




ENDOCRINE DISRUPTING CHEMICALS THAT ARE POTENTIALLY OF CONCERN

Potential endocrine disrupting chemicals	What they do and examples of where they're found
<p>Hormones</p>  <p>Estrogens, including estrone, estradiol, ethynylestradiol and testosterone</p>	<p>Natural and synthetic hormones. Prescription birth control pills containing ethynylestradiol are one major source of estrogens entering the environment.</p>
<p>Industrial chemicals</p>  <p>Some metals</p>	<p>Tributyltin is used in the manufacturing of PVC and was historically used in antifouling paints. Cadmium is used in nicad batteries and other industrial uses.</p>
 <p>Bisphenol A</p>	<p>This chemical is used to produce epoxy resins and polycarbonate plastics (used commonly in some food and drink packaging; also applied as lining to metal food containers and used in some dental sealants).</p>
 <p>Phthalates such as diethylhexylphthalate (DEHP) (also known as Bis(2-ethylhexyl)phthalate)</p>	<p>Phthalates have been widely used as plasticizers in many products since the 1930s. Currently phthalates are considered less potent, with up to a 1,000 times <i>less</i> potent effect than, for instance, the estrogens in birth control pills. They are found in plastic wrap, PVC, vinyl flooring, and ink used to print on plastic containers. Initial testing by Puget Sound agencies has also found high levels of DEHP in some products used in vehicles like brake pads, serpentine belts and tires. These phthalates may end up in stormwater runoff.</p>
 <p>Polychlorinated biphenyls (PCBs) and dioxins (PCDDs)</p>	<p>PCBs were used since 1929 in various electrical applications. While no longer produced, they can be found in older electrical installations and marine sediments. Dioxins are produced as a byproduct during paper manufacturing, incineration and production of chlorinated aromatics. These compounds are very persistent and continue to cycle in the environment.</p>
<p>Personal care products</p>	
 <p>Phthalates such as diethylhexylphthalate</p>	<p>Phthalates are used in some cosmetics and some packaging of personal care products.</p>
 <p>Surfactants - (Alkyphenols such as nonylphenol and octylphenol)</p>	<p>Detergents contain compounds called surfactants to improve cleaning power. They are also used as carriers for some pesticides to make the pesticide stick to the plant. Sometimes they appear to be more toxic to aquatic life through this endocrine disruption mechanism than the active ingredient. They may also be used as plasticizers and UV stabilizers in plastics.</p>
 <p>Parabens</p>	<p>This group of chemicals is commonly used as a preservative in many cosmetics, including hand lotions and shampoos.</p>

(continued on reverse)

(continued from reverse)

	<p>Prescription and over-the-counter drugs</p>	<p>Only a small subset of prescription drugs are known or suspected of being endocrine disrupting compounds, mainly synthetic steroids and other synthetic hormones (for example, birth control pills, hormone replacement therapy).</p>
<p>Pesticides</p>		
	<p>Pesticides, fungicides and herbicides (DDT, lindane, and vinclozolin are just a few)</p>	<p>Several chemicals used to control insect pests or weeds in agriculture, landscaping or home gardening have been identified as possible or definite endocrine disruptors.</p>
	<p>Alkyphenols</p>	<p>Alkyphenols are often used as carrier solutions for pesticides.</p>

The following chart illustrates what gets removed with different wastewater treatment technologies. The membrane bioreactor planned for the Brightwater and Carnation treatment plants remove more than conventional sand filtration. Even this advanced treatment process is not expected to remove all contaminants or EDCs. Higher levels of removal are possible but very expensive.

FILTRATION TREATMENT PROCESSES

