Managing Contaminants of Emerging Concern in the Bay

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Regulating contaminants of emerging concern (CECs) is a challenge due to the ever increasing number of manufactured new chemicals and products coupled with limited information on the environmental risk of many chemicals. Fortunately, we have a number of regulatory tools available and in use in California, particularly in the Bay Area to respond to the challenge, and our Regional Monitoring Program includes monitoring and assessment of CECs in San Francisco Bay. The Bay Area regulatory, scientific, and stakeholder community has been proactive in putting together a framework to guide management and monitoring of CECs in San Francisco Bay. This approach provides a risk-based screening of CECs to identify possible bad actors, and then applies an appropriate management response. The goal is to prevent water quality impairment rather than waiting to react once adverse effects are observed. An overview and examples of implementing the framework will be presented.

Keywords: Contaminants, Monitoring, Pollution Prevention, Regulation

Session Title: Managing CECs: An Ounce of Prevention

Speaker Biography: Tom Mumley is Assistant Executive Officer at California Regional Water Quality Control Board, San Francisco Bay Region. He also serves as Vice Chair of the San Francisco Estuary Partnership Implementation Committee. He has worked at the San Francisco Bay Water Board for thirty years. He received his BS degree in Chemical Engineering from the University of Massachusetts, Amherst in 1976 and his Ph.D. in Chemical Engineering from the University of California, Berkeley in 1983.

Flame Retardants – Effects of Flammability Standards and Bans

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Flame retardant use is widespread in large part due to California's unusually strict flammability standards. Polybrominated diphenyl ethers (PBDEs) are a group of flame retardants added to thermoplastics, polyurethane foam, and textiles. A decade ago, California Environmental Protection Agency (Cal/EPA) studies of PBDEs in people and wildlife in the San Francisco Bay Area revealed extremely high levels, indicating the region is a global PBDE contamination "hot spot." Meanwhile, a growing body of literature suggests PBDEs have toxic properties.

In response to federal pressure, the major manufacturer of PentaBDE and OctaBDE, two of three commercial PBDE mixtures, ceased production in 2004, preceding a California ban effective in 2006. Also in 2006, the United States Environmental Protection Agency (USEPA) issued a significant new use rule ensuring any proposed uses of these chemicals would be reviewed for safety. Production of the last commercial PBDE mixture, DecaBDE, is to be phased out by the end of this year.

The Regional Monitoring Program for Water Quality in the San Francisco Bay (RMP) has monitored PBDEs for over ten years. These chemicals are widely detected in Bay water and sediment, as well as in Bay bivalves, fish, bird eggs, and seals. Declining contamination of Bay sediment and organisms over the last decade is likely linked to the state ban and federal phase-outs. Declines are expected to continue, and should diminish potential impacts of PBDEs on the Bay.

As PBDEs are removed from the market, manufacturers are increasing use of alternative flame retardants. The RMP has detected a number of these chemicals in Bay matrices, and is conducting additional monitoring in 2014. Proposed revisions to state flammability standards could eliminate the need to incorporate these substances into upholstered furniture and many items for infants and young children.

Keywords: Flame Retardants, PBDEs, Flammability Standards, Environmental Monitoring

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Speaker Biography: Rebecca Sutton received her B.S. in Environmental Resource Science from the University of California, Davis and her Ph.D. in Environmental Chemistry from the University of California, Berkeley. Her dissertation explored molecular-scale interactions of ions and natural organic matter with clay mineral surfaces using molecular modeling techniques. Prior to joining SFEI in 2013, Dr. Sutton was a senior scientist with research and advocacy non-profit Environmental Working Group, where she conducted research on chemicals of concern in air, water, soil, consumer goods, and people. At SFEI, Dr. Sutton works on various projects for the Regional Monitoring Program, with an emphasis on emerging contaminants. She also leads SFEI's green chemistry focus area.

Perfluorinated Compounds in San Francisco Bay Seals and Birds

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Since the late 1940s**,** perfluorooctane sulfonate (PFOS) has been widely used as a stain repellant for textiles, furniture, and carpets; as a surfactant in fire-fighting foams and metal finishing processes; as an ingredient in the production of fluoropolymers; and as an insecticide. PFOS repels both water and oil and is highly stable. Consequently, it is used extensively and has been widely detected in the global environment, including in San Francisco Bay birds and seals and to a lesser extent in Bay fish and bivalves.

The RMP in collaboration with the USGS has monitored PFOS in cormorant eggs since 2006 on a triennial cycle. Concentrations in the southern portion of the Bay have been higher than the northern portion of the Bay. Eggs collected in the southern portion of the Bay in 2006 and 2009 contained levels of PFOS above a threshold for impacts on offspring survival in birds (greater than 1,000 ppb). The most recent PFOS egg results in South Bay (2012) were 70% lower than prior levels and are now well below this threshold.

The RMP has also collaborated with The Marine Mammal Center to analyze harbor seal blood for PFOS since 2006. While concentrations of PFOS exhibit similar spatial trends as the bird eggs, concentrations in seals have not shown declines like the bird eggs. The pathways by which these compounds enter the Bay are not fully understood.

Keywords: PFOS, Seals, Bird Eggs, Monitoring, Bay, Emerging Contaminants

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Speaker Biography: Meg Sedlak received a B.A. degree in Geology from Carleton, College in Northfield, MN and a M.S. degree in Water Chemistry from the University of Wisconsin-Madison. Her master's thesis examined the dehalogenation of polychlorinated biphenyls in sediments. Prior to joining SFEI in 2004, Ms. Sedlak held positions at several engineering consulting firms; the Swiss Federal Institute of Environmental Science and Technology; Resources for the Future; and the US Forest Service where she served as a trail ranger in the Chugach National Forest (Alaska). At SFEI, Ms. Sedlak thoroughly enjoys working with scientists, stakeholders, decision-makers, and SFEI staff on the Regional Monitoring Program; her particular areas of interest are water chemistry and emerging contaminants.

Pharmaceuticals and the Bay: A Cradle to Cradle Approach

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A report by San Francisco Estuary Institute shows that 44 different pharmaceutical compounds or metabolites have been detected in San Francisco Bay sediment or mussel samples. These compounds include harmful endocrine disrupters that can severely alter marine reproductive cycles. A big contributor to this problem is related to the lack of funding for convenient and safe disposal options. Today, people flush expired medications into the sewer system or throw them in the trash. Both are still potential pathways to the Bay, given sewer facilities are not specifically designed to remove these compounds and compounds in landfill can result in leachate.

Education alone will not help without a sustainable safe disposal solution. Just who is responsible for dealing with the problem? If the responsibility falls to the government and the utilities, then public resources are forced to pay for solutions. On the hand, non-profits and non-governmental organizations have provided a voice to the problem, but do not have the necessary resources. This leaves the private pharmaceutical companies that are making billions of dollars in profit each year.

Simply put, we need to adopt a new approach that promotes extended producer responsibility with a cradle-to-cradle design.

Keywords: Pharmaceutical, Vietor, Medicine Disposal

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Speaker Biography: Francesca Vietor serves as the program officer for the Environment at The San Francisco Foundation, focusing on efforts to improve the environmental health and wellbeing of vulnerable communities, building community resilience in the face of climate change, and protecting the natural environment. Francesca is also a Commissioner on the San Francisco Public Utilities Commission, where she leads policymaking for the City and County of San Francisco's water, wastewater, and municipal power services. Before that, she was executive director of the Chez Panisse Foundation, where she advanced nutrition education and food justice issues. Previously, she was president of the Urban Forest Council, president of the Commission on the Environment, and the chair of the Mayor's Environmental Transition Team. She has worked for several non-profits, including Rainforest Action Network and Greenpeace, and she has served on many boards, including the Center for Environmental Health, Commonweal and Environmental Working Group.