The Ohio Ambient Ground Water Quality Monitoring Program Documents Water Quality Impacts

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Outline

• Ambient GW Quality Monitoring Program
  – Description, Well locations
• GW quality Impacts
  – Salt storage
  – Oil production
  – Agriculture
• Conclusions
  – Sustainability
Ambient GW Quality Monitoring

- Approximately 200 active wells;
- Continuous data for some wells since 1970s;
- Analyze raw (untreated) water for 30 inorganic and 61 organic parameters;
- 92% of active wells are public water system wells;
  - Primary focus of data collection is to characterize source water for GW based public water systems.
- Well aquifer types: Sand & Gravel 60%; Sandstone 17%; Carbonate 23%.
Ridgedale HS, NW Ohio Carbonate Well: 200’ deep; 97’ casing

Calcium, Total

Nitrate+Nitrite as N

Chloride, Total

Ammonia, Total

Ca
NO₃
Cl
NH₄
Camden, SW Ohio Sand & Gravel Well: 41’ deep; 28’ casing

Calcium, Total
Reporting Limit = 2 mg/L

Chloride, Total
Reporting Limit = 5 mg/L  Secondary MCL = 250 mg/L

Nitrate+Nitrite as N
Reporting Limit = 0.10 mg/L  Primary MCL = 10 mg/L

Ammonia, Total
Reporting Limit = 0.05 mg/L

Ca
Cl
NO₃
NH₄
Cygnet, NW Ohio Carbonate Well: 209’ deep; 40’ casing
Gratis, SW Ohio
Sand & Gravel Well: 26’ deep; 21’ casing

Calcium, Total
- Reporting Limit = 2 mg/L

Nitrate-Nitrite as N
- Reporting Limit = 0.1 mg/L
- Primary MCL = 10 mg/L

Chloride, Total
- Reporting Limit = 5 mg/L
- Secondary MCL = 250 mg/L

Ammonia, Total
- Reporting Limit = 0.05 mg/L
<table>
<thead>
<tr>
<th>Site</th>
<th>Date</th>
<th>Cl  mg/L</th>
<th>Br  µg/L</th>
<th>Cl/Br</th>
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Heath, Central Ohio Sand & Gravel Well; 230’ deep, 182’ casing

- **Calcium, Total**
  - Reporting Limit = 2 mg/L
  - Graph showing variation from 5/91 to 11/7/12

- **Chloride, Total**
  - Reporting Limit = 5 mg/L
  - Secondary MCL = 250 mg/L
  - Graph showing variation from 5/91 to 11/7/12

- **Nitrate+Nitrite as N**
  - Reporting Limit = 0.10 mg/L
  - Primary MCL = 10 mg/L
  - Graph showing variation from 5/91 to 11/7/12

- **Ammonia, Total**
  - Reporting Limit = 0.05 mg/L
  - Graph showing variation from 5/91 to 11/7/12

Graphs illustrate water quality parameters over time.
Heath, Central Ohio  Sand & Gravel Well;  230’ deep, 182’ casing

- **Ammonia, Total**
  - Reporting Limit = 0.05 mg/L
  - NH₄

- **Iron, Total**
  - Reporting Limit = 50 ug/L
  - Secondary MCL = 300 ug/L
  - Fe

- **Manganese, Total**
  - Reporting Limit = 30 ug/L
  - Secondary MCL = 50 ug/L
  - Mn

- **Arsenic, Total**
  - Reporting Limit = 2 ug/L
  - Primary MCL = 10 ug/L
  - As
Conclusions

- PWS wells sensitive to local land use;
- Documented loss of well fields;
- Abandoned well fields:
  - Lost monitoring point;
  - Out of site, out of mind;
- Sustainability issues.
Data & Acknowledgments

- Data Available on Ohio EPA Web Page:
  [http://www.epa.state.oh.us/ddagw/gwqcp.aspx](http://www.epa.state.oh.us/ddagw/gwqcp.aspx)

- PWS Operators
- Ohio EPA District staff & DES staff
- Linda Slattery, Michael Slattery, and Jeff Patzke