MYCELX
TECHNOLOGIES CORPORATION

CASE STUDY FOR INDUSTRIAL WATERWORLD

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Like a bad dream that just won't end, polychlorinated biphenyls (PCBs) continue to plague companies that once used them as non-flammable coolants, lubricants and insulators. Now, an inventive technology is presenting new options for companies looking for cost-efficient and effective solutions to prevent PCB pollution.

The Environmental Protection Agency's 1979 Toxic Substances Control Act banned the production of PCBs because of their harmful effects on people and wildlife. However, PCBs can still be found in old transformers, rubberized paint, vacuum pumps, liquid-cooled electric motors, and even florescent light ballasts. Many of these products remain in use, and they still have the potential to release PCBs into the environment.

While much attention has been focused on the debate about whether or not to dredge the Hudson River to remove years worth of PCB-contaminated sediment, manufacturing plants and utilities around the country commonly face the challenge of treating wastewater or stormwater to remove PCB contamination.

PCBs are stable organic compounds that can remain indefinitely in the environment, where they accumulate in the fatty tissue of most living organisms. The pollutants are so toxic that even one gram contaminates up to one billion liters of water, endangering the aquatic life in it. Obviously, the liability associated with potential environmental pollution is significant.

Typical efforts to filter PCBs from water have included activated carbon, earth filtration or digestive ponds. In some cases, this involves transporting water from an industrial site or its collection point to a treatment facility. These well-intentioned efforts often present not only disposal and cost challenges, but unsatisfactory results as well.

Such was the case for one electric utility that treated stormwater collected from manholes, where it was exposed to old transformers and capacitors that might have PCB-contaminated oil. The water, containing traces of oils, lead and PCBs, had to be pumped from the manholes and then transported to a specialized facility for treatment before it could be discharged into municipal sewer systems. In addition to the transportation fees, the process cost the company 25 cents per gallon.

"This is a significant cost when you're dealing with hundreds of thousands of gallons of water," said Phil D'Angelo, a former electric utility chemist and now an industry consultant with JoDAN Technologies.

D'Angelo was asked to find a more effective and cost-efficient solution for the utility. Working in cooperation with utility personnel, he developed an on-site treatment system using particulate filtration and patented MYCELX technology.

The mobile oil removal system, called the JMOR 2-2, was mounted on a 4' x 4' skid with a centrifugal pump. The system's small footprint made it easy to position on-site. The system consisted of two stainless steel filter housing units, each with four 30-inch MYCELX filters, preceded by particulate bag filters from MYCELX Technologies and LaPoint Industries.

MYCELX is a relatively new, distinctive class of compounds that can instantly remove hydrocarbons and other pollutants, including a broad range of organic chemicals, from water. Once pollutants, such as PCBs, come in contact with MYCELX, they instantly bond to the material and become hydrophobic and viscoelastic, which removes them entirely from the water stream. The MYCELX technology allows the filters to permanently remove the pollutants in a single pass with less than 1 psi of pressure drop, even when saturated.

MYCELX is infused into numerous substrates, providing the ability to address specific pollutants by using the optimal substrate for the task. Originally developed for the oil remediation industry in the early 1990s, MYCELX has since expanded its reach to the industrial wastewater, power generation and marine industries as well.

"MYCELX's effectiveness and its versatility in addressing specific tasks enables us to help companies meet and exceed ever tightening environmental regulations and constraints," said Mack DeVine, CEO of MYCELX Technologies.

MYCELX attracts PCBs like a magnet, but it is also highly repellant to water - a characteristic that allows minimal water to be absorbed by the filters. Used MYCELX filters and other products can be safely incinerated and even used to generate energy due to their high BTU content.

D'Angelo's JMOR 2-2 system proved to be highly effective in removing PCBs, oil and grease, copper and hydrocarbons to Below Detectable Limits (BDL). Additionally, the filter system reduced the particulate lead from the collected stormwater. (*see table below*)

	PCB ppb	TPH ppm	Oil & Grease ppm	Lead Avg. ppm	Copper ppm
Avg. Influent	3.74	367.9	17698	33.0	11.6
Max. Influent	40.0	21400	141000	150.0	87.0
MYCELX Effluent	< 1.0	< 5.0	< 5.0	0.020	< 0.01

Notes:

- Values presented are from the utility's analysis of influent and effluent.
- All PCB samples were analyzed as PCB Aroclors.
- PCB effluent samples were all < 1.0 ppb.
- PCB influent samples had a detection limit greater than 1.0 for some samples and were incorporated as absolute values.

Using the new system over a five-month period, the utility company processed approximately 950,000 gallons of manhole influent. The treatment costs decreased from 25 cents to 2.8 cents per gallon. Even without factoring in the costs it saved from no longer having to transport the water off-site, the utility realized savings of nearly $211,000 in treatment costs alone.

To take the success of this new system an additional step, D'Angelo developed similar system that could be deployed in the street right at the manhole. Called JMOR StreeTreat, it uses a unique bag filter assembly and incorporates particulate filtration with MYCELX technology into one assembly.

D'Angelo has further refined the application of MYCELX technology by designing two new systems that will be placed downstream of oil-water separators. The larger of the two, the JMOR 220-MX12, is designed to remove traces o oil from water and has an operating capacity of 360 gallons per minute. The smaller system, the JMOR 210-MX4, is designed to remove PCBs at a capacity of 60 gallons per minute.

"We're using MYCELX to customize solutions for specific client needs," said D'Angelo. "This enables us to measure the hole before we design the peg, to make sure we have the right solution to address the problem."