Things we can all do

Controlling chemicals

the source is the easiest and least expensive way to

protect the environment and people from the harmful
effects of all pollutants, including EDCs. King County has several
programs for homes and businesses to reduce the amount of
contaminants entering stormwater and wastewater:

- To find out how to safely dispose of stuff you don’t want or
  need, check the Web at http://dnr.metrokc.gov/WTD/community/oldstuff.htm. This site tells you what should
go down toilets, sinks and other household drains; what
should go in the garbage; and what should be disposed of
in other safe and healthy ways.

- You can find resources about practicing natural yard care at
  http://dnr.metrokc.gov/topics/yard-and-garden/

- The Local Hazardous Waste Management Program works with
  households and businesses to reduce the amount of potentially
toxic substances going down the drain. Lots of information on
  less toxic choices can be found at http://www.govlink.org/hazwaste/

- King County’s Industrial Waste Program works with businesses to control the discharge of
  substances that can degrade water quality or harm workers or facilities. A pilot project is under way
  in the drainage basin surrounding the Duwamish Waterway to research, identify and control the
  sources of phthalates (chemicals that make plastic flexible). You can find more information at
  http://dnr.metrokc.gov/WTD/wlr/indwaste/duwamish/phthalates.htm

- The county’s Stormwater Services Program works to stop contaminants (including some
  potential EDCs) from being discharged into surface waters.
  Find out more at http://dnr.metrokc.gov/wlr/stormwater/

For more information on EDCs, check the following Web sites:

http://e.hormone.tulane.edu/
http://www.epa.gov/endocrine/about.html
http://water.usgs.gov/pubs/FS/FS-081-98/#HDR01

For more information, please contact Jo Sullivan at the
Wastewater Treatment Division, 206-296-8361.

Alternate Formats Available
Voice: 206-296-8361 or TTY Relay: 711

King County staff offer tips on how to
find the safest household products and how to
safely dispose of household hazardous waste.

Endocrine Disrupting
Chemicals in the Environment

New information is continually emerging about the
natural and synthetic chemicals people and industries use
every day and dispose of down their drains and toilets.
Some chemicals of concern are classified as endocrine
disrupting compounds, or EDCs.

EDCs are natural or synthetic chemicals
that interfere with or mimic the hormones
responsible for growth and development of
an organism. Some EDCs are synthetic hormones
(such as ethynylestradiol, found in birth control pills)
and natural hormones (such as estrogen and testos-
terone). Some EDCs are found in commonly used
products such as personal care products like soaps and
cosmetics (some contain nonylphenol compounds and
parabens), industrial byproducts, plastics (phthalates) and
pesticides.

When these products are used, disposed of, or
excreted by people or animals, they typically end
up in either stormwater or wastewater. While waste-
water treatment processes can remove a significant
amount of these compounds, small concentrations of
some are discharged into surface waters.

Nationally and internationally, scientists are studying
the potential effects of EDCs on aquatic life and wild-
life. Several chemicals have been classified as

EDCs, but many compounds have not yet been tested.
Because this impact of EDCs is an issue of national
and international scope, it is beyond the capability of
a local agency or utility to solve alone. Studies will
continue for many years before definitive answers are
known and regulations adopted. King County under-
stands public interest and concerns about this issue,
so as we learn more, we will respond to recommenda-
tions and amend regulations as needed.

Below is a summary of what we know and what we
are doing now to deal with the issue of EDCs:

- Scientific analysis. King County scientists are
  tracking this issue carefully to keep up-to-date on
  new findings. King County’s Environmental Labo-
  ratory is continuing to investigate new analytical
  methods for the complex testing of some of these
  chemicals. Sampling for 15 suspected EDCs in
  King County marine and fresh waters found the
  presence of some EDCs at low levels. They are natural estrogen
  (estradiol), synthetic estrogen (ethynylestradiol), plasticizers
  (phthalates), surfactants from soaps (nonylphenol), and epoxy
  compounds (Riphenol A).

(continued inside)
Prevention and education for source control. Preventing EDCs from entering stormwater through a septic tank or sewer system is the easiest and least expensive way to protect people and the environment. To help reduce the problem, we offer resources and programs throughout King County on how to control chemicals at the source.

Wastewater treatment. Conventional secondary wastewater treatment, designed to remove solids and biodegradable organic material from wastewater, removes from 50 to 90 percent of many compounds known to be or suspected of being EDCs. Both the West Point and South Treatment plants use this technology. King County is making efforts to use the advanced wastewater treatment technology where possible. We plan to install membrane bioreactors in the future Brightwater and Carnation treatment plants.

Background
Concerns about EDCs emerged more than a decade ago in Europe, where scientists found fish with altered reproductive systems in rivers that received large volumes of treated wastewater. Scientists found that very low levels of some compounds in the effluent were likely causing reproductive effects. New laboratory methods have recently enabled scientists to detect these compounds at very low levels in many of our waterways, so researchers can now begin studying this new endocrine disruption effect.

How do EDCs get in the water?
Chemicals such as pesticides run off lawns into stormwater systems that drain into local waterways. Residues from drugs and other consumer products we use may regularly—such as birth control pills, soaps, cosmetics and plastics—enter septic systems and sewer systems from showers and dishwashers. Domesticated animals and wildlife also contribute EDCs to the environment. Some can also enter water from the atmosphere.

Doesn't wastewater treatment remove EDCs?
Federal regulations require us to remove 85 percent of solid materials from wastewater before we discharge the treated effluent into natural water bodies. Regulations also require our wastewater discharges to meet state water-quality standards, but there are no water-quality standards for some of these compounds. While standards are available for some compounds (PCBs, some pesticides), the standards were not based on impacts to the endocrine system. King County's treatment plants in Seattle and Renton use a two-stage process called conventional secondary treatment that typically removes 95 percent of the solids; however, this process does not remove all contaminants or EDCs.

Membrane bioreactor technologies, an advanced wastewater treatment process, are proving capable of removing a larger amount of solid materials from wastewater than conventional secondary treatment. For example, the membrane bioreactor technology to be used at the Brightwater and Carnation wastewater treatment plants will produce cleaner water by removing more solids and smaller particles than current technology. Even these advanced technologies are not expected to remove all contaminants or EDCs. Higher levels of removal are possible but very expensive.

Preventing EDCs from entering the wastewater stream is the easiest and least expensive way to protect people and the environment. Please refer to the list of resources and programs at the end of this fact sheet on how to control chemicals at the source.

How do EDCs affect fish and people?
Current research suggests that exposure of fish to some EDCs can mimic estrogen and lead to changes in sex ratio (changed percentage of male and female in the wild), "feminization" of male fish (showing some female characteristics), production of vitellogenin (the protein precursor to egg production in female fish) by male fish, and other changes that may affect reproduction or overall health. Other EDCs can mimic androgen (a male hormone) and have different or opposite effects from the estrogen mimicker.

Environmental lab scientist testing for trace metals.