GENERAL WATER CHEMISTRY PROJECT

Minnesota Community Public Water Systems

Presented by:
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Project Objectives

- Establish baseline chemistry data for community drinking water sources statewide.
- Understand changes to the water chemistry during treatment and filtration.
- Identify the chemical constituents of water at the entry point to the distribution system.
- Identify changes to the water quality that occur in the distribution system.

Anticipated uses for chemistry data

- Provide up-to-date Public Water Supply Data similar to that found in “The Brown Books” (3 – volume set produced by MDH in 1989)
  - MDH regularly receives requests for water chemistry data.
  - Electronic data will save staff time when fulfilling these requests.
- Easily accessible water chemistry data for response to potential contamination events.
- Improve understanding of water quality from each aquifer and well depth.

Analytes - Source

- Ammonia Nitrogen
- Total Phosphorus
- Total Organic Carbon
- Total Alkalinity
- Carbonate Alkalinity
- Bicarbonate Alkalinity
- Dissolved Oxygen
- Conductivity
- Total Dissolved Solids
- Oxidation Reduction Potential
- Temperature
- pH
- Heterotrophic Plate Count
- Arsenic
- Barium
- Bromide and Chloride
- Calcium
- Iron
- Potassium
- Sodium
- Sulfate
- Nitrite
- Magnesium
- Strontium
- Metals Quick Scan (not regulatory compliant)

Analytes – Entry Point

- Ammonia Nitrogen
- Total Phosphorus
- Total Organic Carbon
- Total Alkalinity
- Carbonate Alkalinity
- Bicarbonate Alkalinity
- Dissolved Oxygen
- Conductivity
- Total Dissolved Solids
- Oxidation Reduction Potential
- Temperature
- pH
- Heterotrophic Plate Count
- Calcium
- Magnesium
- Iron
- Manganese
- Nitrate + Nitrite
- Nitrite

Analytes – Distribution System

- Ammonia Nitrogen
- Total Phosphorus
- Total Organic Carbon
- Total Alkalinity
- Carbonate Alkalinity
- Bicarbonate Alkalinity
- Dissolved Oxygen
- Conductivity
- Total Dissolved Solids
- Oxidation Reduction Potential
- Temperature
- pH
- Heterotrophic Plate Count

How analytes were selected

- Constituent is not part of compliance monitoring program
- Laboratory has an inexpensive, established method for analysis
- Field analysis takes minimal time with consistent results
- Data might help the water system understand the underlying cause of treatment difficulties
- Data would be useful in helping systems improve treatment processes and distribution operations

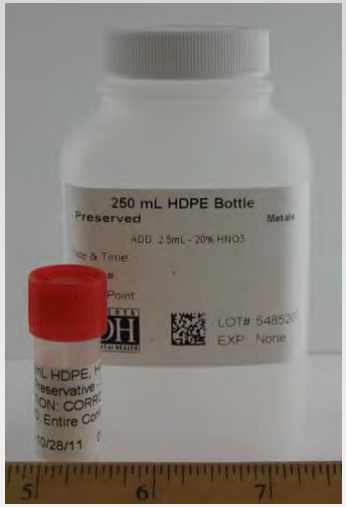
Methods and Equipment

- Sample up to 3 wells, 3 entry points and 1 distribution location for each system.
  - Wells must be running prior to sampling (at least 3 well volumes).
  - Coordinate with Source Water Protection to select representative wells for the water system.

<u>Laboratory Analysis</u>

250 mL sample bottles

- Metals
- Nutrient
- General



Send to MDH Environmental Health Lab.

Methods and Equipment

Field Analysis

Hach DR 890
- Ammonia Nitrogen
- Nitrite

Heterotrophic Plate Count
- 120 mL bacti bottle
- Plate prepared and counted in field office

YSI 556 Meter
- Temperature
- Conductivity
- DO
- pH
- ORP

Communication of Analytical Results

Lab and field analysis data entered into MNDWIS.

- Internal Use

  Search for Results – Select PWS Program: General Water Chemistry Project (IQ)

  - Includes Metals Quick Scan data
  - Can export to MS Excel

- Public Use: Utilities, consultants, industry and others

  Reports – Print Results – Community – General Water Chemistry Batch or Individual

  - Send to water system as soon as possible after sampling
  - Formatted for public communication
  - Does not include Metals Quick Scan data

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MINNESOTA DEPARTMENT OF HEALTH

SECTION OF DRINKING WATER PROTECTION

Report of Analytical Results

Project Name: **General Water Chemistry Project**

System Name: **Richfield** PWSID: **1270045**

ANALYSIS RESULTS -- SOURCES

Date Collected: 06/20/2011
Date Received: 06/20/2011
Collected by: Munson, Anna

Constituent		Well #1		Well #3		Well #6	MCL or Secondary Standard
Alkalinity, Bicarbonate (mg/L)		280		280		280	
Alkalinity, Carbonate (mg/L)		1.4		1		1.3	
Alkalinity, Total (mg/L)		280		280		280	
Ammonia Nitrogen, Total (mg/L)		.2		.1		.35	
Arsenic (ug/L)	<	1	<	1		1.77	10.4
Barium (ug/L)		117		112		150	2000
Bromide (mg/L)		.0728		.108		.096	
Calcium (mg/L)		86.1		97.2		95.1	
Chloride (mg/L)		51.5		80.1		66.3	250*
Dissolved Oxygen (mg/L)		.16		.11		.18	
Hetero. Plate Count (SimPlate) (MPN/ml)		.2		.2	<	.2	
Iron (ug/L)		400		448		740	300*
Magnesium (mg/L)		34.6		39.5		37.4	
Manganese (ug/L)		67.9		159		230	50*
Nitrite Nitrogen, Total (mg/L)	<	.01	<	.01		.02	1

Project Timeline

- Approximately 1,000 community water systems.
- Sampling began in the fall of 2010 with a limited run.
- Quarters 2 and 3 of 2011 – completed about 160 systems.
  - State shut-down hindered progress. Warm autumn helped a bit.
- Sampling will continue Q2/Q3 of 2012 and 2013.
  - We have many systems remaining.

Goal: Finish sampling by Winter 2013.

Studies by Other Agencies

MDH General Water Chemistry Project

Complements water quality studies from other agencies

Unique as it is community public water systems only

Unique in that it is wells, treatment, and distribution

Unique in that it is statewide data

Questions?

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