

Surface Water to Ground Water Ramifications for Public Drinking Water Supplies

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Examples of Public Health Consequences of Drinking Surface-Water Influenced Ground Water or Improperly Treated Surface Water

- ***E.coli* 0157:H7** – 4 dead, 243 ill, 1989-90, Cabool Missouri; 2 dead, 1,000 ill, 1999, New York State. Ground Water Under the Direct Influence of Surface Water (GUDISW)
- ***Salmonella*** -1993, 7 dead, Gideon, Missouri – bird droppings in uncovered surface water storage reservoir
- **Protozoans** - *Giardia lamblia*, *intestinalis*, *Cryptosporidium parvum* - 1993, Milwaukee WI, *Cryptosporidium* – 400,000 ill, 50 dead – improperly treated surface water

Examples of Public Health Consequences from Surface Water Recharge of Ground Water, cont.

- ***Campylobacter jejuni*** – 6 dead Walkerton, Ontario 2000 - GUDISW
- Cholera
- Viruses – Norwalk, Rotavirus
- Other microbes from intestines of humans and animals, can produce powerful toxins, can cause bloody diarrhea, kidney failure, etc.
- Inorganic and Organic Chemicals

Requirements for Ground Water Systems **NOT** Under the Influence of Surface Water

- If not GUDISW, less public health threat, therefore...
- Monitoring costs are lower than surface-water influenced supplies: Bacteria, inorganics (15), radionuclides (4), SOC & VOCs (51),
- Often **no** treatment costs: possibly chlorination
- ...Less expensive to operate: power, basic infrastructure

Requirements for Surface Water or Ground Water **Under** Influence of Surface Water

- Surface Water Treatment Rule 1998 –National costs of SWTR = \$307M;
- 2 new rules with additional requirements for surface water systems since 1998
- Public health control of microbial contaminants
- Turbidity removal performance through filtration
- Filter monitoring every 15 minutes to 4 hours

Requirements for Surface Water or Ground Water **Under** Influence of Surface Water, cont.

- Disinfection (chlorine, UV, ozone) for inactivation of viruses, *Giardia lamblia* and *Cryptosporidium*
- Basic monitoring: Bacteria, inorganics (15), radionuclides (4), SOC & VOCs (51), lead and copper **plus** ongoing source water monitoring for cryptosporidium, disinfection byproducts, treatment techniques

Montana's GUDISW Program

- Determines “direct” surface-water influence on ground water supplies
- Hydrogeological Assessments
- Water Quality Assessments
- Microscopic Particulate Assessments
- About 2060 public water supplies in Montana; about 1900 use ground water; 19 GUDISW systems