

ENVIRONMENTAL DRILLING

DEFINITIONS

PEL - Permissible Exposure Limits, TWA of contaminates concentrations that must not be exceeded during any 8 hour work shift of a 40 hour work week.

REL - Recommended Exposure Limit, a NIOSH standard, TWA of contaminates concentrations for up to a 10 hour workday during a 40 hour work week.

TWA - Time Weighted Average, amount of contaminate concentration measure averaged out over given time period.

STEL - Short Term Exposure Limit, is a fifteen minute TWA exposure that should not be exceeded any time during the day.

PPM - Parts per Million, a measure of concentration of contaminate also listed as milligrams per liter (mg/l).

PPB - Parts per Billion, a measure of concentration of contaminate also listed as micrograms per liter (ug/l).

IDLH - Immediate Dangers to Life and Health, a maximum concentration above which only a highly reliable breathing apparatus providing maximum worker protection was permitted.

MSDS - Material Safety Data Sheet, a source of hazmat information useful in the recognition and identification of hazardous materials.

PPE - Personal Protection Equipment, Refers to respirators, protective clothing, designed to allow a worker to safely perform duties in a zone of contamination. Also categorized as Level A, B, C, and D. Level A being the most protective, Level D being the least protective.

Aliquot - a sample of equal size portion.

RCRA - Resource Conservation and Recovery Act, Federal Law that establishes guidelines for managing solid and hazardous waste.

CERCLA - Comprehensive Environmental Response Compensation and Liability Act. Federal Law that establishes a trust fund to finance clean up and recovery of hazardous waste where ownership could not be determined. (Superfund)

SDWA - Safe Drinking Water Act, Federal law establishes standards for insuring the safety of drinking water.

MAJOR SOURCES OF GROUND WATER POLLUTION

Waste Disposal Sources

- 1) Unlined landfills, dumps, and surface impoundment
- 2) Mining wastes
- 3) On-lot wastewater disposal systems
- 4) Radioactive wastes
- 5) Sludge management via land spreading
- 6) Abandoned sites

Nondisposal Sources

- 1) Abandoned (Illegal) wells
- 2) Accidental spills
- 3) Agricultural chemical practices
- 4) Artificial recharge
- 5) Highway deicing compounds
- 6) Petroleum exploration
- 7) Leaking underground storage tanks and pipelines

ORGANIC COMPOUNDS

Three general classes of contaminate:

1) PESTICIDES:

Chlorinated hydrocarbons, (endrin, lindane, methoxychlor, toxophene)
Chlorophenoxy, (2,4D- 2,4,5-TP)

2) TRIHALOMETHANES:

(By product of disinfection, chlorine and natural occurring organic material)

3) VOLATILE SYNTHETIC ORGANIC CHEMICALS (VOC's):

Carbon Tetrachloride

Benzene

Vinyl chloride

Chemicals that are not naturally occurring

Become stable in an aqueous environment

Possible Carcinogenic in animals and humans

Suspected to be genotoxic, affect DNA molecules in humans

SAMPLING ORGANIC COMPOUNDS

Filled sample vials must be devoid of air bubbles

Sample must reflect ground water conditions surrounding the well that is sampled, not water stored in well casings or groundwater pulled into the well from extended distances due to over purging.

DEVELOPMENT OF MONITORING WELLS

Proper development is essential to monitoring wells.

- 1) Drilling residues remaining in borehole will effect water chemistry
- 2) Bentonite can effect chemical analysis as long as 90 days
- 3) Increase yield of well / requires less sampling time