





Implementation of the Dental Rule in Virginia

NC Pretreatment Consortium, Ashville NC October 15, 2019

Deborah DeBiasi

State Coordinator for Industrial Pretreatment and WET programs

Department of Environmental Quality, Water Division, VPDES permits

deborah.debiasi@deq.virginia.gov 804-698-4028

Overview of Dental Rule

- Dental Effluent Guidelines published June 14, 2017 as 40 CFR part 441
- Dental offices are considered IUs of POTWs, NOT CIUs or SIUs
- DEQ webpage for Dental Rule is <https://www.deq.virginia.gov/DentalRule.aspx>
 - Dental offices that apply or remove amalgam must install amalgam separator and implement 2 BMPs
 - Prohibit discharge of waste (or scrap).
 - Prohibit use of line cleaners that may lead to dissolution of solid mercury from traps and lines.



FAQ for Dental
Offices



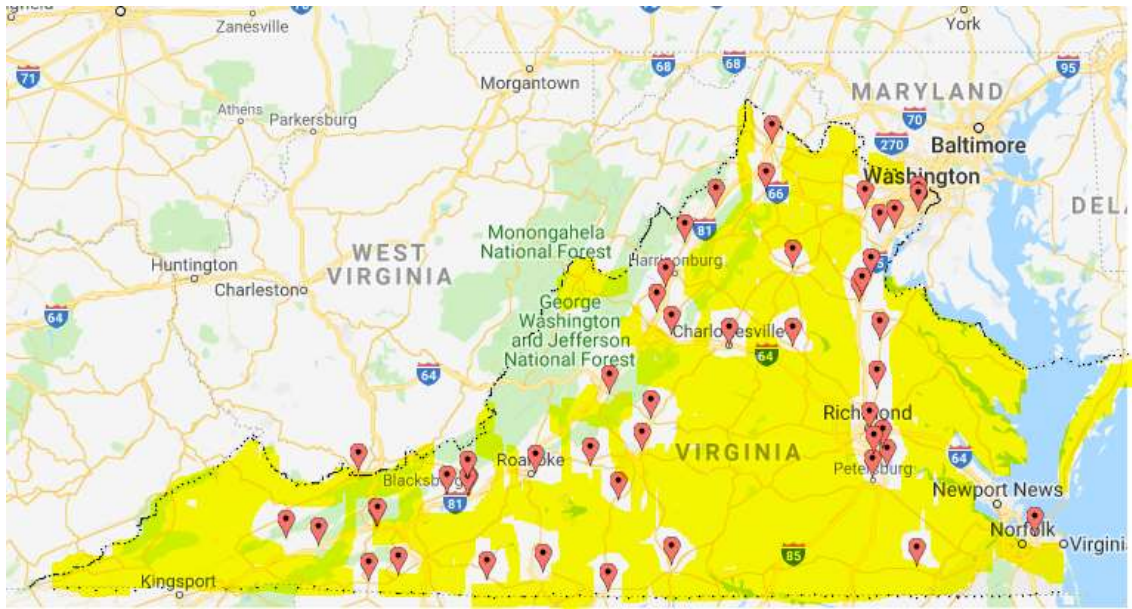
Virginia Dental
Rule Compliance Form

The Compliance Procedure for Virginia

- The Dental Rule asks dental offices to fill in a paper form (obtained from state or EPA) and mail it to their control authority.
- We have a fillable form on our [webpage](#). Dental offices must fill in and submit the Virginia Dental Rule Compliance form to Virginia DEQ as an attachment to an email to DentalRule@deq.Virginia.gov by the applicable date.
- Data can be extracted from forms easily and is consolidated on a spreadsheet and made available to POTWs
- POTWs can also have copy of submitted form



Pretreatment Programs marked



Resources used to find Dental Offices

- Virginia Department of Health (VDH) has list of dental offices with X-ray machines (3800) – does NOT include federal or military dental offices (another 100-200)
- Virginia Dental Association (VDA) posted information about the Dental Rule on their webpages and announced the schedule for compliance at their conferences. They also wrote an article about it for their publication
- Department of Professional and Occupational Regulation – DPOR – Dental Board put a notice in their quarterly mailing about the compliance dates for the rule
- POTWs mailed out a flyer 
Nuance Power
PDF Document
- I have spoken to local groups of dentists about the rule
- Wastewater operator training group informs their students of the rule and that they must ensure their dental offices are compliant

Compliance with the Dental Rule

- 147 offices of ~ 4000 have sent in forms
- Virginia DEQ and POTWs will continue outreach
- VDH sends me list of dental offices with X-ray machines quarterly

Problems encountered, and interesting interpretations of our form instructions

- Some offices do not have excel, so they printed the form and filled it in by hand. I had to transcribe them to our form to extract the data.

If Third-Party Vender is not used, describe in-house practices to ensure proper operation and maintenance of separators or devices in accordance with 40 CFR §441.30 and 40 CFR §441.40. Address maintenance of separator or device, frequency of inspections, disposal of amalgam, etc.

Purifier is used to clean lines weekly and the air flow at the HVE tip is checked. Change side traps also checked, gloves and protective wear worn while doing this task monthly.
Medical waste management is used for disposal of all medical waste including amalgam.
21-27 kPa Flow rate 3.3 liters/second SEE specification sheet

Submissions in lieu of the Dental Form



The email included the name and address of the dental office, and this picture – no form



Date 4/23/18 DD 2011 chairside
Amalgam separator
Reporting Requirements for Virginia Dental
Offices That Apply or Remove Amalgam

A federal rule that was published June 14th, 2017 requires dental practices that apply or remove amalgam to install an amalgam separator to capture waste amalgam. EPA estimates that dentists discharge approximately

This office took the flyer we sent out and scribbled some info in the margins

Several people didn't save the form to their computer before they filled it in. They "saved" it afterwards, not realizing it didn't save their data, then attached to a mail and sent it in. I received a couple dozen blank forms.

One dentist called asking when I was going to install the separator. Another call asked what the fine was if they didn't install a separator. Several forms came in missing most of the information requested on the form.

The first offices to respond with properly filled in forms were exempt from the Dental Rule, but wanted to let us know.

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In Conclusion

- Need an on-line form that anyone can fill out, that dumps the data onto a spreadsheet behind the scenes.
 - Data could be searchable so dental staff could easily update
 - Eliminates the need for special software by public
 - Saves time for pretreatment staff from handling forms



Microconstituents

“Pollutants we should care about”



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What are microconstituents?

Natural and manmade substances in environment

- Human and Veterinary drugs – prescription and OTC (Over The Counter) drugs
- Pet products and supplements
- Food Supplements – nutraceuticals (aka vitamins), caffeine, nicotine, fragrances
- Sun-screen agents
- Lotions, shampoos, soaps, deodorants, toothpaste
- Cosmetics
- Fire Retardants – PBDEs (polybrominated diphenyl ethers (penta, octa, deca), Organophosphate substitutions
- Industrial Chemicals – bisphenol A, phthalates, PFAs, PFOS
- Pesticides – bactericides, herbicides, fungicides, insecticides

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<https://www.sciencedaily.com/releases/2017/05/170501102258.htm>

Widespread vitamin D deficiency likely due to sunscreen use, increase of chronic diseases, review finds. Considered a hormone rather than a vitamin, vitamin D is produced when skin is exposed to sunlight. Vitamin D receptors are found in virtually every cell in the human body. As a result, it plays a wide role in the body's functions, including cell growth modulation, neuromuscular and immune function and inflammation reduction.

Symptoms for insufficient or deficient vitamin D include muscle weakness and bone fractures. People exhibiting these symptoms or who have chronic diseases known to decrease vitamin D, should have their levels checked and, if found to be low, discuss treatment options. **Increasing and maintaining healthy vitamin D levels can be as easy as spending 5-30 minutes in midday sun twice per week.** The appropriate time depends on a person's geographic location and skin pigmentation -- lighter skin synthesizes more vitamin D than darker skin. It is important to forgo sunscreen during these sessions because SPF 15 or greater decreases vitamin D3 production by 99 percent.

Names for this topic

- CPC – Compounds of Potential Concern
- PC - Pollutants of Concern
- EC - Emerging Contaminants – (USGS)
- CEC- Contaminants of Emerging Concern
(AWRA-American Water Resources Assoc, EPA)
- PPCP – Pharmaceuticals and Personal Care Products (name coined by Dr. Christian Daughton, EPA in 1999)
- Microconstituents –(WEF -Water Environment Federation)

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PHARMACEUTICALS AND PERSONAL CARE PRODUCTS (PPCP'S) AS ENVIRONMENTAL POLLUTANTS: POLLUTION FROM PERSONAL ACTIONS

https://cfpub.epa.gov/si/si_public_record_report.cfm?direntryid=66501

<https://www.epa.gov/wqc/contaminants-emerging-concern-including-pharmaceuticals-and-personal-care-products>

<https://www.epa.gov/wqc/contaminants-emerging-concern-including-pharmaceuticals-and-personal-care-products>

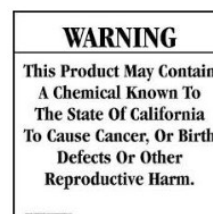
Endocrine Disrupting Compounds

- An endocrine disruptor is a synthetic chemical that either mimics or blocks hormones and **disrupts the body's normal functions** when absorbed into the body.

Natural products in environment (oak tree leaves, other decaying matter), household cleaners, personal care products, pharmaceuticals, pesticides, processed foods, plants (contain natural compounds called phytoestrogens), plastics, industrial chemicals, animal and veterinary sources, air deposits of fire retardants, etc.

<https://www.epa.gov/endocrine-disruption-> Endocrine Disruptor Screening Program (EDSP)
List of EDCs – approx 10,000 chemicals

- Some products will contain this statement (or something similar) on the label, “Do not use if you are pregnant or breast-feeding” or “Do not expose children under 5 years of age” which could indicate the product contains EDCs



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California recently listed glyphosate as a known carcinogen

Roundup: The herbicide active ingredient in Roundup is glyphosate, which if sprayed on the lawn will kill not only the weeds but the lawn. This is a nonselective herbicide that controls any green plant on which it is applied.

Roundup For Lawns: The new Roundup For Lawns does **not** contain glyphosate. The herbicide active ingredients in Roundup For Lawns are MCPA, quinclorac, dicamba and sulfentrazone. These herbicides are effective on a broad range of weeds that might infest the lawn such as dandelion, crabgrass and nutsedge. When used properly it will not kill the desirable turfgrasses in the lawn. This is a selective herbicide that controls specific weeds, but not lawn grasses. To make it even more confusing there is a northern and a southern version of this product for different grass options. The northern version of Roundup for Lawns contains MCPA, quinclorac, dicamba and sulfentrazone. These active ingredients can be found in many lawn herbicides in different combinations for various weed control options. MCPA, 2,4-D and dicamba are products used to control broad leaf weeds such as dandelion, ground ivy or mallow. Quinclorac is often added to provide post-emergent control of crabgrass. Sulfentrazone is a product that provides control of sedges such as yellow nut sedge as well as some broadleaf weeds. All of the active

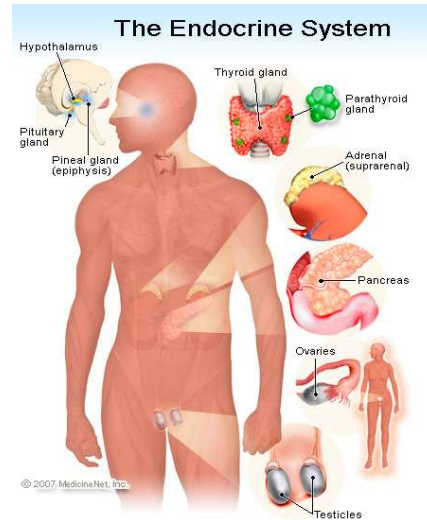
ingredients previously mentioned will not kill your lawn grasses.

<https://news.wsu.edu/2019/04/23/wsu-researchers-see-health-effects-across-generations-popular-weed-killer/>

Parents and first generation ok – second generations had significant increases in testis, ovary and mammary gland diseases and obesity. Third generation males increase in prostate disease, females has increase in kidney disease. Generational toxicology, or epigenetics.

Endocrine System

- Glands that produce and secrete hormones
- Hormones regulate growth, metabolism, sexual development and function
- Pituitary gland, hypothalamus, thyroid gland, parathyroid glands, adrenal glands, pineal body, reproductive glands, pancreas



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<https://www.epa.gov/endocrine-disruption/what-endocrine-system>



<https://www.ewg.org/sunscreen/report/executive-summary/>

Oxybenzone works by absorbing a particular wavelength of UV and converting it to heat energy so you don't get burnt

https://www.bayjournal.com/article/researchers-find-sunscreen-chemicals-in-chesapeake-oysters?utm_source=Bay+Journal+Weekly+News&utm_campaign=6e69d0317f-Newsltr_2019_Sep16&utm_medium=email&utm_term=0_bde9036159-6e69d0317f-69486921

Benefits and Deterrents of Sun Exposure

Sun exposure:

- +Vitamin D uptake in body prevents osteoporosis and bone fractures
- +Benefits children to make strong bones and prevent rickets
- +Lower risk of MS
- +May benefit people with MS
- +10-15 (or 5-30) minutes of sun exposure 2-3 times/week is all body needs.
- Too much sun causes sunburn and may contribute to skin cancers

Little to no sun exposure

- Need Vitamin D supplement
- Vitamin D deficiency is risk factor for cardiovascular issues like heart attacks, high BP, diabetes, and some cancers. Need minimum 600 IUs daily
- Brittle bones - osteoporosis



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https://www.mnn.com/health/fitness-well-being/stories/benefits-of-vitamin-d?utm_source=Weekly+Newsletter&utm_campaign=d31e55717e-RSS_EMAIL_CAMPAIGN_FRI0913_2019&utm_medium=email&utm_term=0_fcbff2e256-d31e55717e-42469305

https://www.technologynetworks.com/proteomics/news/a-new-study-shows-that-vitamin-d-deficiency-is-strongly-linked-to-increased-mortality-and-324135?utm_campaign=NEWSLETTER_TN_Breaking%20Science%20News&utm_source=hs_email&utm_medium=email&utm_content=77085601&hsenc=p2ANqtz--b6lsPCTzWndzLf4LAUoVGkMqPU3mXo_vW77B1JPodvAjRJDpPmdjPC6GHH37ygbxUyRir1yfyFQWww3QpNWN-0bL8zOulCxGayJ-5Px3tIR4UkME&hsmi=77085601

How do Pharmaceuticals get into the Environment?

WUMO

27. May 2018



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How to reduce the amount of pharmaceuticals in the environment

Education of public to dispose of medications properly

- Take unused/unwanted medications to Drug Take Back events for disposal, or dispose of in an authorized collection box. Remove your identification information and address from the container. Collected drugs are ultimately incinerated.

- Trash disposal: English Spanish German Chinese



English



Spanish



German



Chinese

<http://www.deq.virginia.gov/Programs/Water/PermittingCompliance/PollutionDischargeElimination/Microconstituents.aspx>

- Where possible, reduce the amount of medications and nutraceuticals (dietary supplements) ingested
 - Only take medications that are appropriate for the illness/condition
 - Do not take medications longer than necessary or as directed
 - Have your doctor review all of the medications and supplements that you take to make sure combinations won't be a problem

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Drug Disposal Options

Drug collection boxes are available at participating police stations and many pharmacies

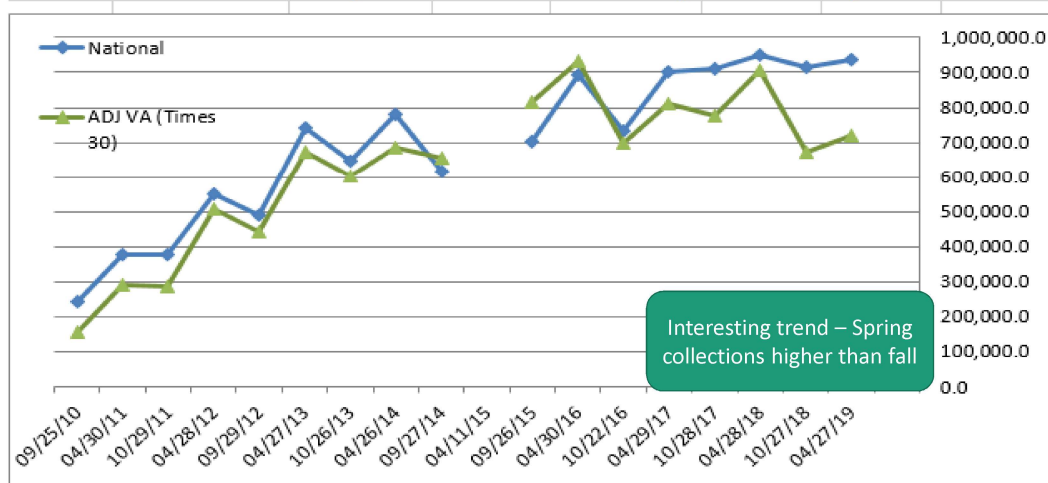


<https://takebackday.dea.gov/>

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Total pounds collected to date Nationally –10,878,950 Virginia – 354,012

Trends for National pounds collected with VA adjusted for comparison



Chrome HTML Document

Click on icon to see how all the states did with the April 2019 Drug Take Back event

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<https://takebackday.dea.gov/sites/default/files/NTBI%2017%20Totals-April2019.pdf>
Slides showing # law enforcement participation, pounds collected per state, and amount collected at April 2019 event per state

FDA Guidance on Drug Disposal

- In 2007, the FDA advised that **13** drugs be flushed down the toilet instead of thrown in the trash
- In January 2012, the FDA advised that **32** drugs be flushed down the toilet instead of thrown in the trash
- In November 2013, the FDA advised that **36** drugs be flushed instead of trashed
- In April 2016, the FDA advised that **45** drugs be flushed instead of thrown in the trash
- April 2018, the FDA posted a list of **49** drugs to be flushed.

From Don McLean's song "Vincent" –

"They would not listen, they're not listening still.

Perhaps they never will..."

FDA list of Drugs to
flush



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[http://www.nacwa.org/docs/default-source/clean-water-current-pdf/22-jan-16/2016-01-22fda-letter-\(letter\).pdf](http://www.nacwa.org/docs/default-source/clean-water-current-pdf/22-jan-16/2016-01-22fda-letter-(letter).pdf)

<https://www.nacwa.org/news-publications/clean-water-current-archives/clean-water-current/2019/03/05/nacwa-hosts-discussion-on-fda-pharmaceutical-flush-list>

<https://www.fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/EnsuringSafeUseofMedicine/SafeDisposalofMedicines/ucm186187.htm>

https://cfpub.epa.gov/si/si_public_record_report.cfm?direntryid=312892&keyword=ecosystems&subject=ecosystems%20research&showcriteria=2&datebeginpublishedpresented=11/04/2011&dateendpublishedpresented=11/04/2016&sortby=pubdateyear&

<https://www.epa.gov/water-research/risks-aquatic-organisms-posed-human-pharmaceutical-use>

[Fascinating video of mutating bacteria](#)

<https://www.wired.com/2016/09/gorgeous-unsettling-video-evolution-action/>

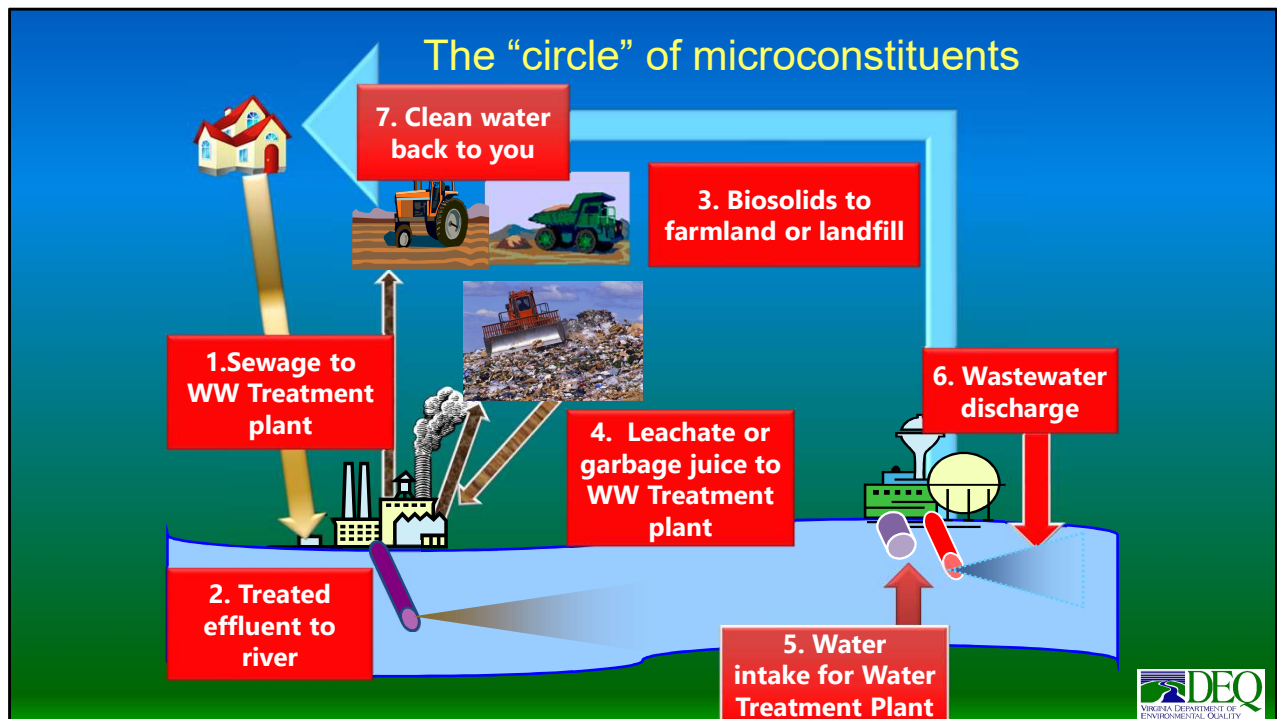
Virginia Guidance



PLEASE
do **NOT** DISPOSE of
ANY MEDICATIONS
by FLUSHING or washing
down the sink!

Don't take the chance that it
could end up in your drinking
water!

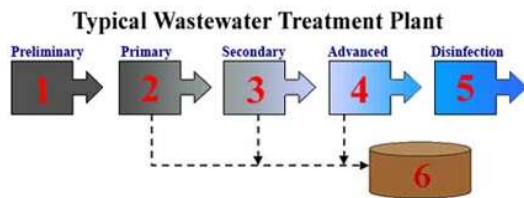
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http://www.theepochtimes.com/n3/2155348-chemicals-with-unknown-health-effects-in-americas-drinking-water/?utm_expid=21082672-11.b4WAd2xRR0ybC6ydhoAj9w.0&utm_referrer=https%3A%2F%2Fwww.google.com%2F

Chemicals With Unknown Health Effects in America's Drinking Water

Why don't Treatment Plants remove microconstituents?



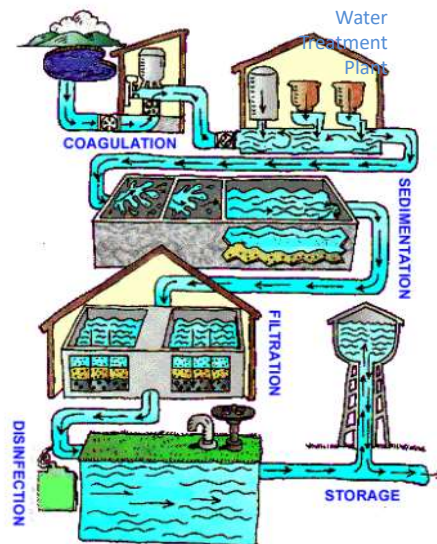
1. Preliminary Treatment — Removes debris which could damage plant equipment
2. Primary Treatment — Removes 90 - 95% of the settleable solids.
3. Secondary Treatment — Removes organic matter through biological oxidation and settling.
4. Advanced Treatment — Removes solids, nitrogen, phosphorus, and other pollutants such as color and metals.
5. Disinfection — Removes organisms which might cause disease.
6. Solids Handling — Treats the solids removed from the wastewater to allow safe and economical disposal.

<https://www.youtube.com/watch?v=A2FmNrEmowE>

All Treatment Plants have steps 1, 2 and 5.

Most Treatment Plants have steps 1, 2, 3 and 5

Many are adding step 4 to remove nutrients, which helps remove estrogenic compounds



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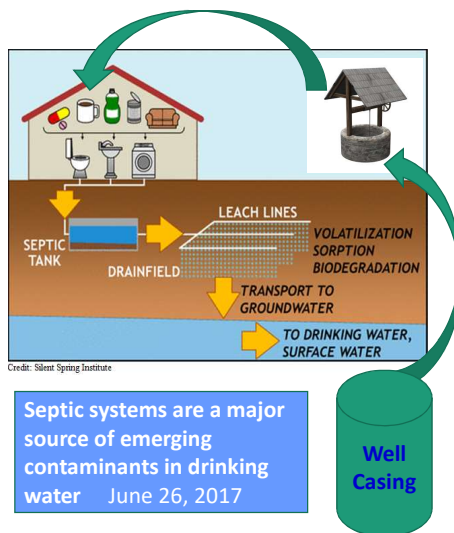
See DEQ at deq.Virginia.gov for info on Wastewater Treatment plants

<https://www.deq.virginia.gov/Programs/Water/WastewaterAssistanceTraining/WastewaterTreatment.aspx>

See Virginia Health Department for info on Water Treatment plants

<http://www.vdh.virginia.gov/drinking-water/>

What is the contribution from septic systems?



- Can do a decent job removing acetaminophen, caffeine, and alkyphenols (in cleaning products)
- Less effective removing TCEP (carcinogenic flame retardant), carbamazepine, and antibiotic sulfamethoxazole
- Contaminants can get into groundwater, which may be source of drinking water for household
- Users need to avoid household products with harmful ingredients

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<https://phys.org/news/2017-06-septic-major-source-emerging-contaminants.html>

Septic systems are a major source of emerging contaminants in drinking water

June 26, 2017

More information: Laurel A. Schaider et al, Review of Organic Wastewater Compound Concentrations and Removal in Onsite Wastewater Treatment Systems, *Environmental Science & Technology* (2017). [DOI: 10.1021/acs.est.6b04778](https://doi.org/10.1021/acs.est.6b04778)

<http://www.vdh.virginia.gov/environmental-health/onsite-sewage-water-services-updated/>

What do you contribute from personal care products (PCPs)?

In 2007, the average person used 9 PPCPs a day. Most recent number is 15 PPCPs per person per day. PPCPs include lotions, powders, soaps, gels, colognes, sprays, toothpaste, make-up, medication, etc.

Think about every product, medication or caffeine/nicotine product you used since you got up.

Read the list of ingredients – remember:



EVERYTHING GOES SOMEWHERE!

Do you need to use all of them?

Can you substitute something less toxic to the environment?

Can you reduce the antibacterial products you use and stay healthy?

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Do we need all the drugs and supplements that we take?

- Pill to sleep
- Pill to stay awake
- Pill to give energy
- Pill to calm down
- Pill to lose weight
- Pill to gain weight
- Pill to stop reproduction
- Pill to encourage fertility
- Pill for pain
- Pill for ulcer from pain pill
- Supplements and vitamins



Would changes in diet, habits, physique help instead of another pill?



Microconstituents are everywhere

ALL municipal sewage, regardless of location, will contain microconstituents. Issue is not unique to any particular municipal area.

Each geographic area will differ only with respect to the types, quantities, and relative abundances of individual contaminants.

Microconstituents can transport by air as well as by water.



Microconstituents are being found in all tested waterways, and are usually 'present' in drinking tap water and bottled water.

'Present' does not mean they are harmful.

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Antibacterial Soaps

- Often contain triclosan (liquid soaps) and triclocarban (bar soaps)— synthetic anti-microbial agent and EPA registered pesticide



Microsoft Word Document



- Not any more effective than soap and water for washing hands



By Sept 6, 2017, hand soaps with triclosan and triclocarban for home use should be removed from shelves



- Use in health care allowed but discouraged
- Most triclosan passes through wastewater treatment plants or ends up in the sludge - very persistent and toxic to marine life.
- May contribute to development of mutant bacteria that are antibiotic resistant.
Discourage use in residential and public areas where possible.

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<https://s3.amazonaws.com/public-inspection.federalregister.gov/2016-21337.pdf>

Accordingly, this final rule covers only OTC consumer antiseptic washes that are intended for use as either a hand wash or a body wash, and does not cover health care antiseptics (80 FR 25166), consumer antiseptic rubs (81 FR 42912), antiseptics identified as "first aid antiseptics" in the 1991 First Aid TFM (56 FR 33644), or antiseptics used by the food industry.

<https://www.beyondpesticides.org/programs/antibacterials/triclosan/products-containing-triclosan>

<https://www.cheatsheet.com/health-fitness/everyday-products-that-contain-triclosan-ingredient-causing-antibiotic-resistance.html/>

<https://s3.amazonaws.com/public-inspection.federalregister.gov/2016-21337.pdf>

https://ehp.niehs.nih.gov/ehp1788/?mc_cid=155344e274&mc_eid=4a6aa19860

In September 2016, the U.S. Food and Drug Administration (FDA) banned nineteen antimicrobial ingredients, including triclosan and triclocarban, in over-the-counter consumer antiseptic wash products based on insufficient evidence demonstrating their safety for long-term daily use and that they reduce the spread of illness and infection.

[https://www.technologynetworks.com/applied-sciences/news/excessive-hygiene-promotes-antibiotic-resistance-](https://www.technologynetworks.com/applied-sciences/news/excessive-hygiene-promotes-antibiotic-resistance-316731?utm_campaign=NEWSLETTER_TN_Environmental%20Analysis&utm_source=hs_email&utm_medium=email&utm_content=70865191&hsenc=p2ANqtz-CJ-lqSEb9hjL4lfcpUHmmKiq2jIMtHCd90wFKfhqwd4thr2IFCgAR1JD2Y_p9d9H33olv5oaqAjj1rKdsqmFR)

[316731?utm_campaign=NEWSLETTER_TN_Environmental%20Analysis&utm_source=hs_email&utm_medium=email&utm_content=70865191&hsenc=p2ANqtz-CJ-lqSEb9hjL4lfcpUHmmKiq2jIMtHCd90wFKfhqwd4thr2IFCgAR1JD2Y_p9d9H33olv5oaqAjj1rKdsqmFR](https://www.technologynetworks.com/applied-sciences/news/excessive-hygiene-promotes-antibiotic-resistance-316731?utm_campaign=NEWSLETTER_TN_Environmental%20Analysis&utm_source=hs_email&utm_medium=email&utm_content=70865191&hsenc=p2ANqtz-CJ-lqSEb9hjL4lfcpUHmmKiq2jIMtHCd90wFKfhqwd4thr2IFCgAR1JD2Y_p9d9H33olv5oaqAjj1rKdsqmFR)

[GaEclAln5B08wO-h98OXA89TME4& hsmi=70865193](#)

Bis-Phenol A, or BPA

- Used in clear, hard plastics (polycarbonate plastic and epoxy resins) since 1957.

All 3's



Some 7's



- Has weak but detectable hormone-like properties
- Some states looking at laws to prohibit BPA from being used in baby bottles and products. Some manufacturers making substitutions now.
- *Removal of BPA for food and drink applications is difficult. Replacement product must be corrosion resistant, withstand high temps used for sterilization and processing, and be chemically compatible with foods, and not add odor or taste.*
- Reduce exposure by using glass baby bottles, stainless water bottles, food products not in cans.

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<http://healthland.time.com/2012/02/24/study-bpa-may-be-linked-with-heart-disease/>

http://www.sciencenews.org/view/generic/id/338202/title/BPA_fosters_diabetes-promoting_changes

<http://www.columbiamissourian.com/stories/2012/01/31/mus-frederick-vom-saal-wants-fda-ban-bpa-endocrine-disruptors/>

BP-A sources

- **Canned foods and drinks**
- **Reusable water bottles** (Polycarbonate plastic #7, or “PC”)
 - Note: Most water and sodas are in flexible, clear plastic bottles made of polyethylene terephthalate, or PET – no BPA.
 - Plastics with #1, 2, 4, or 5 do not contain BPA either
- **Canned sodas and beer**
- **Fast food**, particularly burgers
- **Carbonless register receipts** – BPA absorbed through skin, inhaled, or ingested

BP-A and the 50+ “relatives” - BPS, BPF, BPAF, BPZ, BPP, BHPF, and the list goes on

- BP-A can be substituted with BP-S (bisphenol-S) or BHPF (Fluorene-9-bisphenol) – no real difference in toxicity
- **Public Health term: “Regrettable substitution”** – replacement of one harmful chemical by another possibly equally or more harmful chemical
- Endocrine disruptors – affect fertility in men and women, can affect growth and development, cause obesity, diabetes

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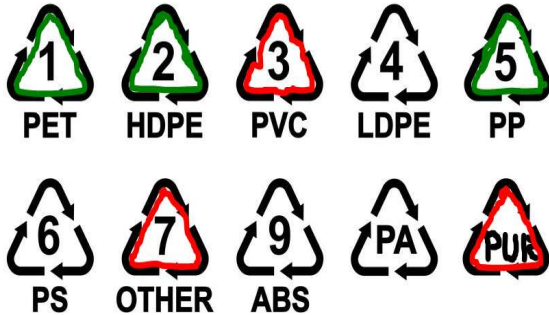
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<https://www.sciencemag.org/news/2018/09/bpa-substitutes-may-be-just-bad-popular-consumer-plastic>

<https://www.nationalgeographic.com/science/2018/09/news-BPA-free-plastic-safety-chemicals-health/>

Plastic recycling hints

Pinpointing harmful plastics



- **#3, PVC and PUR** – polyurethane are the most toxic of the plastics.
- **#7 is next worst**, since the components are unknown
- Only **recycle #1, #2, or #5** plastics
- Trash black plastic – made from recycled electronic waste. It can't be recycled again.

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https://www.mnn.com/lifestyle/responsible-living/stories/chemicals-consumer-plastics-dangerous-confusing?utm_source=Weekly+Newsletter&utm_campaign=6a319fe97a-RSS_EMAIL_CAMPAIGN_FRI0920_2019&utm_medium=email&utm_term=0_fcbff2e256-6a319fe97a-42469305

<https://www.wbur.org/hereandnow/2019/09/20/how-to-recycle-plastic>

Exposing The Myth Of Plastic Recycling: Why A Majority Is Burned Or Thrown In A Landfill¹⁰

Phthalate – the everywhere chemical!

- Phthalates are a group of chemicals used in:

- soft plastic toys for babies, pets, adults
- vinyl flooring and wall covering
- “new car smell”
- detergents
- lubricating oils
- **food packaging**
- pharmaceuticals
- blood bags and tubing
- in about 75% of personal care products
such as cosmetics, fragrances, nail polish,
hair sprays, soaps, and shampoos.



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<https://www.studyfinds.org/chronic-disease-phthalates-chemicals-men/>

Common Household Chemicals Linked To Chronic Disease In Men, Study Finds

“We found that the prevalence of cardiovascular disease, type-2 diabetes and high blood pressure increased among those men with higher phthalate levels,” says Shi, an associate professor at the Adelaide Medical School and the Freemasons Foundation Centre for Men’s Health, in a [university press release](#).

“Importantly, while 82% of the men we tested were overweight or obese – conditions known to be associated with chronic diseases – when we adjusted for this in our study, the significant association between high levels of phthalates and disease was not substantially altered,” adds Shi.

Previous research found that men who frequently ate processed foods, drank sodas, and consumed fewer fruits and vegetables showed higher levels phthalates.

New car smell - "The smell is mostly organic compounds in the vehicle off-gassing.

Anything that is vinyl or plastic—the foam lamination on the seat surface, the plastic on the dash or on the door panel—it's the volatile organic compounds (VOCs) coming out of them that causes that smell."

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4708138/>

Phthalates and Human Health

- Exposure is through
 - Ingestion of food or drink that is in containers containing phthalates
 - Inhalation of dust from items containing phthalates
 - Skin contact with products made with phthalates
- Once in the body, they are converted into metabolites that exit in urine
- Women have higher levels of phthalates than men
- May affect reproduction or development (endocrine disruptor)
- Wash hands well after handling
- Avoid products with phthalates where possible

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<https://toxtown.nlm.nih.gov/chemicals-and-contaminants/phthalates#what-are-they>

Phthalates

- Alters development of reproductive tract, mostly with males – can cause deformity and affect fertility – possible carcinogen. Exposure during fetal development and puberty can help cause an array of complications like genital birth defects, infertility, asthma, and lower IQ
- Correlation of higher levels of phthalates with cardiovascular disease, type-2 diabetes, and high blood pressure for males
- DEHP - diethylhexyl phthalate is a plasticizer used to soften PVC (EU prohibits DEHP at levels greater than 0.1% by weight) <https://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=377&tid=65>
- Used in IV bags, tubing, blood collection machines. Red Cross is buying some DEHP-free equipment with attrition. For DEHP free equipment sources <http://www.noharm.org/>
- Blood bags with DEHP should not be used with infants or children with compromised immunities
- FDA urges alternatives, like ethylene vinyl acetate (EVA) bags which are available except for packed red blood cells

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http://www.noharm.org/europe/issues/toxins/pvc_phthalates/policies.php
Advocacy group – Health Care Without Harm supports/lists hospitals who are DEHP free
www.noharm.org

<http://cen.acs.org/articles/95/i26/European-Union-further-restricts-four.html>

Volume 95 Issue 26 | p. 15 | News of The Week

Issue Date: June 26, 2017

European Union further restricts four phthalates

<http://www.environmentalhealthnews.org/ehs/news/2017/march/pregnant-women2019s-sex-hormones-waver-with-phthalate-exposure>

Pregnant women's sex hormones waver with phthalate exposure

Women exposed to certain chemicals in flooring and food packaging early in pregnancy are more likely to have decreased free testosterone—hormones vital for fetal growth, according to a new study.

Estrogen and testosterone drive a fetus' genital development the first five to 18 weeks of a pregnancy. Altered levels of the sex hormones can lead to abnormalities in a baby's genitals. While the study doesn't prove phthalates in pregnant women lead to genital

problems in babies, it suggests that the ubiquitous chemicals may impact fetal growth.

<https://gizmodo.com/many-restaurant-meals-come-with-a-side-of-hormone-disru-1824159127>

Phthalate reductions/removals

- Some manufacturers taking phthalates out of products due to customer complaints: Avon, Johnson & Johnson, S.C. Johnson, Estee Lauder, Revlon, Unilever, Disney.
- Check here to see if phthalates are in products:
<http://www.ewg.org/skindeep/>
- *Phthalates Action Plan Summary*. US Environmental Protection Agency. Rulemaking 2012
https://www.epa.gov/sites/production/files/2015-09/documents/phthalates_actionplan_revised_2012-03-14.pdf
- DEHP is tested for at public water supplies and regulated under the Safe Drinking Water Act

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<https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-management-phthalates>

https://www.cdc.gov/biomonitoring/Phthalates_FactSheet.html

<https://www.hindawi.com/journals/tswj/2012/615068/>

https://www.niehs.nih.gov/research/supported/assets/docs/j_q/phthalates_the_everywhere_chemical_handout_508.pdf

DEHP - <https://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=377&tid=65>

PFAs, per- and polyfluoroalkyl substances

EPA health advisory of 0.07 µg/l – no plans to change the advisory. No MCL (maximum contaminant level) for drinking water, not listed as a haz waste, with CERCLA or RCRA.

<https://www.amwa.net/article/epa-outlines-path-forward-pfas>

Some states adopting more stringent endpoints. See IRTC (Interstate Technology and Regulatory Council) website - <https://pfas-1.itrcweb.org/fact-sheets/>

Table 4-1 presents the available PFAS water values, Table 4-2 has soil values established by the USEPA, each pertinent state, or country (Australia, Canada and Western European countries)



Table 5-1 summarizes the differences in the PFOA values, Table 5-2 summarizes the differences in the PFOS values for drinking water in the United States.



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<https://pfas-1.itrcweb.org/fact-sheets/>

<https://www.propublica.org/article/how-the-epa-and-the-pentagon-downplayed-toxic-pfas-chemicals>

[EPA Releases Updated PFAS Analytical Method](#) (ASDWA, Nov. 21)

EPA has updated its validated Method 537.1 to test for an additional four PFAS in drinking water, including the GenX chemical, hexafluoropropylene oxide dimer acid.

[Health goal for GenX in drinking water could be reduced; EPA accepting public comment on draft toxicity report](#) (NCPolicyWatch, Nov. 19)

The basis for the potential switch is the EPA's draft report proposing a chronic reference dose for GenX that translates to a health goal of 110 parts per trillion in drinking water.

[EPA Publishes Draft PFAS Toxicity Assessments for PFBS and GenX](#) (ASDWA, Nov. 16)

On Wednesday, November 14, 2018, EPA published its Draft PFAS Toxicity Assessments for PFBS and GenX for public comment

PFAS – the “Forever Chemicals”

Per- and polyfluoroalkyl substances – used to make water-, grease- and stain-repellent coatings

Teflon introduced in 1946, PFOA used by Dupont to make Teflon, PFOS used by 3M to make Scotchgard. Manufacture, use and importation of both effectively banned in the US

DuPont no longer makes or uses PFOA – however, Chemours (spin-off of DuPont) makes a replacement called Gen-X

Exposure can cause

- Testicular, kidney, liver and pancreatic cancer
- Increased cholesterol
- Harmful effect to developing fetus or breastfeeding infant
- Low infant birth weights
- Effects on immune system and thyroid
- Weight gain in humans

PFAS chemicals are persistent - remain in body and environment for decades

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<https://pfas-1.itrcweb.org/fact-sheets/>

<https://www.propublica.org/article/how-the-epa-and-the-pentagon-downplayed-toxic-pfas-chemicals>

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EPA Allowed Companies to Make 40 New PFAS Chemicals Despite Serious Risks -
<https://theintercept.com/2019/09/19/epa-new-pfas-chemicals/>

Products containing PFAS or PFOS

- Some grease-resistant paper, fast food containers/wrappers, microwave popcorn bags, pizza boxes, and candy wrappers
- Nonstick cookware
- Stain resistant coatings used on carpets, upholstery, and other fabrics
- Water resistant clothing
- Cleaning products
- Personal care products (shampoo, dental floss) and cosmetics (nail polish, eye makeup)
- Paints, varnishes, and sealants
- Firefighter turnout gear, firefighting foams

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<https://www.atsdr.cdc.gov/pfas/pfas-exposure.html>

<https://www.cbsnews.com/news/firefighters-battle-occupational-cancer/>
<https://www.nbcboston.com/news/local/Chemical-in-Firefighter-Turnout-Gear-Eyed-As-Potential-Cancer-Agent-494194661.html>

<https://ensia.com/features/agricultural-waste/>

https://www.globalcitizen.org/en/content/mushroom-fungi-packaging-ikea-decompose-ecovative/?fbclid=IwAR2YzJhzKJ9VheD3cHGzD1rv1alzjtxB5sBgA4uhzmJ_dboNe1vqleMarMA

Oldies but goodies – and NO PFOA!

Best if pans
were made
1939-1968



Newer Revere Ware does not have a
circle or reference to a patent



Cast Iron Cookware – No PFOA!



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PFAS Exposure Routes

- Drinking contaminated municipal water or private well water
- Eating fish caught from water contaminated by PFAS (PFOS, in particular)
- Accidentally swallowing contaminated soil or dust
- Eating food that was packaged in material that contains PFAS
- Using some consumer products such as non-stick cookware, stain resistant carpeting, and water repellant clothing.

Note: Only small amount PFAs can get through skin. Showering, bathing, washing dishes should not increase exposure.

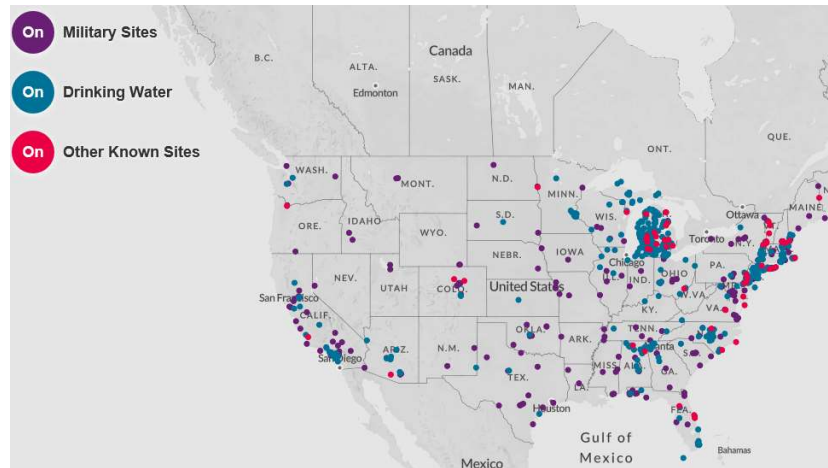
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<https://www.atsdr.cdc.gov/pfas/pfas-exposure.html>

<https://www.mnn.com/food/healthy-eating/questions/whats-the-safest-cookware>

PFAS Contamination in the USA

- DOD report on military bases with PFAs and PFOS issues – https://partner-mco-archive.s3.amazonaws.com/client_files/1524589484.pdf
- Virginia - Langley-Ft. Eustis, NAS Oceana
NALF Fentress, Norfolk Navy Base



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<https://theintercept.com/2018/10/06/dupont-pfas-chemicals-lawsuit/>-
<https://www.nbcoston.com/news/local/Chemical-in-Firefighter-Turnout-Gear-Eyed-As-Potential-Cancer-Agent-494194661.html>
<https://www.militarytimes.com/news/your-military/2018/06/08/dod-explains-whats-being-done-about-water-contamination-on-bases/>

Interactive map showing PFAS contamination in the US:

https://www.ewg.org/interactive-maps/2019_pfas_contamination/map/?_gl=1*7348rl*_gcl_aw*R0NMLjE1Njk0MjEzNjc1RUFJYUIRb2JDdE1JaGNqT2o1VHM1QUIWRFhpR0NoMFJNZ2s4RUFBWUFTQUFFZ0lPRXZEX0J3RQ..&_ga=2.87681944.1449900007.1569421367-532331371.1568742600&_gac=1.45343760.1569421367.EAlaIQobChMIhCjOj5Ts5AlVDXiGCh0RMgk8EAAYASAAEgIOEvD_BwE



Fire Retardants



- PBDEs – Poly-brominated diphenyl ethers (or BDEs), commonly referred to as penta, octa and deca (i.e. penta-brominated diphenyl ether) considered Persistent Organic Pollutants (POPs)
- Used in furniture, carpets, vehicles, electronics - Showing up in sediment, water and air
- PBDEs leaching out of products and get in blood – can cause thyroid problems, developmental problems, carcinogenic
- Penta and Octa forms have been phased out – deca still used
- Organophosphate substitutes (TDCIPP and TPHP) showing up in blood too. May cause fertility problems, and linked to poorer cognitive function in children. [tris \(1,3-dichloro-2-propyl\) phosphate \(TDCPP\)](#).
- New substitute products should be thoroughly tested prior to marketing to make sure that they are safe.

DEQ

<http://www.dailymail.co.uk/sciencetech/article-4258126/High-levels-flame-retardants-indoor-cats.html>

Indoor cats have high levels of brominated flame retardants in their blood. These chemicals are added to furniture and electronics to prevent them from igniting. They become part of house hold dust and can have negative health effects These flame retardants have been associated with feline hyperthyroidism The researchers say that the results are interesting because small children have similar exposure levels to the chemicals as these cats

Read more: <http://www.dailymail.co.uk/sciencetech/article-4258126/High-levels-flame-retardants-indoor-cats.html>

<http://www.environmentalhealthnews.org/ehs/news/2016/dec/flame-retardants-and-car-seats-still-a-thing>

<http://www.lcnewschronicle.com/news/4171016-commission-urges-action-toxic-flame-retardant-great-lakes-region>

<https://community.nfpa.org/community/conference-expo/blog/2016/06/13/toxic-chemical-fire-retardants-discussed-at-nfpa-ce>

<http://www.northcarolinahealthnews.org/2016/09/23/tutoring-the-textile-industry-on-risky-flame-retardants/>

<http://www.environmentalhealthnews.org> and search for topic of interest.

http://news.xinhuanet.com/english/2017-03/10/c_136117072.htm

Fire retardants

- PBDEs are used in cell phones, remote controls, personal computers, computer monitors, textiles, electronics, cabinets and enclosures for electronics, foam cushioning, foam-based packaging materials, upholstery, carpet padding, paint products, and adhesives
- Exposure through
 - Ingestion – eating contaminated food or water
 - Inhalation – breathing air or dust with PBDE emissions
 - Skin contact – touching items containing PBDEs
- Concerns – endocrine disruptor, may cause liver, thyroid and neurodevelopmental dysfunction. Accumulates in body.
- Children and pets have more exposure

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<https://toxtown.nlm.nih.gov/chemicals-and-contaminants/polybrominated-diphenyl-ethers-pbdes>

Feeling Blue?

48

<https://www.sciencenews.org/article/suds-turn-silver-nanoparticles-clothes-duds>
Athletic clothing and hospital gown containing silver for antibacterial purposes lose coating with bleach detergents

<http://www.mayoclinic.org/healthy-lifestyle/consumer-health/expert-answers/colloidal-silver/faq-20058061>

<https://www.purestcolloids.com/blue-man.php>
– claims colloidal silver not at fault

Argyria from silver ingestion

- Paul Karason started turning blue 15 years after he began ingesting silver-based prep and colloidal silver to self-medicate a skin condition. Stan Jones, bottom right
- **Argyria** (ahr-JIR-e-uh), a blue-gray discoloration of your skin, eyes, internal organs, nails and gums. While argyria doesn't pose a serious health problem, it can be a cosmetic concern because it doesn't go away when you stop taking silver products.
- Currently no FDA approved oral OTC or prescription drugs containing silver.
- <https://nccih.nih.gov/health/silver>



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<http://abcnews.go.com/Health/internet-sensation-papa-smurf-dies-blue-people-live/story?id=20368758>

<http://www.webmd.com/vitamins-supplements/ingredientmono-779-colloidal%20silver.aspx?activeingredientid=779&activeingredientname=colloidal%20silver>

Silver as Antibacterial Silver

- The Silver Institute promotes silver in medical supplies as biocide, in water purification systems, pools and spas (<https://www.silverinstitute.org/site/>)
- Silver or triclosan treated clothing for “anti-odor” and “anti-bacterial” purposes will release coatings with bleach detergents (~25% after 2 washes, up to 50% with more washes), discharging to sewers → POTWs → state waters. **Bacteria mutate to survive, becoming more antibiotic resistant.**
- **The Mayo Clinic** – Colloidal silver isn't considered safe or effective for any of the health claims manufacturers make. Silver has no known purpose in the body, nor is it an essential mineral, as some sellers of silver products claim.
- 3/25/15 EPA requires registration under pesticide law of products containing nanoscale (smaller than 1 micrometer) silver designed to control microbes.

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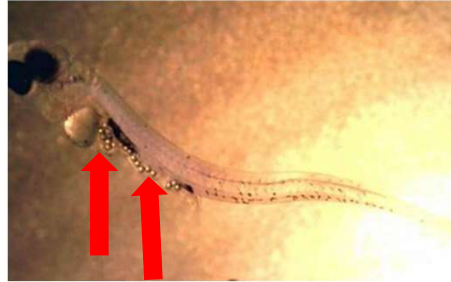
<https://www.sciencenews.org/article/suds-turn-silver-nanoparticles-clothes-duds>
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<https://www.purestcolloids.com/blue-man.php>
– claims colloidal silver not at fault

Microbeads

- Plastics disintegrate in the oceans and are ingested by aquatic organisms
- Many PCPs contained microbeads like exfoliates, body washes, toothpastes
- Seafood eating humans ingest up to 11,000 tiny pieces of plastic every year
- **2017 – illegal to sell a PCP with plastic microbeads**



Larval perch with plastic beads

Next issue is glitter, small pieces of plastic

DEQ

<http://www.telegraph.co.uk/science/2017/01/24/seafood-eaters-ingest-11000-tiny-pieces-plastic-every-year-study/>

<https://skyoceanrescue.com/>

<http://storyofstuff.org/plastic-microbeads-ban-the-bead/>

https://www.mnn.com/food/healthy-eating/blogs/how-much-plastic-do-you-consume-every-day?utm_source=Weekly+Newsletter&utm_campaign=e4d06372d1-

[RSS_EMAIL_CAMPAIGN_MON0610_2019&utm_medium=email&utm_term=0_fcbff2e256-e4d06372d1-42469305](https://www.mnn.com/food/healthy-eating/blogs/how-much-plastic-do-you-consume-every-day?utm_source=Weekly+Newsletter&utm_campaign=e4d06372d1-RSS_EMAIL_CAMPAIGN_MON0610_2019&utm_medium=email&utm_term=0_fcbff2e256-e4d06372d1-42469305)

<https://www.cbc.ca/radio/quirks/april-7-2018-microplastics-contaminate-land-a-four-eyed-lizard-dark-matter-goes-missing-1.4607807/scientists-worry-microplastics-found-on-farmers-fields-could-end-up-in-our-food-1.4607830>

Microplastics and Microfibers

- Microfibers are made of plastic and chemical covered non-plastics
- Breaking off clothes in the water, discharged through drain water
- One fleece jacket could shed 250,000 pieces of fibers/wash

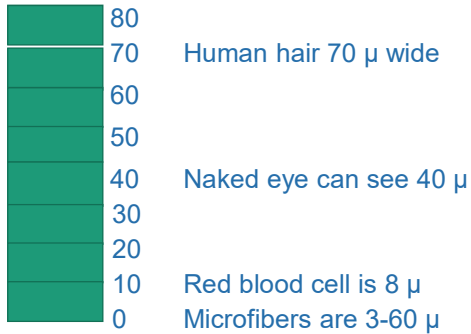


Photo shows a 3 mm (0.1 in) section of microfibers filtered from drain water of standard load of laundry magnified 120 X

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<http://www.telegraph.co.uk/science/2017/01/24/seafood-eaters-ingest-11000-tiny-pieces-plastic-every-year-study/>

<https://skyoceanrescue.com/>

<http://storyofstuff.org/plastic-microbeads-ban-the-bead/>

<http://rozaliaproject.org/stop-microfiber-pollution/>

http://time.com/5581326/plastic-particles-in-bottled-water/?fbclid=IwAR0wuzcrVOMKUIBukTpL_62PXT_DbrU2B-fUc64oNyYNUb9rq6ZRu27di40



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<http://www.telegraph.co.uk/science/2017/01/24/seafood-eaters-ingest-11000-tiny-pieces-plastic-every-year-study/>

<https://skyoceanrescue.com/>

<http://storyofstuff.org/plastic-microbeads-ban-the-bead/>

<http://rozaliaproject.org/stop-microfiber-pollution/>

Virginia.gov Online Services | Agencies Search Virginia.Gov

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Programs | Water | Permitting & Compliance | Pollution Discharge Elimination | Microconstituents

Microconstituents in the Environment - Links

Virginia Department of Environmental Quality
P.O. Box 1105
Richmond, VA 23218

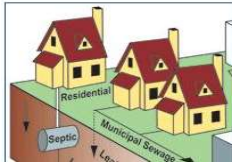
Contact Us:
1-(804) 695-4000
1-800-592-5482 (Toll Free in VA)

View Department of Environmental Quality Expenses 

Microconstituents in the Environment

Overview

Studies have shown that our nation's waters contain a broad range of chemicals and compounds that can cause ecological harm. As analytical test procedures continue to measure compounds in smaller and smaller concentrations, additional compounds are being identified in our waters. These products include both human and veterinary drugs, antibiotics, fragrances and cosmetics, soaps, fire retardants, pesticides and plasticizers (compounds which are used in a wide array of plastic products ranging from plastic bottles and eye glasses to sport safety equipment).



Most of the products and compounds that

Fact Sheets

DISPOSAL OF HOME PHARMACEUTICALS FLYERS

English
Español
Chinese
German

Information on collection events for Unwanted/Expired Home Pharmaceuticals and Collection Sites is in the hyperlink below:

[Collection Events and Collection Sites](#)

<http://www.deq.virginia.gov/programs/water/permittingcompliance/pollutiondischargeelimination/microconstituents.aspx>

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Annie Leonard video series: <http://www.storyofstuff.com/>

The Story of Electronics, The Story of Stuff, The Story of Cap & Trade, The Story of Bottled Water, etc.

🚩 Site to check for news articles on the subject worldwide

<http://www.environmentalhealthnews.org/>

🚩 The Association of State Drinking Water Administrators (ASDWA) www.asdwa.org

🚩 Pharmacy waste list server

<http://lists.dep.state.fl.us/cgi-bin/mailman/listinfo/pharmwaste>

🚩 USGS Emerging Contaminant Project site

<http://toxics.usgs.gov/regional/emc/>

🚩 <http://toxics.usgs.gov/regional/emc/index.html> USGS Emerging Contaminants

🚩 Health Care without Harm - <http://www.noharm.org>

🚩 The Poseidon Report – Study on effectiveness of wastewater technologies on PPCPs in WW and DW – May 06

<http://poseidon.bafg.de/servlet/is/2884/>

🚩 WHO Working Group on Pharmaceuticals in Drinking Water

<http://water.epa.gov/scitech/swguidance/ppcp/who.cfm>