

# The Hidden Dangers of

## Examining little-known threats to the environment

By Daniel L. Theobald

**W**hen we think of mop water, most likely we think of our kitchen floor. In industrial plants, however, mop water could contain a toxic blend of chemicals that are mopped off the floor, and sometimes end up in our rivers, streams and municipal wastewater systems. While we consider the health of our environment, we don't necessarily realize the hidden dangers of mop water. This article will provide an overview of some of the detrimental effects industrial mop water has on the environment, public health and some wastewater treatment processes.

Mop water contains settled particles in the atmosphere, including dust, cleaning chemicals and anything on the floor. Hidden dangers in industrial mop water not only contain everyday air pollutants such as mold spores, pollen, and plant and insect parts, but also certain toxic items such as:

- Dust mites and dust mite feces;
- Rodent waste;
- Bacteria;
- Cigarette smoke, including its toxic byproduct of produced lead; and
- Heavy metal particles such as: cadmium floor spills from shellfish and liver; mercury from vapors, which can affect the immune system and damage the nervous system; volatile organic compounds that coalesce onto the dust; dioxins, a highly toxic compounds formed by burning material in incinerators, which are carried throughout the atmosphere and cling to dust particles in the air; and formaldehyde, which is released from smoke and carried throughout the atmosphere, and causes irritation and increased respiration rate.

### Cleaning Chemicals

Cleaning chemicals also can present environmental and health issues. Chlorine (low-pH) is used in cleaners and water disinfection, which is a respiratory irritant and potential thyroid disrupter. Chlorine dissolves when mixed with water. It also can escape from water and enter air under certain conditions. Most direct releases of chlorine to the environment are to air and to surface water. Once released, chlorine reacts with other chemicals. In water, it combines with inorganic material to form chloride salts, and organic material to form chlorinated organic chemicals.

Sodium hydroxide (high-pH) is found in oven cleaners and drain openers. If it gets in contact with the skin or eyes, it can cause severe burns. Solid sodium hydroxide or solutions of sodium

Mop water can contain certain toxic items.

# Industrial Mop Water

## & wastewater treatment processes

hydroxide will cause chemical burns, permanent injury or scarring, and even blindness if it contacts unprotected human or animal tissue. Protective gear such as rubber gloves, safety clothing and eye protection always should be used when handling solid sodium hydroxide or its solutions.

Dissolution of sodium hydroxide is highly exothermic, and the resulting heat may cause heat burns or ignite flammables. Sodium hydroxide is extremely caustic, and can react with fats and oils on skin, in a reaction that creates salts. For this reason, sodium hydroxide is very dangerous, and skin should be washed thoroughly with copious volumes of water following contact with this substance.

A solution of 0.5 moles or more of sodium hydroxide should be labeled "corrosive," while a solution between 0.5 to 0.05 moles should be labeled "irritant."

Ammonia (high-pH) is in all-purpose cleaners, including glass cleaner. Inhaled ammonia can immediately burn the nose, throat and respiratory tract. If lower concentrations are inhaled, nose and throat irritation may be experienced, as well as coughing. Low concentrations of ammonia that come in contact with skin or eyes quickly can cause irritation. High concentrations of ammonia can cause severe injury and burns.

Triclosan is an ingredient added to certain antibacterial soaps to reduce or prevent bacterial contamination. Recent studies, however, have raised questions about whether triclosan might be hazardous to human health. Research has shown that triclosan might contribute to the development of antibiotic-resistant germs and might be harmful to the immune system.

### On the Floor

Spills from machine use—including metalworking fluids of all kinds—may contain oil, sand, mud (from forklifts entering building), parts wash, metal chips and dissolved metals, solid debris (papers, wood chips from pallets).

Anything on the floor from an industrial production or sanitizing cleanup process including non-routine water such as mop water typically is the dirtiest and most unpredictable water source requiring wastewater treatment.

Mop water from beef, pork and poultry food processing facilities may have a significant impact on the treatment process of the receiving wastewater treatment plant. Blood from processes including slaughtering meat thawing can overwhelm the required wastewater treatment. Blood has one of the highest pollution values of any waste, measured at approximately 15% to 20% by volume, which equals 150,000 to 200,000 mg/L. This

pollution concentration is an extreme value and can devastate wastewater treatment.

Mop water in snack food or pastry manufacturing facilities can overcome wastewater treatment plants. Sugar water from the production process area can overpower the waste load demanding regulated treatment. Sugar has a high pollution value for waste. Its pollution value is resembled as 1.5% to 2% (15,000 to 20,000 mg/L) by volume. This pollution concentration can effectively prevent treatability.

Similar conditions can occur in other facilities manufacturing liquid sugar-based products such as soft drinks. Sanitation cleanup water can have so much mop and sanitation water that the volume of untreated wastewater can hydraulically deluge the entire wastewater treatment plant.

Mop water, along with other chemicals, can kill a package plant on the connected piping system. Mop water and floor stripper used to clean large retail establishments poured down the drain could kill a necessary healthy biomass of an appropriately sized wastewater treatment plant.

### Lessening the Effects

Fortunately, there are ways to mitigate the scenarios mentioned above. Dust mites, for example, are the source of one of the most powerful biological allergens and they grow in damp, warm environments. Perhaps a little known recommendation of the U.S. Environmental Protection Agency is to maintain the relative humidity between 30% and 50% inside buildings. By doing so, the growth of some sources of biological material can be minimized and therefore may mitigate exposure to hidden dangers in mop water.

For decreasing an adverse consequence of cleaning chemicals in mop water, consider making your own cleaning products by mixing safe ingredients like vinegar and baking soda. Also, if you are concerned about a cleaning product you are currently using, call the company's toll-free number and inquire about problem ingredients.

For diminishing chain-reacting hidden dangers in mop water requiring wastewater treatment, capture and contain concentrated waste such as blood, sugar and chemicals in the source generation area prior to releasing any wastewater for treatment.

Knowing these discoveries and using this guidance could reduce future exposure to hidden dangers in mop water. **IWWD**

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