

TABLE 1
CATEGORIES OF POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION

AGRICULTURAL SOURCES (K)⁵

TYPE OF SOURCE	HEALTH, ENVIRONMENTAL, OR AESTHETIC CONTAMINANT^{1,2,3}
Animal feedlots (0006) ⁴ and burial areas (0007)	Livestock sewage wastes; nitrates; phosphates; chloride; chemical sprays and dips for controlling insect, bacterial, viral, and fungal pests on livestock; coliform ⁶ and noncoliform bacteria; viruses
Manure spreading areas (0008) and storage pits (0009)	Livestock sewage wastes; nitrates
Livestock waste disposal areas (0010)	Livestock sewage wastes; nitrates
Crop areas and irrigation sites (0011)	Pesticides; ⁷ fertilizers; ⁸ gasoline and motor oils from chemical applicators
Chemical storage areas and containers (0012)	Pesticide ⁷ and fertilizer ⁸ residues
Farm machinery areas (0013)	Automotive wastes; ⁹ welding wastes
Agricultural drainage wells (0014) and canals (0015)	Pesticides; ⁷ fertilizers; ⁸ bacteria; salt water (in areas where the fresh-saltwater interface lies at shallow depths and where the water table is lowered by channelization, pumping, or other causes)

RESIDENTIAL SOURCES (D)

TYPE OF SOURCE	HEALTH, ENVIRONMENTAL, OR AESTHETIC CONTAMINANT^{1,2,3}
Common household maintenance and hobbies (0016)	<u>Common Household Products:</u> ¹⁰ Household cleaners; oven cleaners; drain cleaners; toilet cleaners; disinfectants; metal polishes; jewelry cleaners; shoe polishes; synthetic detergents; bleach; laundry soil and stain removers; spot removers and dry cleaning fluid; solvents; lye or caustic soda; household pesticides; ¹¹ photochemicals; printing ink; other common products; <u>Wall and Furniture Treatments:</u> Paints; varnishes; stains; dyes; wood preservatives (creosote); paint and lacquer thinners; paint and varnish removers and deglossers; paint brush cleaners; floor and furniture strippers; <u>Mechanical Repair and Other Maintenance Products:</u> Automotive wastes; ⁹ waste oil; diesel fuel; kerosene; #2 heating oil; grease; degreasers for driveways and garages; metal degreasers; asphalt and roofing tar; tar removers; lubricants; rustproofers; car wash detergents; car waxes and polishes; rock salt; refrigerants
Lawns and gardens (0017)	Fertilizers; ⁷ herbicides and other pesticides used for lawn and garden maintenance ¹²
Swimming pools (0018)	Swimming pool maintenance chemicals ¹³
Septic systems (0019), cesspools (0020), and sewer lines (0021)	Septage; coliform and noncoliform bacteria; ⁶ viruses; nitrates; heavy metals; synthetic detergents; cooking and motor oils; bleach; pesticides; ^{11, 12} paints; paint thinner; photographic chemicals; swimming pool chemicals; ¹¹ septic tank/cesspool cleaner chemicals; ¹⁴ elevated levels of chloride, sulfate, calcium, magnesium, potassium, and phosphate
Underground storage tanks (0022)	Home heating oil
Apartments and condominiums (0023)	Swimming pool maintenance chemicals; ¹³ pesticides for lawn and garden maintenance and cockroach, termite, ant, rodent, and other pest control; ^{11,12} wastes from on-site sewage treatment plants; household hazardous wastes ¹⁰

**TABLE 1 (cont.)
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GOVERNMENT SOURCES (E)

TYPE OF SOURCE	HEALTH, ENVIRONMENTAL, OR AESTHETIC CONTAMINANT^{1,2,3}
Schools (0024) and government offices and grounds (0025)	Solvents; pesticides; ^{11,12} acids; alkalis; waste oils; machinery/vehicle servicing wastes; gasoline and heating oil from storage tanks; general building wastes ¹⁵
Park lands (0026)	Fertilizers; ⁸ herbicides; ¹² insecticides ¹¹
Public and residential areas infested with mosquitoes, gypsy moths, ticks, ants, or other pests (0027)	Pesticides ^{7,11}
Highways, road maintenance depots, and deicing operations (0028)	Herbicides in highway rights-of-way; ^{7,12} road salt (sodium and calcium chloride); road salt anticaking additives (ferric ferrocyanide, sodium ferrocyanide); road salt anticorrosives (phosphate and chromate); automotive wastes ⁹
Municipal sewage treatment plants and sewer lines (0029)	Municipal wastewater; sludge; ¹⁶ treatment chemicals ¹⁷
Storage, treatment, and disposal ponds, lagoons, and other surface impoundments (0030)	Sewage wastewater; nitrates; other liquid wastes; microbiological contaminants
Land areas applied with wastewater or wastewater byproducts (0031)	Organic matter; nitrate; inorganic salts; heavy metals; coliform and noncoliform bacteria; ⁶ viruses; nitrates; sludge; ¹⁶ nonhazardous wastes ¹⁸
Storm water drains and basins (0032)	Urban runoff; gasoline; oil; other petroleum products; road salt; microbiological contaminants
Combined sewer overflows (municipal sewers and stormwater drains) (0033)	Municipal wastewater; sludge; ¹⁶ treatment chemicals; ¹⁷ urban runoff; gasoline; oil; other petroleum products; road salt; microbial contaminants
Recycling/reduction facilities (0034)	Residential and commercial solid waste residues
Municipal waste landfills (0035)	Leachate; organic and inorganic chemical contaminants; wastes from households ¹⁰ and businesses; ¹⁵ nitrates; oils; metals
Open dumping and burning sites (0036), closed dumps (0037)	Organic and inorganic chemicals; metals; oils; wastes from households ¹⁰ and businesses ¹⁵
Municipal incinerators (0038)	Heavy metals; hydrocarbons; formaldehyde; methane; ethane; ethylene; acetylene; sulfur and nitrogen compounds
Water supply wells, monitoring wells, older wells, domestic and livestock wells (0039), unsealed and abandoned wells (0040), and test hole/wells (0041)	Surface runoff; effluents from barnyards, feedlots, septic tanks, or cesspools; gasoline; used motor oil; road salt
Sumps and dry wells (0042)	Storm water runoff; spilled liquids; used oil; antifreeze; gasoline; other petroleum products; road salt; pesticides; ⁷ and a wide variety of other substances
Drainage wells (0043)	Pesticides; ^{11,12} bacteria
Well pumping that causes interaquifer leakage, induced filtration, landward migration of sea water in coastal areas; etc. (0044)	Saltwater; excessively mineralized water
Artificial groundwater recharge (0045)	Storm water runoff; excess irrigation water; stream flow; cooling water; treated sewage effluent; other substances that may contain contaminants, such as nitrates, metals, detergents, synthetic organic compounds, bacteria, and viruses

**TABLE 1 (cont.)
CATEGORIES OF POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION**

COMMERCIAL SOURCES (C)

TYPE OF SOURCE	HEALTH, ENVIRONMENTAL, OR AESTHETIC CONTAMINANT^{1,2,3}
Airports (0046), abandoned airfields (0047)	Jet fuels; deicers; diesel fuel; chlorinated solvents; automotive wastes; ⁹ heating oil; building wastes ¹⁵
Auto repair shops (0048)	Waste oils; solvents; acids; paints; automotive wastes; ⁹ misc. cutting oils
Barber and beauty shops (0049)	Perm solutions; dyes; miscellaneous chemicals contained in hair rinses
Boat yards and marinas (0050)	Diesel fuels; oil; septage from boat waste disposal areas; wood preservative and treatment chemicals; paints; waxes; varnishes; automotive wastes ⁹
Bowling alleys (0051)	Epoxy; urethane-based floor finish
Car dealerships (especially those with service depts.) (0052)	Automotive wastes; ⁹ waste oils; solvents; miscellaneous wastes
Car washes (0053)	Soaps; detergents; waxes; miscellaneous chemicals
Camp grounds (0054)	Septage; gasoline; diesel fuel from boats; pesticides for controlling mosquitoes, ants, ticks, gypsy moths, and other pests; ^{7,11} household hazardous wastes from recreational vehicles (RVs) ¹⁰
Carpet stores (0055)	Glues and other adhesives; fuel from storage tanks if forklifts are used
Cemeteries (0056)	Leachate; lawn and garden maintenance chemicals ¹²
Construction trade areas and materials (plumbing, heating and air conditioning, painting, paper hanging, decorating, drywall and plastering, acoustical insulation, carpentry, flooring, roofing and sheet metal, wrecking and demolition, etc.) (0057)	Solvents; asbestos; paints; glues and other adhesives; waste insulation; lacquers; tars; sealants; epoxy waste; miscellaneous chemical wastes
Country clubs (0058)	Fertilizers; ⁸ herbicides; ^{7,12} pesticides for controlling mosquitoes, ticks, ants, gypsy moths, and other pests; ¹¹ swimming pools chemicals; ¹³ automotive wastes
Dry cleaners (0059)	Solvents (perchloroethylene, petroleum solvents, Freon); spotting chemicals (trichloroethane, methylchloroform, ammonia, peroxides, hydrochloric acid, rust removers, amyl acetate)
Funeral services and crematories (0060)	Formaldehyde; wetting agents; fumigants; solvents
Furniture repair and finishing shops (0061)	Paints; solvents; degreasing and solvent recovery sludges
Gasoline services stations (0062)	Oils; solvents; miscellaneous wastes
Hardware/lumber/parts stores (0063)	Hazardous chemical products in inventories; heating oil and fork lift fuel from storage tanks; wood-staining and treating products such as creosote
Heating oil companies, underground/above ground storage tanks (0064)	Heating oil; wastes from truck maintenance areas ⁹
Horticultural practices, garden nurseries, florists (0065)	Herbicides, insecticides, fungicides, and other pesticides ¹²
Jewelry/metal plating shops (0066)	Sodium and hydrogen cyanide; metallic salts; hydrochloric acid; sulfuric acid; chromic acid
Laundromats (0067)	Detergents; bleaches; fabric dyes
Medical institutions (0068)	X-ray developers and fixers; ¹⁹ infectious wastes; radiological wastes; biological wastes; disinfectants; asbestos; beryllium; dental acids; miscellaneous chemicals
Office buildings and complexes (0069)	Building wastes; ¹⁵ lawn/garden maintenance chemicals; ¹² gasoline; motor oil

**TABLE 1 (cont.)
CATEGORIES OF POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION**

COMMERCIAL SOURCES (C) - continued

TYPE OF SOURCE	HEALTH, ENVIRONMENTAL, OR AESTHETIC CONTAMINANT^{1,2,3}
Paint stores (0070)	Paints; paint thinners; lacquers; varnishes; other wood treatments
Photography shops, photo processing laboratories (0072)	Biosludges; silver sludges; cyanides; miscellaneous sludge
Print shops (0073)	Solvents; inks; dyes; oils; photographic chemicals
Railroad tracks and yards (0074)	Diesel fuel; herbicides for rights-of-way; creosote for preserving wood ties
Research laboratories (0075)	X-ray developers and fixers; ¹⁹ infectious wastes; radiological wastes; biological wastes; disinfectants; asbestos; beryllium; solvents; infectious materials; drugs; disinfectants (quaternary ammonia, hexachlorophene, peroxides, chlornexade; bleach); miscellaneous chemicals
Scrap and junk yards (0076)	Any wastes from businesses ¹⁵ and households; ¹⁰ oils
Sports and hobby shops (0077)	Gunpowder and ammunition; rocket engine fuel; model airplane glue
Aboveground and underground storage tanks (0078)	Heating oil; diesel fuel; gasoline; other petroleum products; other commercially used chemicals
Pharmacies (0071)	Spilled and returned products
Transportation services for passenger transit (local and interurban) (0079)	Waste oil; solvents; gasoline and diesel fuel from vehicles and storage tanks; fuel oil; other automotive wastes ⁹
Veterinary services (0080)	Solvents; infectious materials; vaccines; drugs; disinfectants (quaternary ammonia, hexachlorophene, peroxides, chlornexade, bleach); x-ray developers and fixers ¹⁹

INDUSTRIAL SOURCES (B)

TYPE OF SOURCE	HEALTH, ENVIRONMENTAL, OR AESTHETIC CONTAMINANT^{1,2,3}
Material stockpiles (coal, metallic ores, phosphates, gypsum) (0081)	Acid drainage; other hazardous and nonhazardous wastes ¹⁸
Waste tailing ponds (commonly for the disposal of mining wastes) (0082)	Acids; metals; dissolved solids; radioactive ores; other hazardous and nonhazardous wastes ¹⁷
Transport and transfer stations (trucking terminals and rail yards) (0083)	Fuel tanks; repair shop wastes; ⁹ other hazardous and nonhazardous wastes ¹⁷
Aboveground and underground storage tanks and containers (0084)	Heating oil; diesel and gasoline fuel; other petroleum products; hazardous and nonhazardous materials and wastes ¹⁸
Storage, treatment, and disposal ponds, lagoons, and other surface impoundments (0085)	Hazardous and nonhazardous liquid wastes; ¹⁸ septage; sludge ¹⁶
Chemical landfills (0086)	Leachate; hazardous and nonhazardous wastes; ¹⁸ nitrates
Radioactive waste disposal sites (0087)	Radioactive wastes from medical facilities, power plants, and defense operations; radionuclides (uranium, plutonium)
Unattended wet and dry excavation sites (unregulated dumps) (0088)	A wide range of substances; solid and liquid wastes; oil-field brines; spent acids from steel mill operations; snow removal piles containing large amounts of salt
Operating and abandoned production and exploratory wells (for gas, oil, coal, geothermal, and heat recovery); test hole wells; monitoring and excavation wells (0089)	Metals; acids; minerals; ¹⁸ sulfides; other sulfides; other hazardous and nonhazardous chemicals ¹⁸
Dry wells (0090)	Saline water from wells pumped to keep them dry
Injection wells (0091)	Highly toxic wastes; hazardous and nonhazardous industrial wastes; ¹⁸ oil-field brines
Well drilling operations (0092)	Brines associated with oil and gas operations

**TABLE 1 (cont.)
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INDUSTRIAL PROCESSES (B) (PRESENTLY OPERATED OR TORN-DOWN FACILITIES)²⁰

TYPE OF SOURCE	HEALTH, ENVIRONMENTAL, OR AESTHETIC CONTAMINANT^{1,2,3}
Asphalt plants (0093)	Petroleum derivatives
Communications equipment manufacturers (0094)	Nitric, hydrochloric, and sulfuric acid wastes; heavy metal sludges; copper-contaminated etchant (e.g., ammonium persulfate); cutting oil and degreasing solvent (trichloroethane, Freon, or trichloroethylene); waste oils; corrosive soldering flux; paint sludge; waste plating solution
Electric and electronic equipment manufacturers and storage facilities (0095)	Cyanides; metal sludges; caustics (chromic acid); solvents; oils; alkalis; acids; paints and paint sludges; calcium fluoride sludges; methylene chloride; perchloroethylene; trichloroethane; acetone; methanol; toluene; PCBs
Electroplaters (0096)	Boric, hydrochloric, hydrofluoric, and sulfuric acids; sodium and potassium hydroxide; chromic acid; sodium and hydrogen cyanide; metallic salts
Foundries and metal fabricators (0097)	Paint wastes; acids; heavy metals; metal sludges; plating wastes; oils; solvents; explosive wastes
Furniture and fixtures manufacturers (0098)	Paints; solvents; degreasing sludges; solvent recovery sludges
Machine and metalworking shops (0100)	Solvents; metals; miscellaneous organics; sludges; oily metal shavings; lubricant and cutting oils; degreasers (TCE); metal marking fluids; mold-release agents
Mining operations (surface and underground) (0101)	Mine spoils or tailings that often contain metals; acids; highly corrosive mineralized waters; metal sulfides
Unsealed abandoned mines used as waste pits (0102)	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals ¹⁸
Paper mills (0103)	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals; ¹⁸ organic sludges; sodium hydroxide; chlorine; hypochlorite; chlorine dioxide; hydrogen peroxide
Petroleum production and storage companies, secondary recovery of petroleum (0104)	Hydrocarbons; oil-field brines (highly mineralized salt solutions)
Industrial pipeline (0105)	Corrosive fluids; hydrocarbons; other hazardous and nonhazardous materials and wastes ¹⁸
Photo processing laboratories (0106)	Cyanides; biosludges; silver sludges; miscellaneous sludges
Plastics materials and synthetics producers (0107)	Solvents; oils; miscellaneous organics and inorganics (phenols, resins); paint wastes; cyanides; acids; alkalis; wastewater treatment sludges; cellulose esters; surfactant; glycols; phenols; formaldehyde; peroxides; etc.
Primary metal industries (blast furnaces, steel works, and rolling mills) (0108)	Heavy metal wastewater treatment sludge; pickling liquor; waste oil; ammonia scrubber liquor; acid tar sludge; alkaline cleaners; degreasing solvents; salt; metal dust
Publishers, printers, and allied industries (0109)	Solvents; inks; dyes; oils; miscellaneous organics; photographic chemicals
Public utilities (phone, electric power, gas) (0110)	PCBs from transformers and capacitors; oils; solvents; sludges; acid solution; metal plating solutions (chromium, nickel, cadmium); herbicides from utility rights-of-way
Sawmills and planers (0111) and gluing wastes	Treated wood residue (copper quinolate, mercury, sodium bazide); tanner gas; paint sludges; solvents; creosote; coating
Stone, clay, and glass manufacturers (0112)	Solvents; oils and grease; alkalis; acetic wastes; asbestos; heavy metal sludges; phenolic solids or sludges; metal-finishing sludge
Welders (0113)	Oxygen, acetylene
Wood preserving facilities (0114)	Wood preservatives; creosote

TABLE 1 (cont.)
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Key to footnotes

¹In general, groundwater 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 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 sources listed on this table are used and managed properly, groundwater contamination is not likely to occur.

²Contaminants can reach groundwater 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.

³This table lists most common wastes, but not all potential wastes. For example, it is not possible to list all potential contaminants contained in storm water runoff or research laboratory wastes.

⁴Contaminant WHPP Number.

⁵Facility WHPP Code.

⁶Coliform 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 water supplies.

⁷Pesticides include herbicides, insecticides, rodenticides, fungicides, and avicides; 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 (EPA, 1990b), which EPA classifies as moderately toxic (class 3) and slightly toxic (class 4) materials, respectively (Meister Publishing Company, 1991).

⁸The EPA National Pesticides Survey (EPA, 1991) found that the use of fertilizers correlates to nitrate contamination of groundwater supplies.

⁹Automotive wastes can include gasoline; antifreeze; automatic transmission fluid; battery acid; engine and radiator flushes; engine and metal degreasers; hydraulic (brake) fluid; and motor oils.

¹⁰Toxic or hazardous components of common household products are noted on the attached table (EPA 1990c).

¹¹Common household pesticides for controlling pests such as ants, termites, bees, wasps, flies, cockroaches, silverfish, mites, ticks, fleas, worms, rats, and mice can contain active ingredients including naphthalene, phosphorus, xylene, chloroform, heavy metals, chlorinated hydrocarbons, arsenic, strychnine, kerosene, nitrosamines, and dioxin.

¹²Common 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.

¹³Swimming 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.

¹⁴Septic tank/cesspool cleaners include synthetic organic chemicals such as 1,1,1 trichloroethane, tetrachloroethylene, carbon tetrachloride, and methylene chloride.

¹⁵Common wastes from public and commercial buildings include automotive wastes (see above definition); rock salt; and residues from cleaning products that may contain chemicals such as xlenols, glycol esters, isopropanol, 1,1,1-trichloroethane, sulfonates, chlorinated phenols, and cresols.

**TABLE 1 (cont.)
POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION**

Key to footnotes (cont.)

¹⁶Municipal wastewater treatment sludge can contain organic matter; nitrates; inorganic salts; heavy metals; coliform and noncoliform bacteria (see above definition); and viruses.

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

¹⁸The 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) discharged from businesses.

¹⁹X-ray developers and fixers may contain reclaimable silver, glutaldehyde, hydroquinone, phenedone, potassium bromide, sodium sulfite, sodium carbonate, thiosulfates, and potassium alum.

²⁰This table lists potential groundwater contaminants from many common industries, but it does not address all industries.

Source: Wyoming Department of Environmental Quality