consume fish. Ingested microplastic can transfer and persist into their cells for months. How big is the problem of microplastic contamination? Where are these materials coming from? To answer those questions, the scientists looked for microplastic contamination along

18 coasts around the world and did some detective work to track down a likely source of this contamination. They found more microplastic on shores in densely populated areas, and identified an important source -- wastewater from household washing machines. They point out that more than 1,900 fibers can rinse off of a single garment during a wash cycle, and these fibers look just like the microplastic debris on shorelines. The problem, they say, is likely to intensify in the future, and the report suggests solutions: "Designers of clothing and washing machines should consider the need to reduce the release of fibers into wastewater and research is needed to develop methods for removing microplastic from sewage."

Abstracts

A GIS model-based assessment of the environmental distribution of γ-hexachlorocyclohexane in European soils and waters

The MAPPE GIS based multimedia model is used to produce a quantitative description of the behaviour of γ-hexachlorocyclohexane (γ-HCH) in Europe, with emphasis on continental surface waters. The model is found to reasonably reproduce γ-HCH distributions and variations along the years in atmosphere and soil; for continental surface waters, concentrations were reasonably well predicted for year 1995, when lindane was still used in agriculture, while for 2005, assuming severe restrictions in use, yields to substantial underestimation. Much better results were yielded when same mode of release as in 1995 was considered, supporting the conjecture that for γ-HCH, emission data rather that model structure and parameterization can be responsible for wrong estimation of concentrations. Future research should be directed to improve the quality of emission data. Joint interpretation of monitoring and modelling results, highlight that lindane emissions in Europe, despite the marked decreasing trend, persist beyond the provisions of existing legislation.

(Source: http://www.sciencedirect.com/science/article/pii/S0269749110003106)

One century sedimentary records of polycyclic aromatic hydrocarbons, mercury and trace elements in the Qinghai Lake, Tibetan Plateau

Sediments from a remote lake of northeastern Tibetan Plateau were analyzed for polycyclic aromatic hydrocarbons (PAHs) and trace metals. USEPA priority PAHs, ranged from 11 in 1860 to 279 ng g^{-1} in 2002, while, the deposition fluxes were in the range of 0.2–11.4 ng cm^{-2} yr^{-1}. Similarly, from 1860 to 2002, an increased trend of Hg flux was observed (0.5–3.2 ng cm^{-2} yr^{-1}). Remarkable increase of PAHs and Hg concentration began from 1970, nearly the same period of the “Reform and Open” Policy had been embarked (1978) in China. Good correlations were found between concentrations of Pb, Zn, Cd, As, Hg, and PAHs, which suggested the sources of these chemicals in the sediment is analogous, likely from anthroprogenic sources. Based on isomer ratios, PAHs in core were dominantly from the incomplete combustion of coal. Owing to the proximity to dust source area (Qaidam Basin) and the close association between PAHs, Hg, Pb, and particle matters, atmospheric dust-transport and deposition might be the main pathways that pollutants enter into Qinghai Lake.

(Source: http://www.sciencedirect.com/science/article/pii/S0269749110002691)