Overview of DEEP’s Road Salt Investigations

CEHA Fall Chloride Workshop
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November 14, 2018
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Overview

1. Sodium & Chloride Complaints/Background Information
2. Sources of Sodium & Chloride
3. Road Salt - Common Links
4. DEEP’s Potable Water Program
5. Water Quality Concerns
6. Strategy for Addressing Road Salt Impacted Wells
Changing Expectations...
Sodium & Chloride Impacts to Private Wells

• 2014 - increase in complaints relating to elevated sodium and chloride in private wells
• 120+ impacted wells identified within past 5 years attributed to road salt pollution
• Typical concentrations in private drinking water wells
   Sodium = 300+ mg/L (100 mg/L Guidance)
   Chloride = 600+ mg/L (250 mg/L MCL)
Sources of Sodium and Chloride

- **Natural salt deposits**: not common in CT
- **Seawater**: brackish water, salt-water intrusion
- **Salt water pool backwash**
- **Agricultural, industrial chemicals, landfill leachate**
- **Water softeners**: add salt to water supply, brine backwash
- **Road Salt**: storage, handling, application
Sources of Road Salt pollution:

- **Road application/run off**
  - Most common cause
  - Drainage towards well
  - Infiltration/groundwater recharge in the vicinity
- **Parking lots** – high application rate
- **Salt storage facility** – storage and handling
- **Plow contractor** – washing trucks
- **Plowing/placing snow on or near wellhead**
  - Pushing snow off pavement/over curbing
Too much?
Where Does All That Salt Go?

- Melt water overland flow
- Storm drain overland flow
- Snow on roadside infiltration
Where Does All That Salt Go?
How Road Salt gets into Drinking Water Wells

*Common links between Road Salt application and elevated sodium/chloride levels in wells:*

- Shallow depth to bedrock
- **Road drainage:** open drainage, catch basins, drainage ditches/easements, outfalls
- Well location
- **Disposal/stockpiling of snow:** plowed off road, salt spray, snow placed in front yards
- **Poor well construction:** shallow/dug wells, damaged casing, well sealed below ground
Elevated Sodium and Chloride in Drinking Water supplies can cause:

- **Health-related:**
  - Increased sodium intake (salt-restricted diets)
  - Leaching of lead and copper from plumbing
  - Mobilization of naturally-occurring manganese

- **Corrosivity:**
  - Leads to premature failure of plumbing & appliances
CT’s Potable Water Law – **Connecticut General Statutes Section 22a-471**

- DEEP investigates complaints regarding potential impacts to drinking water wells as the result of **man-made sources of pollution**
  - Naturally-occurring contaminants not addressed*
- 22a-471 requires the Responsible Party to provide a **short-term supply of drinking water** and evaluate long-term solution for safe supply of drinking water
DEEP’s Potable Water Program

2013 Amendments to 22a-471

- DEEP no longer has the authority to provide short-term supply of drinking water

- Funding eliminated for short-term supply of drinking water (bottled water/filters)
DEEP’s Potable Water Program

**DEEP’s Investigation**

- Limited resources - relying on well owners to test their wells
- Well water sampling, data analysis
- Well-head inspection, water treatment system use
- File Review: well completion reports, well water quality reports
DEEP’s Potable Water Program

- Geologic mapping data
  - Aerial Photography/Streetside Imagery
  - Bedrock/Lithogeochemical maps
  - Topography/Surficial Geology/Soils

- Further testing (if necessary)
  - Additional Well Water testing
  - Shallow Groundwater/Soil testing
  - Snowpack samples

- Work with local and state Health Departments
Strategy for Addressing Road Salt Impacted Wells

Solutions for wells impacted by Road Salt application:

Short-term:
- Providing **bottled water**
- Roadway **drainage improvements**
- Road salt application **BMPs**
- **Source removal**
- On-going **monitoring** of well water quality
Strategy for Addressing Road Salt Impacted Wells

Long-term Options:

- Installing a **Secondary Well Seal** (Jaswell seal)

**Pros:**
- Sealing off a leaking well casing seal
- Sealing off a particular zone/fractures contributing to poor water quality
- Relatively inexpensive to install

**Cons:**
- Reduced storage and yield
- Can be difficult to ensure a tight seal
Strategy for Addressing Road Salt Impacted Wells

Secondary well seal – Jaswell Seal
Strategy for Addressing Road Salt Impacted Wells

Long-term Options:

- Drilling a **new well** – well siting limitations
- Connecting to **public water** (if available – permanent solution)
- **Community well**
- POU or POE treatment:
  - **Reverse Osmosis**