

Virginia Department of Health, Office of Drinking Water
Source Water Assessment Program Typical Contaminants Compendium (Rev. December 2015)

Land Use	Typical Contaminants ^{1,2,3}	Contaminant Types
COMMERCIAL / INDUSTRIAL		
Auction lots	Livestock sewage wastes; nitrates; phosphates; coliform and noncoliform bacteria; giardia, viruses; total dissolved solids	Inorganics
Automotive Body shops/repair shops	Waste oils; solvents; acids; paints; automotive wastes ⁴ ; miscellaneous cutting oils	Inorganics, SOCs, VOCs
Car washes	Soaps; detergents, waxes; miscellaneous chemicals	
Gas stations	oils; solvents; gasoline, diesel, miscellaneous wastes, lead	
Boat Services/repair/refinishing	Diesel fuels; oil; septage from boat waste disposal area; wood preservative and treatment chemicals; paints; waxes; varnishes; automotive wastes ⁴	Inorganics, SOCs, VOCs
Cement / concrete plants	Diesel fuels; solvents; oils; miscellaneous wastes	Inorganics, SOCs, VOCs
Dry cleaners	Solvents (perchloroethylene, petroleum solvents, Freon); spotting chemicals (trichloroethane, methyl chloroform, ammonia, peroxides, hydrochloric acid, rust removers, amyl acetate)	VOCs
Electrical/electronic manufacturing	Cyanides; metal sludges; caustic (chromic acid); solvents; oils; alkalis; acids; paints and paint sludges; calcium fluoride sludges; methylene chloride; perchloroethylene; trichloroethane; acetone; methanol; toluene; PCBs	Inorganics, SOCs, VOCs
Food processing / Animal Slaughtering	Nitrates; salts; phosphorus; miscellaneous food wastes; chlorine; ammonia; ethylene glycol	Inorganics, Microbial, VOCs, SOCs
Funeral homes and Mortuaries	External corporeal wash water, internal body fluids, as well as residual arterial embalming chemicals (formaldehyde, phenol, and methanol)	Inorganics, Microbial, SOCs, VOCs
Furniture repair/manufacturing	Paints; solvents; degreasing and solvent recovery sludges; lacquers; sealants	Inorganics, SOCs, VOCs
Hardware/lumber/parts stores	Hazardous chemical products in inventories; heating oil and fork lift fuel from storage tanks; wood-staining and treating products such as creosote; paints; thinners; lacquers; varnishes	Inorganics, SOCs, VOCs
Home manufacturing	Solvents; paints; glues and other adhesives; waste insulation; lacquers; tars; sealants; epoxy wastes; miscellaneous chemical wastes	Inorganics, SOCs, VOCs
Hospitals/Research laboratories	X-ray developers and fixers ⁸ ; infectious wastes; radiological biological wastes, disinfectants; asbestos; beryllium; solvents; infectious materials; drugs; disinfectants; (quaternary ammonia, hexachlorophene, peroxides, chlorhexidine, bleach); and miscellaneous chemical wastes.	Inorganics, Microbial, RADs, SOCs, VOCs
Junk/scrap/salvage yards	Automotive wastes ⁴ ; PCB contaminated wastes; any wastes from businesses ⁶ and households ⁷ ; oils; lead	Inorganics, SOCs, VOCs
Machine shops	Solvents; metals; miscellaneous organics; sludges; oily metal shavings; lubricant and cutting oils; degreasers (tetrachloroethylene); metal marking fluids; mold-release agents	Inorganics, SOCs, VOCs
Medical/vet offices	X-ray developers and fixers ⁸ ; infectious wastes; radiological wastes; biological wastes; disinfectants; asbestos; beryllium; dental acids; variable miscellaneous chemicals	Inorganics, Microbial, RADs, SOCs, VOCs
Metal plating/finishing/ fabricating	Sodium and hydrogen cyanide; metallic salts; hydrochloric acid; sulfuric acid; chromic acid; boric acid; paint wastes; heavy metals; plating wastes; oils; solvents	Inorganics, SOCs, VOCs
Military installations	Wide variety of hazardous and nonhazardous wastes depending on the nature of the facility and operation ⁹ ; diesel fuels; jet fuels; solvents; paints; waste oils; heavy metals; radioactive wastes	Inorganics, RADs, SOCs, VOCs

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Office buildings/complexes	Building wastes ⁶ ; lawn and garden maintenance chemicals ⁵ ; gasoline; motor oil	Inorganics, SOC, VOCs
Parking lots/malls	Hydrocarbons; heavy metals; building wastes ⁶	Inorganics, SOC, VOCs
Pharmaceutical	TSS, oil & grease, fecal coliform, volatile organic compounds, nonconventional pollutants.	Microbial, SOC, VOCs
Photo processing, print shop	Ethanol, isopropanol, ethylene glycol, xylene, toluene, cyclohexanone, petroleum products, volatile organic compounds, lead, chromium, silver, cadmium, and barium,	Inorganics, SOC, VOCs
Textiles	Scouring alkali waste, oils, surfactants, lubricants, dye, bleaching (hydrogen peroxide, sodium hypochlorite, sodium chlorite, sulfur dioxide), caustic soda, salts	Inorganics, SOC
Wood preserving/treating	Wood preservatives; creosote, pentachlorophenol, arsenic, dioxin.	Dioxin, Inorganics, SOC
Wood/pulp/paper processing and mills	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals ⁹ ; organic sludges; sodium hydroxide; chlorine; hypochlorite; chlorine dioxide; hydrogen peroxide; treated wood residue (copper quinolate, mercury, sodium azide); tanner gas; paint sludges; solvents; creosote; coating and gluing wastes, dioxin.	Dioxin, Inorganics, SOC
Chemical Processing / Storage		
Above/Below ground storage tanks	Heating oil; diesel fuel; gasoline; other chemicals	Inorganics, SOC, VOCs
Chemical/petroleum processing/storage	Hazardous chemicals; solvents; hydrocarbons; heavy metals; asphalt	Inorganics, SOC, VOCs
Coal Gasification Facility	Gas loss, leaching of residual products found in ash residue in the spent gasification cavity (calcium, sodium, sulfate, bicarbonate, metals), condensed liquids (BTEX, phenolic compounds, Polycyclic aromatic hydrocarbons (PAHs) and heterocyclic compounds.	Inorganics, SOC, VOCs
Pesticide / Herbicide / Fertilizer Manufacture / Distribution / Storage	Wide variety of hazardous and nonhazardous wastes depending on the nature of the facility.	Inorganics, SOC, VOCs
Plastics/synthetics producers	Solvents; oils; miscellaneous organic and inorganics (phenols, resins); paint wastes; cyanides; acids; alkalis; wastewater treatment sludges; cellulose esters; surfactant; glycols; phenols; formaldehyde; peroxides; etc.	Inorganics, SOC, VOCs
Disposal		
Solid Waste Collection / Transfer Site	Wide variety of contaminants depending on the historical use. Anthropogenic waste (toxic metals, hydrocarbons, chlorinated hydrocarbons, surfactant-derived compounds, phthalates, pharmaceutical chemicals. Biological waste (ammonia, dissolved organic carbon, aliphatic compounds, phenols, derivatives of abietic acid)	Inorganics, Microbial, SOC, VOCs
Hazardous Waste Recovery Facility / Waste Transfer / Storage / Disposal and Superfund Sites	Wide variety of contaminants depending on historical use.	Inorganics, Microbial, RADs, SOC, VOCs
Resource Extraction		
Shale Gas extraction / Coalbed methane extractions / Tight sands hydraulic fracturing	Total dissolved solids, fracturing fluid additives: acids, biocides, gel agents, clay stabilizers, corrosion inhibitors, pH adjusting agents, scale inhibitors, surfactants; metals, naturally occurring radioactive materials.	Inorganics, RADs, SOC, VOCs
Mines/gravel pits	Mine spills or tailings that often contain metals; acids; highly corrosive mineralized waters; metal sulfides; metals; acids; minerals sulfides; other hazardous and nonhazardous chemicals ⁹	Inorganics, RADs, VOCs
NON-INDUSTRIAL		
Golf courses	Fertilizers ¹² ; herbicides ¹¹ ; pesticides for controlling mosquitoes, ticks, ants, gypsy moths, and other pests ⁵	Inorganics, SOC, VOCs
Transportation		

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Airports (maintenance/fueling areas)	Jet fuels; deicers; diesel fuel; chlorinated solvents; automotive wastes; ⁴ heating oil; building wastes ⁶	VOCs
Barge and Vessel Traffic	Fuel, miscellaneous wastes; oil; variable transported materials	Inorganics, Microbial, RADs, SOC, VOCs
Boat ramps and marinas	Gasoline, diesel, miscellaneous wastes, lead, waste oil; solvents; gasoline and diesel fuel from vehicles and storage tanks; fuel oil; other automotive wastes ⁴ ; deicing products; variable transported materials	Inorganics, SOC, VOCs
Fleet / trucking / bus terminals	Waste oil; solvents; gasoline and diesel fuel from vehicles and storage tanks; fuel oil; other automotive wastes ⁴	Inorganics, SOC, VOCs
Primary Roadways / Truck Terminals	Gasoline, diesel, miscellaneous wastes, lead, waste oil; solvents; gasoline and diesel fuel from vehicles and storage tanks; fuel oil; other automotive wastes ⁴ ; deicing products; variable transported materials	Inorganics, Microbial, RADs, SOC, VOCs
Railroad tracks / yards / maintenance / fueling areas	Diesel fuel; herbicides for rights-of-way ¹¹ ; creosote from preserving wood ties; solvents; paints; waste oils	Inorganics, Microbial, RADs, SOC, VOCs
Agriculture		
Crop and Fodder Production/ Specialty Crop Production/Nursery	Pesticides, herbicides, fertilizers, nitrates.	Inorganics, SOC, VOCs
Pasture (Grazing)/Confined Animal Feeding Operations/Aquaculture	Nutrients: nitrogen, ammonia, and phosphorus; organic matter; pathogens; parasites, bacteria, and viruses; solid matter; pesticides and hormones; antibiotics, metals	Inorganics, Microbial
Land Disposal		
Cemetery	Microbiological contaminants including <i>Staphylococcus spp.</i> , <i>Bacillus spp.</i> , <i>Enterobacteriaceae spp.</i> , fecal streptococci, <i>Clostridium spp.</i> , <i>Helicobacter pylori</i> , enteroviruses, rotavirus, calicivirus; arsenic, mercury, formaldehyde, copper, lead, zinc.	Inorganics, Microbial, SOC
Injection wells/drywells/sumps	Stormwater runoff; spilled liquids; used oils; antifreeze; gasoline; solvents; other petroleum products; pesticides ¹¹ ; and a wide variety	Inorganics, Microbial, RAD, SOC, VOCs
Landfills/dumps (active and closed)	Leachate; organic and inorganic chemical contaminants; waste from households ⁷ and businesses ⁶ ; nitrates; oils; metals; solvents; sludge	Inorganics, Microbial, SOC, VOCs
Septic systems	Nitrates; septage; Cryptosporidium; Giardia; coliform ¹⁰ and noncoliform bacteria; viruses; drain cleaners; solvents; heavy metals; synthetic detergents; cooking and motor oils; bleach; pesticides; ^{5,13} paints; paint thinner; swimming pool chemicals; ¹⁴ septic tank/cesspool cleaner chemicals ¹⁵ ; elevated levels of chloride, sulfate, calcium, magnesium, potassium, and phosphate; other household hazardous wastes ⁷	Inorganics, Microbial
Utilities		
Urban stormwater management infrastructure	TSS, pesticides and fertilizers, animal waste, metals, oil and grease/hydrocarbons, bacteria and viruses, nitrogen and phosphorus ,	Inorganics, Microbial, SOC, VOCs
Utility stations/maintenance areas	PCBs from transformers and capacitors; oils; solvents; sludges; acid solution; metal plating solutions (chromium, nickel, cadmium); herbicides from utility rights-of-way	Dioxin, SOC
Wastewater treatment facilities	Municipal wastewater; sludge ¹⁶ ; treatment chemicals ¹⁷ ; nitrates; heavy metals; coliform ¹⁰ and noncoliform bacteria; nonhazardous wastes ¹⁶	Inorganics, Microbial, SOC, VOCs

NOTES

¹ This table lists the most common wastes, but not all potential wastes. For example, it is not possible to list all potential contaminants contained in stormwater runoff or from military installations.

² In general, water contamination stems from the misuse and improper disposal of liquid and solid wastes; the illegal dumping or abandonment of household, commercial, or industrial chemicals; the accidental spilling of chemicals from trucks, railways, aircraft, handling facilities, and storage tanks; or the improper siting, design, construction, operation, or maintenance of agricultural, residential, municipal, commercial, and industrial

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drinking water wells and liquid and solid waste disposal facilities. Contaminants also can stem from atmospheric pollutants, such as airborne sulfur and nitrogen compounds, which are created by smoke, flue dust, aerosols, and automobile emissions, fall as acid rain, and percolate through the soil. When the contaminants list in this table are used and managed properly, environmental contamination is not likely to occur.

³ Contaminants can reach water bodies from activities occurring on the land surface, such as industrial waste storage; from sources below the land surface but above the water table, such as septic systems; from structures beneath the water table, such as wells; or from contaminated recharge water.

⁴Automobile wastes can include gasoline; antifreeze; automatic transmission fluid; battery acid; engine and radiator flushes; engine and metal degreasers; hydraulic (brake) fluid; and motor oils.

⁵ Common pesticides used for lawn and garden maintenance (i.e., weed killers, and mite, grub, and aphid controls) include such chemicals as 2,4-D; chlorpyrifos; diazinon; benomyl; captan; dicofol; and methoxychlor.

⁶ Common wastes from public and commercial buildings include automotive wastes; and residues from cleaning products that may contain chemicals such as xlenols, glycol esters, isopropanol, 1,1,1-trichloroethane, sulfonates, chlorinated phenols, and cresols.

⁷ Household hazardous wastes are common household products which contain a wide variety of toxic or hazardous.

⁸ X-ray developers and fixers may contain reclaimable silver, glutaraldehyde, hydroquinone, potassium bromide, sodium sulfite, sodium carbonate, thiosulfates, and potassium alum.

⁹ The Resource Conservation and Recovery Act (RCRA) defines a hazardous waste as a solid waste that may cause an increase in mortality or serious illness or pose a substantial threat to human health and the environment when improperly treated, stored, transported, disposed of, or otherwise managed. A waste is hazardous if it exhibits characteristics of ignitability, corrosivity, reactivity, and/or toxicity. Not covered by RCRA regulations are domestic sewage; irrigation waters or industrial discharges allowed by the Clean Water Act; certain nuclear and mining wastes; household wastes; agricultural wastes (excluding some pesticides); and small quantity hazardous wastes (i.e., less than 220 pounds per month) generated by businesses.

¹⁰ Coliform bacteria can indicate the presence of pathogenic (disease-causing) microorganisms that may be transmitted in human feces. Diseases such as typhoid fever, hepatitis, diarrhea, and dysentery can result from sewage contamination of drinking water supplies.

¹¹ Pesticides include herbicides, insecticides, rodenticides, fungicides and avicides. EPA has registered approximately 50,000 different pesticide products for use in the United States. Many are highly toxic and quite mobile in the subsurface. An EPA survey found that the most common pesticides found in drinking water wells were DCPA (dacthal) and atrazine, which EPA classifies as moderately toxic (class 3) and slightly toxic (class 4) materials, respectively

¹² The EPA National Pesticides Survey found that the use of fertilizers correlates to nitrate contamination of groundwater supplies.

¹³ Common household pesticides for controlling pests such as ants, termites, bees, wasps, flies, cockroaches, silverfish, mites, ticks, fleas, worm, rates, and mice can contain active ingredients include naphthalene, phosphorus, xylene, chloroform, heavy metals, chlorinated hydrocarbons, arsenic, strychnine, kerosene, nitrosamines, and dioxin.

¹⁴ Swimming pool chemicals can contain free and combined chlorine; bromine; iodine; mercury-based, copper-based, and quaternary algaecides; cyanuric acid; calcium or sodium hypochlorite; muriatic acid; sodium carbonate.

¹⁵ Septic tank/cesspool cleaners include synthetic organic chemicals such as 1,1,1 trichloroethane, tetrachloroethylene, carbon tetrachloride, and methylene chloride.

¹⁶ Municipal wastewater treatment sludge can contain organic matter, nitrates; inorganic salts, heavy metals; coliform and noncoliform bacteria; and viruses.

¹⁷ Municipal wastewater treatment chemicals include calcium oxide; alum; activated alum, carbon, and silica; polymers; ion exchange resins; sodium hydroxide; chlorine; ozone; and corrosion inhibitors.