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	
Animal feedlots Chemical facilities Drainage wells Manure/fertilizer applications On site pesticide mixing & loading Pesticide applications Storage/Treatment Activities Land application of biosolids Lawn maintenance/pest treatment Material stockpiles Storage tanks (above ground) Storage tanks (underground) Storage tanks (underground) Valoue ABCDEFGH ABC Surface impoundments (all types) Waste piles or tailings ABCDEFGHI (slag/CKD) AGJKL Disposal Activities Abandoned landfills Landfills (current) ABCDEFGHI AB	
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Septic systems	
Septic systems √ ABCDEFGH EIK	Н
Resource Extraction	
Abandoned oil/gas wells √ DHI BFGL (CH₂	ı)
Existing/active oil/gas wells ACDEFG ABFGJKL (CH ₄ , C ₂ H ₆)
Abandoned/poorly built water wells	
Coal mining/acid mine drainage √ BCDEFH JKL (pH)	
Quarries (noncoal)/borrow pits	
Other	
Atmospheric deposition	
Industrial facilities	-Cs)
Hazardous waste generators	
Hazardous waste sites √ ABCDEFG ABCDEGH (PFCs)	IJKL
Natural groundwater conditions (3)	
Petroleum/fuel pipelines	
Sewer lines	
Salt storage & Road deicing ABCDEF FGK	
Urban runoff	

Major Sources of GW Contamination Table (Continued)

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(1) Factors in Selecting a Contaminant Source	(2) Contaminants	
A. Human health and/or environmental risk (toxicity)	A.	Volatile organic chemicals
B. Size of the population at risk	B.	Petroleum compounds
C. Location of the source relative to drinking water sources	C.	MTBE/TBA
D. Number and/or size of contaminant sources	D.	Pesticides
E. Hydrogeologic sensitivity	E.	Nitrates
F. State findings, other findings	F.	Salinity/brine
G. Documented from mandatory reporting	G	Metals
H. Geographic distribution/occurrence	H.	Radionuclides
I. Other criteria (please describe)	l.	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.