Appendix 3. Water-quality properties and constituents measured, a summary of data, and complete data archive for 1993–2008.

Table A3–1. Physical properties and constituents analyzed in samples, 1993–2008, associated human-health benchmarks for drinking water, detection frequency, and frequency of exceeding human-health benchmarks, both in the entire dataset and samples collected from sources of drinking water.

[USGS, U.S. Geological Survey; CAS, Chemical Abstract Service. Common method reporting levels (MRLs) and long-term method detection levels (LT–MDLs) are those used for about 10 percent of samples. MCL, U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Level for public-water supplies; AMCL, USEPA proposed Alternative Maximum Contaminant Level for public water supplies; HBSL, health-based screening level developed by the USGS on the basis of USEPA toxicity information and methods [48, 58, 59]; ROE, residue on evaporation; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, milligram per liter; µg/L, microgram per liter; pCi/L, picocurie per liter; col/100 mL, number of colonies per 100 milliliters; *E. coli, Escherichia coli*; --, not available or not applicable]

Property or contaminant	Units	USGS parameter code	CAS number	Predominant-use group	Common MRLs and LT–MDLs	Human-health benchmark		All data					Data from sites used as a source of drinking water				
								Number of samples	Detections exceeding human-health benchmark value		Detections exceeding one-tenth of human-health benchmark value		Number of samples	Detections exceeding value		Detections exceeding one-tenth of value	
						Value	Type		Number	Percent	Number	Percent		Number	Percent	Number	Percent
Physical properties																	
Temperature	°C	00010	--	--	--	--	--	640	--	--	--	--	523	--	--	--	--
Specific conductance	µS/cm at 25 °C	00095	--	--	1	--	--	639	--	--	--	--	522	--	--	--	--
Dissolved oxygen	mg/L	00300	--	--	0.1	--	--	629	--	--	--	--	516	--	--	--	--
pH	Standard units	00400	--	--	--	6.5 to 8.5	SMCL	639	226	*-35	*--	--	522	157	*30	--	--
Alkalinity as $CaCO_3$	mg/L	00410, 00419 or 39086 or 90410	--	--	1	--	--	635	--	--	--	--	522	--	--	--	--
Major ions																	
Bicarbonate	mg/L	00440 or 00450 or 00453		--	--	--	--	631	--	--	--	--	518	--	--	--	--
Bromide	mg/L	71870	24959–67–9	--	0.01	--	--	584	--	--	--	--	470	--	--	--	--
Calcium	mg/L	00915	7440–70–2	--	0.01–0.02	--	--	609	--	--	--	--	492	--	--	--	--
Chloride	mg/L	00940	16887–00–6	--	0.1	250	SMCL	609	0	0.0	--	--	492	0	0.0	--	--
Fluoride	mg/L	00950	16984–48–8	--	0.1	4	MCL	609	0	0.0	19	3.1	492	0	0.0	16	3.3
Magnesium	mg/L	00925	7439–95–4	--	0.01	--	--	609	--	--	--	--	492	--	--	--	--
Potassium	mg/L	00935	7440–70–2	--	0.1	--	--	609	--	--	--	--	492	--	--	--	--
Silica	mg/L	00955	7631–86–9	--	0.01	--	--	609	--	--	--	--	492	--	--	--	--
Sodium	mg/L	00930	7440–23–5	--	0.2	--	--	609	--	--	--	--	492	--	--	--	--
Sulfate	mg/L	00945	14808–79–8	--	0.1	250	SMCL	609	2	0.3	--	--	492	2	0.4	--	--
Dissolved solids (ROE)	mg/L	70300		--	1–10	500	SMCL	609	18	3.0	--	--	492	16	3.3	--	--
Trace elements																	
Aluminum	µg/L	01106	7429–90–5	--	0.8–1	--	--	299	--	--	--	--	217	--	--	--	--
†Antimony	µg/L	01095	7440–36–0	--	0.05–1	6	MCL	278	1	0.4	4	1.4	196	1	0.5	3	1.5
Arsenic	µg/L	01000	7440–38–2	--	0.2–1	10	MCL	299	9	3.0	52	17	217	9	4.1	48	22
Barium	µg/L	01005	7440–39–3	--	1	2,000	MCL	299	0	0.0	32	11	217	0	0.0	29	13
†Beryllium	µg/L	01010	7440–41–7	--	0.03–1	4	MCL	278	0	0.0	2	0.7	196	0	0.0	0	0.0
Boron	µg/L	01020	7440–42–8	--	7–16	1,000	HBSL	177	0	0.0	0	0.0	136	0	0.0	0	0.0
†Cadmium	µg/L	01025	7440–43–9	--	0.02–1	5	MCL	299	0	0.0	1	0.3	217	0	0.0	0	0.0
Chromium	µg/L	01030	7440–47–3	--	0.4–1	100	MCL	296	0	0.0	0	0.0	214	0	0.0	0	0.0
Cobalt	µg/L	01035	7440–48–4	--	1	--	--	278	--	--	--	--	196	--	--	--	--
Copper	µg/L	01040	7440–50–8	--	0.2–1	1,300	Action level	299	0	0.0	1	0.3	217	0	0.0	1	0.5
Iron	µg/L	01046	7439–89–6	--	3–10	--	--	609	72	12	131	22	492	48	9.8	91	18
Lead	µg/L	01049	7439–92–1	--	0.04–1	15	Action level	299	0	0.0	27	9.0	217	0	0.0	25	12
Lithium	µg/L	01130	7439–93–2	--	0.3–3	--	--	148	--	--	--	--	109	--	--	--	--
Manganese	µg/L	01056	7439–96–5	--	0.1–1	300	HBSL	624	37	5.9	162	26	507	22	4.3	111	22
Molybdenum	µg/L	01060	7439–98–7	--	0.03–1	40	HBSL	276	0	0.0	19	6.9	194	0	0.0	17	8.8
Nickel	µg/L	01065	7440–02–0	--	0.2–1	100	HBSL	278	0	0.0	5	1.8	196	0	0.0	1	0.5

Table A3–1. Physical properties and constituents analyzed in samples, 1993–2008, associated human-health benchmarks for drinking water, detection frequency, and frequency of exceeding human-health benchmarks, both in the entire dataset, and samples used as a source of drinking water—Continued

[USGS, U.S. Geological Survey; CAS, Chemical Abstract Service. Common method reporting levels (MRLs) and long-term method detection levels (LT–MDLs) are those used for at least about 10 percent of samples. MCL, U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Level for public-water supplies; AMCL, USEPA proposed Alternative Maximum Contaminant Level for public water supplies; HBSL, health-based screening level developed by the USGS on the basis of USEPA toxicity information and methods [48, 58, 59]; °C, degrees Celsius; µS/cm, microsiemens per centimeter; mg/L, milligram per liter; ROE, residue on evaporation; µg/L, microgram per liter; pCi/L, picocuries per liter; col/100 mL, colonies per 100 milliliters; *E. coli, Escherichia coli*; --, not available or not applicable]

Property or contaminant	Units	USGS parameter code	CAS number	Predominant-use group	Common MRLs and LT–MDLs	Human-health benchmark		All data					Data from sites used as a source of drinking water			
								Number of samples	Detections exceeding human-health benchmark value		Detections exceeding one-tenth of human-health benchmark value		Number of samples	Detections exceeding value		Detections exceeding one-tenth of value	
						Value	Type		Number	Percent	Number	Percent		Number	Percent	Number	Percent
Selenium	µg/L	01145	7782–49–2	--	0.7–1.2	50	MCL	299	0	0.0	2	0.7	217	0	0.0	2	0.9
Silver	µg/L	01075	7440–22–4	--	0.1–1	100	HBSL	299	0	0.0	0	0.0	217	0	0.0	0	0.0
Strontium	µg/L	01080	7440–24–6	--	10	4,000	HBSL	257	1	0.4	31	12	206	1	0.5	29	14
Thallium	µg/L	01057	7440–28–0	--	0.02–0.9	2	MCL	148	0	0.0	2	1.4	109	0	0.0	2	1.8
Vanadium	µg/L	01085	7440–62–2	--	0.2–1	--	--	148	--	--	--	--	109	--	--	--	--
Zinc	µg/L	01090	7440–66–6	--	0.5–1	2,000	HBSL	299	1	0.3	14	4.7	217	0	0.0	10	4.6
Nutrients and dissolved organic carbon																	
Nitrite as N	mg/L	00613	14797–65–0	--	0.003–0.01	1	MCL	625	0	0.0	4	0.6	508	0	0.0	3	0.6
Nitrate as N	mg/L	00631	*14797–55–8	--	0.02–0.05	10	MCL	624	59	9.5	348	56	507	58	11	280	55
Ammonia as N	mg/L	00608	7664–41–7	--	0.02	--	--	625	--	--	--	--	508	--	--	--	--
Ammonia plus organic nitrogen as N	mg/L	00623	--	--	0.05–0.2	--	--	548	--	--	--	--	438	--	--	--	--
Phosphorus, dissolved as P	mg/L	00666	7723–14–0	--	0.002–0.01	--	--	486	--	--	--	--	406	--	--	--	--
Orthophosphate as P	mg/L	00671	14265–44–2	--	0.01	--	--	623	--	--	--	--	506	--	--	--	--
Dissolved organic carbon	mg/L	00681	--	--	0.1, 0.3	--	--	642	--	--	--	--	520	--	--	--	--
Radon and other radionuclides																	
Radon	pCi/L	82303	14859–67–7	--	26–80	4,000 pCi/L and 300 pCi/L	≈Proposed AMCL and proposed MCL	559	56	10	463	83	478	51	11	395	83
Alpha activity	pCi/L	75987 or 63104	12587–46–1	--	3	15 pCi/L	MCL	127	11	8.7	†--	--	119	10	8.4	†--	--
Beta activity	pCi/L	75989 or 63015	12587–47–2	--	4	50 pCi/L	MCL	127	1	0.8	†--	--	119	1	0.8	†--	--
Sum of radium–226 and radium–228	pCi/L	Either 09503 or 09511 plus 81366	7440–14–4	-- --	Varies by sample	5 pCi/L	MCL	128	2	1.6	†--	--	120	1	0.8	†--	--
Tritium	pCi/L	07000	10028–17–8	--	1	--	--	169	--	--	--	--	166	--	--	--	--
Uranium	µg/L	22703	7440–61–1	--	0.4, 1.0	30 µg/L	MCL	508	2	0.4	56	11	412	2	0.5	55	13
Bacteria																	
§Total coliform	§See footnote	31501, 50569, 90900, 90908	--	--	*Colony forming unit per 100 mL	§See footnote	MCL	313	187	60	--	--	313	187	60	--	--
¶*E. coli*	*Colony forming unit per 100 mL	31633, 50278, 50468, 90901	--	--	*Colony forming unit per 100 mL	*colony forming unit per 100 mL	MCL	234	57	24	--	--	234	57	24	--	--

*One-tenth of benchmark value not evaluated for non-human-health-related Secondary Maximum Contaminant levels.

†Although concentrations in some samples exceeded one-tenth of the benchmark, is not possible to fully evaluate the detection frequency at one-tenth of the benchmark because detection limits for a large proportion of the samples were greater than one-tenth of the benchmark.

‡Not all radionuclides were not evaluated at one-tenth of the benchmark because of reporting levels.

§No more than 5 percent of samples were total coliform positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform positive per month.) Every sample that has total coliform must be analyzed for either fecal coliform or *E. coli* if two consecutive TC-positive samples, and one is also positive for *E. coli* fecal coliforms, system has an acute MCL violation.

¶ Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

≈ U.S. Environmental Protection Agency proposed MCL of 300 used for exceeding one-tenth of human-health benchmark and proposed AMCL of 4,000 used for radon used for exceeding human-health benchmark.

Table A3–2. Pesticides analyzed in samples, 1993–2008, associated human-health benchmarks for drinking water, detection frequency, and frequency of exceeding human-health benchmarks, both in the entire dataset and in samples collected from sources of drinking water.

[USGS, U.S. Geological Survey; CAS, Chemical Abstract Service. Predominant-use group is from Gilliom and others[10] and includes compound class for pesticides AMD, amide; CAB, carbamate; CBE, chlorobenzoic acid esters; CPA, chlorophenoxy acids; DNA, dinitroanalines; MSA, miscellaneous acids; MSC, miscellaneous; NPH, nitrophenols; OCL, organochlorines; OPH, organophosphates; PHN, phenols; PYR, pyrethroids; SFE, sulfite esters; TRZ, triazines, URC, uracils; URA, ureas). Pesticide degradation products are designated by use group "DP" with parent compound indicated in parentheses. MCL, U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Level for public-water supplies; HBSL, health-based screening level developed by the USGS on the basis of USEPA toxicity information and methods[48, 58, 59], value is low end of range, ass ociated with 10^{-6} cancer risk; µg/L, microgram per liter; --, not available or not applicable; ≥, greater than or equal to]

Property or contaminant	Units	USGS parameter code	CAS number	Predominant-use group	Human-health benchmark		Number of samples	All data				Data from sites used as a source of drinking water			
					Value	Type		Number of detections at any concentration	Percentage of detections at any concentration	Percentage of detections greater than benchmark	Percentage of detections ≥ 0.1 of the benchmark	Number of samples	Number of detections at any concentration	Percentage of detections at any concentration	Percentage of detections greater than benchmark
2,6-Diethylaniline	µg/L	82660	579–66–8	DP (Alachlor) (AMD)	--	--	636	1	0.2	--	--	522	1	0.2	--
Acetochlor	µg/L	49260	34256–82–1	Herbicide (AMD)	1	HBSL	498	1	0.2	0	0	386	1	0.3	0
Alachlor	µg/L	46342	15972–60–8	Herbicide (AMD)	2	MCL	637	24	3.8	0	0.2	523	23	4.4	0
alpha-HCH	µg/L	34253	319–84–6	DP (gamma-HCH) (OCL)	0.006	HBSL	550	1	0.2	0.2	0.2	441	1	0.2	0.2
Atrazine	µg/L	39632	1912–24–9	Herbicide (TRZ)	3	MCL	637	258	41	0	6.1	523	218	42	0
Azinphos-methyl (Guthion)	µg/L	82686	86–50–0	Insecticide (OPH)	10	HBSL	636	0	0	0	0	522	0	0	0
Benfluralin	µg/L	82673	1861–40–1	Herbicide (DNA)	4	HBSL	636	2	0.3	0	0	523	1	0.2	0
Butylate	µg/L	04028	2008–41–5	Herbicide (CAB)	400	HBSL	550	1	0.2	0	0	441	1	0.2	0
Carbaryl	µg/L	82680	63–25–2	Insecticide (CAB)	40	HBSL	637	17	2.7	0	0	523	13	2.5	0
Carbofuran	µg/L	82674	1563–66–2	Insecticide (CAB)	40	MCL	621	5	0.8	0	0	508	4	0.8	0
Chlorpyrifos	µg/L	38933	2921–88–2	Insecticide (OPH)	2	HBSL	636	1	0.2	0	0	522	1	0.2	0
cis-Permethrin	µg/L	82687	54774–45–7	Insecticide (PYR)	4	HBSL	636	0	0	0	0	--	--	0	0
Cyanazine	µg/L	04041	21725–46–2	Herbicide (TRZ)	1	HBSL	621	12	1.9	0	0.3	508	10	2.0	0
DCPA (Dacthal)	µg/L	82682	1861–32–1	Herbicide (CBE)	70	HBSL	636	1	0.2	0	0	522	1	0.2	0
Deethylatrazine	µg/L	04040	6190–65–4	DP (Atrazine) (TRZ)	--	--	637	292	46	--	--	523	247	47	--
Diazinon	µg/L	39572	333–41–5	Insecticide (OPH)	1	HBSL	636	7	1.1	0	0	522	5	1.0	0
Dieldrin	µg/L	39381	60–57–1	Insecticide, DP (Aldrin) (OCL)	0.002	HBSL	636	25	3.9	3.6	3.6	522	8	1.5	1.3
Disulfoton	µg/L	82677	298–04–4	Insecticide (OPH)	0.9	HBSL	620	0	0	0	0	507	0	0	0
EPTC	µg/L	82668	759–94–4	Herbicide (CAB)	200	HBSL	620	3	0.5	0	0	507	3	0.3	0
Ethalfluralin	µg/L	82663	55283–68–6	Herbicide (DNA)	30	HBSL	550	0	0	0	0	441	0	0	0
Ethoprop (Ethoprophos)	µg/L	82672	13194–48–4	Herbicide (OPH)	1	HBSL	621	0	0	0	0	508	0	0	0
Fonofos	µg/L	04095	944–22–9	Insecticide (OPH)	10	HBSL	636	2	0.3	0	0	522	2	0.4	0
gamma-HCH (Lindane)	µg/L	39341	58–89–9	Insecticide (OCL)	0.2	MCL	550	1	0.2	0	0.2	441	1	0.2	0
Linuron	µg/L	82666	330–55–2	Herbicide (URA)	5	HBSL	565	2	0.4	0	0	456	1	0.2	0
Malathion	µg/L	39532	121–75–5	Insecticide (OPH)	50	HBSL	636	0	0	0	0	522	0	0	0
Metolachlor	µg/L	39415	51218–45–2	Herbicide (AMD)	700	HBSL	637	149	23	0	0	523	126	24	0
Metribuzin	µg/L	82630	21087–64–9	Herbicide (TRZ)	90	HBSL	636	7	1.1	0	0	522	6	1.1	0
Molinate	µg/L	82671	2212–67–1	Herbicide (CAB)	0.7	HBSL	620	2	0.3	0	0	507	2	0.4	0
Napropamide	µg/L	82684	15299–99–7	Herbicide (AMD)	800	HBSL	551	2	0.4	0	0	442	2	0.4	0
p,p'-DDE	µg/L	34653	72–55–9	DP (p,p'-DDT) (OCL)	0.1	HBSL	550	23	4.2	0	0	441	21	4.8	0
Parathion (Ethyl parathion)	µg/L	39542	56–38–2	Insecticide (OPH)	0.02	HBSL	550	0	0	0	0	441	0	0	0
Parathion-methyl (Methyl parathion)	µg/L	82667	298–00–0	Insecticide (OPH)	1	HBSL	636	0	0	0	0	522	0	0	0
Pebulate	µg/L	82669	1114–71–2	Herbicide (CAB)	50	HBSL	550	3	0.5	0	0	441	3	0.7	0
Pendimethalin	µg/L	82683	40487–42–1	Herbicide (DNA)	70	HBSL	636	1	0.2	0	0	522	1	0.2	0
Phorate	µg/L	82664	298–02–2	Insecticide (OPH)	4	HBSL	636	0	0	0	0	522	0	0	0
Prometon	µg/L	04037	1610–18–0	Herbicide (TRZ)	400	HBSL	637	109	17	0	0	523	90	17	0
Pronamide (Propyzamide)	µg/L	82676	23950–58–5	Herbicide (AMD)	1	HBSL	637	2	0.3	0	0	523	2	0.4	0
Propachlor	µg/L	04024	1918–16–7	Herbicide (AMD)	1	HBSL	551	0	0	0	0	442	0	0	0
Propanil	µg/L	82679	709–98–8	Herbicide (AMD)	6	HBSL	621	2	0.3	0	0	508	2	0.4	0
Propargite	µg/L	82685	2312–35–8	Acaricide (SFE)	1	HBSL	619	0	0	0	0	507	0	0	0
Simazine	µg/L	04035	122–34–9	Herbicide (TRZ)	4	MCL	637	136	21	0	0.2	523	120	23	0
Tebuthiuron	µg/L	82670	34014–18–1	Herbicide (URA)	1,000	HBSL	637	32	5.0	0	0	523	23	4.4	0
Terbacil	µg/L	82665	5902–51–2	Herbicide (URC)	90	HBSL	565	2	0.4	0	0	456	2	0.4	0
Terbufos	µg/L	82675	13071–79–9	Insecticide (OPH)	0.4	HBSL	636	1	0.2	0	0	522	0	0	0
Thiobencarb	µg/L	82681	28249–77–6	Herbicide (CAB)	70	HBSL	620	0	0	0	0	507	0	0	0
Triallate	µg/L	82678	2303–17–5	Herbicide (CAB)	20	HBSL	550	2	0.4	0	0	441	2	0.5	0
Trifluralin	µg/L	82661	1582–09–8	Herbicide (DNA)	20	HBSL	636	5	0.8	0	0	522	3	0.6	0

Table A3–3. Volatile organic compounds analyzed in samples, 1993–2008, associated human-health benchmarks for drinking water, detection frequency, and frequency of exceeding human-health benchmarks, both in the entire dataset, and samples used as a source of drinking water.

[USGS, U.S. Geological Survey; CAS, Chemical Abstract Service. Predominant use group is from Moran and others.[50] MCL, U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Level for public-water supplies; HBSL, health-based screening level developed by USGS using USEPA toxicity information and methods;[48, 58, 59] µg/L, microgram per liter; --, not available or not applicable]

Property or contaminant	Units	USGS parameter code	CAS number	Predominant use group	Human-health benchmark		All data					Data from sites used as a source of drinking water				
					Value	Type	Number of samples	*Number of detections at any concentration	*Percentage of detections at any concentration	Percentage of detections greater than benchmark	Percentage of detections greater than 0.1 of the benchmark	Number of samples	*Number of detections at any concentration	*Percentage of detections at any concentration	Percentage of detections greater than benchmark	Percentage of detections greater than 0.1 of the benchmark
1,1,1,2-Tetrachloroethane	µg/L	77562	630–20–6	Solvent	70	HBSL	498	0	0	0	0	385	0	0	0	0
1,1,1-Trichloroethane (TCA)	µg/L	34506	71–55–6	Solvent	200	MCL	498	59	12	0	0	385	46	12	0	0
1,1,2,2-Tetrachloroethane	µg/L	34516	79–34–5	Solvent	0.3	HBSL	498	0	0	0	0	385	0	0	0	0
1,1,2-Trichloroethane	µg/L	34511	79–00–5	Solvent	5	MCL	498	1	0.2	0	0	385	1	0.3	0	0
1,1-Dichloroethane	µg/L	34496	75–34–3	Solvent	--	--	498	17	3.4	N/A	N/A	385	9	2.3	N/A	N/A
1,1-Dichloroethene (-Ethylene)	µg/L	34501	75–35–4	Solvent	7	MCL	498	14	2.8	0	0	385	12	3.1	0	0
1,1-Dichloropropene	µg/L	77168	563–58–6	Organic synthesis	--	--	498	0	0	N/A	N/A	385	0	0	N/A	N/A
1,2,3,4-Tetramethylbenzene (Prehnitene)	µg/L	49999	488–23–3	Gasoline hydrocarbon	--	--	323	1	0.3	N/A	N/A	259	1	0.4	N/A	N/A
1,2,3,5-Tetramethylbenzene (Isodurene)	µg/L	50000	527–53–7	Gasoline hydrocarbon	--	--	323	2	0.6	N/A	N/A	259	2	0.8	N/A	N/A
1,2,3-Trichlorobenzene	µg/L	77613	87–61–6	Organic synthesis	--	--	498	0	0	N/A	N/A	385	0	0	N/A	N/A
1,2,3-Trichloropropane	µg/L	77443	96–18–4	Organic synthesis	40	HBSL	498	0	0	0	0	385	0	0	0	0
1,2,3-Trimethylbenzene	µg/L	77221	526–73–8	Gasoline hydrocarbon	--	--	323	1	0.3	N/A	N/A	259	1	0.4	N/A	N/A
1,2,4-Trichlorobenzene	µg/L	34551	120–82–1	Solvent	70	MCL	498	1	0.2	0	0	385	1	0.3	0	0
1,2,4-Trimethylbenzene	µg/L	77222	95–63–6	Gasoline hydrocarbon	--	--	498	12	2.4	N/A	N/A	385	9	2.3	N/A	N/A
1,2-Dichlorobenzene (*o*-)	µg/L	34536	95–50–1	Solvent	600	MCL	498	0	0	0	0	385	0	0	0	0
1,2-Dichloroethane (ethylene dichloride)	µg/L	32103	107–06–2	Solvent	5	MCL	498	5	1.0	0	0.6	384	2	0.5	0	0.3
1,2-Dichloropropane	µg/L	34541	78–87–5	Fumigant	5	MCL	498	6	1.2	0	0.2	385	5	1.3	0	0.3
1,3,5-Trimethylbenzene	µg/L	77226	108–67–8	Gasoline hydrocarbon	--	--	498	3	0.6	N/A	N/A	385	2	0.5	N/A	N/A
1,3-Dichlorobenzene (*m*-dichlorobenzene)	µg/L	34566	541–73–1	Solvent	600	HBSL	498	1	0.2	0	0	385	1	0.3	0	0
1,3-Dichloropropane	µg/L	77173	142–28–9	Fumigant	--	--	498	0	0	N/A	N/A	385	0	0	N/A	N/A
1,4-Dichlorobenzene (*p*-dichlorobenzene)	µg/L	34571	106–46–7	Fumigant	75	MCL	498	39	7.8	0	0	385	6	1.6	0	0
2,2-Dichloropropane	µg/L	77170	594–20–7	Fumigant	--	--	498	0	0	N/A	N/A	385	0	0	N/A	N/A
2-Chlorotoluene (*o*-)	µg/L	77275	95–49–8	Solvent	100	HBSL	498	0	0	0	0	385	0	0	0	0
2-Ethyltoluene (1-ethyl-2-methylbenzene)	µg/L	77220	611–14–3	Gasoline hydrocarbon	--	--	323	1	0.3	N/A	N/A	259	1	0.4	N/A	N/A
3-Chloropropene (3-chloro-1-propene)	µg/L	78109	107–05–1	Organic synthesis	--	--	323	0	0	N/A	N/A	259	0	0	N/A	N/A
4-Chlorotoluene	µg/L	77277	106–43–4	Solvent	100	HBSL	498	0	0	0	0	385	0	0	0	0
Acetone (2-propanone)	µg/L	81552	67–64–1	Solvent	6,000	HBSL	323	3	0.9	0	0	259	3	1.1	0	0
Acrylonitrile (2-propenenitrile)	µg/L	34215	107–13–1	Organic synthesis	0.06	*HBSL	323	1	0.3	0.3	0.3	259	1	0.4	0.4	0.4
Benzene	µg/L	34030	71–43–2	Gasoline hydrocarbon	5	MCL	498	17	3.4	0.4	1.2	385	9	2.3	0	0.5
Bromobenzene	µg/L	81555	108–86–1	Solvent	--	--	498	0	0	N/A	N/A	385	0	0	N/A	N/A
Bromochloromethane	µg/L	77297	74–97–5	Personal care and domestic use product	90	HBSL	497	1	0.2	0	0	384	1	0.3	0	0
Bromodichloromethane ($CHBrCl_2$)	µg/L	32101	75–27–4	Trihalomethane	†80	MCL	498	21	4.2	0	0	385	13	3.4	0	0
Bromoform (tribromomethane)	µg/L	32104	75–25–2	Trihalomethane	†80	MCL	498	2	0.4	0	0	385	2	0.5	0	0
Bromomethane (methyl bromide)	µg/L	34413	74–83–9	Fumigant	100	HBSL	498	0	0	0	0	385	0	0	0	0
Carbon disulfide	µg/L	77041	75–15–0	Organic synthesis	700	HBSL	323	16	4.9	0	0	259	15	5.8	0	0
Carbon tetrachloride (tetrachloromethane)	µg/L	32102	56–23–5	Solvent	5	MCL	498	6	1.2	0	0.2	385	6	1.6	0	0.3

Table A3–3. Volatile organic compounds analyzed in samples, 1993–2008, associated human-health benchmarks for drinking water, detection frequency, and frequency of exceeding human-health benchmarks, both in the entire dataset, and samples used as a source of drinking water.—Continued

[USGS, U.S. Geological Survey; CAS, Chemical Abstract Service. Predominant use group is from Moran and others [50]. MCL, U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Level for public-water supplies; HBSL, health-based screening level developed by USGS using USEPA toxicity information and methods;[48, 58, 59] µg/L, microgram per liter; --, not available or not applicable]

Property or contaminant	Units	USGS parameter code	CAS number	Predominant use group	Human-health benchmark		All data					Data from sites used as a source of drinking water				
					Value	Type	Number of samples	*Number of detections at any concentration	*Percentage of detections at any concentration	Percentage of detections greater than benchmark	Percentage of detections greater than 0.1 of the benchmark	Number of samples	*Number of detections at any concentration	*Percentage of detections at any concentration	Percentage of detections greater than benchmark	Percentage of detections greater than 0.1 of the benchmark
Chlorobenzene (Monochlorobenzene)	µg/L	34301	108–90–7	Solvent	100	MCL	498	1	0.2	0	0	385	0	0	0	0
Chloroethane	µg/L	34311	75–00–3	Solvent	--	--	498	2	0.4	N/A	N/A	385	1	0.3	N/A	N/A
Chloroform (trichloromethane) (TCM)	µg/L	32106	67–66–3	Trihalomethane	†80	MCL	498	94	19	0	1.5	385	53	14.0	0	0.5
Chloromethane (methyl chloride)	µg/L	34418	74–87–3	Organic synthesis	30	HBSL	498	22	4.4	0	0	385	16	4.2	0	0
cis-1,2-Dichloroethene	µg/L	77093	156–59–2	Solvent	70	MCL	497	10	2.0	0	0	385	6	1.6	0	0
cis-1,3-Dichloropropene	µg/L	34704	10061–01–5	Fumigant	§0.3	⁺HBSL	498	0	0	0	0	385	0	0	0	0
Dibromochloromethane	µg/L	32105	124–48–1	Trihalomethane	†80	MCL	498	4	0.8	0	0	385	4	1.0	0	0
Dibromochloropropane (1,2-Dibromo-3-chloropropane; DBCP)	µg/L	82625	96–12–8	Fumigant	0.2	MCL	498	0	0	0	0	385	0	0	0	0
Dibromomethane	µg/L	30217	74–95–3	Solvent	--	--	498	0	0	N/A	N/A	385	0	0	N/A	N/A
Dichlorodifluoromethane (CFC-12)	µg/L	34668	75–71–8	Refrigerant	1,000	HBSL	483	12	2.5	0	0	370	7	1.9	0	0
Diethyl ether (Ethyl ether; 1,1'-oxybisethane)	µg/L	81576	60–29–7	Solvent	1,000	HBSL	323	1	0.3	0	0	259	1	0.4	0	0
Diisopropyl ether (DIPE)	µg/L	81577	108–20–3	Gasoline oxygenate	--	--	323	4	1.2	N/A	N/A	259	4	1.5	N/A	N/A
Ethyl methacrylate	µg/L	73570	97–63–2	Organic synthesis	--	--	323	0	0	N/A	N/A	259	0	0	N/A	N/A
Ethyl *tert*-butyl ether (ETBE)	µg/L	50004	637–92–3	Gasoline oxygenate	--	--	323	0	0	N/A	N/A	259	0	0	N/A	N/A
Ethylbenzene	µg/L	34371	100–41–4	Gasoline hydrocarbon	700	MCL	498	4	0.8	0	0	385	2	0.5	0	0
Ethylene dibromide (1,2-dibromoethane; EDB)	µg/L	77651	106–93–4	Fumigant	0.05	MCL	498	0	0	0	0	385	0	0	0	0
Hexachlorobutadiene	µg/L	39702	87–68–3	Organic synthesis	*0.9	HBSL	498	0	0	0	0	385	0	0	0	0
Hexachloroethane	µg/L	34396	67–72–1	Solvent	0.7	HBSL	323	0	0	0	0	259	0	0	0	0
Iodomethane	µg/L	77424	74–88–4	Organic synthesis	--	--	323	0	0	N/A	N/A	259	0	0	N/A	N/A
Isopropylbenzene ((1-methylethyl) benzene)	µg/L	77223	98–82–8	Gasoline hydrocarbon	700	HBSL	498	4	0.8	0	0	385	3	0.8	0	0
m- & *p*-Xylene	µg/L	85795	108–38–3 and 106–42–3	Gasoline hydrocarbon	‡10,000	MCL	323	1	0.3	0	0	259	1	0.4	0	0
Methyl acrylate (methyl-2-propenoate)	µg/L	49991	96–33–3	Organic synthesis	--	--	323	0	0	N/A	N/A	259	0	0	N/A	N/A
Methyl acrylonitrile (2-methyl-2-propenitrile)	µg/L	81593	126–98–7	Organic synthesis	0.7	HBSL	323	0	0	0	0	259	0	0	0	0
Methyl butyl ketone (n-butyl methyl ketone; 2-hexanone)	µg/L	77103	591–78–6	Solvent	--	--	323	0	0	N/A	N/A	259	0	0	N/A	N/A
Methyl ethyl ketone (ethyl methyl ketone; MEK)	µg/L	81595	78–93–3	Solvent	4,000	HBSL	323	5	1.5	0	0	259	5	1.9	0	0
Methyl isobutyl ketone (isobutyl methyl ketone; MIBK)	µg/L	78133	108–10–1	Solvent	--	--	323	1	0.3	N/A	N/A	259	1	0.4	N/A	N/A
Methyl methacrylate	µg/L	81597	80–62–6	Organic synthesis	10,000	HBSL	498	0	0	0	0	259	0	0	0	0
Methyl *tert*-butyl ether (MTBE)	µg/L	78032	1634–04–4	Gasoline oxygenate	--	--	497	82	16.5	N/A	N/A	385	57	14.8	N/A	N/A
Methylene chloride (dichloromethane)	µg/L	34423	75–09–2	Solvent	5	MCL	498	14	2.8	0	0.4	385	12	3.1	0	0.3
Naphthalene	µg/L	34696	91–20–3	Gasoline hydrocarbon	100	HBSL	498	7	1.4	0	0.2	385	3	0.8	0	0.5
n-Butylbenzene	µg/L	77342	104–51–8	Gasoline hydrocarbon	--	--	498	2	0.4	N/A	N/A	385	1	0.3	N/A	N/A
n-Propylbenzene	µg/L	77224	103–65–1	Solvent	--	--	498	3	0.6	N/A	N/A	385	2	0.5	N/A	N/A
o-Xylene (1,2-Dimethylbenzene)	µg/L	77135	95–47–6	Gasoline hydrocarbon	‡10,000	MCL	323	2	0.6	0	0	259	1	0.4	0	0
Perchloroethene (Tetrachloro-ethene; PCE)	µg/L	34475	127–18–4	Solvent	5	MCL	498	68	13.7	0	1.0	385	44	11.4	0	0.5

Table A3–3. Volatile organic compounds analyzed in samples, 1993–2008, associated human-health benchmarks for drinking water, detection frequency, and frequency of exceeding human-health benchmarks, both in the entire dataset and in samples collected from sources of drinking water.—Continued

[USGS, U.S. Geological Survey; CAS, Chemical Abstract Service. Predominant use group is from Moran and others.[50] MCL, U.S. Environmental Protection Agency (USEPA) Maximum Contaminant Level for public-water supplies; HBSL, health-based screening level developed by USGS on the basis of USEPA toxicity information and methods [48, 58, 59]; µg/L, microgram per liter; --, not available or not applicable]

Property or contaminant	Units	USGS parameter code	CAS number	Predominant use group	Human-health benchmark		All data					Data from sites used as a source of drinking water				
					Value	Type	Number of samples	*Number of detections at any concentration	*Percentage of detections at any concentration	Percentage of detections greater than benchmark	Percentage of detections greater than 0.1 of the benchmark	Number of samples	*Number of detections at any concentration	*Percentage of detections at any concentration	Percentage of detections greater than benchmark	Percentage of detections greater than 0.1 of the benchmark
p-Isopropyltoluene (4-Isopropyltoluene)	µg/L	77356	99–87–6	Gasoline hydrocarbon	--	--	498	3	0.6	N/A	N/A	385	2	0.5	N/A	N/A
sec-Butylbenzene	µg/L	77350	135–98–8	Gasoline hydrocarbon	--	--	498	2	0.4	N/A	N/A	385	1	0.3	N/A	N/A
Styrene	µg/L	77128	100–42–5	Gasoline hydrocarbon	100	MCL	498	5	1.0	0	0	385	4	1.0	0	0
tert-Amyl methyl ether (Methyl *tert*-pentyl ether; *tert*-pentyl methyl ether)	µg/L	50005	994–05–8	Gasoline oxygenate	--	--	323	5	1.5	N/A	N/A	259	4	1.5	N/A	N/A
tert-Butylbenzene	µg/L	77353	98–06–6	Gasoline hydrocarbon	--	--	498	0	0	N/A	N/A	385	0	0	N/A	N/A
Tetrahydrofuran (1,4-epoxybutane)	µg/L	81607	109–99–9	Solvent	--	--	323	11	3.4	N/A	N/A	259	11	4.2	N/A	N/A
Toluene	µg/L	34010	108–88–3	Gasoline hydrocarbon	1,000	MCL	498	13	2.6	0	0	385	9	2.3	0	0
Total xylene	µg/L	81551	108–38–3; 106–42–3 and 95–47–6	Gasoline hydrocarbon	[†]10,000	MCL	175	7	4.0	0	0	126	2	1.6	0	0
trans-1,2-Dichloroethene	µg/L	34546	156–60–5	Solvent	100	MCL	498	0	0	0	0	385	0	0	0	0
trans-1,3-Dichloropropene	µg/L	34699	10061–02–6	Fumigant	[§]0.3	[‡]HBSL	498	0	0	0	0	385	0	0	0	0
trans-1,4-Dichloro-2-butene	µg/L	73547	110–57–6	Organic synthesis	--	--	323	0	0	N/A	N/A	259	0	0	N/A	N/A
Trichloroethene (TCE)	µg/L	39180	79–01–6	Solvent	5	MCL	498	30	6.0	0	1.4	385	23	6.0	0.3	1.3
Trichlorofluoromethane (CFC-11)	µg/L	34488	75–69–4	Refrigerant	2,000	HBSL	483	15	3.1	0	0	370	5	1.4	0	0
Trichlorotrifluoroethane [1,1,2-trichloro-1,2,2-trifluoroethane] (CFC-113)	µg/L	77652	76–13–1	Refrigerant	200,000	HBSL	483	4	0.8	0	0	370	2	0.5	0	0
Vinyl bromide (bromoethene)	µg/L	50002	593–60–2	Organic synthesis	--	--	323	0	0	N/A	N/A	259	0	0	N/A	N/A
Vinyl chloride (chloroethene)	µg/L	39175	75–01–4	Organic synthesis	2	MCL	498	0	0	0	0	385	0	0	0	0

[*] Value is low end of range, associated with 10^{-6} cancer risk.

[†] MCL is for sum for four trihalomethanes.

[‡] MCL is for the sum for all xylenes; prior to 1996, samples were analyzed for total xylene; samples collected after 1996 were analyzed for *o*-xylene and *m*-& *p*-xylene.

[§] HBSL is for sum of *cis*-1,3-dichloropropene and *trans*-1,3-dichloropropene.