Sources of Groundwater Contamination

DEP previously identified and prioritized a list of major groundwater contamination sources and the information was briefly reviewed and updated for this report. The priorities include industrial facilities, surface impoundments including centralized impoundments at unconventional gas well sites, underground storage tanks, hazardous waste sites, landfills, waste piles, aboveground storage tanks, manure/fertilizer applications, chemical facilities, septic systems, acid mine drainage, and abandoned oil and gas wells. The contaminants associated with these sources are also shown. Additionally, bulk salt storage and active natural gas wells were noted as significant sources of ground water contamination by one region.

Multiple regional studies have indicated 30% to 90% of private water wells have total coliform contamination. In addition, one study showed up to 30% *E. coli* contamination. A USGS study (Zimmerman, T.M., Zimmerman, M.L. and Lindsey, B.D., 2001, Relation between selected well construction characteristics and occurrence of bacteria in private household supply wells, south-central and southeastern Pennsylvania: USGS WRIR 01-4206, 22 p.) stated that either or both well construction and aquifer contamination could be responsible for the results, but problems were more likely to occur where the well was poorly constructed. Pennsylvania currently has no statewide private water well construction requirements.

Major Sources of Groundwater Contamination

Contaminant Source	High Priority Sources (√)	Factors Considered in Selecting Contaminant Sources (1)	Contaminants (2)
Agricultural Activities			
Animal feedlots			
Chemical facilities	√	ADCEFG	ABCDE
Drainage wells			
Manure/fertilizer applications	√	ABCDEFGH	DEIK
On site pesticide mixing & loading			
Pesticide applications			
Storage/Treatment Activities			
Land application of biosolids			
Lawn maintenance/pest treatment			
Material stockpiles			
Storage tanks (above ground)	√	ABCDEFGH	ABC
Storage tanks (underground)	√	ABCDEFGH	ABC
Surface impoundments (all types)	√	ABCDEFGH	ABFGHJK
Waste piles or tailings	√	ABCDEFGHI (slag/CKD)	AGJKL
Disposal Activities			
Abandoned landfills	√	ABCDE	ADGJ
Landfills (current)	√	ADEFGHI	ABCDEFGH
Septic systems	√	ABCDEFGH	EIK
Underground injections			
Resource Extraction			
Abandoned oil/gas wells	√	DHI	BFGL (CH_4)
Existing/active oil/gas wells		ACDEFG	ABFGJKL (CH_4, C_2H_6)
Abandoned/poorly built water wells			
Coal mining/acid mine drainage	√	BCDEFH	JKL (pH)
Quarries (noncoal)/borrow pits			
Other			
Atmospheric deposition			
Industrial facilities	√	ABCDEFG	ABCGL (PFCs)
Hazardous waste generators			
Hazardous waste sites	√	ABCDEFG	ABCDEGHIJKL (PFCs)
Natural groundwater conditions **(3)**			
Petroleum/fuel pipelines			
Sewer lines			
Salt storage & Road deicing		ABCDEF	FGK
Urban runoff			

Major Sources of GW Contamination Table (Continued)

(1) Factors in Selecting a Contaminant Source

A. Human health and/or environmental risk (toxicity)
B. Size of the population at risk
C. Location of the source relative to drinking water sources
D. Number and/or size of contaminant sources
E. Hydrogeologic sensitivity
F. State findings, other findings
G. Documented from mandatory reporting
H. Geographic distribution/occurrence
I. Other criteria (please describe)

(2) Contaminants

A. Volatile organic chemicals
B. Petroleum compounds
C. MTBE/TBA
D. Pesticides
E. Nitrates
F. Salinity/brine
G Metals
H. Radionuclides
I. Microbiological
J. Sulfates, manganese and/or iron
K. Total dissolved solids
L. Other contaminant (please describe)

(3) This could include natural occurring contaminants such as radium, radon, sulfate, arsenic, iron, manganese, salt, etc.