EVOLUTION OF POLLUTION PREVENTION IN THE WASTEWATER INDUSTRY

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BAYWORK Training A La Carte
April 23, 2019
Evolution of Pollution Prevention

- Reaction Mode
  - Didn’t look at the horizon, just responded to problems
Reaction Mode

Cuyahoga River, Ohio  1969
Evolution of Pollution Prevention

- **Reaction Mode**
  - Didn’t look at the horizon, just responded to problems

- **Anticipation Mode**
  - Watching for emerging contaminants
  - At one time, organophosphate pesticides, cyanide and dioxin were emerging contaminants
Q: For how much longer are we going to sit back, waiting for the next water quality impairment?
Definition of Insanity

Doing the same thing over and over again and expecting different results
Evolution of Pollution Prevention

- **Reaction Mode**
  - Didn’t look at the horizon, just responded to problems

- **Anticipation Mode**
  - Started looking for emerging contaminants
  - At one time, organophosphate pesticides and cyanide were emerging wastewater pollutants

- **Prevention Mode**
  - Prevent the production of pollutants rather than waiting for them to be a problem or shifting them to another media
PREVENTING Pollution

- We’re not quite there yet, but we’re getting closer.
- Seeking relief in the legislative and regulatory arenas
- Shifting regulation upstream
PREVENTING Pollution

➢ Consumer products are not regulated to consider water quality impacts.
Main Driver for Product Design
The design of products and processes that minimize the use and generation of hazardous substances.
California’s Safer Consumer Products Regulations Ask an Important Question:

Is It Necessary?
What are CECs?

- Unregulated chemicals found in low concentrations in the water environment
- Not routinely monitored for in wastewater or waterways (sporadic data)
- Unknown impact on the environment
  - Innocent until proven guilty
  - Shifts burden to government agencies
Examples of CECs

- Flame retardants
- Pharmaceuticals
- Pesticides
- Antibacterial compounds
- Nanoparticles
- Personal care products
- Surfactants
- Wipes
Why Worry About CECs Now?

- Improved analytical techniques
- Some CECs are not following traditional dose response (effects at very low concentrations)
- The POTW industry has seen this play out over and over
  - Fool me once…
- When feasible, POTWs are not waiting until impact is demonstrated to take action.
Issues for POTWs

- POTW have a limited ability to remove CECs.
- POTW discharge into surface waters.
- CECs can be found in recycled water and biosolids, which could limit options for beneficial reuse.
How POTWs Approach CECs

- POTW community becomes aware of study results that show impact on an aquatic species due to a CEC.
- POTWs determine potential sources and pathways for CEC to wastewater stream.
- POTWs take action where possible, which usually includes an outreach component.
- Sometimes POTW action on CECs can be very involved (pharmaceuticals).
Treatment is NOT the Solution
Regional Monitoring Program
Personal Care Product Ingredients

PFOS
Fipronil
Nonylphenol
PBDEs

HBCD
Pyrethroids*
Pharmaceuticals
Personal Care Product Ingredients
PBDDs and PBDFs

Alternative Flame Retardants
Fluorinated Chemicals
Pesticides, Plasticizers
Microplastic
Many others
Samsung Silver Ion Washing Machine

Exclusively patented by Samsung (silver 99.9%)

- Cold Water is Supplied.
- Pure Silver is Electrolyzed.
- 100 Quadrillion Silver Ions are Created.
- The Silver Ions Penetrate the Laundry Killing Bacteria.*
  *Based on Samsung Tested Bacteria.
- The Silver Ions are Released Into the Drum of the Washer.

Clothing items:
- Blouse
- Shirt
- Lingerie
- Blankets
Samsung Silver Ion Washing Machine

- Because this machine met water efficiency criteria, it appeared on rebate lists offered by Bay Area water agencies.
- May 2007 BACWA letter to Bay Area Water Supply & Conservation Agencies (BAWSCA) requested their members not provide a rebate on this machine.
- BAWSCA agreed.
- This action impacted Bay Area sales so significantly that Samsung Engineers started calling.
- Our response was to participate in the EPA’s regulatory process for pesticides.
## CEE Qualifying Residential Clothes Washers

April 16, 2013

This list is based on the 2011 CEE Residential Clothes Washer Specifications (see tab below). The list is updated monthly. See the CEE website (www.cee1.org) for the most recent listing.

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Microbeads

- Tiny pieces of plastic found in many health and beauty products, including soap and body scrubs
- 5 millimeters or less in size
- Intended to be used to exfoliate or cleanse the body or any part of the body
Microbead-Free Waters
Act of 2015

- Prohibits the manufacturing, packaging, and distribution of rinse-off cosmetics containing plastic microbeads.

- Deadlines for rinse-off cosmetics:
  - July 1, 2017 to stop manufacturing
  - July 1, 2018 to stop the introduction or delivery of these products into interstate commerce

- Deadlines for rinse-off cosmetics that are also non-prescription drugs:
  - July 1, 2018 to stop manufacturing
  - July 1, 2019 to stop the introduction or delivery for these products into interstate commerce.
Triclosan

- Antibacterial agent
- Active ingredient in many consumer products
Products Containing Triclosan

- Hand soap
- Dish-washing products
- Laundry detergents
- Plastics (toys, cutting boards)
- Toothpaste
- Deodorants
- Cosmetics
- Hair conditioners
- Impregnated sponges
- Pesticides (as an inert ingredient)
What are the Concerns?

- Measurable in the environment
- Acutely and chronically toxic to aquatic organisms
- Bioaccumulates in fish and human tissue
- May degrade into other toxic compounds
- Impacts bacterial resistance to antibiotics
Is Antibacterial Soap Necessary?

- American Medical Association
  - "No data exist to support their efficacy"

- FDA - October 2005
  - FDA determined there is no measurable benefit to consumer’s from using these products.
  - Reviewing since early 1970s

- Mayo Clinic
  - "a false sense of security"
2016 FDA Ban on 19 Antibacterial Agents in Hand Soap

1. Cloflucarban
2. Fluorosalan
3. Hexachlorophene
4. Hexylresorcinol
5. Iodine complex (ammonium ether sulfate and polyoxyethylene sorbitan monolaurate)
6. Iodine complex (phosphate ester of alkylaryloxy polyethylene glycol)
7. Nonylphenoxypropyl (ethyleneoxy) ethanoliodine
8. Poloxamer-iodine complex
9. Povidone-iodine 5 to 10 percent
2016 FDA Ban on 19 Antibacterial Agents in Hand Soap

10. Undecoylium chloride iodine complex
11. Methylbenzethonium chloride
12. Phenol (greater than 1.5 percent)
13. Phenol (less than 1.5 percent)
14. Secondary amyltricresols
15. Sodium oxychlorosene
16. Tribromsalsalan
17. Triclocarban
18. Triclosan
19. Triple dye
Pharmaceuticals in the News

AP: Drugs found in drinking water

Hormonal chemicals may be imperiling fish

Pain pills a rising cause of death

Prescription drug overdoses are up 56% since 1997

Drugs in water causing troubling problems to fish, wildlife

OxyContin abuse in region soars

OUTPACING METH | The illicit use of the painkiller, especially among teens, has driven up its street price, which has made pharmacies robbery targets.

the region say that methamphetamine’s popularity is quickly being outpaced by the powerful prescription painkiller simply known as “Oxy.” among teens, Oxy commands a street value of $80 per pill.

According to the Drug Enforcement Administration (DEA), prescription-drug
Background

- 1990s European detection studies
- In 2002, USGS found 80% of U.S. waterways tested contained one or more pharmaceutical or personal care product compound.
- A 2008 study by the Associated Press found an array of pharmaceuticals in the drinking water supplies of at least 41 million Americans.
- Sources of pharmaceuticals in surface water
  - Animal feedlots
  - POTWs (both through excretion and direct sewer ing)
  - Landfill leachate
No Drugs Down the Drain
2006 Statewide Campaign

- CASA, EPA, SWRCB + dozens of local agencies
- Joint legislative proclamation by Senate and Assembly
- SWRCB proclamation
- 65 official partners
- 2 kickoff press events, PSAs, ads and media statewide
Legislative/Regulatory Activity

- CA SB 966 (Simitian) 2007
  - Developed “model program” guidelines
  - Final Report to the legislature encouraged extended producer responsibility (EPR) legislation
- Alameda County Passed Ordinance requiring EPR in July 2012 – 1\textsuperscript{st} in the nation
- DEA regulations expanded collection options for controlled substances in late 2012
- Failed attempts to pass a statewide bill in 2013 and 2014
- In the meantime, 12 California Counties Passed local ordinances
Finally, SB 212 Passed in 2018

California State Senator Hannah-Beth Jackson
Municipal water use

Potable reuse

Drinking water treatment plant

Water recycling plant

Waste water treatment

Options:
- Add to reservoir
- Inject underground
Potable reuse is the introduction of highly-treated wastewater into the drinking water supply. Some refer to it as “toilet to tap”
Orange County operates the largest groundwater replenishment system in the world!
Orange County’s Advanced Treatment Process

Groundwater Reservoir
What Makes it Through Reverse Osmosis Membranes?

- Compounds with:
  - Low molecular weight
  - Neutral charge
- For example: acetone
Questions or Comments?