

Analysis of Groundwater Monitoring of Residential Wells

In the

Vicinity of Carbon Limestone Landfill,

Poland Township, Mahoning County, Ohio

By

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Submitted in Partial Fulfillment of the Requirements

For the Degree of

Master of Science

In the

Environmental Studies  
Program

YOUNGSTOWN STATE UNIVERSITY

December 2012

Analysis of Groundwater Monitoring of Residential Wells in the Vicinity Of Carbon  
Limestone Landfill, Poland Township, Mahoning County, Ohio

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## **ABSTRACT**

This research analyzed test results of private groundwater wells within a one mile radius of the Carbon Limestone Landfill (CLL) located in Poland Township, Mahoning County, Ohio, with the objective of determining the impact the CLL had on groundwater quality over a sampling period of May 2003 – September 2010. Data was collected by the Mahoning County Board of Health District as a part of the Groundwater Surveillance in the Vicinity of Mahoning County Landfills project. The data collected from the Board of Health contained all results from participating wells, which began in 2003. Analysis of the data included creating time-series graphs of each parameter tested for individual wells using Microsoft Excel graphing capabilities, as well as mapping the concentrations using ArcGIS to illustrate any changes to the groundwater over time. Both time-series graphing and ArcGIS mapping analyses suggest that no impacts to the local groundwater by the Carbon Limestone Landfill were shown during the May 2003 – September 2010 sampling period. The inclusion of on-site data from Carbon Limestone Landfill monitoring wells for four discrete dates, however, show possible migrations of certain chemical constituents from the landfill. Continued monitoring and incorporation of more recent on-site sampling data is needed to fully evaluate the possible relationships of on-site water quality to off-site (residential) water quality.

## Acknowledgements

I would like to thank my advisor and mentor, Dr. Jeff Dick ('Doc') for his patience and leadership throughout, not only this project, but my entire college career. He has taught me more than groundwater and geology, but also about life and especially how to believe in myself. I also want to thank my committee members who were each a valuable resource to this project: Dr. Felicia Armstrong, Dr. Colleen McLean, and Mr. Len Perry. Additional acknowledgements are for Mahoning County District Board of Health for making the groundwater data available for this research.

Gratitude is also given to my colleagues and friends who gave me that 'extra push' or a comforting smile and hug on the days that I needed it. To two very special friends: 'coco cox' and 'pressure makes diamonds' ~ I will never be able to thank you enough.

To my parents, sister, nieces, and entire family: thank you for never losing faith in me and for believing in all that I can do! Dad – your 'Bug' has come a long way!

Last, but not least, I have to acknowledge and thank my husband and closest friend, Nick. Without him and the sacrifices he has made, I would have never been able to achieve this goal. Thank you for always giving me not just a house to go to, but a home.

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## **Chapter 1 Introduction**

Groundwater is a natural pathway for chemicals to be transported in the environment. Groundwater quality is the natural chemical and physical state of the water as well as alterations to the natural state of the water that may occur from anthropogenic activities. Alteration of the chemical and physical state of groundwater can occur naturally from geologic materials, or from a multitude of anthropogenic sources (USEPA, 2012).

Anthropogenic sources of groundwater impact can involve waste products and the disposal of wastes in landfills. As a population grows, the amount of waste generated increases. Landfills have been used as storage for wastes for many years. The storage of waste in a landfill can pose many issues with soils, groundwater, and surface waters.

### Overview of Project

In 1991, a “host community” agreement between Mahoning County District Board of Health (DBOH), Allied Waste Services, Poland Township, Ohio, and Mahoning County’s Solid Waste Management District was initiated to provide funding for a groundwater monitoring program for residents living within a one mile radius of the Carbon Limestone Landfill in Mahoning County, Ohio. This program began at the request of residents in the vicinity of Mahoning County’s eight landfill facilities.

Participating resident’s wells are sampled semi-annually by the Mahoning County DBOH and analyzed in the DBOH’s accredited laboratory for 27 parameters. Each participant receives a detailed report of the test results, allowing the homeowner to

compare current results to previous results. (Mahoning County District Board of Health, 2006)

The Carbon Limestone Landfill (CLL) is an active landfill located in Poland Township, Mahoning County, Ohio. There are 210 residential wells within the one mile radius of the CLL. Mahoning County DBOH water quality test results are available from 2003 to 2010, with 73 wells participating in the program as of 2010. The test results were analyzed for any changes over time to determine the impact the CLL has on the groundwater quality of the area.

Water quality results from the CCL were included for four dates, which matched to the Mahoning County District Board of Health sampling dates. It is important to use common sampling dates to combine on-site water quality data with off-site data. This data is from on-site monitoring completed by Eagon and Associates. With the inclusion of this data, a more meaningful map can be created showing water quality results.

#### Thesis Objectives and Summary

This research analyzed test results of private groundwater wells within a one mile radius of the Carbon Limestone Landfill (CLL) located in Poland Township, Mahoning County, Ohio, with the objective of determining the impact the CLL has on groundwater quality over time. Data was collected by the Mahoning County Board of Health District as a part of the Groundwater Surveillance in the Vicinity of Mahoning County Landfills project. The data collected from the Board of Health contained all results from participating wells, which began in 2003. Additional water quality data from on-site CCL monitoring wells for the period of May 2003 – November 2005 will augment/compliment the Mahoning County District Board of Health data. Analysis of the data included

creating time-series graphs of each parameter tested for individual wells, as well as mapping the concentrations to illustrate changes to the groundwater over time. The research findings will aid in the continuing monitoring of residential groundwater quality in the vicinity of landfills.



## **Chapter 2 Literature Review**

### Introduction

Groundwater studies encompass many aspects of the natural environment. The occurrence and interaction of groundwater with surrounding environments is variable and complex (ODNR, 2011). The quality of groundwater can be affected by numerous sources including contamination spills and infiltration from land uses, leakage from underground storage tanks and septic tanks, and by naturally occurring solids, liquids, and gases (Fetter, 1994; USGS, Ohio EPA, 2010).

Throughout history people have relied on both surface and groundwater for fresh water supply. In 2000, groundwater accounted for 21% of all water withdrawals in the United States (Hutson, et al., 2004). The usage of groundwater is increasing due to higher demands for fresh water from the exponentially growing human population (Ahn and Chon, 1999). The increased demands for fresh water sources have impacted natural groundwater environments drastically in some places.

Groundwater quality varies from one place to another due to geology, land use, and other factors. Completely naturally pure water does not exist; even without anthropogenic inputs, groundwater contamination can occur naturally. As groundwater flows through soil, bed rock, and other rock layers, it will dissolve and absorb substances (Hutson, et al., 2004). Possible impacts to groundwater are landfills, areas where semi-solid and solid wastes are disposed of (Fetter, 1994). One of the main impacts a landfill can have on groundwater quality is occurrence of leachate entering an aquifer system (Lu, et al., 1985).

## Groundwater

Groundwater is generally defined as the water existing below the ground surface that fills void spaces in geologic materials such as pores, fractures, and joints (Ohio EPA, 2010). The main source of groundwater is infiltration through the local soil column from direct precipitation as well as surface run off, as well as infiltration from surface water bodies (ODNR, 2011).

The hydrologic cycle is the natural cycle in which water moves throughout the environment. Figure 2-1 displays a simple diagram of the hydrologic cycle including evaporation, condensation, precipitation, surface runoff, transpiration, infiltration, and groundwater flow. These processes control migration of water resources (Ohio EPA, 2010).

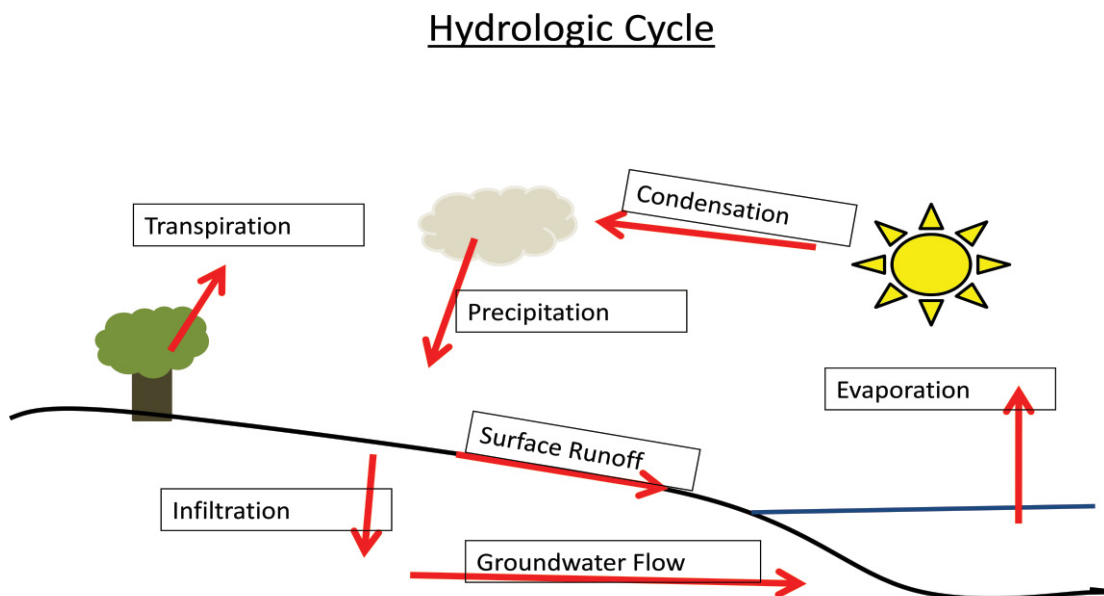


Figure 2-1 : Hydrologic Cycle

Infiltration occurs as water from precipitation filters through pore spaces within soil and sand or rock until it reaches a layer in which it cannot easily move through. This layer is referred to as an impermeable layer, a relatively impermeable material or layer of impermeable material such as clay or shale (USGS, 2001). Once the water has reached an impermeable layer, it will collect above the layer and move laterally through a higher permeable layer (Angle, 2003). The higher permeable layer is an aquifer, a geologic unit that can store and transmit water at rates high enough to supply reasonable amounts to water wells (Fetter, 1994).

Groundwater flow in aquifers is controlled by laws of physics and thermodynamics and is complex and varied (Fetter, 1994; Ohio EPA, 2010). Groundwater is generally slow moving, sometimes at rates as little as a few feet per year (USGS, 2001).

#### Surface and Groundwater Interactions

The quality of groundwater depends to a considerable extent on the condition of the surrounding land, especially surface conditions. Through the hydrologic cycle processes, water will dissolve or absorb gases and solids as it travels to the subsurface (Fetter, 1994). This creates a unique natural quality of groundwater that can vary from place to place.

## General Chemistry of Groundwater in Ohio

The state of Ohio has abundant groundwater resources. The average rainfall in the state is 30 – 34 inches per year and infiltration rates of 3 – 16 inches per year (ODNR, 2010). Figure 2-2 illustrates the three main aquifer systems in Ohio – sand and gravel, sandstone, and carbonate systems.

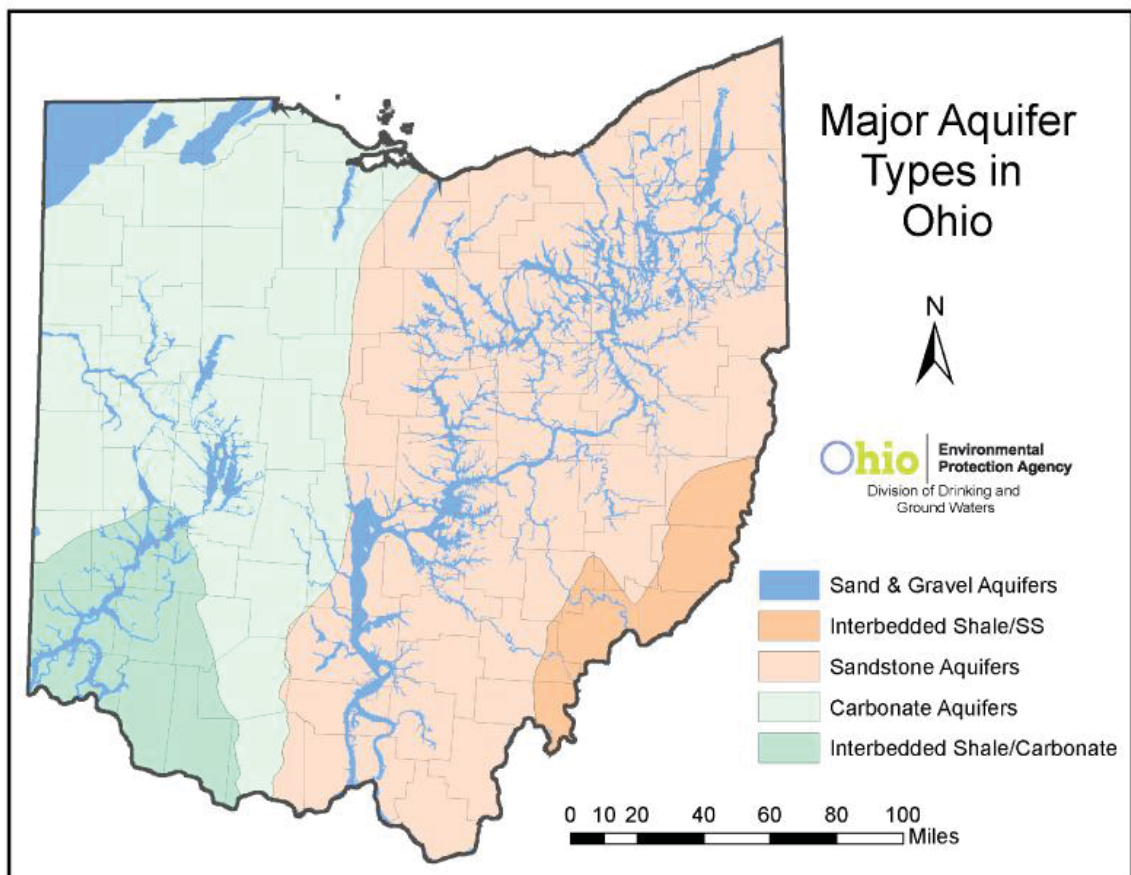


Figure 2-2: Major Aquifers in Ohio (Ohio EPA, 2008)

The Ohio Environmental Protection Agency (Ohio EPA) Division of Drinking and Ground Water is responsible for characterizing the groundwater quality within the state's aquifers. The characterization of groundwater quality comes from data collected from public water supply wells (wells in which 25 or more people use, or wells with a

minimum of 15 connections), the Ohio Ambient Ground Water Monitoring Program, as well as special studies (Ohio EPA, 2000). The Ohio Ambient Ground Water Monitoring Program was established in 1967 to measure water quality in the state's major aquifer systems. Currently 200 wells are a part of the network, with two thirds of the wells in unconsolidated deposits and the other third in bedrock aquifers (Ohio EPA, 2012).

Figure 2-3 illustrates the locations of wells in the Ambient Ground Water Monitoring Program.

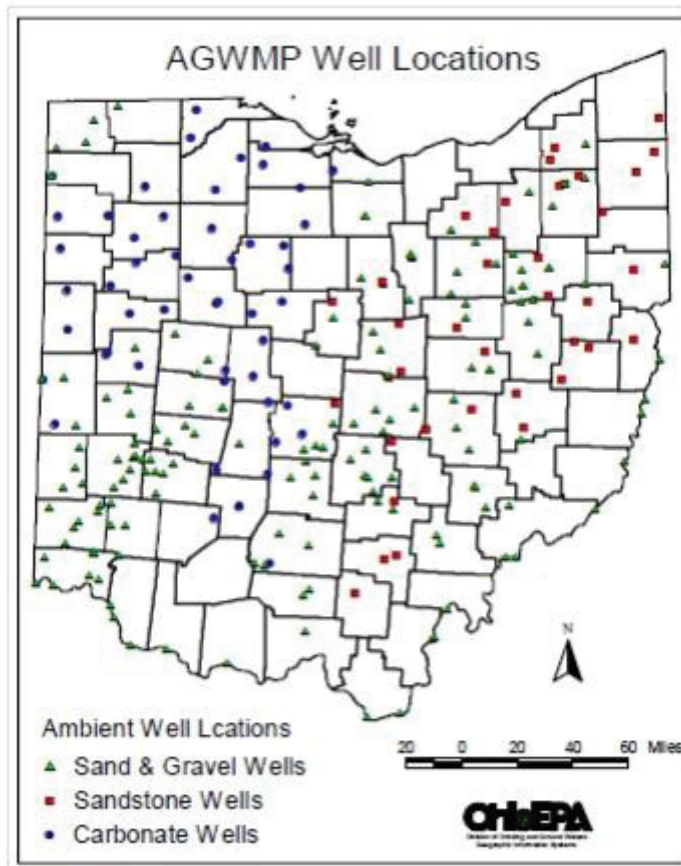


Figure 2-3: Ambient Ground Water Monitoring Program Locations (Ohio EPA, 2002)

The data collected by the Ohio EPA Division of Drinking and Ground Water enables a generalized water quality characterization for each of the major types of aquifers. Combining all of the data onto a piper diagram (Figure 2-4) allows the visible distinction of waters from different origins and chemistries. The small diamond symbols indicate individual mean concentrations and the larger square symbols indicate the average for the aquifer type. The major cations are represented in the left triangle, anions in the right triangle, and composite is represented by the central diamond. The blue symbols represent carbonate aquifer systems, the red: the sandstone aquifer systems: and the green the sand and gravel systems.

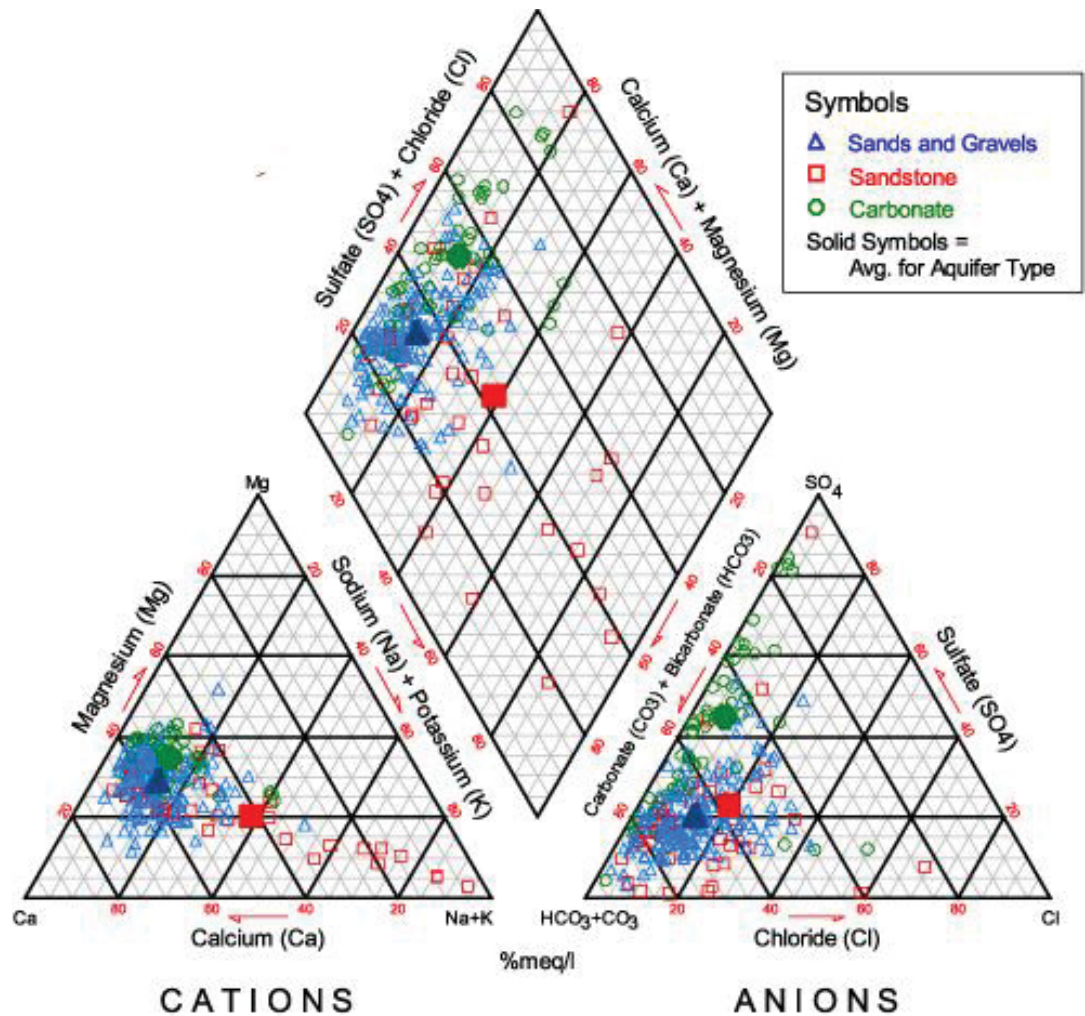


Figure 2-4: Piper Diagram of Ohio's Main Aquifers (Ohio EPA, 2012)

Groundwater in sand and gravel aquifers is located within pore spaces between individual grains. In Ohio, the sand and gravel aquifers are, for the most part, unconsolidated valley outwash deposits from glacial melt water of Quaternary sands and gravels. (Paul C. Rizzo and Associates, Inc., 1991; Ohio EPA, 2000). The general water type of the sand and gravel aquifer in Ohio is calcium bicarbonate. The water quality is characterized by low total dissolved solids (TDS), zinc, fluoride, and sulfate; manganese is elevated (Ohio EPA, 2000).

The carbonate aquifers are characterized as calcium – bicarbonate – sulfate water type. These waters are slightly alkaline and have the greatest mean concentration of calcium, magnesium, sulfate, TDS, alkalinity, strontium, iron, hardness, and conductivity out of all three major aquifer types (Ohio EPA, 2000). The high levels of calcium and magnesium are from the carbonate rocks. High levels of sulfate may indicate presence of organics, iron sulfides in the aquifer, dissolution of gypsum, and/or redox conditions (Ohio EPA, 2002). Strontium, a naturally occurring element may be indicative of the strontium sulfate mineral celestite ( $\text{SrSO}_4$ ) in the Silurian/Devonian bedrock of Ohio (ODNR, 2002).

The sandstone aquifers of Ohio are characterized by a calcium – sodium – bicarbonate water type and exhibit low alkalinity and moderately alkaline pH conditions. Elevated barium levels and low sulfate levels are indicative of a sulfate reduction of barium sulfate within the system (Ohio EPA, 2000). The sandstone aquifers are of upper Paleozoic siltstones, sandstones, conglomerates separated by shales, limestones, clays, and coal seams (Ohio EPA, 2002).

#### Groundwater Parameters

The samples taken by Mahoning County DBOH were tested for twenty-seven parameters, most of which are part of Ohio EPA's primary and Secondary Maximum Contaminate Limits (MCLs). On-site wells at Carbon Limestone Landfill are examined for 22 metal parameters, 11 general parameters, and 5 organic parameters, as listed in Although private wells have no regulations for water quality in the state of Ohio, the samples are compared to the standards set by the Ohio Department of Health's Private



Water System Program and the U.S. EPA's public Drinking Water Standards. Four main guidelines are used in regard to the water quality; Maximum Contaminant Levels (MCLs), Secondary Maximum Contaminant Levels (SMCLs), Action Levels and Recommended Levels.

MCLs:

Established for public drinking water sources by the U.S. EPA for chemicals that pose a potential serious risk to human health and are enforceable.

SMCLs:

Established by the U.S. EPA as guidelines for chemicals that cause unpleasant aesthetic conditions, which do not pose a human health risk and are non-enforceable.

Action levels:

Established for lead and copper and are guidelines for the protection of water distribution systems. The levels are considered exceeded if ten percent of the samples exceed the action level. If the action level is exceeded, damaging effects could occur to pipes and water systems.

Recommended Levels:

Established by individual agencies which determine concentrations above the recommended level may cause adverse human health effects. The recommended levels are suggested, but not enforceable, and are usually created by agencies independent of the

U.S. EPA (ex. American Heart Association, World Health organization, etc.).

The twenty-seven parameters tested for by the Mahoning County DBOH are included in Table 2-2, as well as the MCL, SMCL, Action level, or Recommended Level. Table 2-3 lists the Mahoning County District Board of Health Laboratory Services detection limits for each parameter tested.

Table 2-1: On-site Parameters

<b>Metal Parameters</b>
Antimony
Arsenic**
Barium**
Beryllium
Boron
Cadmium**
Calcium
Chromium**
Cobalt
Copper**
Iron**
Lead**
Magnesium**
Manganese**
Nickel**
Potassium**
Selenium**
Silver**
Sodium**
Thallium
Vanadium
Zinc**

<b>General Parameters</b>
Alkalinity**
Ammonia**
Chloride**
Nitrate/Nitrite**
pH**
Specific Conductivity**
Sulfate**
Sulfide
Temperature
Total Dissolved Solids (TDS)**
Turbidity**

<b>Organics</b>
1,1 – Dichloroethane
cis – 1,2 – Dichloroethylene
Dichlorodifluoromethane
Trichloroethylene
Vinyl Chloride

\*\* Denotes Mahoning County DBOH parameter

Table 2-2: MCLs, SMCLs, Action Levels, and Recommended Levels

Maximum Contaminate Levels (MCLs)	
Bacteria (Total Coliform)	Zero (negative)
Arsenic	10 µg/L
Barium	2000 µg/L
Cadmium	5 µg/L
Chromium	100 µg/L
Fluoride	4 µg/L
Mercury	2 µg/L
Nitrate	10 mg/L
Selenium	50 µg/L

Secondary Maximum Contaminate Levels (SMCLs)	
Chloride	250 mg/L
Total Dissolved Solids	500 mg/L
Iron	300 µg/L
Manganese	50 µg/L
pH	6.5 – 8.5
Silver	100 µg/L
Sulfate	250 µg/L
Zinc	5000 µg/L

Action Levels	
Copper	1300 µg/L
Lead	15 µg/L

Recommended Levels	
Sodium	20 mg/L

No Standards
Alkalinity
Ammonia
Conductivity
Chemical Oxygen Demand (COD)
Magnesium
Potassium
Turbidity

(USEPA, 2012)

Table 2-3: Mahoning County Lab. Detection Limits

Maximum Contaminate Levels (MCLs)	
Bacteria (Total Coliform)	Negative/Positive
Arsenic	5.0 µg/L
Barium	100 µg/L
Cadmium	10 µg/L
Chromium	20 µg/L
Fluoride	0.02 µg/L
Mercury	0.20 µg/L
Nitrate	0.5 mg/L
Selenium	2.0µg/L

Action Levels	
Copper	10 µg/L
Lead	5.0 µg/L

Recommended Levels	
Sodium	0.10 mg/L

No Standards	
Alkalinity	1.0 mg/L
Ammonia	0.02 mg/L
Conductivity	1.0 µmhos/cm
Chemical Oxygen Demand (COD)	10 mg/L
Magnesium	0.10 mg/L
Potassium	0.10 mg/L
Turbidity	0.1 NTU

Secondary Maximum Contaminate Levels (SMCLs)	
Chloride	1.0 mg/L
Total Dissolved Solids	1.0 mg/L
Iron	50 µg/L
Manganese	10 µg/L
pH	0
Silver	10 µg/L
Sulfate	1.0 µg/L
Zinc	10 µg/L

(Mahoning County District Board of Health, 2011)

## Maximum Contaminate Level (MCL) Parameters

### Arsenic

Arsenic is colorless, tasteless, odorless, and very toxic at low concentrations (Ravenscroft, P., *et al*, 2009). The earliest recorded measurement of arsenic in natural waters was in 1885 by German chemist Fresenius at Wiesbaden Spa (Ravenscroft, P., *et al*, 2009). Arsenic occurs in both inorganic and organic forms naturally, with organic arsenic not causing major health problems in humans (Ohio Bureau of Environmental Health, 2009). Inorganic arsenic includes: arsenic acid ( $\text{H}_3\text{AsO}_4$ ), arsenous acid ( $\text{H}_3\text{AsO}_3$ ), arsenic metal (As), and arsine gas ( $\text{AsH}_3$ ). The oxidation states are +3, +3, 0, -3, respectively (Matisoff, G. *et al*, 1982). The higher the oxidation state, the less toxic the arsenic form is.

In groundwater, arsenic is common in two states. Arsenate ( $\text{H}_n\text{AsO}_4^{n-3}$ ) has an oxidation state of +5 and is predominating in oxic waters (Matisoff, G. *et al*, 1982). Oxic water is when water has a dissolved-oxygen concentration greater than or equal to 0.5 milligram per liter (Ravenscroft, P., *et al.*, 2009). Arsenite ( $\text{H}_n\text{AsO}_3^{n-3}$ ) has an oxidation state of +3 and is predominating in reducing waters (Matisoff, G. *et al*, 1982).

Arsenic is highly toxic to humans, even in low concentrations. Long term exposure can lead to arsenicosis, which has many symptoms including: muscular weakness; mild psychological effects; skin ailments; diseases of the kidneys, liver, cardiovascular system; diabetes; chronic and acute lung disease; gangrene; skin cancers, lung, liver, kidney, and bladder cancers; and even death (Ravenscroft, P., *et al*, 2009). Effects depend on cumulative exposure or ingestion, and is most commonly seen in adults due to build up of contaminants in the system.

Originally, the United States Environmental Protection Agency (EPA) set a Maximum Contaminant level (MCL) for arsenic at 50 ppb. Investigations into the hazards of arsenic lead to the EPA changing the MCL for arsenic to 10 ppb to aid in protecting consumers from the risks and hazards of ingesting arsenic-contaminated water. This change occurred on October 31, 2001. (US EPA, 2001, Thomas, M.A., *et al*, 2005)

## Barium

Barium metal does not occur in nature, although found in sulfate ores (barite) and carbonate ores (witherite). Barium compounds may be released into water and soil by discharge and disposal of drilling fluids from oil and gas wells, smelting of copper, and manufacture and disposal of automotive parts and accessories (U.S. EPA, 2012). Ingestion of high levels of barium in drinking water can lead to possible gastrointestinal tract issues, as well as increased blood pressure and muscular weakness (ASTDR, 2007).

## Bacteria

Total coliform bacteria are one of the 27 parameters tested. Although some coliform bacteria are not harmful to humans, others may cause gastrointestinal illnesses, fevers, or other flu-like symptoms (Swistock, et al., 2003). If the bacteria are found to be present in a water source, it is presumed that there is a contamination pathway between water source and bacterial source. The most common source pathway tends to be from surface runoff in contact with animal or fecal waste, as well as groundwater sources in contact with leaking septic tanks. Any level of coliform found indicate some health risk to humans, therefore, the U.S. EPA has set the maximum contaminant health goal to zero (USEPA, 2011)

## Cadmium

Cadmium has no essential biological function and is highly toxic to plants and animals (Alloway, 1995). Natural concentrations within the environment are usually at low concentrations and do not cause acute toxicity. However, within the last century, Cadmium has been used more in metallurgy, sewage sludges, and pesticides. This can cause higher than natural concentrations in soils and groundwater. Once Cadmium enters the environment, it does not break down naturally. However, Cadmium will change forms. Some forms, such as cadmium chloride and cadmium sulfate are soluble in water. When these compounds enter into the environment, they can become very mobile in groundwater. Insoluble forms bind strongly onto soil sediment, causing contamination of the soil. Plants can take up cadmium from the soil and biomagnifies in the food chain (ATSDR, 2008).

## Chromium

Chromium has been used in alloy steel since 1887 and in chrome plating processes since 1926 (McGrath, 1995). It increases the hardness and resistance to mechanical wearing of the alloys and plating. Chromium is very resistant to oxidation. Chromium (III) is an essential nutrient in the human body that aides in the usage of sugars, proteins, and fats (ATSDR, 2008). Chromium (VI) is toxic to humans and can be released into the environment from sewage sludge and wastewater, fly ash disposal, fertilizers, and small amounts from asbestos brake linings in automobiles (McGrath, 1995).

## Fluoride

Fluoride can cause bone fractures and other bone disorders in adults when consumed in excessive amounts (USEPA, 2011). Although fluoride is added in some public water systems, the MCL is set at 4 mg/L.

## Mercury

Mercury has been used by humans for over 3,500 years and is currently used in electrical applications and industrial processes (Steinnes, 1995). All forms of mercury are toxic to humans and it has no essential biological function (ATSDR, 1999). In the environment, mercury usually combines with other elements to form compounds. Sources of mercury in the environment are found as follows: 80% found in air as emissions, 15% from fertilizers, fungicides, and municipal solid wastes, and 5% from industrial wastewaters (ASTDR, 1999). Because of the high percentage of Mercury in the air, it tends to accumulate on surface soils. It does not readily move into groundwater systems, unless a direct alteration of the natural chemistry occurs (Pais and Jones, 1997).

## Nitrate

Nitrates in drinking water can cause methemoglobinemia, also known as blue baby syndrome. The MCL (10 mg/l) was established to protect portions of the population who have abnormal stomach enzymes, which are the most sensitive to higher levels of nitrates (Swistock, et al., 2003). Water impacted by nitrates usually has a pathway linking the source water to a source of fertilizers or animal/human waste.



## Selenium

Selenium has high solubility in water and strong adsorption to soils (Pais and Jones, 1997; Neil, 1995). Selenium is not found alone in nature, usually it is found along sulfur containing compounds. Selenium occurs in different concentrations depending on oxidation forms and soil chemistry. In high clay content soils, there is usually an increase in selenium concentrations (Pais and Jones, 1997). Ingestion of selenium in excess of the MCL can lead to hair and nail loss, numbness in hands and feet, as well as other circulatory issue (USEPA, 2012).

## Secondary Maximum Contaminant Level (SMCL) Parameters

### Chloride

High levels of chloride will cause water to have a salty taste. Excessive intake of high levels could potentially result in heart related health issues (USEPA, 2011).

### Total Dissolved Solids (TDS)

TDS is the total amount of substances dissolved into water. Water with elevated TDS may have elevated levels of salts. High levels may cause water to stain, or have an undesirable color, as well as unpalatable taste (USEPA, 2011).

### Iron

Iron exists as oxides and hydroxides in the soil and has a very complex biochemistry (Pais and Jones, 1997). Iron hydroxides have been used in the past for

sequestering metal contaminants (Brady, et al., 1998). Iron is toxic to humans at 200 mg, and lethal at 7 – 35 g.

## Manganese

Manganese is the most abundant of all trace metals in the lithosphere (Pais and Jones, 1997). It is one of the least toxic elements, and has a wide range of oxidation states in soil environments. Most manganese dissolved in water will attach to particles and settle out, and in soil, the chemical properties of both the manganese and soil will have an effect on how fast it will move through the system (ATSDR, 2008). Manganese is common in the environment, and humans are exposed to low levels every day. It is routinely found in soils and waters, but at concentrations higher than 0.5 mg/L, it can cause neurological problems (ATSDR, 2008).

## pH

Low pH (acidic) water may have a bitter taste and cause corrosion to plumbing systems. High pH (basic) water may feel slimy and leave unwanted deposits (USEPA, 2011). pH is a measure of the relative amount of free hydrogen and hydroxyl ions in the water sample (USGS, 2012). A change in pH can alter the behavior of chemicals in the water. Heavy metals tend to dissolve more readily in acidic water (water will more free hydrogen ions) (Mesner and Geiger, 2010).

## Silver

Intake of high levels of silver may cause skin discoloration and grayness of the whites of the eyes (USEPA, 2011).

## Sulfate

Sulfates occur naturally in groundwater from leaching of sulfur deposits. It can also occur from industrial waste and sewage effluent. High levels will cause a bitter taste of the water (Swistock, et al., 2003).

## Zinc

There are 55 mineralized forms of zinc that are found in nature (ATSDR, 2005). Zinc is predominately used in galvanizing processes and found at hazardous wastes sites and industrial sites. It is also found in most fertilizers and sewage sludges (Kiekens, 1995). Zinc also can be found in automobile tires, which can release up to 10,000 metric tons in the U.S. annually (Rose and Shea, 2007). Zinc is easily absorbed by mineral and organic substances and tends to accumulate on soil surface (Pais and Jones, 1997).

## Action Level Parameters

### Copper

High concentrations of copper can be very harmful to humans even though it is essential to living organisms. Copper enters the environment by many ways including: mining, farming, manufacturing operations, wastewater flow, industrial wastes (ATSDR,

2004). Copper does not naturally breakdown in the environment, it will, however, change forms. Most copper will bond to soil particles and is easily precipitated (Pais and Jones, 1997).

## Lead

Lead is a non-essential element for biological function and is very toxic. Lead is one of the least mobile of all heavy metals (Pais and Jones, 1997). Soil systems behave as a sink for lead, which sticks to the soil particles (ATSDR, 2007). Lead and lead alloys are commonly found in pipes, batteries, lead-containing gasoline (now unavailable for common auto fuel in the US), sewage sludge, hazardous waste sites, and recycled metals (ATSDR, 2007; Davies, 1995). Lead has increased in the natural environment by 1,000 times over the last three centuries due to anthropogenic activities (ATSDR, 2007).

## Recommended Level Parameters

### Sodium

The level that is recommended by the American Heart Association for sodium is 200 mg/L. Excessive amounts may cause heart diseases and other disorders (USEPA, 2011).

## Parameters without water quality guidelines

### Alkalinity

Alkalinity is a measure of how much acid can be added to a sample without a large change in pH. Alkalinity is affected by the presence of carbonate, bicarbonate, and

occasionally borate, silicate, and phosphate (USEPA, 2012). The range for most natural waters is 10 – 500 mg/L (U.S. Department of the Interior, 2009).

#### Ammonia

Ammonia (NH<sub>3</sub>) exists as a gas that dissolves in water (ATSDR, 2004).

Ammonia sources include household and industrial cleaners and fertilizers (USEPA, 2012). Nitrate and ammonia can occur together in reducing conditions in groundwater if a nitrogen source is nearby (USGS, 2011).

#### Conductivity

Conductivity, as defined by the United States Geological Survey (USGS), is the “measure of ability of water to conduct electrical current” (USGS, 2011). It is affected by the presence of chloride, nitrate, sulfate, and phosphate ions (negative charges) as well as sodium, magnesium, calcium, iron, and aluminum cations (positive charges, as well as any other dissolved inorganic substances (USEPA, 2012).

#### Chemical Oxygen Demand (COD)

Chemical Oxygen Demand (COD) is the measure of the oxygen consuming capacity of inorganic and organic matter present in water (USEPA, 2012).

## Magnesium

Magnesium originates from dissolving limestone or gypsum. There are no adverse health effects to elevated magnesium in water. Elevated magnesium can lead to increased hardness of water (ODNR, 2011).

## Potassium

Potassium is an essential element to humans and is seldom found in drinking waters at levels that could be a concern to human health. According to the WHO (2009), a common source of potassium in drinking water is the use as an alternative to salts in water treatment.

## Turbidity

Turbidity is defined as the solid material that does not settle out of water, also referred to as suspended particles (ODNR, 2011). High turbidity will give water a cloudy appearance, which can be aesthetically unappealing. High turbidity in a well can be caused by improper well casing, a cracked casing, or a missing well cap (Ohio EPA, 2010). Although no direct health effects occur from high levels of turbidity, some toxic substances can adhere to the suspended particles causing ill effects (ODNR, 2011).

## Landfills

Municipal solid waste (MSW) is defined under Ohio Administrative Code (OAC) § 3745: 27 as any unwanted solid or semi-solid material, more commonly known as garbage or rubbish (OAC § 3745: 27, USEPA, 2012). MSW results from daily activities of residential, commercial, industrial, institutional, and agricultural operations, and does not include construction, mining, demolition debris, or hazardous and infectious materials (USEPA, 2012). MSW is disposed of by means of incineration or sanitary landfill facilities (Spiegelman, 2005). The United States Environmental Protection Agency (USEPA) has collected and reported data of the generation and disposal of MSW in the United States since 1960. In 2010, 250 million tons of MSW was generated in the United States (USEPA, 2011). Figure 2-5 illustrates the generation of MSW, by material, for the year 2010.

**2010 Total MSW Generation (by Material)  
250 Million Tons (Before Recycling)**

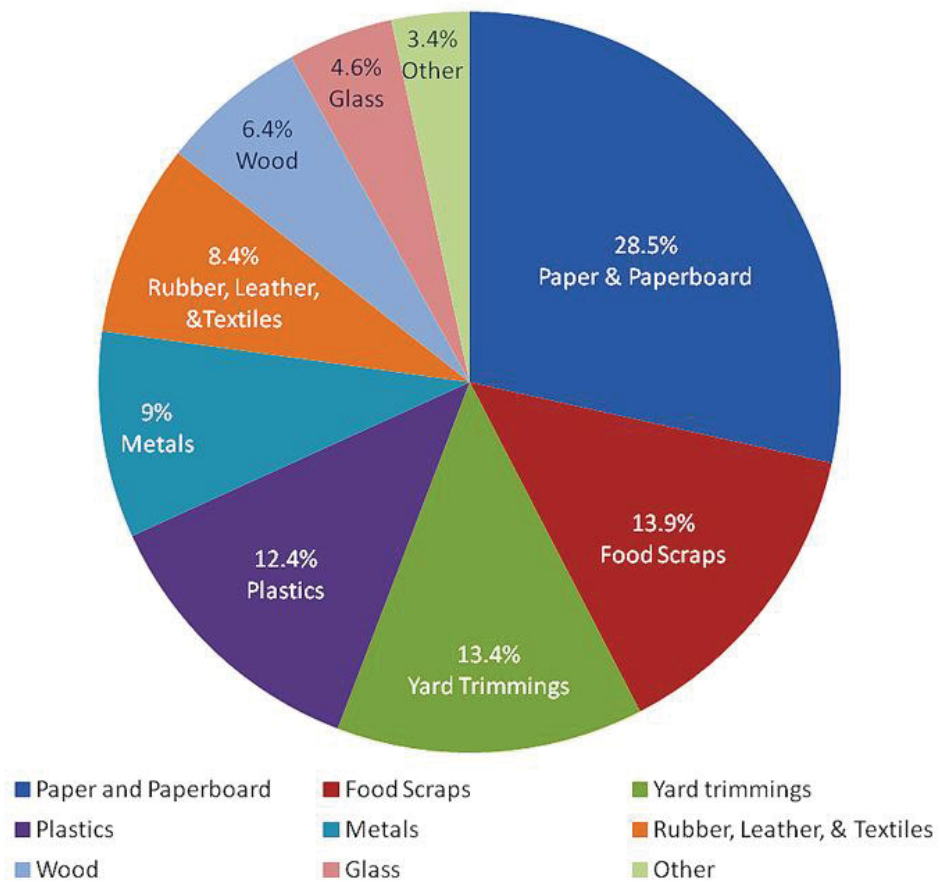


Figure 2-5: 2010 Total MSW (USEPA, 2012)

Sanitary landfill facilities are engineered facilities for the disposal of MSW on or into the ground and includes all units involved with operations (structures, leachate collection systems, liner systems, etc.) according to Ohio Administrative Code (OAC) § 3745: 27-01. An environmental impact may occur if water passing through the refuse accumulates contaminants (known as leachate) and enters underlying groundwater (Lu, et al., 1985). This leachate can cause unsafe contaminate levels in groundwater wells which



can be hazardous to human health and detrimental to the environment. It is important to monitor groundwater for any possible changes in the chemistry which would indicate a presence of leachate. The composition of leachate from MSW is varied due to the type of waste that influences the creation of the leachate, as well as how the waste is processed, the age of the landfill, and environmental factors such as precipitation rate, temperature, and geology (Lu, et al., 1985).

Landfills located within the United States are designed and operated under federal and state regulations. Modern landfills are designed to protect from possible contamination to the environment and to ensure human safety (USEPA, 2012). All MSW landfills (MSWLFs) are required to comply with the regulations in title 40 of the Code of Federal Regulations (CFR) section 258 or required to comply with equivalent state regulations. These regulations for landfills located within Ohio include (per OAC § 3745: 27-08):

- A prepared in-situ foundation – ensures landfills are built in suitable areas
- A composite liner or geosynthetic clay liner (GCL) – creates an impervious layers to protect aquifer systems
- A leachate collection and management system – includes a perforated pipe within the waste area that drains to a collection area, which is treated onsite or a waste water treatment plant
- Surface water controls – collects surface water from waste area to prevent contamination to nearby water bodies

- Groundwater monitoring system – required testing of groundwater to determine if leakage has occurred into the aquifer system
- Explosive gas controls – as waste decomposes, methane is released; gas is usually captured using collection wells, and in some cases used as a renewable energy source

(USEPA, 2012, Republic Service, 2012, OAC 3745-27-08)

Each of these regulations aids in protecting the environment from damages from the landfill. A geosynthetic clay liner (GCL) can be used as a barrier system to prevent leachate from entering aquifer systems. GCLs were created in 1986 and are composed of a thin layer of clay (usually bentonite) bonded to a geotextile membrane or attached between two sheets of geotextile (USEPA, 2001). Bentonite is granular clay from volcanic deposits and is extremely absorbent, and when used in a liner, will ‘heal’ itself if punctured, working as a precaution to leakage from landfill leachate (USEPA, 2011). Although new technologies are helping to prevent seepage of leachate into groundwater systems, no liner is everlasting. It was stated in the August 30, 1988 Federal Register (Vol.53, No. 168, pg. 33345) that:

*“Even the best liner and leachate collection system will ultimately fail due to natural deterioration... (with new technologies in liners and systems leaks) may be delayed by many decades.”*

Ohio has a total of 40 licensed municipal solid waste landfills (current as of May 16, 2012) according to the Ohio Environmental Protection Agency (Ohio EPA). In 2010, 22,295,115.59 tons of solid waste was disposed of within the 40 landfills, with 4,035,649 tons coming from out-of-state (Ohio EPA, 2011). In Mahoning County (2010), three

active MSWLFs accepted waste: Carbon Limestone Landfill, Central Waste, Inc, and Mahoning Landfill (Figure 2-6) accepting a total of 1,542,078.69 tons of MSW (OEPA, 2011).

### 2010 Active MSWLFs in Mahoning County, Ohio

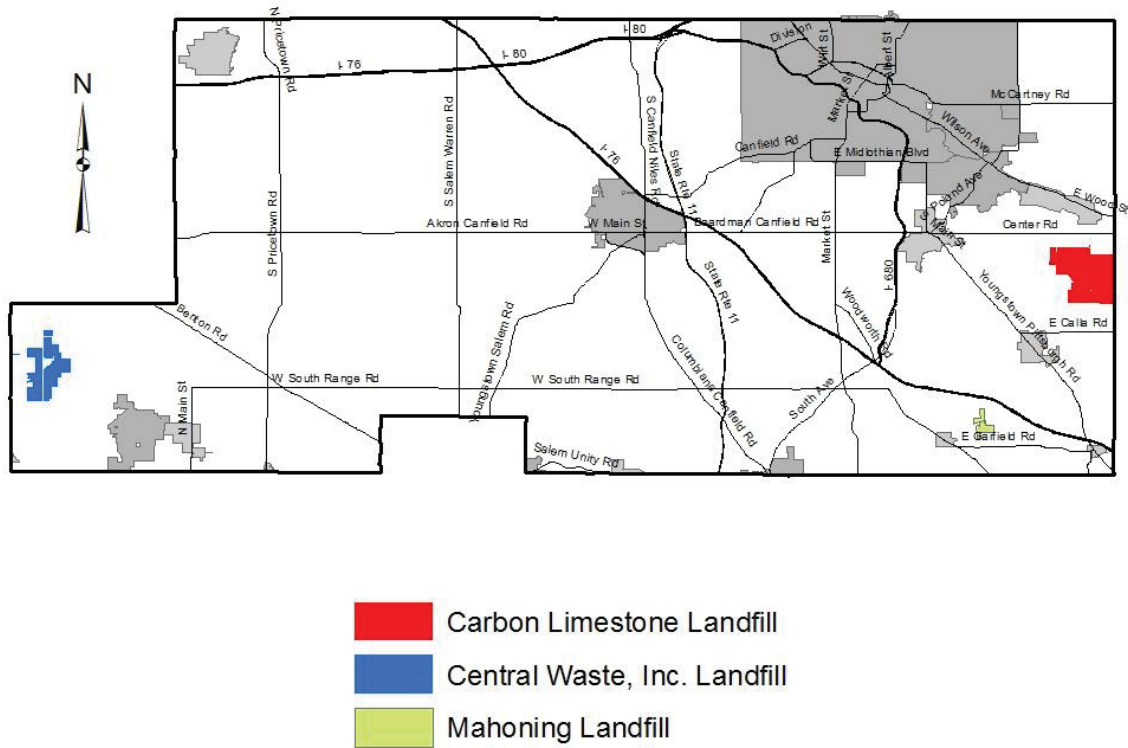


Figure 2-6: 2010 Active MSWLFs in Mahoning County, Ohio

The Carbon Limestone Landfill (CLL) is located in Poland, Ohio. During 2010 the facility accepted 938,059.78 tons of MSW (Ohio EPA, 2011). CCL is owned and operated by Republic Services, one of the largest waste and recycling companies in the

United States. Through a series of mergers and acquisitions the company was incorporated in 1998 (Republic Services, 2012).

## Leachate

### Creation of Leachate

The impact of landfill leachate on groundwater is a widely researched and published topic throughout the world. Examples of published research includes areas such as Seattle Washington (Ragle et al., 1995), Greece (Fatta, et al., 1999), Denmark (Kjeldsen, et al., 1998), Alaska (Gan and Friesen, 1991), Nigeria (Akinbile, 2012), Italy (Rapti – Caputo and Vaccaro, 2006), Gaza Strip (Alsaibi et al., 2011), and Poland Township, Mahoning County, Ohio (Paul C. Rizzo and Associates, 1990 and Harris, 1989). Regardless of compliance to local and federal regulations (such as groundwater monitoring networks, liner systems and leachate collection systems) most regulation agencies assume leachate from landfills will eventually contaminate the groundwater of the area (Fatta, et al., 1999).

Spatial variability of groundwater flow and contamination pathways make it difficult to detect all leachate released from a particular landfill (Yeniül et al., 2005). Leachate composition also varies from place to place and can even show variation from the same source (Ragle et al., 1995). Leachate is created when percolating water, whether from precipitation or the waste itself, comes in contact with decomposing waste and extracts dissolved and suspended components (Kjeldsen, et al., 2002).

Leachate composition depends on two main factors: composition of the waste and biological and chemical reactions within the waste (Fatta, et al., 1999). Although,

composition of leachate is varied, there are common constituents (Table 2-4). Leachate will also be produced in a landfill at different rates, depending on the environmental conditions present (Ragle et al., 1995).

Table 2-4: Common constituents of leachate from MSWLFs

Common Constituents of Leachate from MSWLFs
Total Dissolved Solids (TDS)
Chloride
Ammonia
Sulfate
Alkalinity
Chemical Oxygen Demand (COD)
Calcium
Magnesium
Sodium
Potassium
Iron
Manganese
Other Heavy Metals: Cadmium, Chromium, Copper, Lead, Nickel, Zinc, Arsenic, Barium, Mercury, Silver, Selenium, Strontium, etc.

(CH2MHILL, 2007; Kjeldsen, et al., 2002; Paul C. Rizzo and Associates, 1991)

Most regulations, including the USEPA, require a liner in new landfill facilities. These liners are either compacted clays or geosynthetic liners, containing bentonite clay and a geotextile fabric, which create an impermeable layer to prevent seepage of leachate into groundwater systems (USEPA 2001). Published research has shown that landfills without liners have a higher probability of impacting the local groundwater than landfills with liners. Liners do not, however, make a landfill completely impermeable; the liners can have faulty seams and rip, puncture, or tear during or after installation, and degrade due to chemical interactions with the waste (Gan and Friesen, 1991).

Unlined landfills, such as the Ano Liosia landfill in Greece have more physical and chemical parameters of the groundwater above permissible limits due to the presence of leachate (Fatta, et al., 1999). In Alslaibi, et al. (2011), wells around two landfills in the Gaza Strip were studied. One was lined, the other unlined. By using GIS technology (Geographical Information System) contamination was illustrated showing a significant difference between the areas around the unlined landfill compared to the lined landfill. The wells tested near the unlined landfill showed a significant increase of chloride and heavy metals when compared to the wells near the lined landfill.

Unlined landfills do not directly indicate the presence of contaminated groundwater. An unlined landfill has a greater probability of impacting the local aquifer systems. Two landfills in Northern Italy were researched by D. Rapti-Caputo and C. Vaccaro in 2006. Similar to the Gaza Strip situation, one landfill was lined, the other unlined. In this study it was concluded that no immediate impact was occurring to the groundwater or the area, but future monitoring would be required.

Groundwater monitoring is essential to the protection of areas surrounding any landfill. A reliable groundwater monitoring network will help determine the likelihood and severity of contamination (Yenigül et al., 2005). The US EPA requires all landfills that receive more than 20 tons of waste per day to monitor the uppermost aquifer system for 62 constituents at least semiannually (USEPA 2012).

## **Chapter 3 Study Area**

### Introduction

Carbon Limestone Landfill is a MSW landfill operating in Mahoning County, Ohio. Located in northeast Ohio, Mahoning County is predominately sedimentary rocks with a variable thickness veneer of unconsolidated glacial deposits.

### Geology

The bedrock of Mahoning County is of the Carboniferous (Pennsylvanian and Mississippian) System of the Paleozoic Era. The bedrock is covered in most areas by variable thickness glacial deposits of the Pleistocene Epoch (two million – 10,000 years before present), and include glacial tills, lacustrine, outwash, and kames (Angle, 2003). The generalized stratigraphy of Mahoning County is shown in Table 3-1. Not all layers of strata are found through the entire county, nor are all layers the same thickness.

The Mississippian Sedimentary System includes fine grained sandstones, siltstones, and shales of the Cuyahoga Group and the underlying Berea Sandstone (Angle, 2003). Overlying the Mississippian System is a disconformity separating it from the system or rocks of the Pennsylvania age.

The Pennsylvanian System includes the Pottsville through Massillon – Sharon (Pm-s) formations which are characterized as deltaic sandstones with abundant cross-beds, and the Pottsville and Allegheny Groups (Pap). The Pottsville and Allegheny Group rocks are characterized by spatially variable cyclothem deposits consisting of sandstone, siltstone, shale, limestone, coal, and underclay.

Table 3-1: Generalize Stratigraphy of Mahoning County, Ohio

General Stratigraphy of Mahoning County			
Pleistocene	Glacial Deposits	Till, lacustrine, outwash, moraines, kames	25 – 100 gallons per minute (gpm)
Carboniferous (Pennsylvanian)	Pennsylvanian Undifferentiated	Inter-bedded dirty sandstones, shales, and siltstones, with thin coal, limestone, and clay layers.	Poor aquifer system less than five (gpm)
	Allegheny & Pottsville groups Upper Freeport Lower Freeport Middle Kittaning Lower Kittaning Vanport Limestone Clarion Formation Brookville Coal Homewood Formation Mercer Formation	Inter-bedded sandstones, siltstones, and shales with thin coal, limestone, and clay layers	Poor to moderate aquifer system; 0 – 25 gpm
	Pottsville Massillon through Sharon Formations	Massillon: Coarse to medium-grained cross-bedded sandstone Sharon: Loosely cemented, coarse-grained, cross-bedded sandstone with conglomerate zones	5 – 25 gpm
Carboniferous (Mississippian)	Cuyahoga Formation Meadville Shale Sharpsville Sandstone Orangeville Shale	Shale with thin sandstone and siltstone inter-bedded	2 – 5 gpm
	Berea Sandstone	Fine to medium-grained sandstone; found only in subsurface.	Historically a source of water, brines, and petroleum

(Angle, 2003; Harris, 1989; Paul C. Rizzo Associates, 1991)



The sedimentary bedrock is overlain in most places by glacial deposits from the late Pleistocene glacial period. Most of the deposits are from the Wisconsin glacial stage with less common deposits of the Illinoian and pre-Illinoian Episodes (Harris, 1989). Glacial-filled or buried valley deposits are found throughout Mahoning County (Figure 3-1). Depending on the topography of these deposits, there may be an association with modern stream systems.

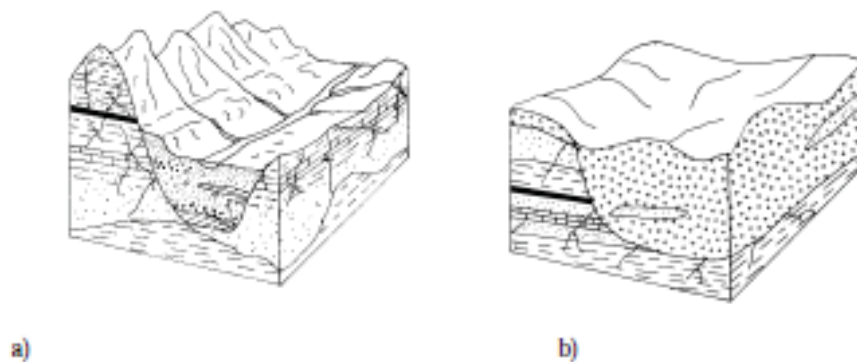


Figure 3-1: Buried Valleys (Angle, 2003)

There are two main types of groundwater resources in Mahoning county, unconsolidated glacial fill aquifers and consolidated bedrock aquifers. The unconsolidated aquifers are highly variable till and outwash deposits consisting of sand, gravel, and clay (Harris, 1989; Angle, 2003; Swistock, et al., 2003). Sand and gravel typically have relatively high porosity and permeability with actual groundwater yield dependent on aerial extent and thickness. The bedrock aquifers have a range of ground water yields, with the Sharon sandstone averaging the highest yield of all bedrock formations in the county at 25 – 40 gpm (Angle, 2003). Regional near surface

groundwater flow tends to correspond to surface water divides and drainage basins.

Deeper waters follow the natural dip in the bedrock from the northwest to the southeast (Paul C. Rizzo and Associates, Inc., 1991).

## Demographics and Land Use

### Demographics

Mahoning County is located in northeastern Ohio (Figure 3-2), bordering Trumbull county on the north, Portage County on the west, Stark County on the southwest, Columbiana County on the south, and Lawrence and Mercer Counties in Pennsylvania on the east. The county is 415.25 square miles and the population in 2010 was 238,823 (U.S. Census Bureau, 2011).

Mahoning County is located on the glaciated Allegheny Plateau section of the Appalachian Province. The highest elevation within the county is 1,320 feet in Green Township, and the lowest elevation is 795 feet south of Lowellville, where the Mahoning River enters Pennsylvania (Angle, 2003). The county is visually characterized by low rolling hills with an occasional deep stream valley (Paul C. Rizzo Associates, Inc. 1990).



Figure 3-2: Location of Mahoning County, Ohio

### Land Use

According to the Groundwater Pollution Potential of Mahoning County, Report No. 51 (Angle, 2003), 40 percent of the county’s land use is agricultural, 30 percent is forested, and the remaining 30 percent land use is combined urban, industrial, residential, strip mines, and reservoirs. Figure 3-4 displays the generalized land cover of Mahoning County from the Ohio Department of Natural Resources. This data is based on land cover from 1994. The seven categories are defined in Table 3-2.

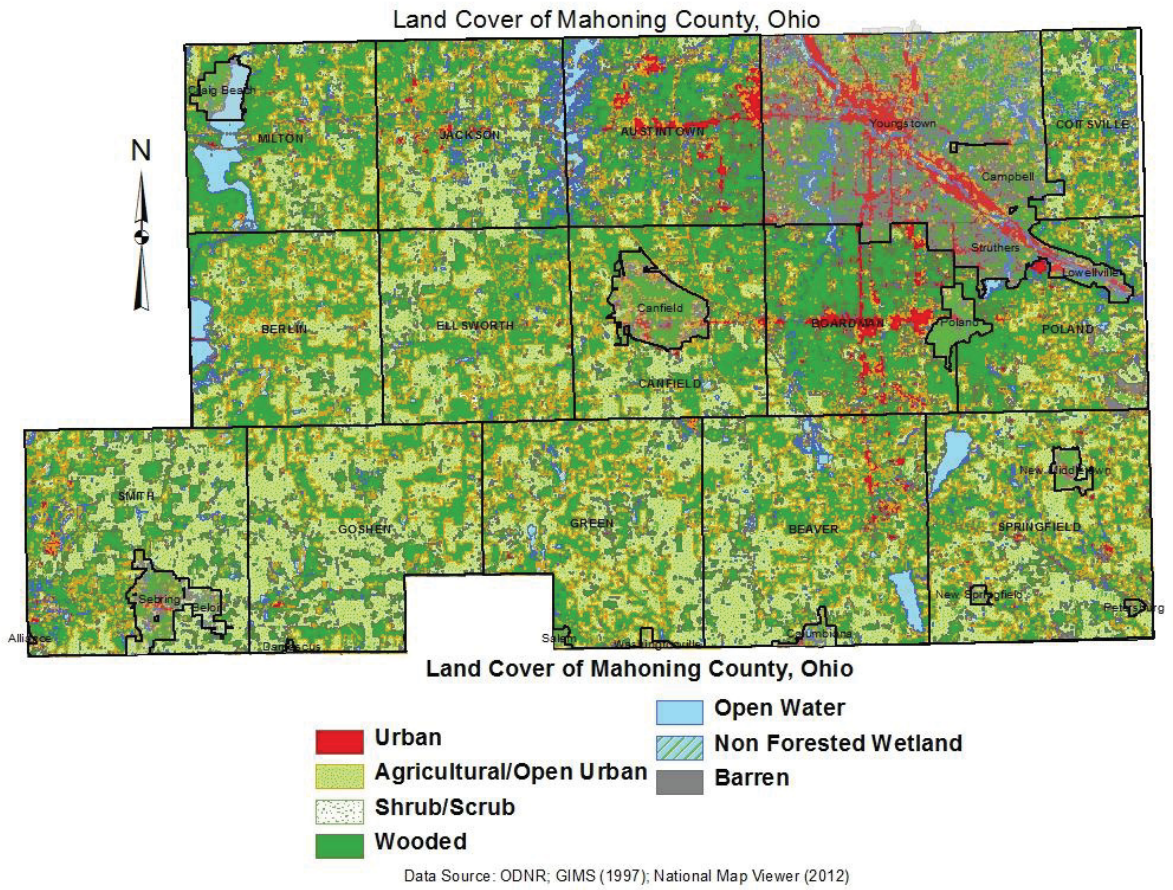


Figure 3-3: Land Cover of Mahoning County, Ohio

Table 3-2: Land Cover Classifications of Mahoning County, Ohio

<u>CODE</u>	<u>DESCRIPTION</u>
1	URBAN (open impervious surfaces: roads, buildings, parking lots and similar hard surface areas which are not obstructed from aerial view by tree cover.) See 7. BARREN
2	AGRICULTURE/OPEN URBAN AREAS (cropland and pasture; parks, golf courses, lawns and similar grassy areas not obstructed from view by tree cover)
3	SHRUB/SCRUB (young, sparse, woody vegetation; typically areas of scattered young tree saplings)
4	WOODED (deciduous and coniferous)
5	OPEN WATER
6	NON FORESTED WETLANDS (includes wetlands identified from 1994 Thematic Mapper data as well as from the Ohio Wetlands Inventory)
7	BARREN (strip mines, quarries, sand and gravel pits, beaches) Many of the URBAN features identified in this inventory are constructed from materials obtained from the BARREN features. Because of this, there will on occasion be URBAN areas identified as BARREN as well as BARREN areas identified as URBAN.

(ODNR, 1997)

## Carbon Limestone Landfill Previous Research

The Carbon Limestone Landfill was a limestone quarry in the 1920s, where mining of the Vanport limestone occurred. In 1963, the mining operations left a large open pit, depleted of the Vanport Limestone that would become the site of the landfill operation. The Carbon Limestone Landfill (CCL) is located in Poland Township in Mahoning County, Ohio (Figure 3-4).

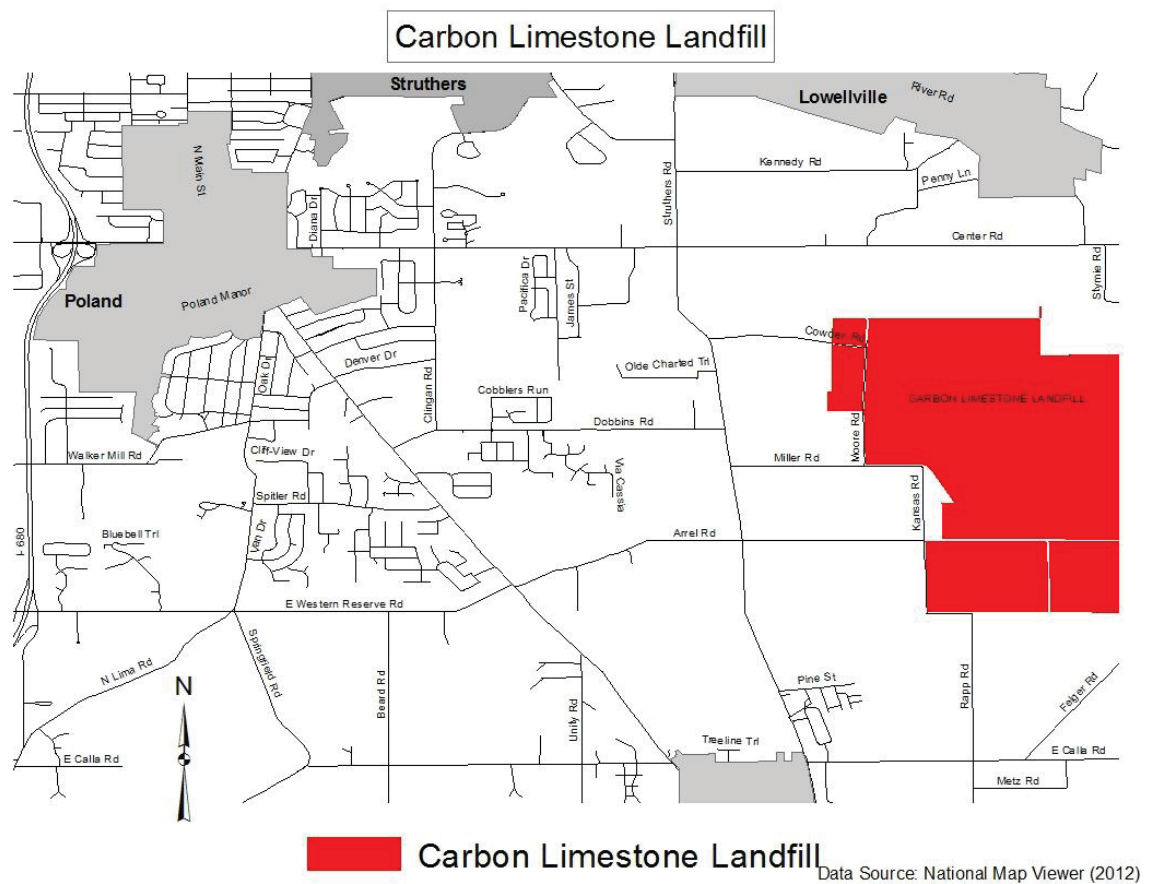


Figure 3-4: Location of Carbon Limestone Landfill

The CCL is in a rural area of Mahoning County, and many of the surrounding residents depend on the groundwater resources of the area as a fresh water source. The

Mahoning County District Board of Health has tested 67 of the 210 private wells within a one mile radius of the CCL property (Mahoning County District Board of Health, 2011). The participating well locations are shown in Figure 3-5 with the inclusion of 30 on-site wells.

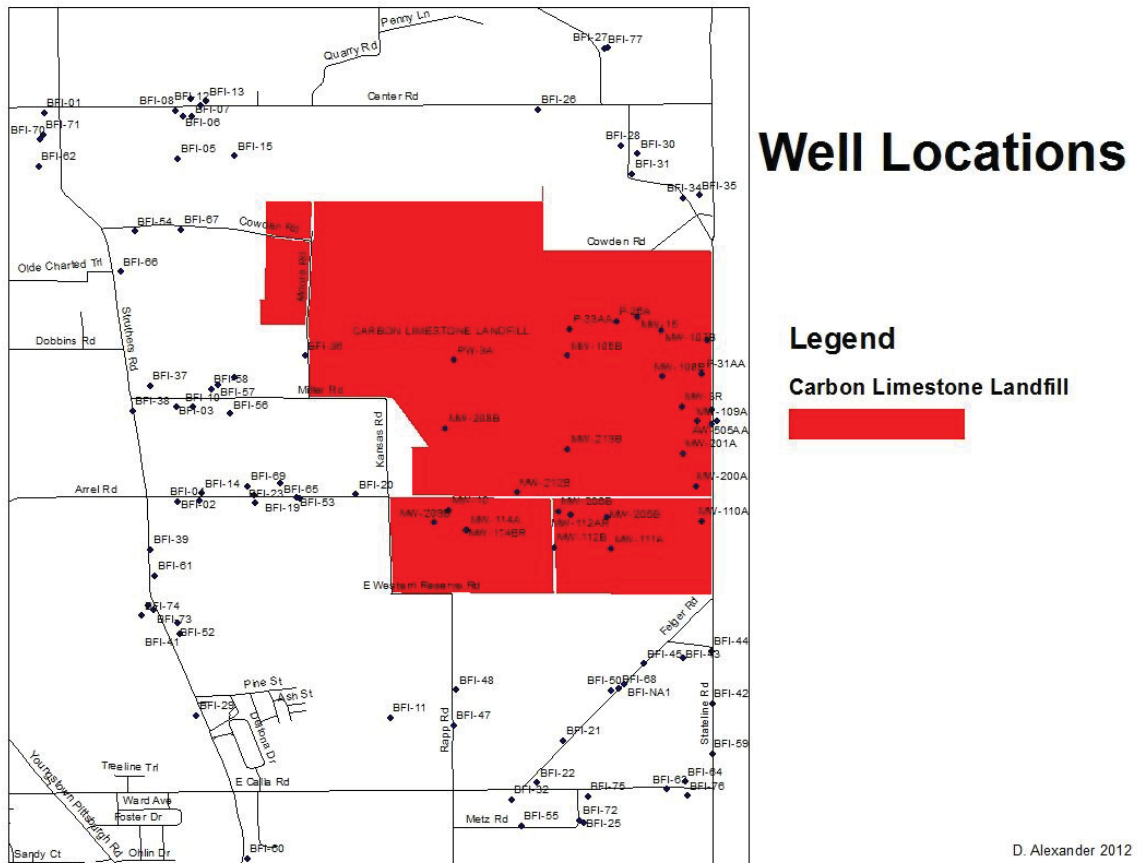


Figure 3-5: Participating Well Locations

CLL was constructed in separate phases. Phase I contains fifteen foot of low permeability in-situ material and Phase II and III has a liner systems and passive drainage leachate system in place. Phase I operated from 1963 – 1993 and has 91 acres capped, reducing infiltration from precipitation. Phase II operated from 1992 – 2011, Phase III is currently operational (Eagon & Associates, 2005). In 1989 a report was completed by A. Harris on the possible bacterial contamination of residential wells located on Stymie

Road, just north of the landfill site. Harris' conclusion indicated poorly maintained septic systems as well as improperly installed or cracked well casings as the source of the bacterial contamination, not CLL (Harris, 1989).

The CLL site has three hydrologic units of interest: the Clarion Formation, the Vanport Limestone, and unconsolidated sand and gravels (Rizzo and Associates 1991). The Clarion formation contains inter-bedded shales, sandstones, and coal seams and is the main aquifer of the area. The Vanport limestone overlies the Clarion Formation and was mined from the CCL site as early as the 1920s. The unconsolidated materials are a heterogeneous mixture of glacial till and other geologic materials left over from limestone quarrying operations (Rizzo 1991). The regional aquifer system is defined as the Clarion Formation and is the source water for the village of Lowellville, Ohio (Rizzo, 1990). It has a regional flow of northwest to southeast.

The groundwater has been monitored on-site of CCL since 1985. The general groundwater quality is high in dissolved iron and solids, with low magnesium and calcium concentrations (Rizzo 1991).



## **Chapter 4 Materials and Methods**

### Mahoning County District Board of Health Groundwater Sampling

Sampling and testing of the groundwater for May 2003 – September 2010 was completed by the Mahoning County District Board of Health. Sampling was conducted by registered sanitarians from the Mahoning County Solid and Infectious Waste Program and collected following Ohio EPA Standard Sampling Procedures. The sampling procedure strives to obtain untreated (raw) water samples from well storage tanks or from outside faucets not connected to the home's water treatment systems. Once the samples were collected, they were transported in ice chests to the District Board of Health Laboratory Service Division located in Austintown, Ohio. The laboratory is accredited through the Ohio Environmental Protection Agency (Ohio EPA), as well as the American Association for Laboratory Accreditation (Mahoning County, 2011).

### Carbon Limestone Landfill On-site Monitoring Data

Pursuant to Ohio Administrative Code 3745-27-10, sanitary landfills within the State of Ohio must implement a groundwater monitoring program, establishing water quality within the significant zones of saturation as well as the uppermost aquifer system. Water quality results from approximately 1990 – 2005 were obtained from the 2006 document by Eagon and Associates "November 2005 Second Semiannual Monitoring Event Results: BFIO Carbon Limestone Landfill Mahoning County, Ohio", which included sampling results from 30 on-site wells. Each of the on-site monitoring well used are within the Clarion Formation aquifer, as determined from well logs in Appendix K. Two well logs, AW-506AA and MW-209B were unable to be located. These results

were correlated with the Mahoning County District Board of Health sampling dates. Four dates, May 2003, November 2003, May 2004, and November 2005, were matched to the DBOH monitoring dates. To combine on-site water quality data with off-site (residential) data, it was important to use common sampling dates.

### **Mahoning County District Board of Health Laboratory Methods**

Groundwater samples from residential wells were received at the laboratory and are analyzed over a five week period by a certified Ohio EPA lab analyst. The methods and procedures used for testing of the samples follow United States EPA methods and *Standard Methods for Examination of Water and Wastewater, 21<sup>st</sup> Ed.*

#### Data Format

Water analyses results were recorded and maintained by the Mahoning County DBOH. The data included locations of participating resident's wells, complete water quality reports with levels of parameters tested, and background information of the Groundwater Surveillance in the Vicinity of Mahoning County Landfills. The water test results were organized by testing date in Microsoft Excel files (Original data in located in Appendix C). Once the files were received from the Mahoning County DBOH, the data was sorted by individual well identifiers to aid in the time-series graphing of the results. Each well was time-series graphed for each parameter tested, illustrating any and all changes in water quality through the given testing periods.

## Time-Series Graphing

Time-series analysis of water quality parameters tested in wells participating in the Mahoning County District Board of Health's Groundwater Surveillance in the Vicinity of Mahoning County Landfills program from May 2003 to September 2010 were performed in order to identify temporal water quality changes. The Mahoning County DBOH provided water well information and corresponding test results in Microsoft Excel format. These data were arranged by test date and included:

- Test Dates
- Mahoning County DBOH well identification number in the format of BFI-XX
- Address of the location of the well (Street, City, State, zip code)
- Tested parameters with results

The data for the various testing periods were referenced to the Mahoning County DBOH well identification number for the purpose of creating time-series graphs of tested parameters of each well.

The data format required several adjustments in order to create the time-series graphs using Microsoft Excel. Certain results were listed as "ND" or non-detection for values falling below the limits of Mahoning County DBOH laboratory. The corresponding minimum detection limit numerical values were substituted for "ND" in these situations. The minimum detection limit for each tested parameter is shown in Table 4-1. Parameters that were not tested for a particular sampling date (marked with a blank cell) were input as #N/A to display on the graph as no data collected. Each #N/A value shows as a continuous line between sampling dates on the graphs (Table 4-2 and Figure 4-1). Since numerical values are required to produce time-series graphs in Microsoft Excel,

bacteria results reported as POS/NEG (positive/negative) were changed to “1” for positive results and “0” for negative results.

Table 4-1: Mahoning County District Board of Health Laboratory's minimum detection limit by parameter (Mahoning County DBOH, 2008)

Parameter	Mahoning County DBOH Laboratory Minimum Detection Limit
Bacteria	NEG
Arsenic	5 µg/L
Barium	100 µg/L
Cadmium	10 µg/L
Chromium	20 µg/L
Fluoride	0.02 mg/L
Mercury	0.2 µg/L
Nitrate	.050 mg/L
Selenium	2 µg/L
Chloride	1 mg/L
Dissolved solids	1 mg/L
Iron	50 µg/L
Manganese	10 µg/L
pH	0 pH units
Silver	10 µg/L
Sulfate	1.0 mg/L
Zinc	10 µg/L
Copper	10 µg/L
Lead	5 µg/L
Sodium	0.10 mg/L
Alkalinity	1 mg/L
Ammonia	0.02 mg/L
Conductivity	1.0 umhos/cm
Chemical Oxygen Demand (COD)	10 mg/L
Magnesium	.10 mg/L
Potassium	0.10 mg/L
Turbidity	0.10 NTU

Table 4-2: BFI-02 Alkalinity example of using #N/A

Sample Date	ID	Alkalinity
May-03	BFI-02	#N/A
Nov-03	BFI-02	#N/A
May-04	BFI-02	#N/A
Sep-04	BFI-02	#N/A
Jul-05	BFI-02	340.00
Nov-05	BFI-02	310.00
Aug-06	BFI-02	170.00
Nov-06	BFI-02	180.00
Apr-07	BFI-02	260.00
Jul-07	BFI-02	440.00
Feb-08	BFI-02	#N/A
Jun-08	BFI-02	190.00
Nov-08	BFI-02	210.00
Apr-09	BFI-02	180.00
May-09	BFI-02	#N/A
Sep-09	BFI-02	170.00
Oct-09	BFI-02	#N/A
Mar-10	BFI-02	#N/A
Apr-10	BFI-02	180.00
Aug-10	BFI-02	#N/A
Sep-10	BFI-02	180.00

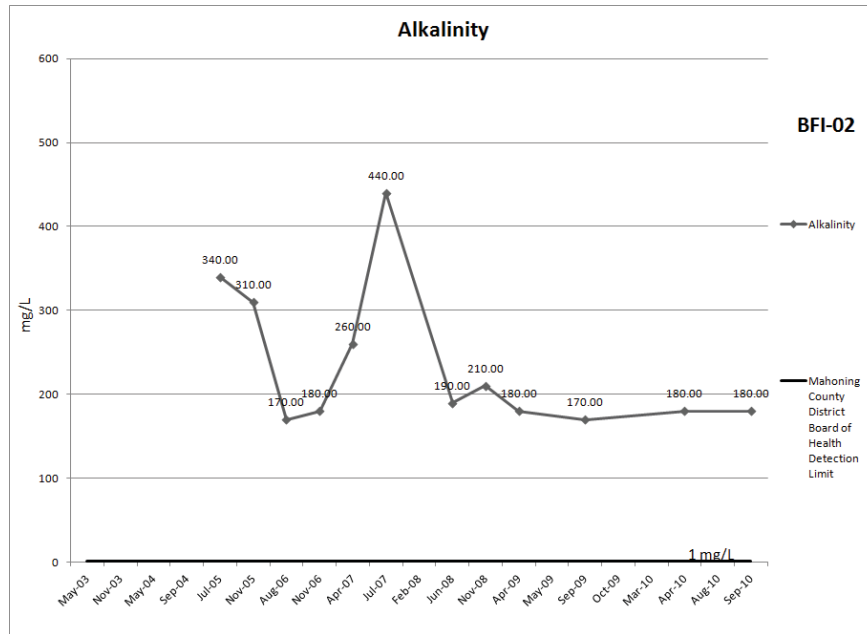


Figure 4-1: BFI-02 Alkalinity: Example of using #N/A

A template file was created in Microsoft Excel to create time-series graphs for each of the tested parameters. This allowed data for each participating well to easily be copied and pasted into a separate Microsoft Excel workbook linked to time-series charts. The template consisted of a data worksheet (named Data), and a worksheet for each parameter time-series graph created (named by individual parameters), as well as separate worksheets for minimum detection limits (named DLimit), MCLs (named MCL), SMCLs (named SMCL), Action levels (named ActionLv), and Recommended levels (named RecLv) of each parameter. The inclusion of formulas defined under the ‘Name Manager’ function in Microsoft Excel enables the graphs to automatically update whenever future testing parameters are entered. Examples of the formulas used under the “Name Manager” are shown in Table 4-3; a complete list is located in Appendix A. The formulas define ranges of data to be used in the graphs. The ranges include individual columns of data for each parameter tested.

Table 4-3: Defined Ranges in Microsoft Excel Name Manager

Named Range	Formula	Description
ACopper	=OFFSET(ActionLv!\$B\$3,0,0,COUNTA(ActionLv!\$B:\$B)-2,1)	Action Level for Copper
ALead	=OFFSET(ActionLv!\$C\$3,0,0,COUNTA(ActionLv!\$C:\$C)-2,1)	Action Level for Lead
ID	=OFFSET(Data!\$C\$2,0,0,COUNTA(Data!\$C:\$C)-1,1)	Mahoning County DBOH Well Identification
mcArsenic	=OFFSET(MCL!\$C\$3,0,0,COUNTA(MCL!\$C:\$C)-2,1)	MCL
mcBacteria	=OFFSET(MCL!\$J\$3,0,0,COUNTA(MCL!\$J:\$J)-2,1)	MCL
mcBarium	=OFFSET(MCL!\$D\$3,0,0,COUNTA(MCL!\$D:\$D)-2,1)	MCL

The general formula used to reference data ranges is:

$$=OFFSET(Data!$A$1,0,0,COUNTA(Data!$A:$A)-1,1)$$

The OFFSET function directs Excel to return a range that is a given number of rows and columns from the given reference. In this formula example, the given reference is 'COUNTA(Data!\$A:\$A)'; referencing to all cells within column 'A' on the worksheet named Data that contain values. The (-1, 1) values define the area for Excel to label the range, in this scenario, (-1) defines the range as one row below the top (allowing for column headings) and (1) defines the range as one column wide, including all data within column 'A'. Using this formula, each range was defined for a given parameter. The variable that changed within each formula was the column heading (A, B, C...), depending on which column the selected parameter was located within the Data sheet.



The insert graph function in Microsoft Excel was used to create a “line with markers” graph type for each parameter tested. Select Data (under chart tools) was used to edit the series for each graph to a defined name. The vertical series were defined by the parameter being graphed and the horizontal series was defined by the sampling dates. A second vertical series was included on all graphs to indicate the minimum detection limits of the Mahoning County DBOH laboratory. Certain graphs also included MCL, SMCL, Action Level, and Recommended Level if the parameter graphed had values for these individual levels.

Each participating well in the Groundwater Surveillance in the vicinity of Mahoning County Landfills program (73 wells are included in this data) has a 2007 Microsoft Excel workbook file (.xlsx extension) named by well identification, that contains 34 worksheets. The worksheets are described in Table 4-4.

Table 4-4: Excel worksheet descriptions

Spreadsheet Name	Description
Data	Laboratory results of each parameter tested for every sampling date
DLimit	The Mahoning County District Board of Health's Laboratory minimum detection limits
MCL	Repeated list of Maximum Contaminate Level (MCL) for parameters with MCLs
SMCL	Repeated list of Secondary Maximum Contaminate Level (SMCL) for parameters with SMCLs
ActionLv	Repeated List of Action Levels for parameters with Action Levels
RecLv	Repeated list of Recommended Levels for parameters with Recommended Levels
Limits	List of Minimum Detection Limits, MCLs, SMCLs, Action Levels, and Recommended Levels
Alkalinity	Time-series graph
Ammonia	Time-series graph
Chloride	Time-series graph
Conductivity	Time-series graph
Fluoride	Time-series graph
Arsenic	Time-series graph
Barium	Time-series graph
Cadmium	Time-series graph
Chromium	Time-series graph
Copper	Time-series graph
Iron	Time-series graph
Lead	Time-series graph
Manganese	Time-series graph
Mercury	Time-series graph
Selenium	Time-series graph
Silver	Time-series graph
Zinc	Time-series graph
Magnesium	Time-series graph
Potassium	Time-series graph
Sodium	Time-series graph
EPA Nitrate	Time-series graph
COD	Time-series graph
pH	Time-series graph
Dissolved Solids	Time-series graph
Sulfate	Time-series graph
Bacteria	Time-series graph
Turbidity	Time-series graph

Microsoft Excel enables users to create macros which are sets of instructions based on actions recorded as work is completed on a spreadsheet (Microsoft Corporation, 2012). A macro can be recorded from key strokes or from Visual Basic for Applications (VBA) code. The time-series workbooks created included all sheets of data and charts, and are large Excel workbooks. By using a VBA code, each graph within a workbook can be copied into a new workbook file, than saved as an Adobe .pdf file, allowing for more efficient viewing and printing abilities.

Coding for VBA can easily be found using Microsoft Office Help, as well as a brief search of the internet. Once a code is found, it can be copied into Excel's VBA and recorded using a macro to be used multiple times on separate files. The code used for extruding all charts from a workbook was found by using the internet. Stackoverflow is a question and answer site for VBA programming. The code was used from a post on May 8, 2012. The following code was used (Stack Exchange, Inc., 2012):

```

Option Explicit
Sub Sample()
    Dim ws As Worksheet, wsTemp As Worksheet
    Dim chrt As Shape
    Dim tp As Long
    Dim NewFileName As String

    On Error GoTo Whoa

    Application.ScreenUpdating = False

    NewFileName = "C:\Charts.Pdf"

    Set ws = Sheets("Status and SLA trends")
    Set wsTemp = Sheets.Add

    tp = 10

    With wsTemp
        For Each chrt In ws.Shapes
            chrt.Copy
            wsTemp.Range("A1").PasteSpecial
            Selection.Top = tp
            Selection.Left = 5
            tp = tp + Selection.Height + 50
        Next
    End With

    wsTemp.ExportAsFixedFormat Type:=xlTypePDF, Filename:=NewFileName,
Quality:=xlQualityStandard, _
        IncludeDocProperties:=True, IgnorePrintAreas:=False,
OpenAfterPublish:=True

    Application.DisplayAlerts = False
    wsTemp.Delete

LetsContinue:
    With Application
        .ScreenUpdating = True
        .DisplayAlerts = True
    End With
    Exit Sub
Whoa:
    MsgBox Err.Description
    Resume LetsContinue
End Sub

```

Figure 4-2: Visual Basic Coding

To access VBA in Microsoft Excel, the Developer tab must be enabled. Under the Developer Tab, VBA can be accessed under the Code functions. The code can then be copied into a new module in VBA. Once the code has been copied, a macro can be created to efficiently run the code on multiple files. For more efficiency, a command button can be installed on the Quick Access Toolbar of Excel by right clicking and selecting the VBA module.

The macro was run on each of the time-series Excel files, creating new files which included the graphs alone (no data worksheets). Each of these ‘new’ files were saved as an Adobe .pdf file, allowing for quick and easy access to individual well files and the ability to print multiple charts on a single sheet. Each Adobe .pdf file was saved as the well identification number and included 27 time-series graphs.

#### Mapping of Groundwater Sampling Results

Visualization of the results of the Mahoning County DBOH’s Groundwater Surveillance Program in the Vicinity of Landfill’s was achieved by utilizing the Environmental Sciences Research Institute’s (ESRI) program ArcGIS 10.1. This program allows for mapping of study area from coordinate locations, as well as results of sampled analyte concentrations. Each residential well participating in the Mahoning County DBOH’s program was assigned a unique identifier, BFI-XX, in which XX was a specific number to an address. The original data supplied by the DBOH contained addresses of the corresponding wells. For utilization of the ArcGIS program, specific coordinate information (latitude, longitude) was needed.

The Ohio Department of Natural Resources (ODNR), Division of Soil and Water Resources serves as Ohio's repository for water well logs drilled within the state. Under Ohio Revised Code 1521.05, water well drillers are required to record and log each well completed and files the log with the ODNR Division of Soil and Water Resources. Currently, the Division holds over 780,000 well log and drilling reports of wells drilled within Ohio since the 1940s (ODNR, 2012). Computerization of well logs began in 1989, with the database available to the public in October of 1999. This database can be accessed from <http://www.dnr.state.oh/water/maptechs/wellogs/appNew/> with about 80% of Mahoning County's logs available (ODNR, 2012). This on-line database is easily searched by key fields such as: owner name (at time of drilling), street address, driller, yield, and aquifer type (ODNR, 2012). Each well log contains vital information about the individual well such as: coordinate location, depth, aquifer formation, yield, etc. An example of a water well log is shown in Figure 4-3.

# WELL LOG AND DRILLING REPORT

DNR 7802.05e

Ohio Department of Natural Resources  
Division of Water, 2045 Morse Road, Columbus, Ohio 43229-6605  
Voice (614) 265-6740 Fax (614) 265-6767

Well Log Number

2009151

Page 1 of 1 for this record.

WELL LOCATION	CONSTRUCTION DETAILS																																																																	
County _____ Township _____	Drilling Method: <u>CABLE TOOL</u>																																																																	
Owner/Builder _____	<b>BOREHOLE/CASING</b> (Measured from ground surface)																																																																	
Address of Well Location _____	1 { Borehole Diameter <u>6.63</u> inches Depth <u>33</u> ft. Casing Diameter <u>6.63</u> in. Length <u>35</u> ft. Thickness <u>0.188</u> in.																																																																	
City _____ Zip Code +4 _____	2 { Borehole Diameter <u>6.63</u> inches Depth <u>195</u> ft. Casing Diameter <u>4.5</u> in. Length <u>190</u> ft. Thickness <u>0.25</u> in.																																																																	
Permit No. <u>5925</u> Section: _____ and/or Lot No. _____	Casing Height Above Ground <u>1.5</u> ft.																																																																	
Use of Well <u>DOMESTIC</u>	Type { 1: <u>Steel</u> 2: <u>PVC</u>																																																																	
<b>Coordinates of Well</b> (Use only one of the below coordinate systems)	Joints { 1: <u>Welded</u> 2: <u>Threaded</u>																																																																	
State Plane Coordinates	<b>SCREEN</b>																																																																	
N <input type="checkbox"/> X _____ +/- _____ ft.	Diameter _____ in. Slot Size _____ in. Screen Length _____ ft.																																																																	
S <input type="checkbox"/> Y _____ +/- _____ ft.	Type _____ Material _____																																																																	
Latitude, Longitude Coordinates	Set Between _____ ft. and _____ ft.																																																																	
Latitude: <u>40.994717</u> Longitude: <u>80.5496</u>	<b>GRAVEL PACK</b> (Filter Pack)																																																																	
Elevation of Well in feet: _____ +/- _____ ft.	Material/Size _____ Vol./Wt. Used _____																																																																	
Datum Plane: <input type="checkbox"/> NAD27 <input type="checkbox"/> NAD83 Elevation Source _____	Method of Installation _____																																																																	
Source of Coordinates: <u>GPS</u>	Depth: Placed From: _____ ft. To: _____ ft.																																																																	
Well location written description:	<b>GROUT</b>																																																																	
	Material <u>Bentonite dry granular</u> Vol./Wt. Used <u>150 LBS.</u>																																																																	
	Method of Installation <u>Dry Driven</u>																																																																	
	Depth: Placed From: <u>0</u> ft. To: <u>33</u> ft.																																																																	
Comments on water quality/quantity and well construction: <u>SET PACKERS @ 75</u>	<b>DRILLING LOG*</b>																																																																	
	FORMATIONS INCLUDE DEPTH(S) AT WHICH WATER IS ENCOUNTERED.																																																																	
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Is Copy Attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Flowing Well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																																																																		
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I hereby certify the information given is accurate and correct to the best of my knowledge.																																																																		
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City, State, Zip <u>COLUMBIANA OH 44408</u>																																																																		
Signed <u>THOMAS L. BELL</u> Date <u>4/20/2007</u>																																																																		
(Filed Electronically)																																																																		
ODH Registration Number <u>0623</u>	Aquifer Type (Formation producing the most water) <u>SHALE</u>																																																																	
	Date of Well Completion <u>4/4/2007</u> Total Depth of Well <u>195</u> ft.																																																																	

Completion of this form is required by section 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.  
Distribute copies of this record to Customer, and Local Health Department.

Figure 4-3: Example of ODNR water well log (BFI-19)

Participating wells in the Mahoning County DBOH data were individually searched by address using the ODNR's online database. Twenty seven of the 73 original well logs were identified and accessed from the online database. An addition six water well logs were physically located at the ODNR Division of Soil and Water Resources Office in Columbus, Ohio. The office holds the original copies of each well log, organized by county and township. Thirty three of the 73 participating well logs were located. The water well logs of participating wells are located in Appendix B.

Participating wells in which a log was unable to be located were geo-referenced using the property address and Google Earth. By inputting an address into Google Earth, a place mark can be added to obtain coordinate information for each property. Forty of the wells were located this way, as seen in Figure 4-4.

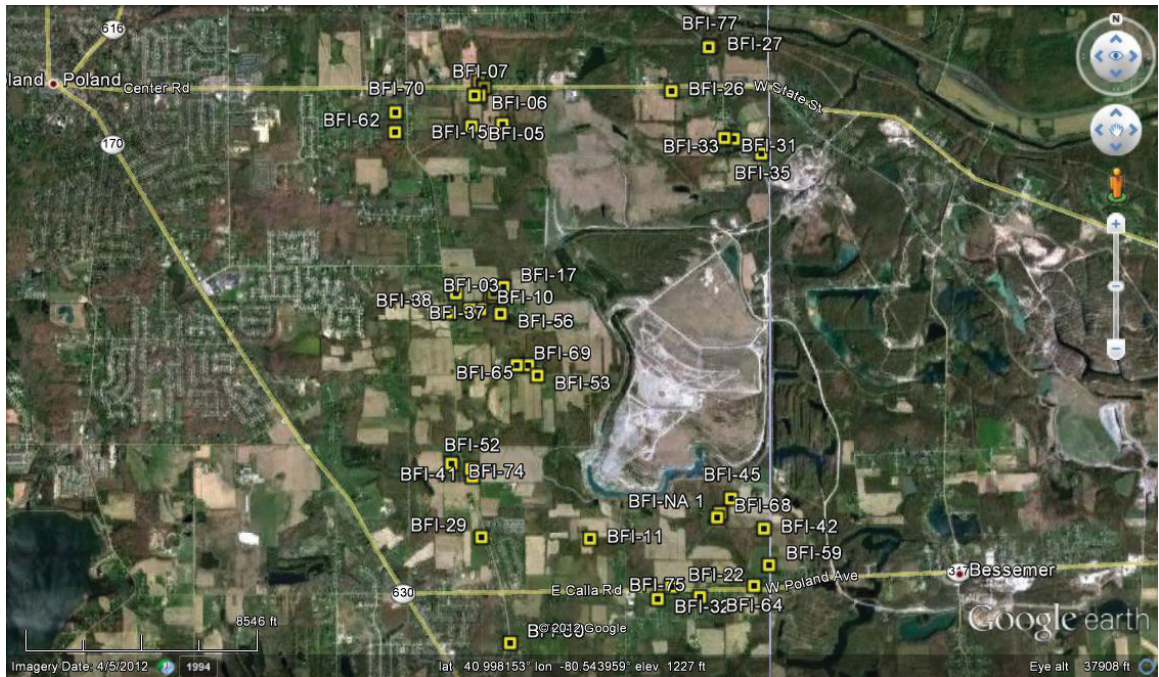


Figure 4-4: Google Earth Image of un-located well logs



Once all of the addresses were placed into Google Earth, geo-referencing for coordinate location was done by reviewing the properties of each individual place mark, as seen in the screenshot in Figure 4-5.

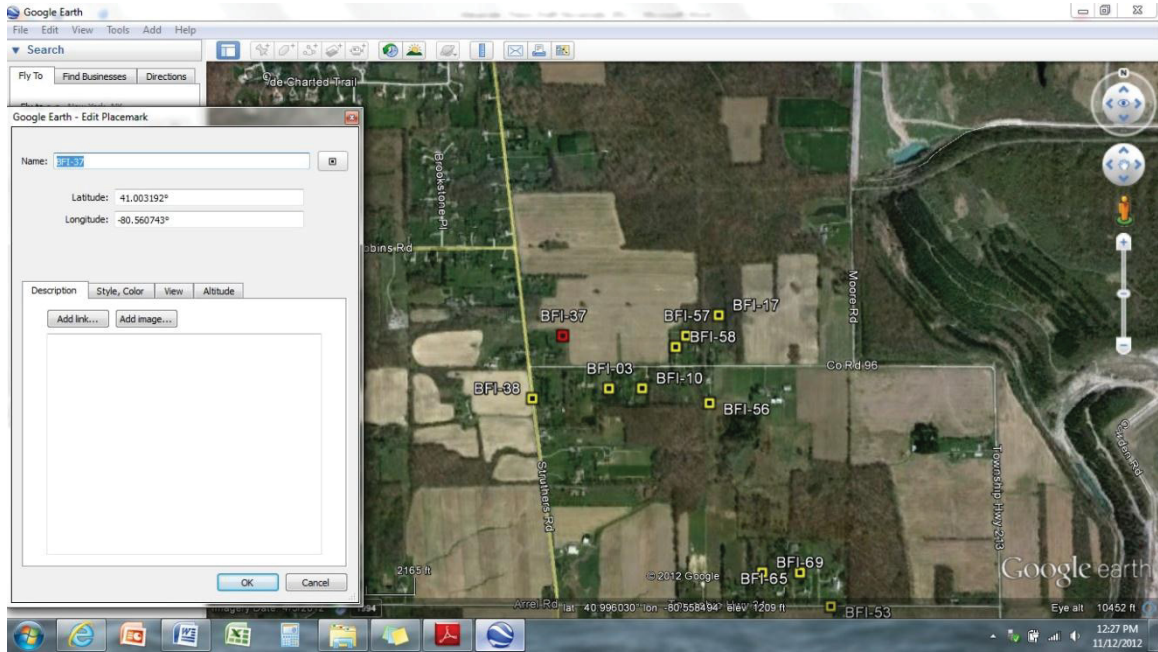


Figure 4-5: Screenshot of Google Earth and Place Mark Properties

Each well coordinate location was added to an Excel spreadsheet as 'x and y' data, with the given name as the unique identifier (BFI-XX). A layer for the locations of each well was created in ArcGIS 10.1 by using the 'Add XY Data' utility within the program. This enabled the Excel spreadsheet coordinate data to be shown as a map layer in ArcGIS 10.1. This layer of data was then saved as an ArcGIS layer file to be used in future mapping as is shown in Figure 4-6.

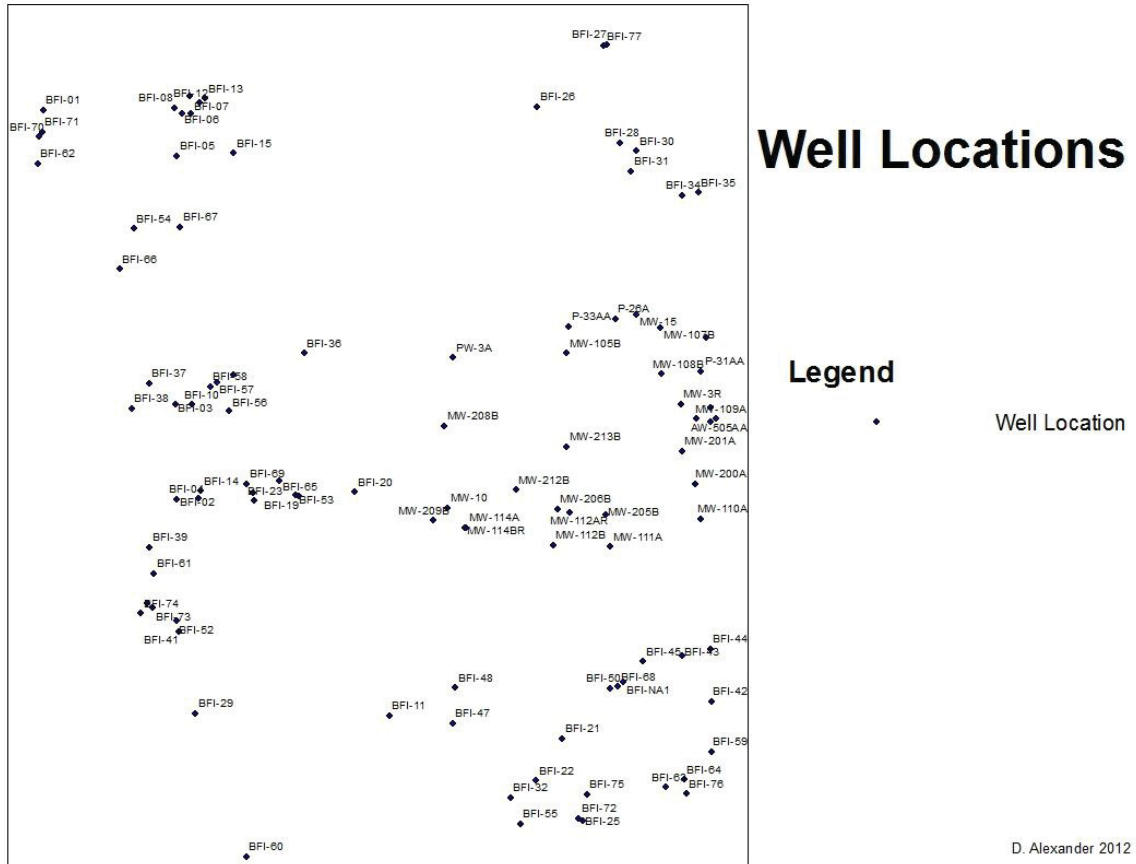


Figure 4-6: Well Location Layer

### Mapping of Study Area

The study area was mapped by using data supplied publicly by Mahoning County GIS ftp site. This site allows users to download GIS data, free of charge, and can be found at: <http://gis.mahoningcountyoh.gov/>. Data download for the study area mapping included properly parcels, roads, and political boundaries.

The property parcel layer includes data supplied by the Mahoning County Auditor of all property owners within the county. Each parcel is drawn as a polygon shape file within ArcGIS. To obtain the Carbon Limestone Landfill parcels, a ‘select by attributes’ query was ran, highlighting all parcels within Mahoning County that are owned by the landfill. This was achieved by selecting attributes by using the query: Deedowner =

‘CarbonLimestoneLF’. Once the polygons in the layer are highlighted, a new layer, with only the chosen polygons is created by exporting the selection. This enables visualization to the extent of parcels owned by the landfill, as seen in Figure 4-7.

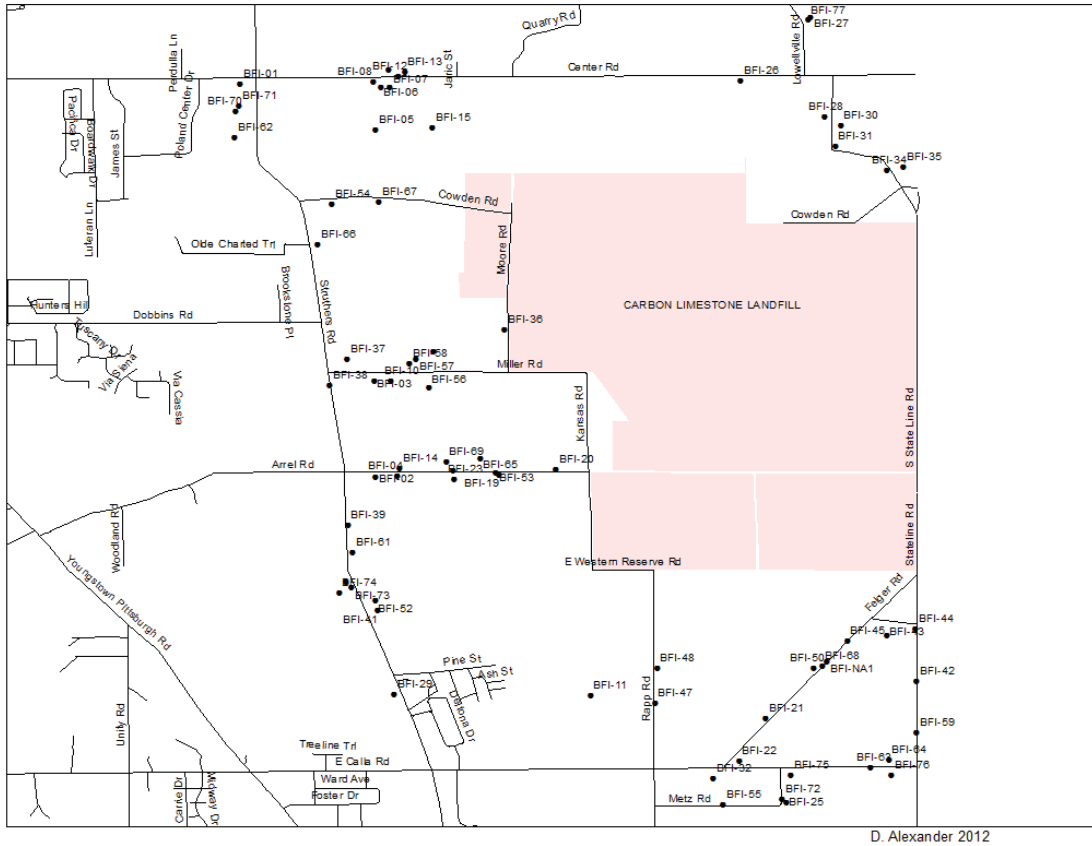


Figure 4-7: Carbon Limestone Landfill Parcels

## Mapping of Generalized Groundwater Flow

To illustrate the groundwater flow, a generalized map was created to illustrate the direction. A potentiometric map in an ArcGIS shape file format was downloaded from the Ohio Department of Natural Resources Division of Soil and Water. This potentiometric surface layer was changed into a raster format to illustrate differing depths of the groundwater surface. Groundwater flows from high head to low head, or high elevation to low elevation.

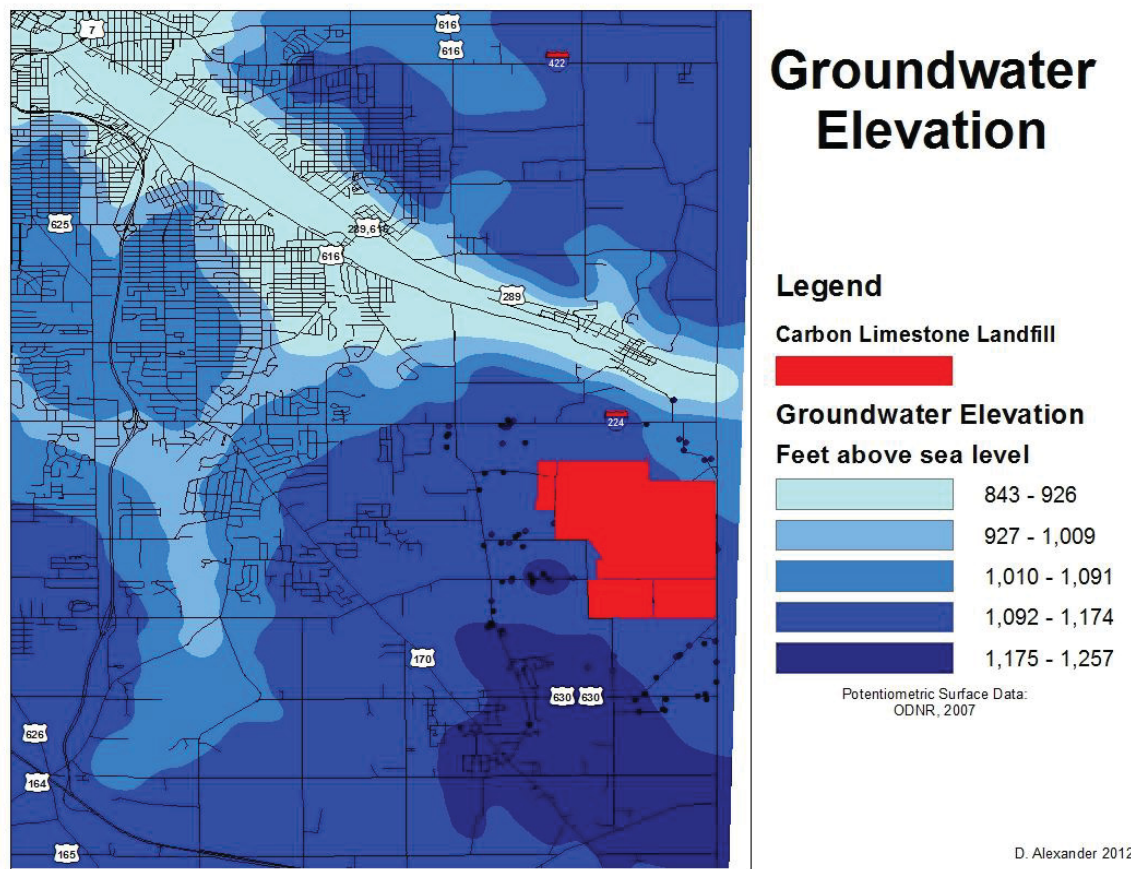


Figure 4-8: Generalized Groundwater Elevation

Site-specific groundwater elevations were attempted by combining static water levels acquired from water well logs with the digital elevation model (DEM) for the area.

Due to extreme disruption to the natural landscape at the site of the Carbon Limestone Landfill, the DEM shows unnatural elevations. Because of this, when rendering the groundwater elevation surface, abnormalities are shown from anthropogenic impacts of the ground surface falsifying flow paths.

### Mapping of Sampling Results

To show sampling results for each participating well for a given sampling date, analyte results from excel spreadsheets were joined to well location data within ArcGIS. This creates an attribute table containing well locations and results of sampling. To further utilize ArcGIS in visualizing the results of the data, natural neighbor interpolation (spatial analyst tool) was used.

Natural neighbor interpolation is a method of using multivariate data in Delaunay triangulation. The value of a given cell is estimated by using weighted values of the closest surrounding points. This creates a raster of both given data as well as estimated data.

Natural neighbor interpolation was used on each sampling date, for each analyte tested. ArcGIS contains a ModelBuilder interface, which is used to build and edit geoprocessing models within ArcGIS. Figure 4-9 illustrates the completed ModelBuilder geoprocessing model for the September 2010 sampling date. Once the model is run, individual raster layers are created for each analyte, based on the natural neighbor interpolation.

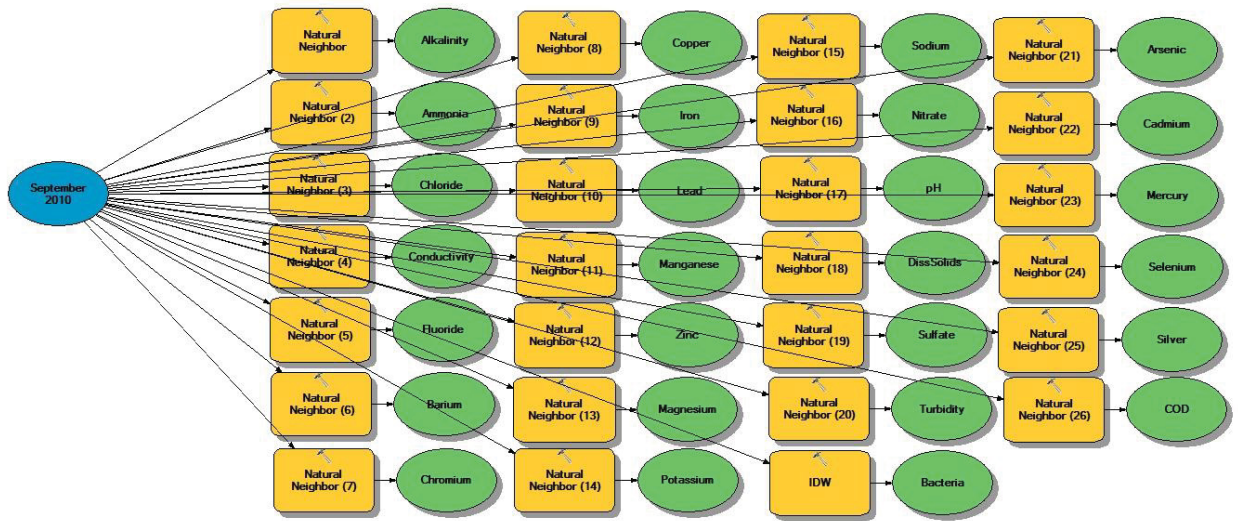
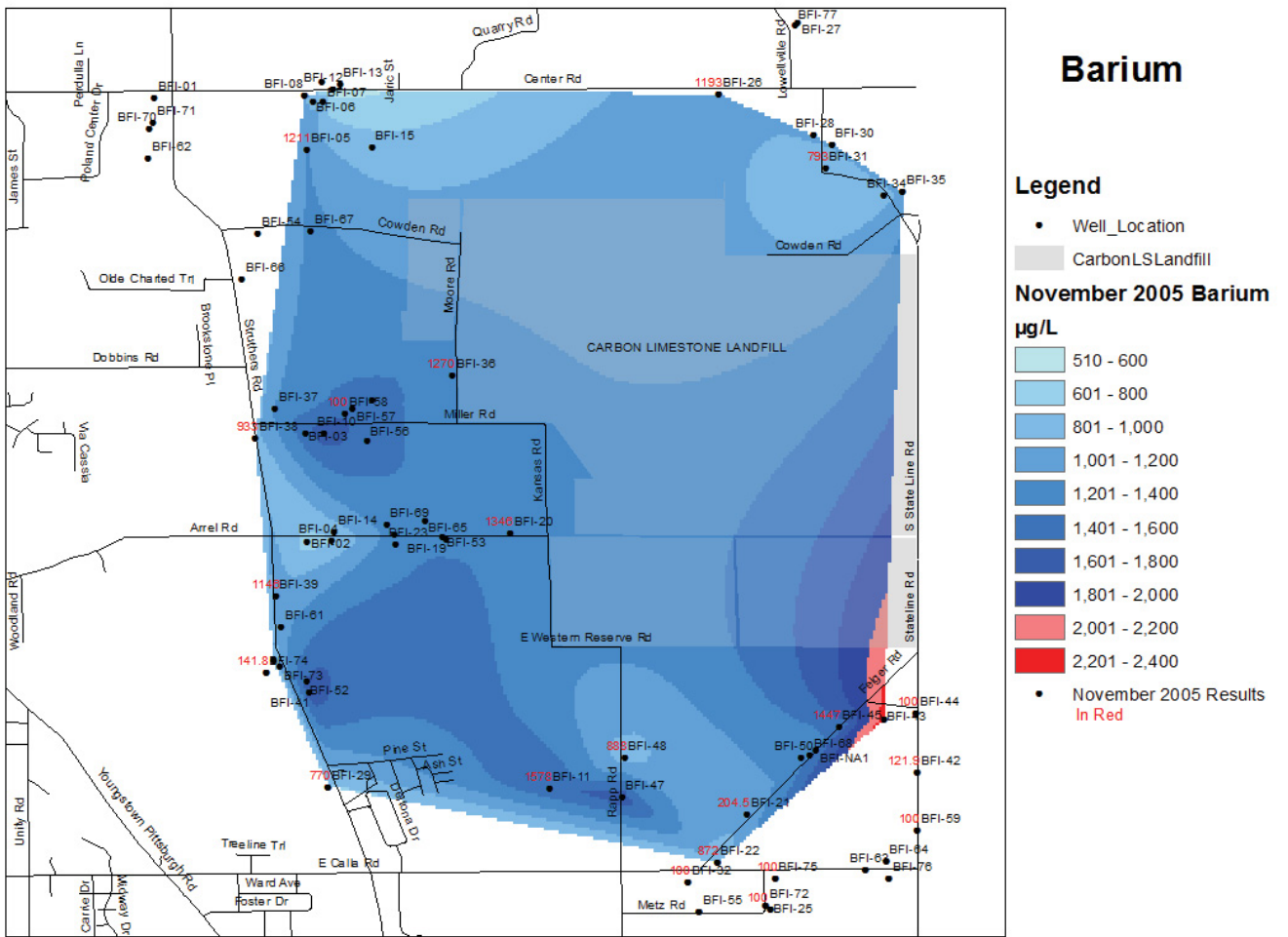


Figure 4-9: ModelBuilder for Natural Neighbor Interpolation

The individual raster layers from the natural neighbor interpolation are then combined with the map of the study area, enabling concentration levels to be color coded for each analyte. For an example, Figure 4-10 is the resulting map of November 2005 Barium levels. ArcGIS automatically produces a raster with ‘stretched’ symbology, which was changed to ‘classified’ under the properties menu for each layer. Each layer was also set to an interval to illustrate levels above the MCL, SMCL, Action Level, or Recommended Level based on the individual parameter.



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Figure 4-10: November 2005 Barium Results

## Mapping of Sampling Results in Combination with On-site Monitoring Results

On-site sampling data was entered into the corresponding Microsoft Excel spreadsheet. This enabled a new natural neighbor raster to be created in ArcGIS, illustrating both on-site data as well as off-site residential data. With the inclusion of more data points to interpolate, a more meaningful map can be created showing water quality results.



## **Chapter 5 Results**

### Introduction

The following sections summarize the results obtained from both the time-series graphing of individual analytes for each well as well as mapping of the results for each analyte for a specific sampling date. Each analyte tested was researched for any changes over the given sampling period (May 2003 – September 2010).

Because of the multiple sources that may cause a positive result, bacteria was not furthered researched. Positive bacteria results can be caused from unmaintained wells, agricultural run-off, effluent from septic systems, and many more sources beyond the scope of this research

Analytes without MCL, SMCL, Action Level or Recommended Levels were not further researched using time-series graphs, but may be included in the discussion section as possible explanations for increased concentrations. The following analytes were not researched using the time-series charts: alkalinity, ammonia, conductivity, chemical oxygen demand, magnesium, potassium, and turbidity.

## Time-Series Graphing

A complete file of all time-series charts created for all analytes for every participating well is found in Appendix D as Adobe (.pdf) files for each well.

### Arsenic

The MCL of arsenic, as defined by the U.S. EPA is 10 µg/L, with the detection limit of Mahoning County DBOH labs set at 5 µg/L. Two participating wells, BFI-44 and BFI-53, were the only wells to show an increase of the level of arsenic. The remaining wells can be exemplified from Figure 5-1 and Figure 5-2.

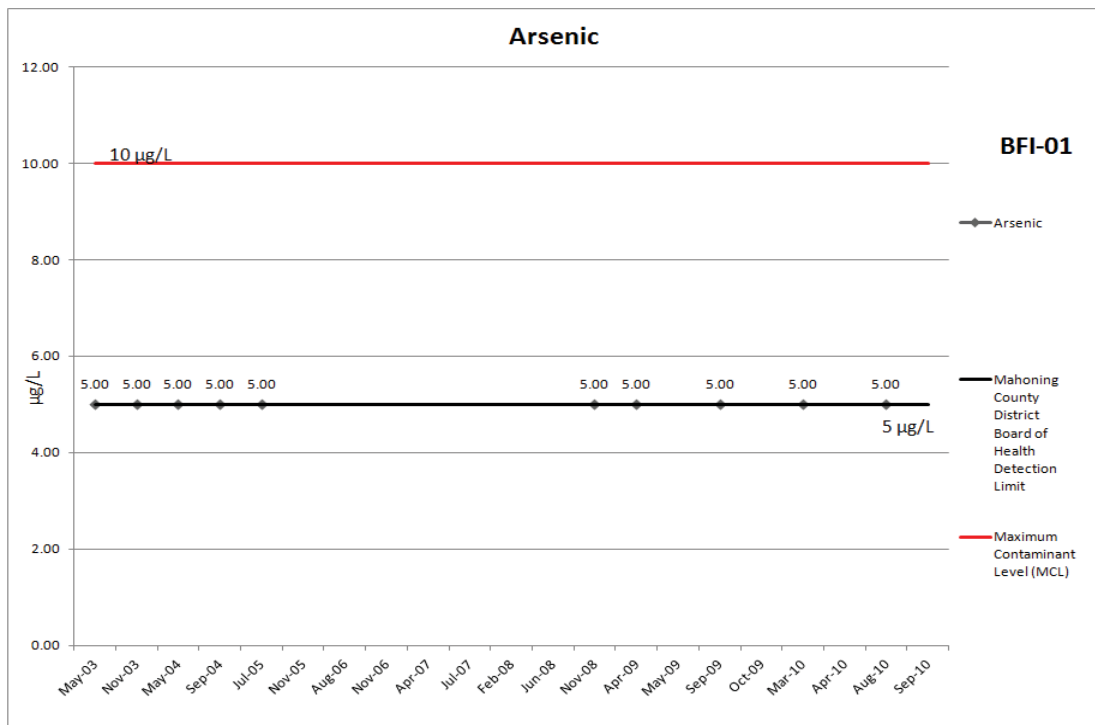


Figure 5-1: BFI-01 Arsenic

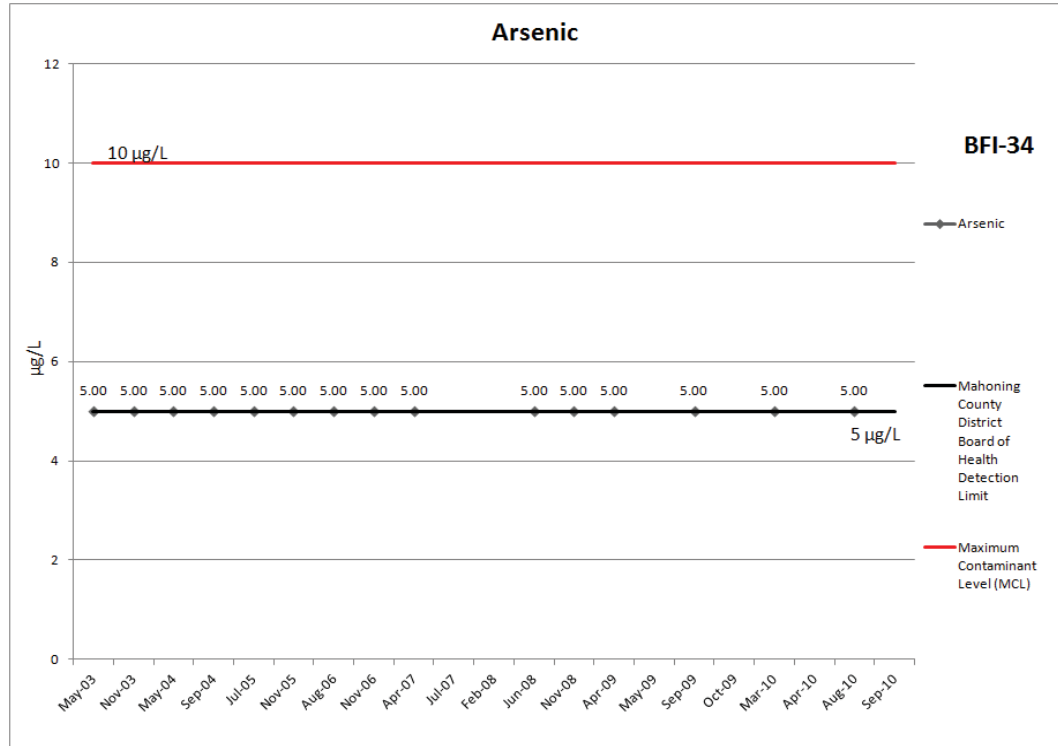


Figure 5-2: BFI-34 Arsenic

BFI-53 showed an increase in arsenic concentration on two occasions: June 2008 and April of 2009 with resulting concentrations 8.3 µg/L and 7.0 µg/L respectively as shown in Figure 5-3. Although both of these concentrations are below the MCL of water quality, they are parameter measurements of interest, however this well was only tested for arsenic three occasions.

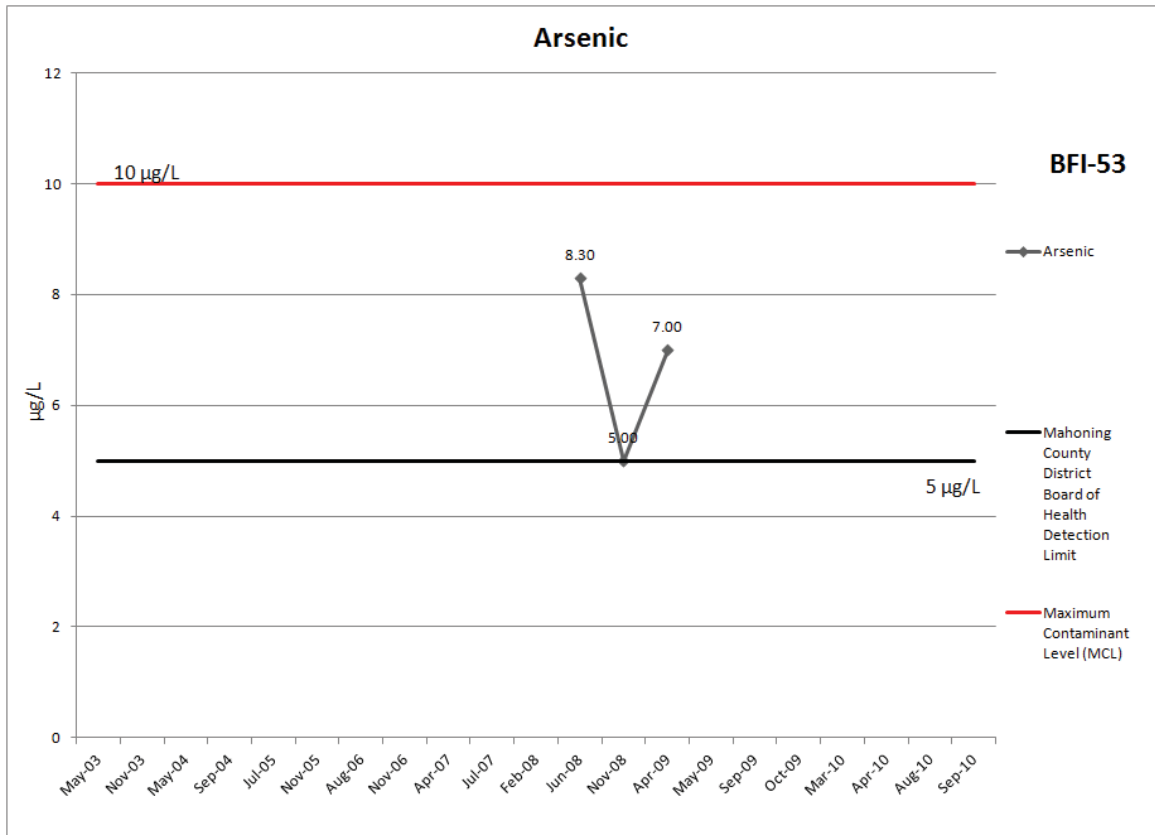


Figure 5-3: BFI-53 Arsenic

In the results from May, 2003, BFI-44 arsenic concentration result was 15.3 µg/L, 5.3 µg/L higher than the MCL, as shown in Figure 5-4. This result is an abnormality when compared to the remaining sample results on the time-series graph.

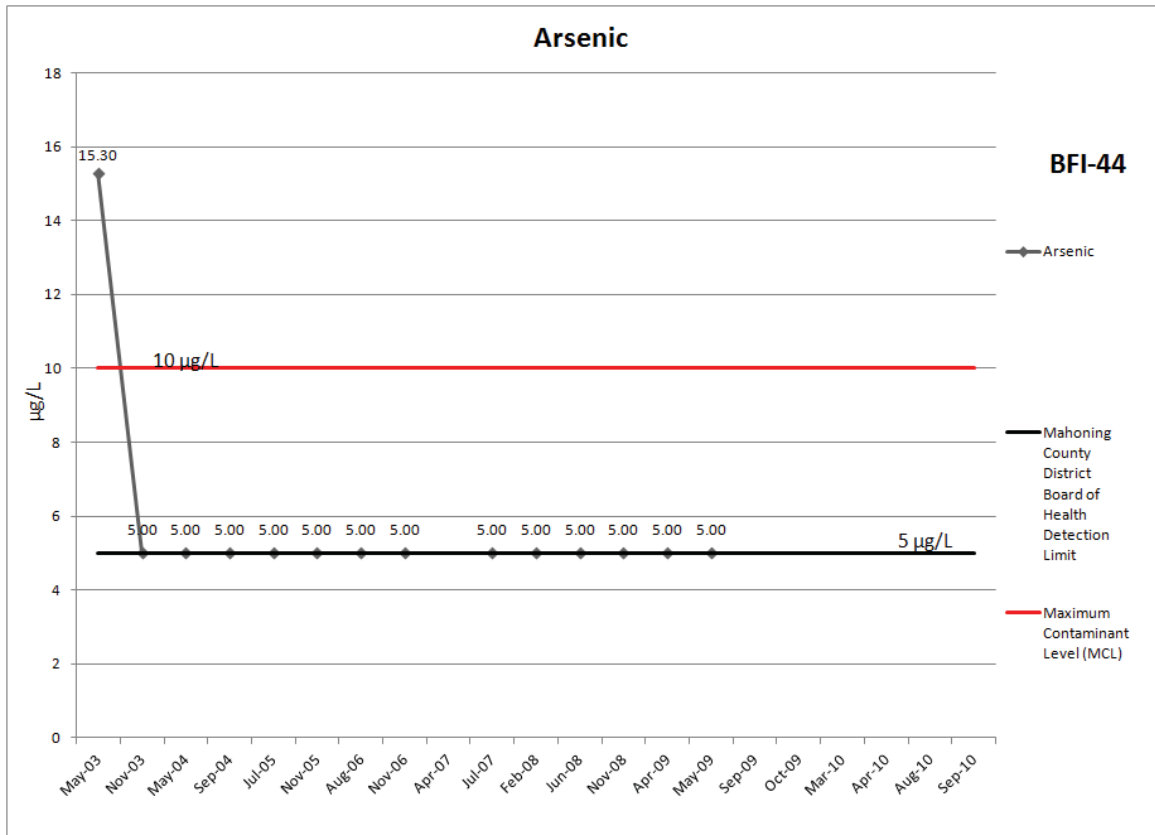


Figure 5-4: BFI-44 Arsenic

## Barium

Barium has a MCL of 2000 µg/L and Mahoning County DBOH laboratory's minimum detection limit is 100 µg/L. BFI-43, during the November 2005 sampling event was the only well above the MCL with a result of 2300 µg/L, as shown in Figure 5-5. Thirty three other wells showed concentration measurements of interest, with an increasing concentration occurring in a time range from May 2003 till November 2005, decreasing to baseline levels for the August 2006 sampling event. All thirty three wells with increased Barium concentrations are included in Appendix E

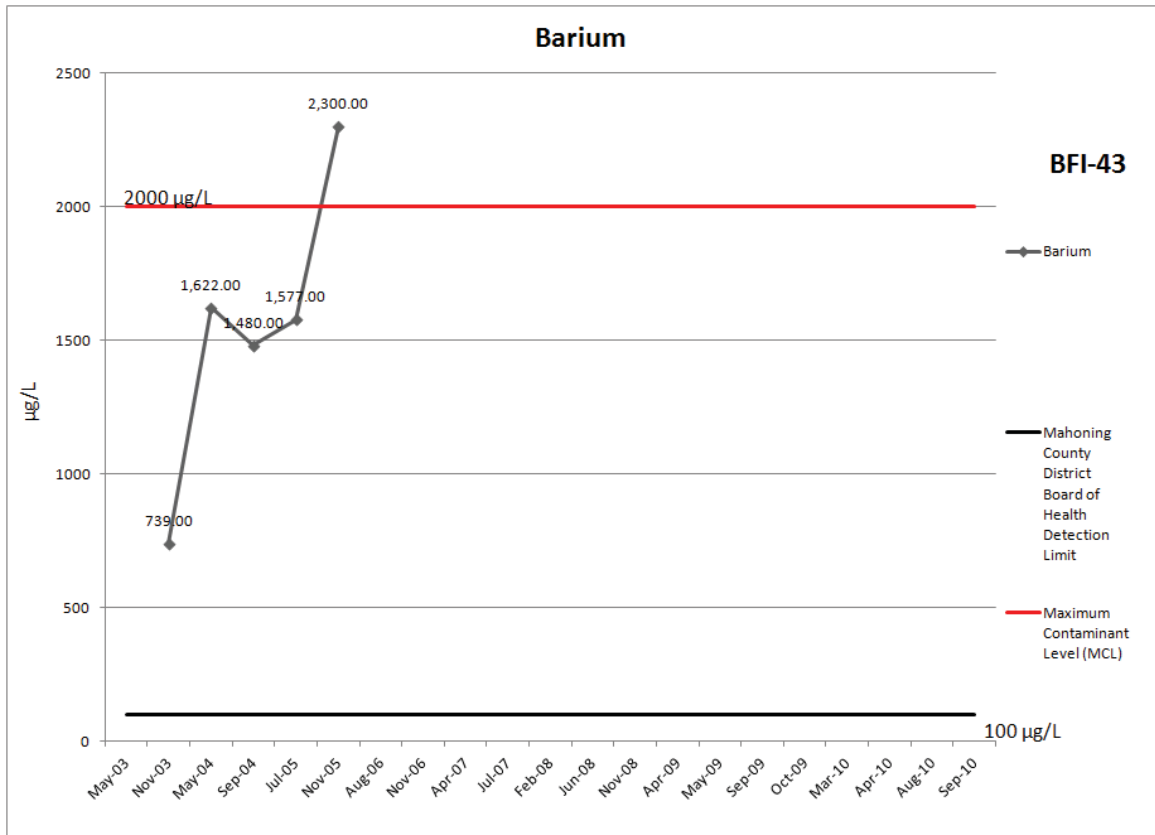


Figure 5-5: BFI-43 Barium

The remaining 39 wells did not show the same barium concentration trend as the previous wells. The barium time-series charts for these wells are similar to BFI-13, BFI-14, and BFI-64 (Figure 5-6, Figure 5-7, and Figure 5-8) with the remainder of the well time-series charts available in Appendix D, arranged by well name.

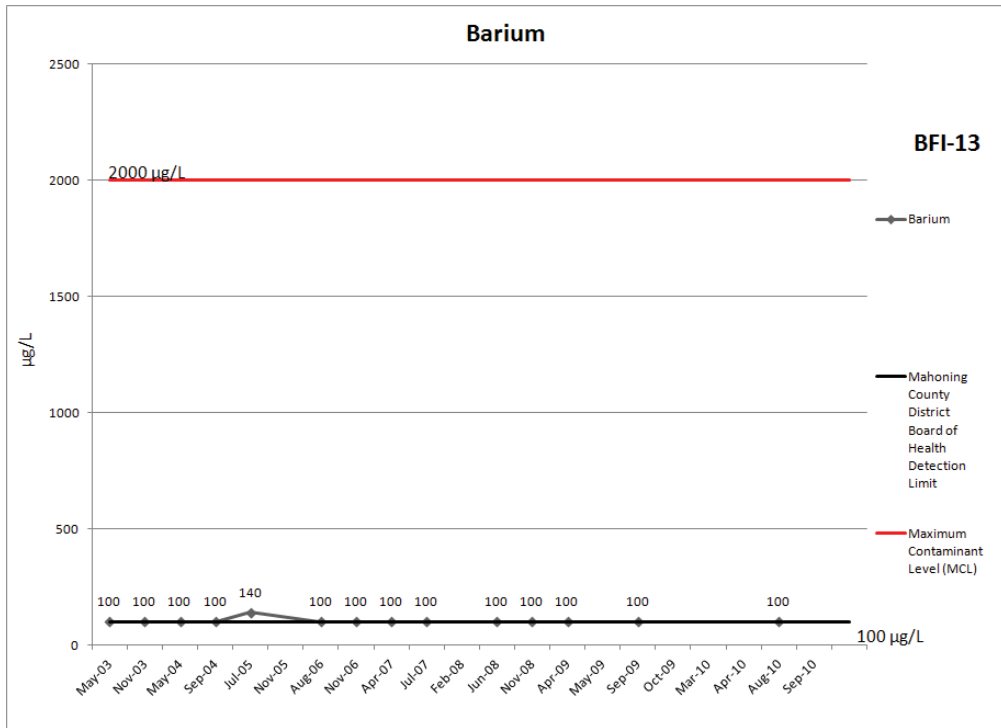


Figure 5-6: BFI-13 Barium

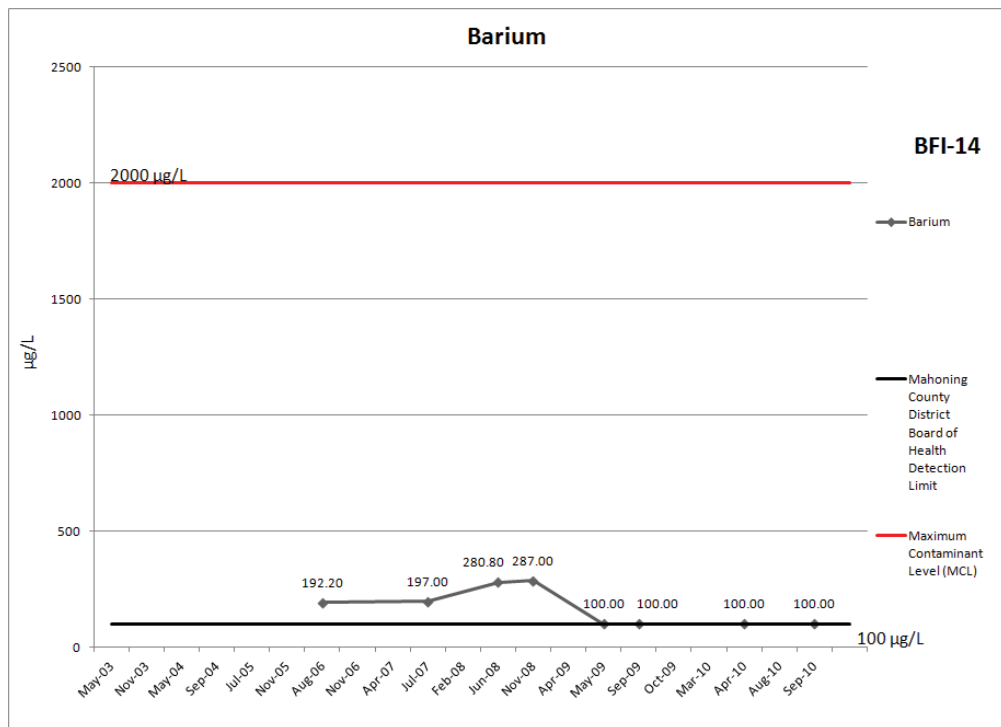


Figure 5-7: BFI-14 Barium

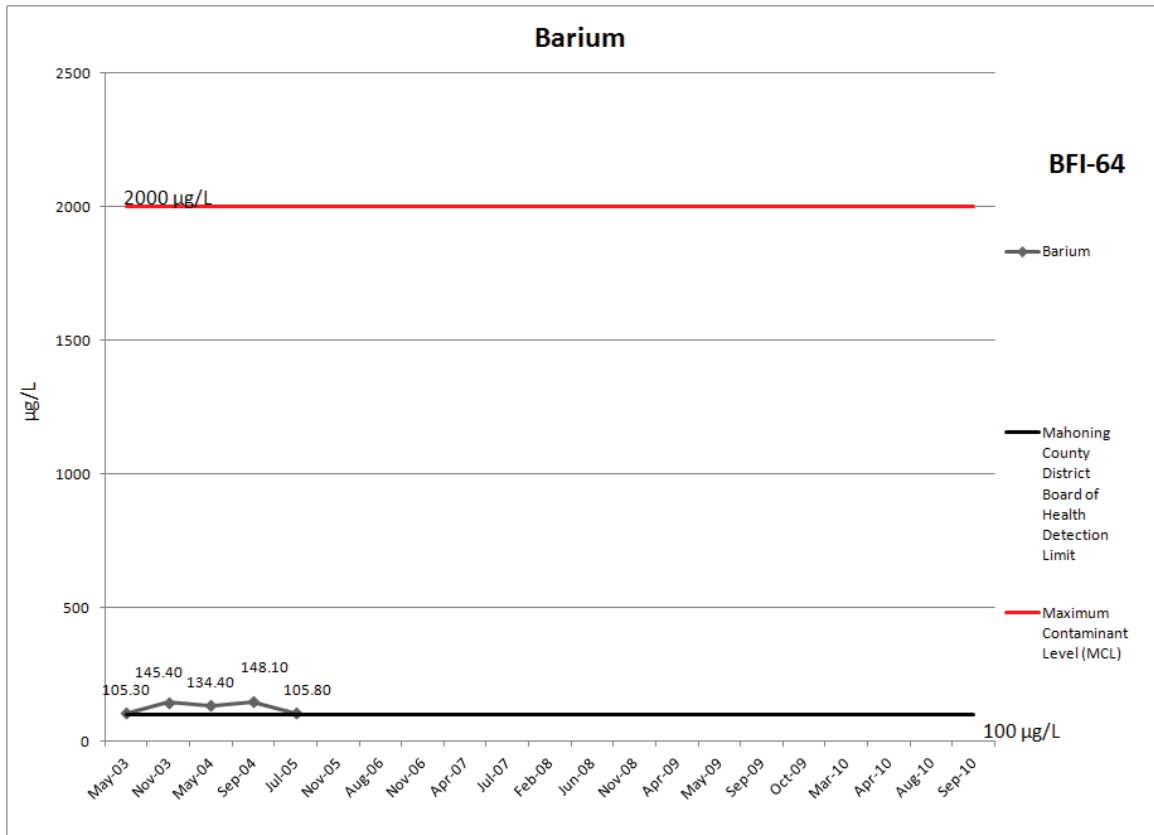


Figure 5-8: BFI-64 Barium

## Cadmium

Cadmium has a MCL of 5 µg/L, with Mahoning County DBOH laboratory minimum detection limit of 10 µg/L. Due to the minimum detection limit higher than the limits of the MCL, it is difficult to determine exact measurements above MCL limits. However, November 2003 sampling event contained three wells, BFI-43, BFI-44, and BFI-47 with results higher than 10 µg/L. The results were 12.2 µg/L, 10.3 µg/L, and 11.2 µg/L, respectively, as shown in Figure 5-9, Figure 5-10, and Figure 5-11. The remaining time-series charts can be located in Appendix D, arranged by well name.



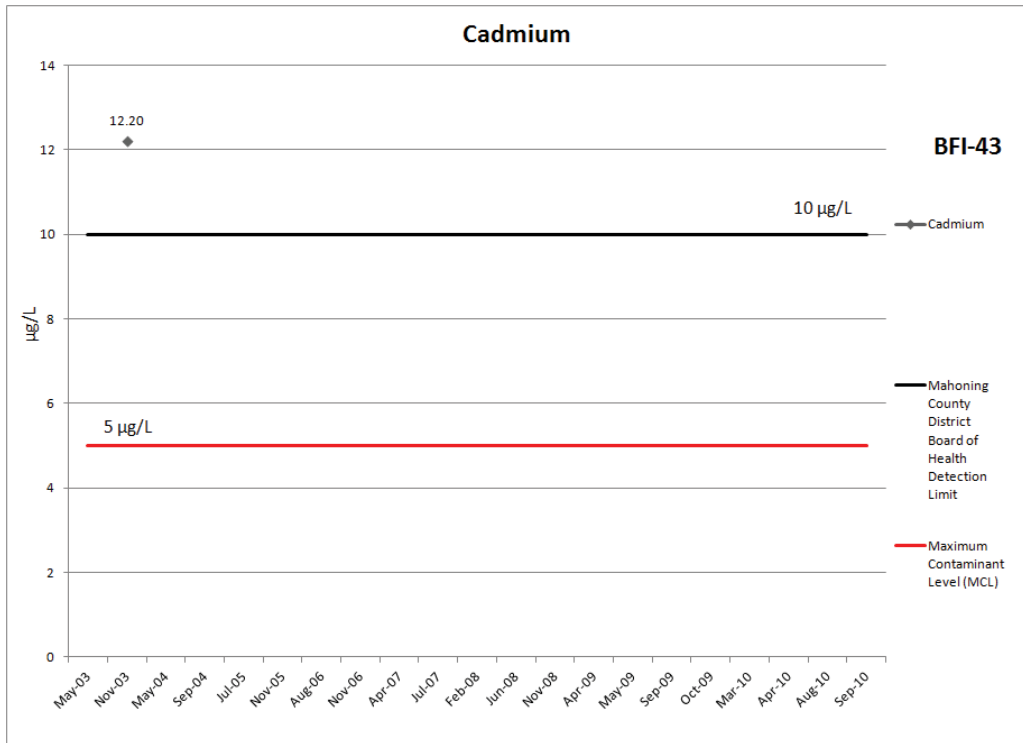


Figure 5-9: BFI-43 Cadmium

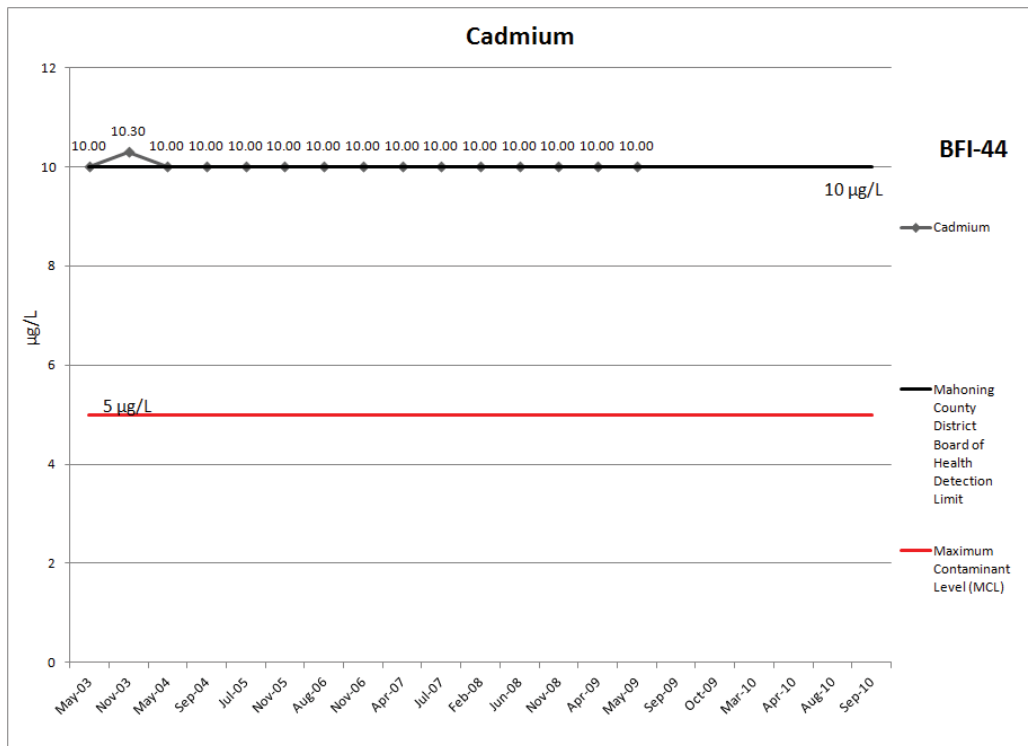


Figure 5-10: BFI-44 Cadmium

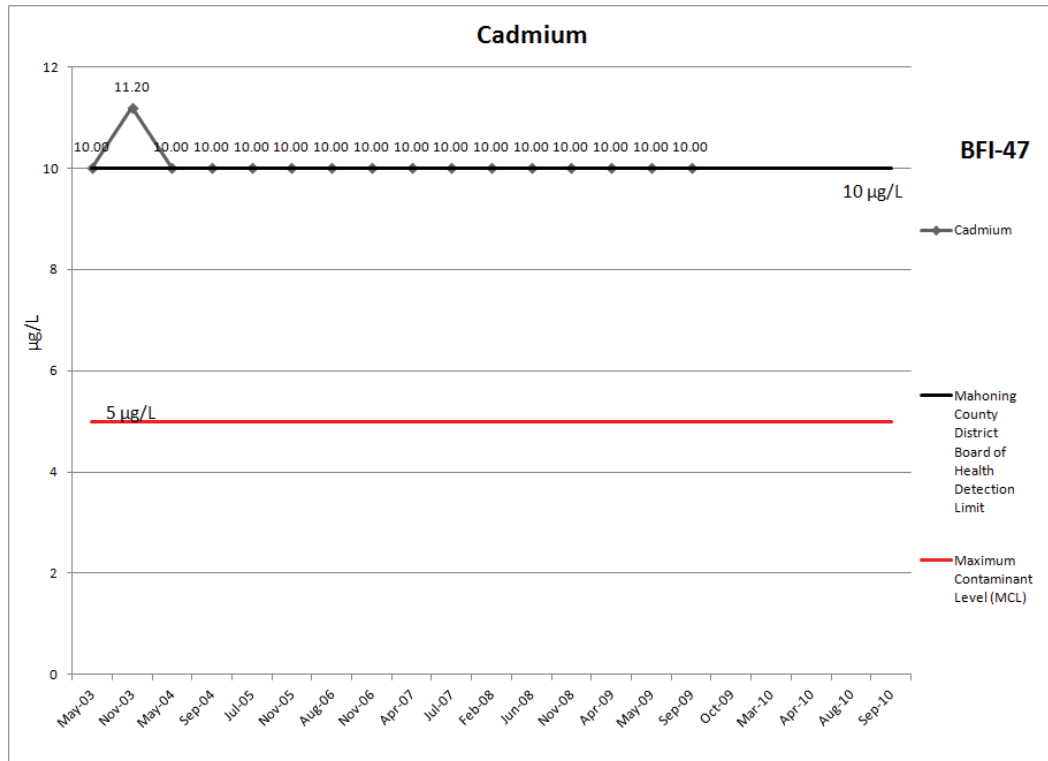


Figure 5-11: BFI-47 Cadmium

## Chromium

Chromium MCL is 100 µg/L, with the Mahoning County DBOH laboratory minimum detection limit of 20 µg/L. No wells sampled were above the MCL limit; however, November 2003 sampling resulted in three wells with elevated levels (BFI-05, BFI-33, and BFI-47) with the highest level recorded at 40 µg/L. September 2009 sampling resulted in six wells with slightly elevated levels of chromium: BFI-08, BFI-34, BFI-36, BFI-39, BFI-58, and BFI-61. The highest recorded level from the September 2009 sampling event was 35.5 µg/L. All chromium concentrations returned to base level in the next sampling event. The time series charts for each of these wells is located in Appendix D.

## Fluoride

Fluoride MCL is 4 mg/L and the Mahoning County DBOH laboratory minimum detection limit is 0.2 mg/L. The highest level of fluoride recorded during the May 2003 – September 2010 sampling events was 2.0 mg/L in the BFI-19 well during the July 2007 sample. All other levels were below MCL. The time series charts for fluoride can be found in Appendix D, arranged by well name.

## Mercury

The MCL for mercury is 2 µg/L and the minimum detection limit of Mahoning County DBOH Laboratory is 0.2 µg/L. No well sampled during May 2003 – September 2010 had detectable limits of mercury, as exemplified in Figure 5-12.

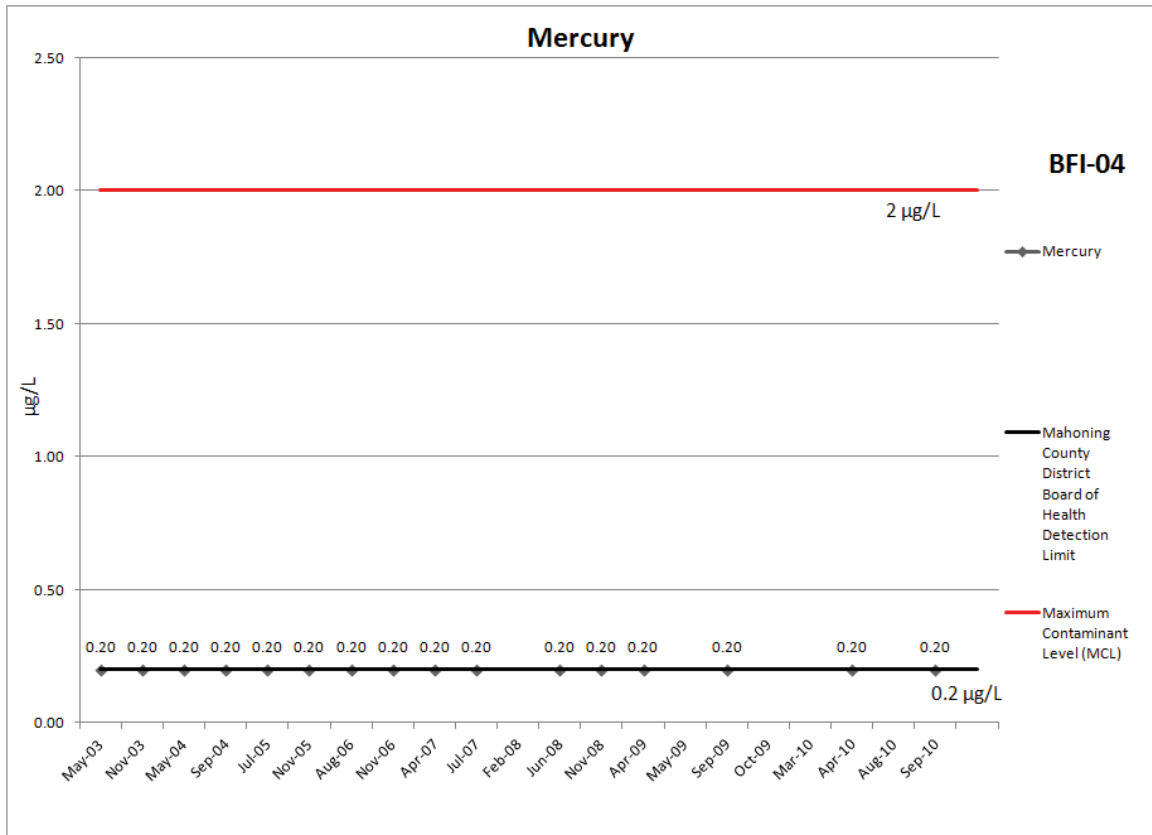


Figure 5-12: BFI-04 Mercury - an example of all well results

### Nitrate

The MCL for nitrate is 10 mg/L and the Mahoning County DBOH Laboratory's minimum detection limit is 0.5 mg/L. Most levels of nitrates for participating wells sampled were well below the MCL, however, wells BFI-37 and BFI-47 had elevated levels. BFI-37 (Figure 5-13) fluctuated throughout the times sampled, but never was above the MCL limit. BFI-47 (Figure 5-14) was above the MCL in the November 2003 sampling event (10.86 mg/L) and the August 2006 sampling event (12.92 mg/L).

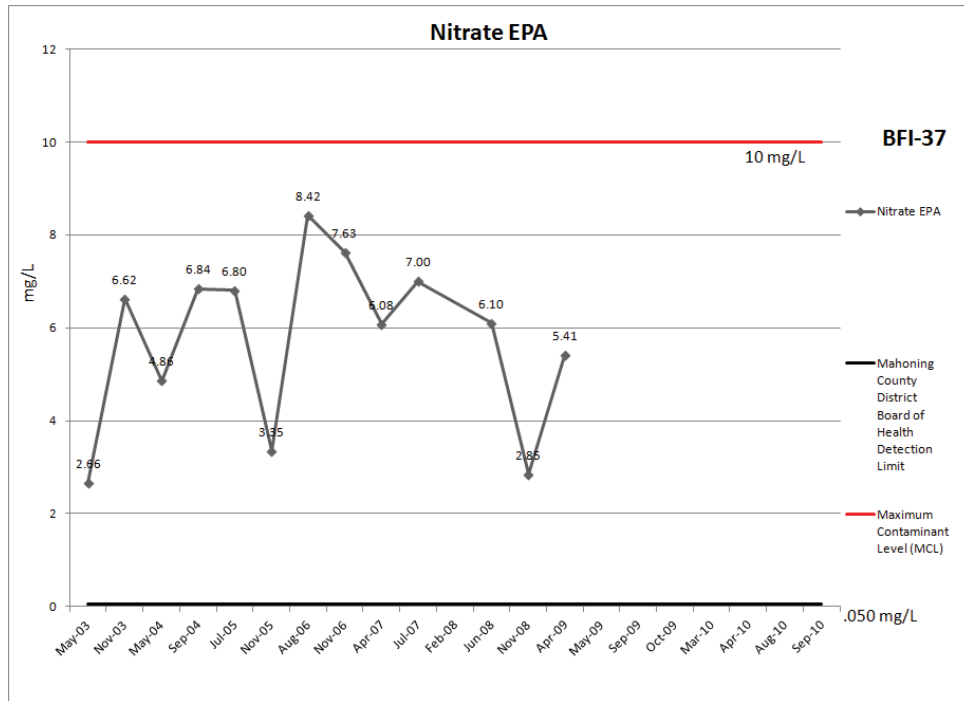


Figure 5-13: BFI-37 Nitrate

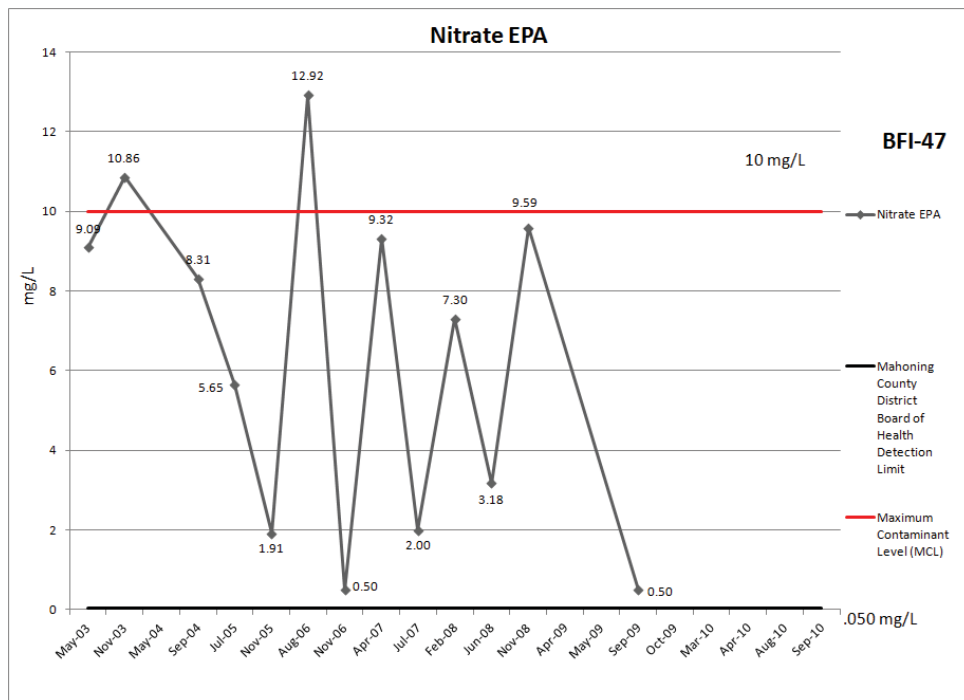


Figure 5-14: BFI-47 Nitrate

## Selenium

The MCL for selenium is 50 µg/L and the minimum detection limit of the Mahoning County DBOH Laboratory is 2 µg/L. No participating well in the program had levels above the MCL during any sampling event. The majority of the wells had no detection of selenium as shown in Figure 5-15. BFI-08 (Figure 5-16) had the only concentration detected of 24.1 µg/L in May, 2004.

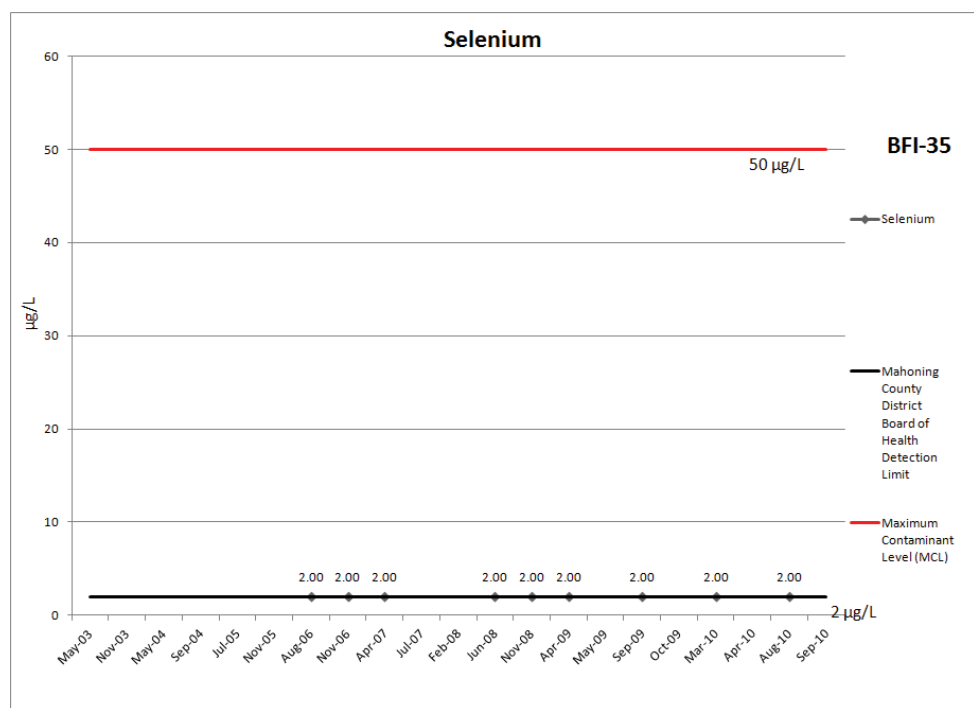


Figure 5-15: BFI-35 Selenium

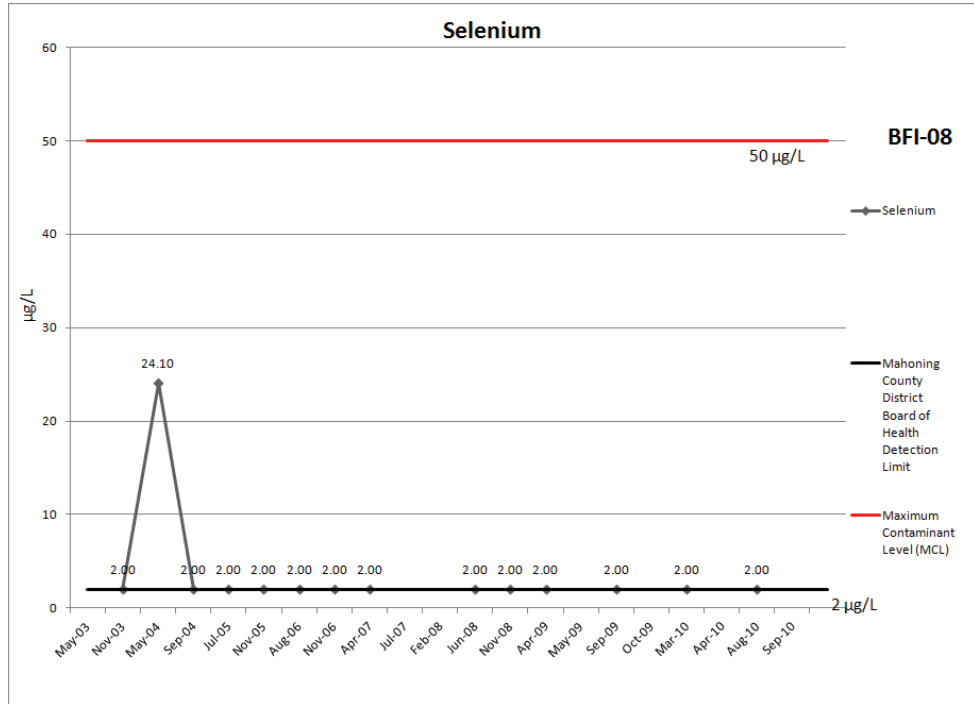


Figure 5-16: BFI-08 Selenium

## Chloride

Chloride has a SMCL of 250 mg/L and the minimum detection limit for the Mahoning County DBOH Laboratory is 1 mg/L. Only two wells out of the 73 participants have elevated chloride levels above the recommended SMCL. Well BFI-47, as shown in Figure 5-17, has two abnormalities in the data trend. The May 2004 sampling event peaked at 280.00 mg/L. In November 2006, another peak occurred at 400.00 mg/L.

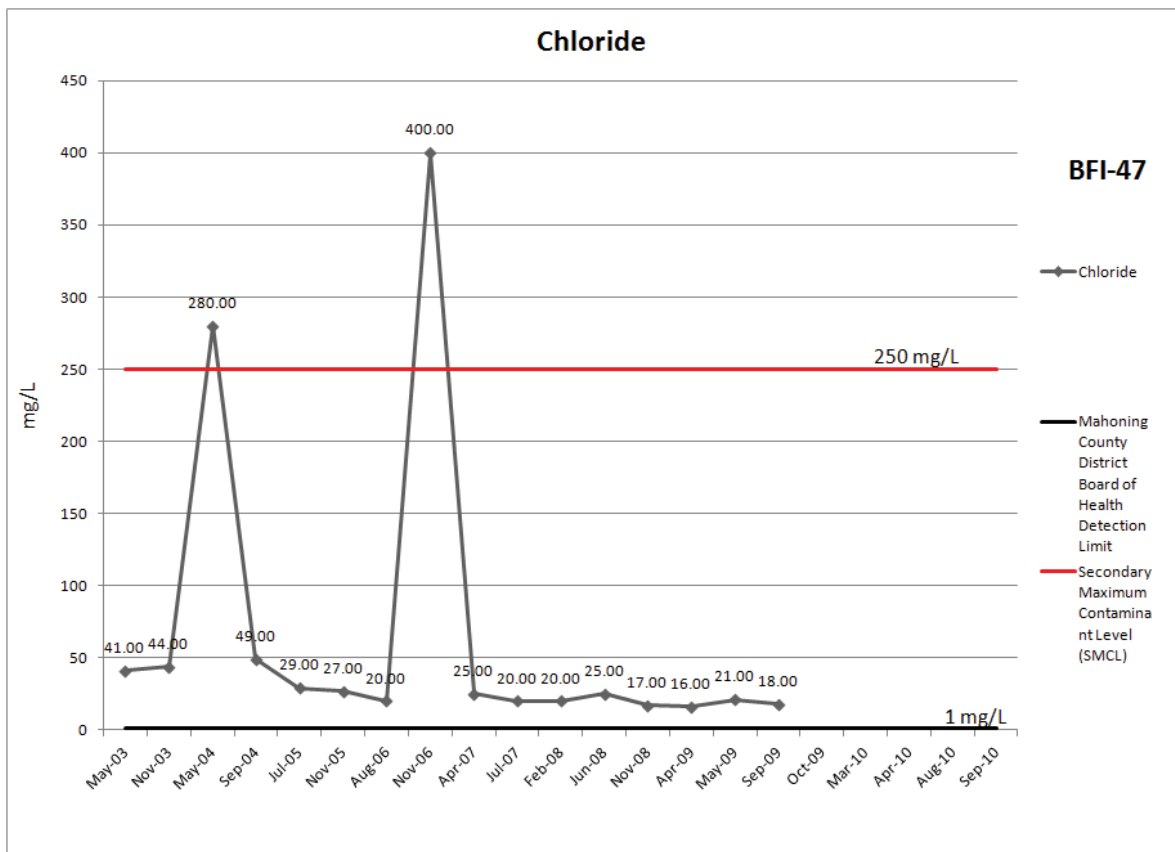


Figure 5-17: BFI-47 Chloride



BFI-48 had multiple levels above the recommended SMCL of chloride. Only three sampling events were below the SMCL, as shown in Figure 5-18.

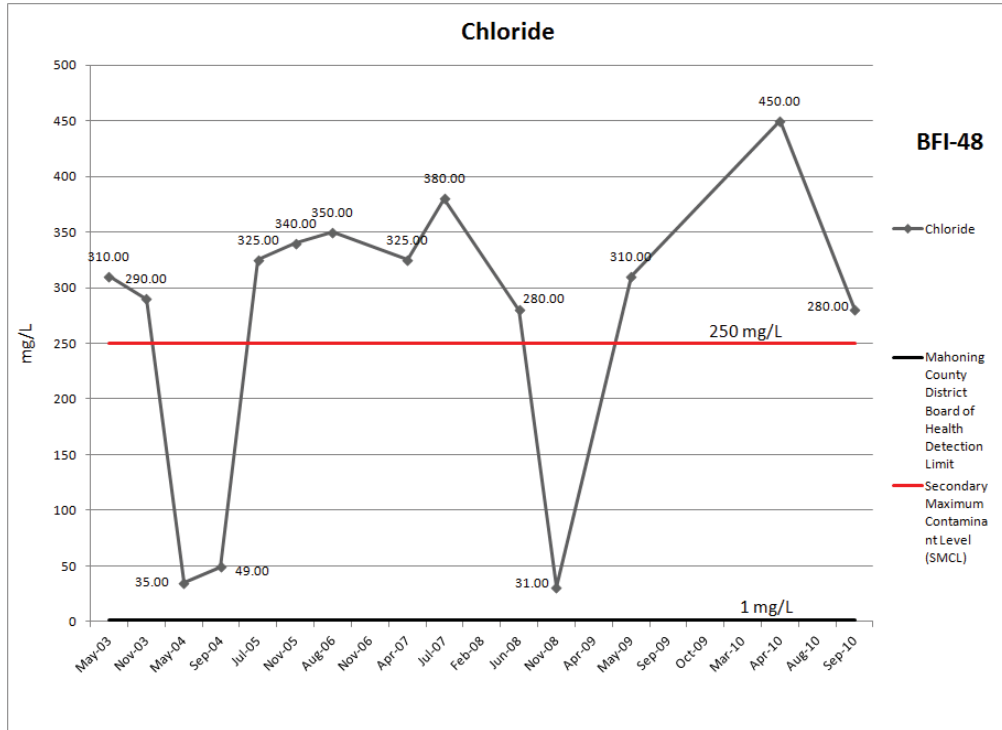


Figure 5-18: BFI-48 Chloride

### Total Dissolved Solids

The SMCL for dissolved solids is 500 mg/L, with the minimum detection limit of Mahoning County DBOH Laboratory at 1 mg/L. Of the 73 participating wells, 20 showed an abnormality in the data (higher value(s) than the rest), 17 were higher than SMCL level in all results, and three showed an increasing trend of dissolved solids. Time Series charts for each are located in Appendix F with differing trends of dissolved solid concentrations located in Table 5-1.

Table 5-1: Dissolved Solid Trends

Abnormality in data trend	High levels	Increasing trend
BFI-02	BFI-03	BFI-31
BFI-05	BFI-04	BFI-50
BFI-08	BFI-06	BFI-59
BFI-10	BFI-07	
BFI-11	BFI-12	
BFI-17	BFI-13	
BFI-19	BFI-15	
BFI-20	BFI-43	
BFI-21	BFI-44	
BFI-22	BFI-47	
BFI-25	BFI-48	
BFI-26	BFI-52	
BFI-27	BFI-56	
BFI-28	BFI-57	
BFI-29	BFI-62	
BFI-30	BFI-71	
BFI-34	BFI-75	
BFI-41		
BFI-42		
BFI-63		

Iron

Iron has a SMCL of 300 µg/L and the Mahoning County DBOH laboratory minimum detection is 50 µg/L. Four wells (BFI-52, BFI-54, BFI-59, and BFI-74) had no data recorded for iron concentrations, 22 wells (Table 5-2) had resulting iron concentrations below SMCL. The remaining 48 wells, as listed in Table 5-3, showed abnormalities in data (high concentrations for a given sampling date) or had concentrations above the SMCL of iron for all sampling dates. Each times series graph is located in Appendix D, organized by well name.

Table 5-2

Wells resulting in Iron Concentrations below SMCL		
BFI-03	BFI-34	BFI-55
BFI-04	BFI-37	BFI-58
BFI-12	BFI-38	BFI-63
BFI-13	BFI-41	BFI-70
BFI-20	BFI-47	BFI-71
BFI-22	BFI-48	BFI-76
BFI-23	BFI-54	BFI-NA2
BFI-32		

Table 5-3

Wells resulting in Iron Concentrations above SMCL			
BFI-01	BFI-19	BFI-40	BFI-65
BFI-02	BFI-21	BFI-42	BFI-66
BFI-05	BFI-25	BFI-43	BFI-67
BFI-06	BFI-26	BFI-44	BFI-68
BFI-07	BFI-27	BFI-45	BFI-69
BFI-08	BFI-29	BFI-50	BFI-72
BFI-10	BFI-30	BFI-53	BFI-73
BFI-11	BFI-31	BFI-57	BFI-75
BFI-14	BFI-33	BFI-60	BFI-77
BFI-15	BFI-35	BFI-61	BFI-NA1
BFI-17	BFI-36	BFI-62	
BFI-18	BFI-39	BFI-64	

Manganese

The SMCL for manganese is 50 µg/L and the minimum detection limit of the Mahoning County DBOH Laboratory is 10 µg/L. Forty five wells had concentrations above the SMCL for manganese, as shown in Table 5-4. Wells with an (A) are wells that only showed one concentration higher than the baseline, causing an abnormality in the data. The time-series charts can be located in Appendix D, organized by well name.

Table 5-4: Manganese Concentrations above SMCL

BFI-04 (A)	BFI-19	BFI-35 (A)	BFI-56	BFI-68
BFI-05	BFI-20 (A)	BFI-40	BFI-57	BFI-69
BFI-08	BFI-21	BFI-42	BFI-60	BFI-72 (A)
BFI-10	BFI-23	BFI-43	BFI-61	BFI-73 (A)
BFI-11	BFI-25	BFI-44	BFI-62	BFI-74 (A)
BFI-14	BFI-26 (A)	BFI-48	BFI-63	BFI-77
BFI-15	BFI-27	BFI-50	BFI-64	BFI-NA1 (A)
BFI-17 (A)	BFI-29	BFI-52	BFI-65	BFI-NA2 (A)
BFI-18	BFI-33 (A)	BFI-53	BFI-67	

(A) = Abnormality

pH

The SMCL for pH is 7.0 – 10.5, with the range for the Mahoning County DBOH 0 – 14. No changes in pH were recognized through the sample period of May 2003 – September 2010. Complete pH time-series graphs are located in Appendix D, arranged by well name.

Silver

The SMCL for silver is 100 µg/L, with the minimum detection limit for the Mahoning County DBOH at 10 µg/L. Neither abnormalities, nor increasing

concentrations of silver were detected in the sampling period May 2003 – September 2010. Complete silver time-series charts are located in Appendix D, arranged by well name.

Sulfate

THE SMCL for sulfate is 250 mg/L and the minimum detection limit for the Mahoning County DBOH Laboratory is 1.0 mg/L. Ten of the participating wells had concentrations above the SMCL, as listed in Table 5-5. The time-series charts for each of these wells can be located in Appendix D, organized by well name.

Table 5-5: Concentrations of Sulfates above SMCL

BFI-02	BFI-44
BFI-03	BFI-48
BFI-13	BFI-57
BFI-31	BFI-66
BFI-43	BFI-71

Zinc

Zinc has an SMCL of 5000 µg/L and the Mahoning County DBOH minimum detection limit is 10 µg/L. Only one well had a concentration above the SMCL. BFI-27, in the April 2009 sampling event, had a zinc result of 5170 µg/L, as shown in Figure 5-19.

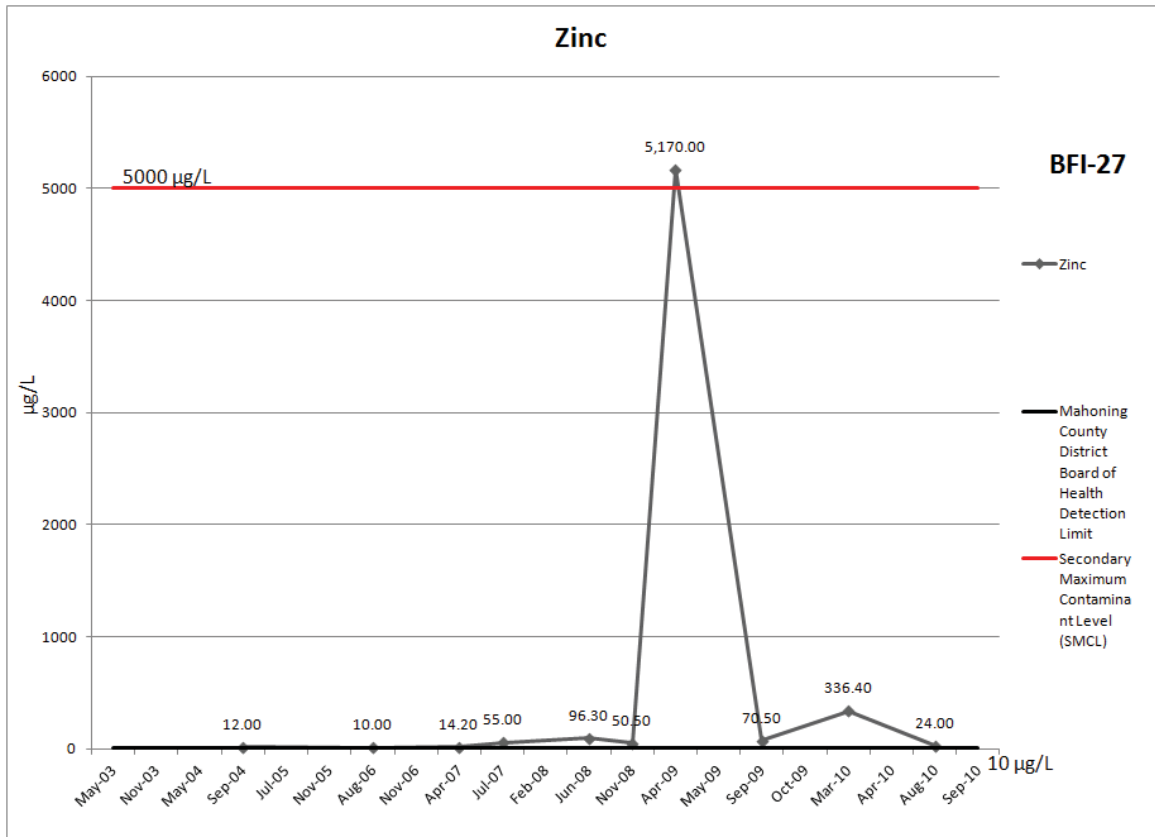


Figure 5-19: BFI-27 Zinc

### Copper

Copper has an Action Level of 1300 µg/L and the Mahoning County DBOH has a minimum detection of 10 µg/L. One well, BFI-14, during the May 2009 sampling had an elevated level of 2802 µg/L as shown in Figure 5-20.

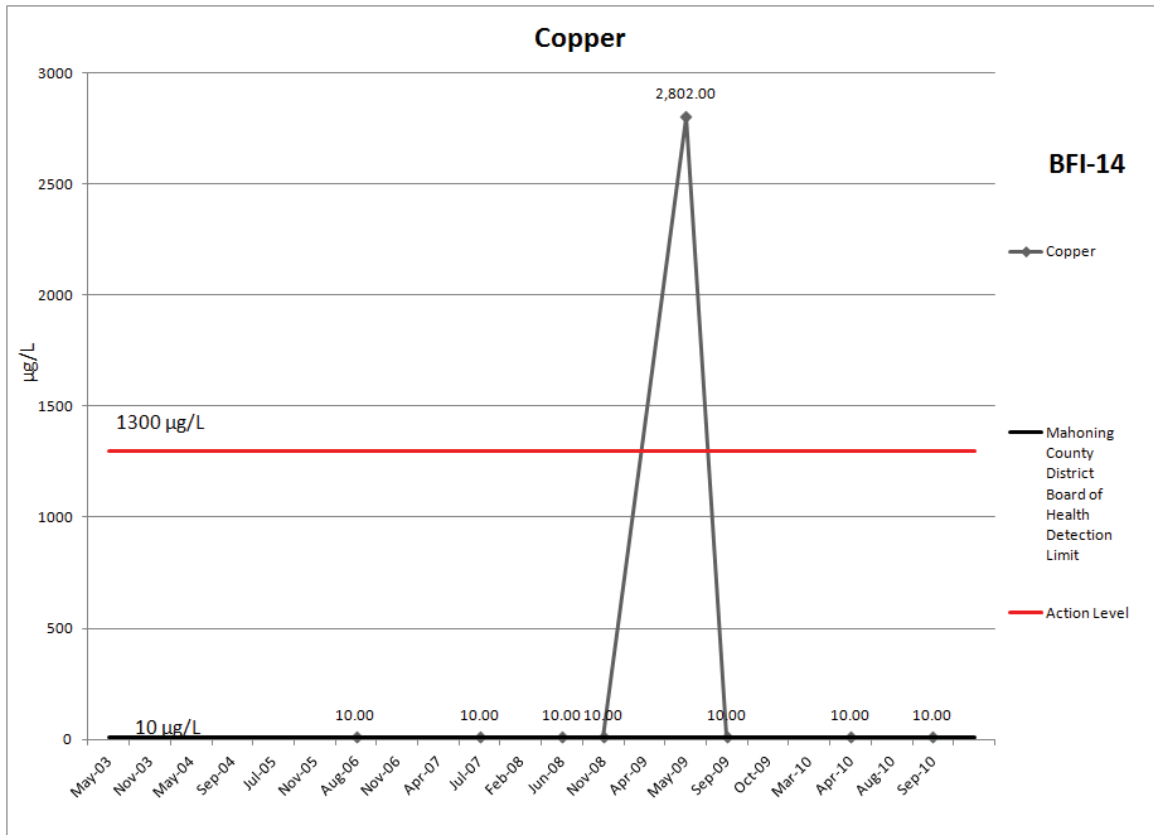


Figure 5-20: BFI-14 Copper

## Lead

Lead has an Action Level of 15 µg/L and the minimum detection limit of Mahoning County DBOH is 5 µg/L. Two different sampling dates resulted in elevated lead levels in four different wells. In May, 2003, BFI-39 resulted in lead value of 24 µg/L and BFI-71 resulted in 17 µg/L (Figure 5-21). BFI-12, during the April 2009 sampling event, resulted in a lead concentration of 35.9 µg/L (Figure 5-22).

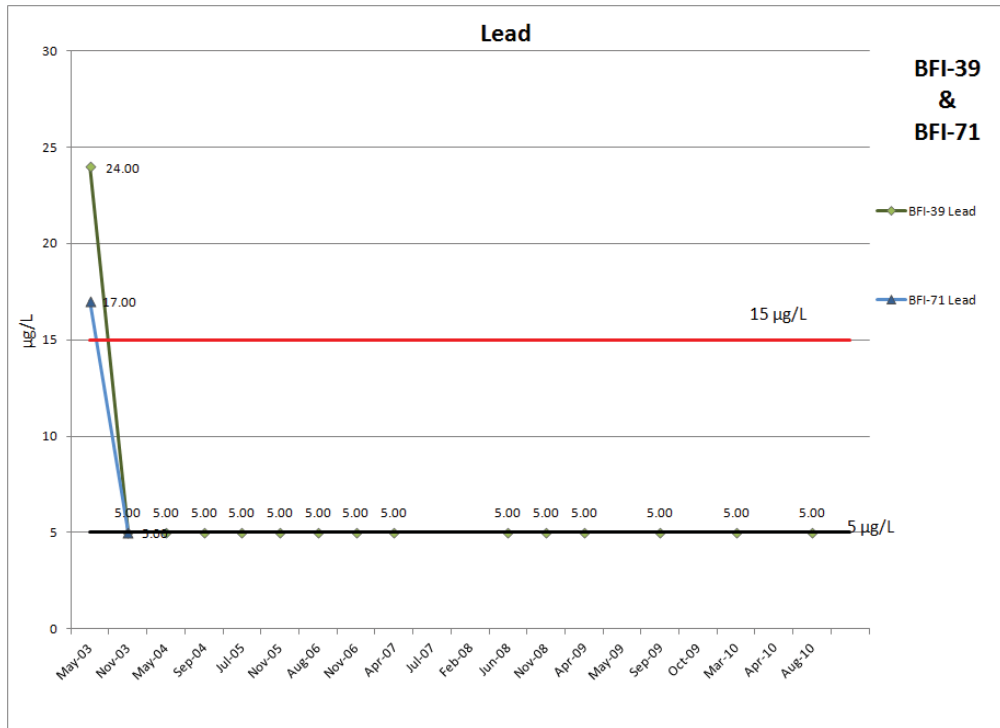


Figure 5-21: BFI-39 & BFI-71 Lead

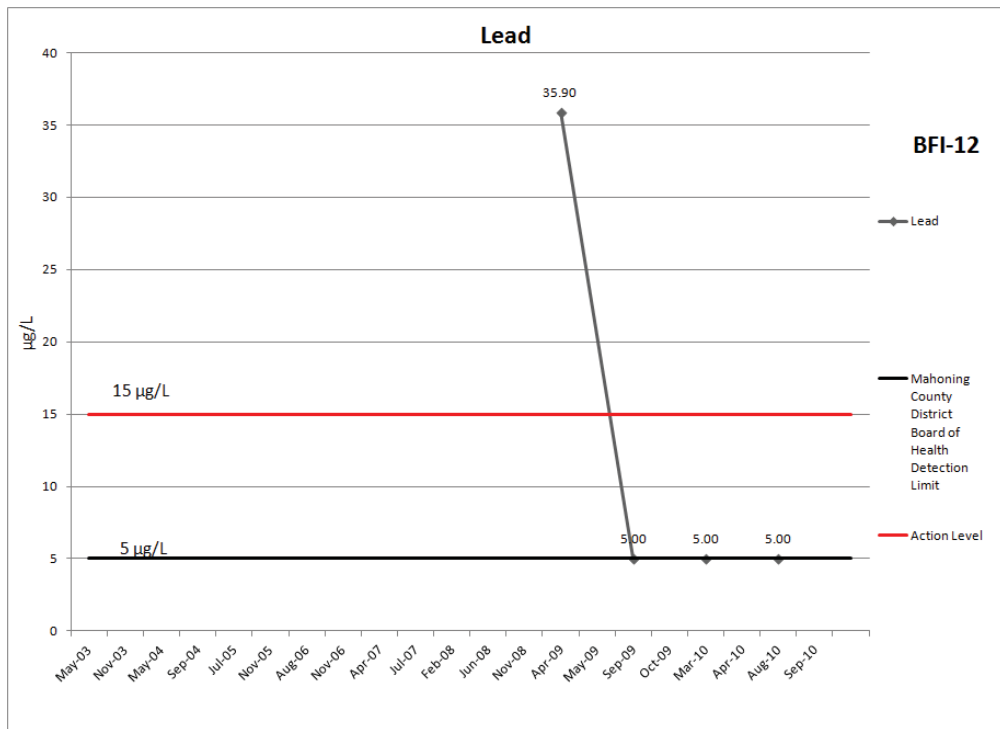


Figure 5-22: BFI-12 Lead



## Sodium

Sodium has a Recommended Level of 200 mg/L, with the Mahoning County DBOH Laboratory having a minimum detection limit of 0.10 mg/L. BFI-47 was the only well with levels higher than the Recommended. In May, 2004, level reached 350 mg/L, and in November, 2006, sodium level was 356.8 mg/L (Figure 5-23).

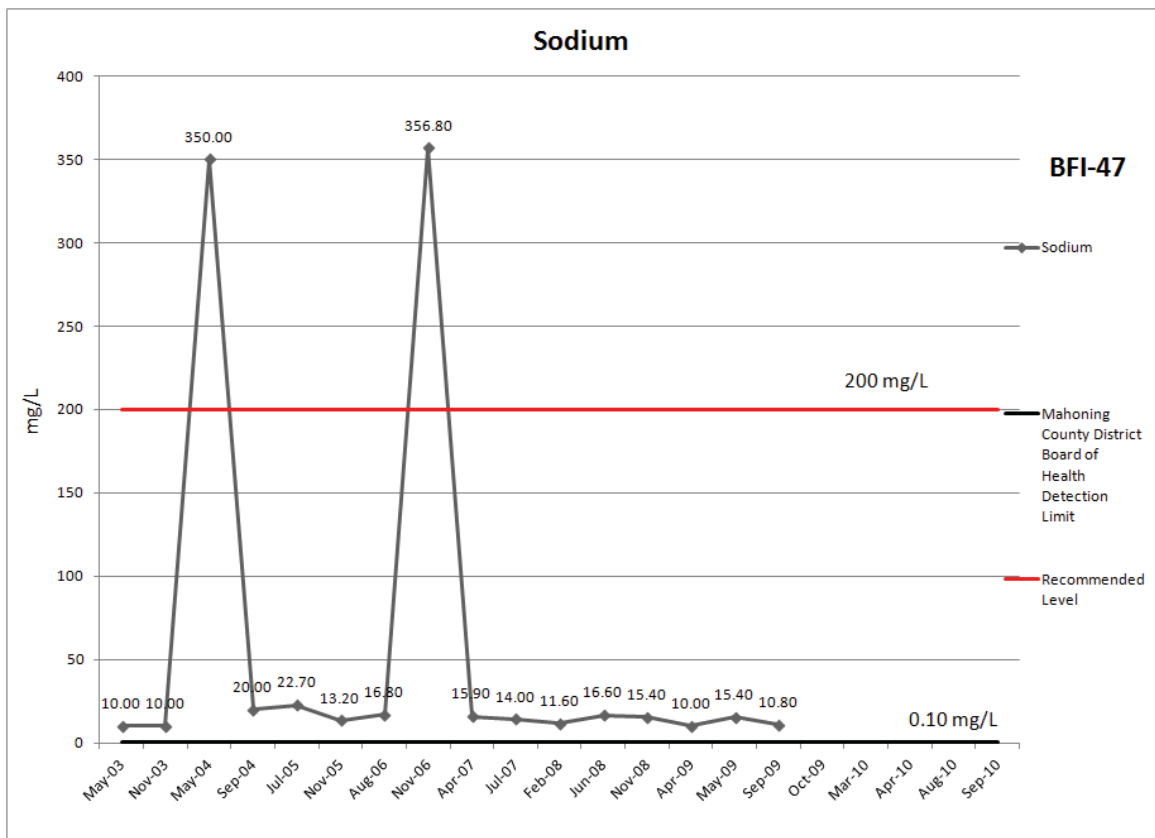


Figure 5-23: BFI-47 Sodium

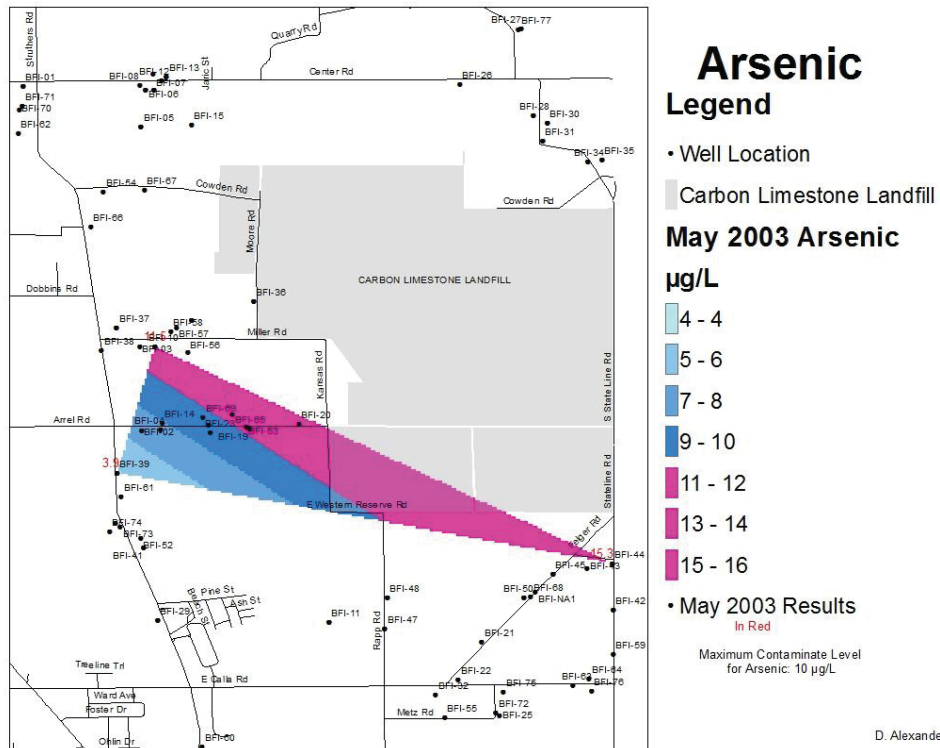
## Mapping of Groundwater Sampling Results

The mapping of water quality results was completed in two phases. The first phase included only the off-site residential wells participating in Mahoning County District Board of Health program. The second phase of ArcGIS mapping involved the inclusion of the four on-site sampling dates into the data set. The results of the second phase will be discussed later in this chapter.

## Mapping of Off-site Residential Water Quality Results

### Arsenic

Three sampling events resulted in elevated levels of arsenic. May 2003, June 2008, and April 2009 sampling events were mapped. The May 2003 sampling resulted in two wells, BFI-10 and BFI-44, having higher concentrations of arsenic than the MCL (10 µg/L) as shown in Figure 5-24. Figure 5-25 and Figure 5-26 (June 2008 and April 2009) show increased levels of arsenic around BFI-53.



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Figure 5-24: May 2003 Arsenic

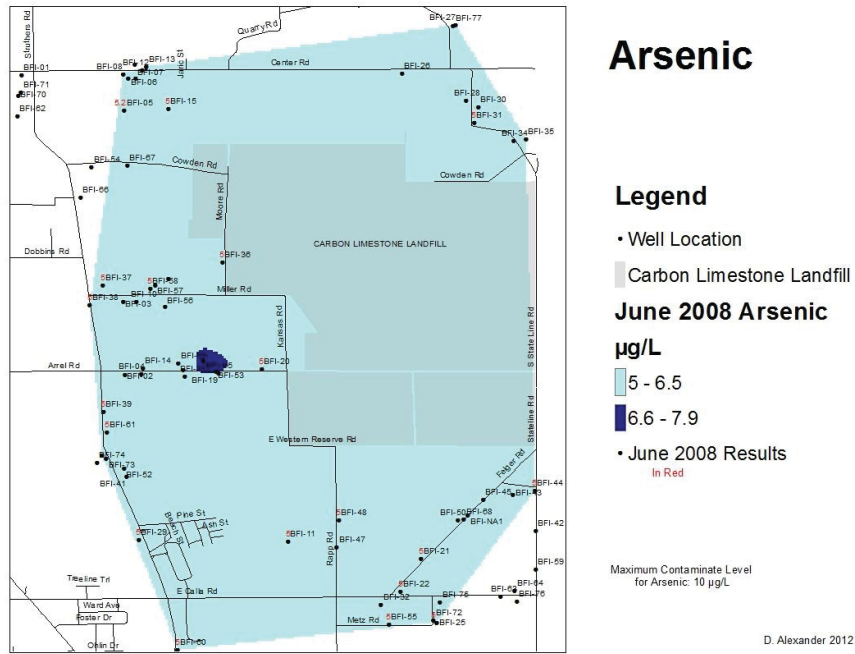


Figure 5-25: June 2008 Arsenic

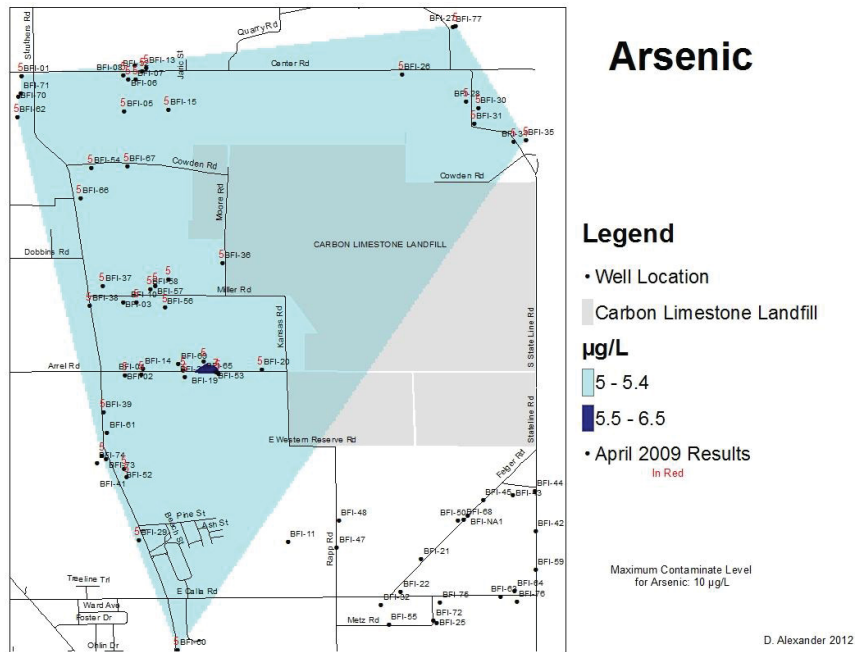


Figure 5-26: April 2009 Arsenic

## Barium

An increase of barium concentrations occurred from May 2003 – November 2005, with only one result higher than the MCL for barium (2000 µg/L). Each sampling event was mapped as shown in Figure 5-27 - Figure 5-32.

## Cadmium

The November 2003 sampling date was the only event to result in elevated cadmium levels as shown in Figure 5-33. All other results were at or below the minimum detection limit of 10 µg/L. However, at the minimum detection level, the concentration is above the MCL of 5 µg/L. The ArcGIS natural neighbor interpolation of the November 2003 did not return results. The map drawn shows the three wells with concentrations of interest.

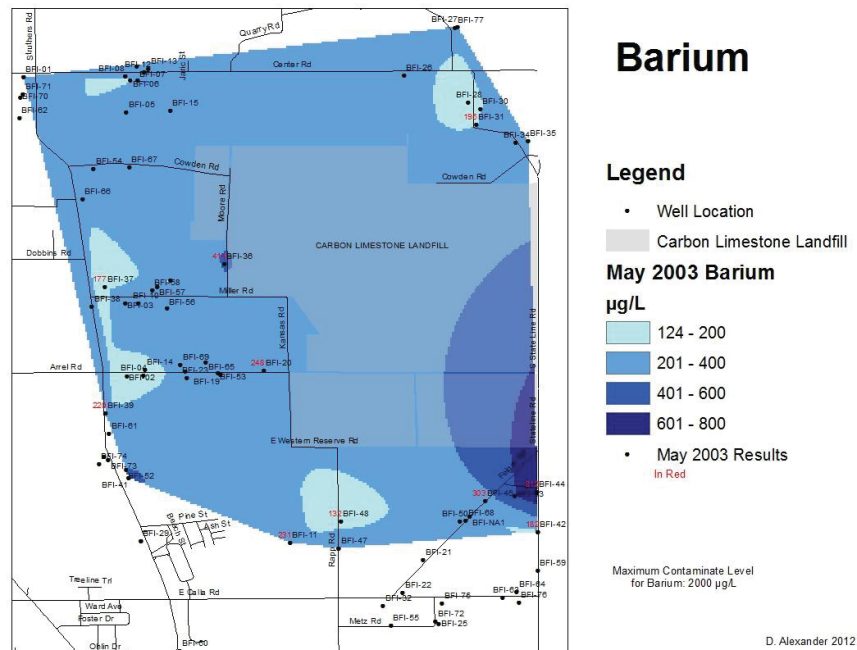


Figure 5-27: May 2003 Barium

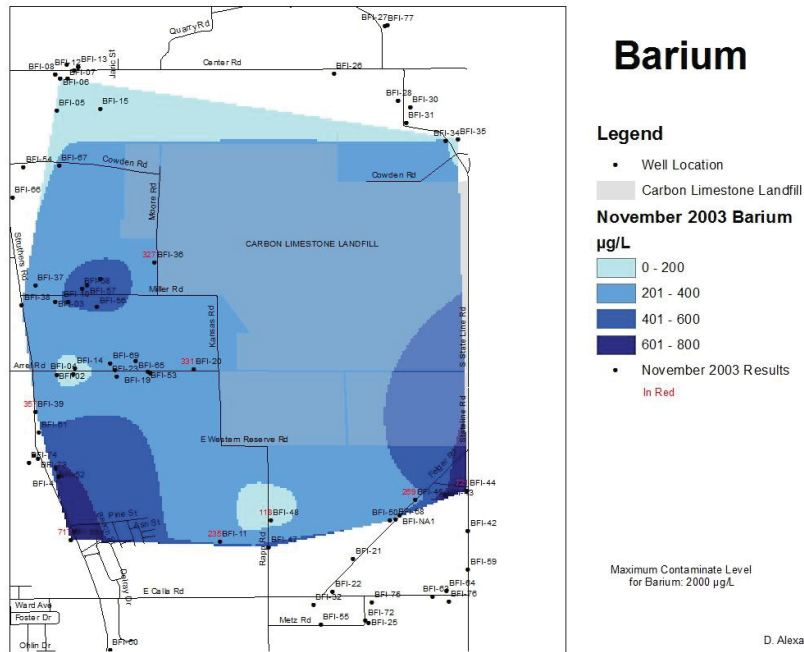


Figure 5-28: November 2003 Barium

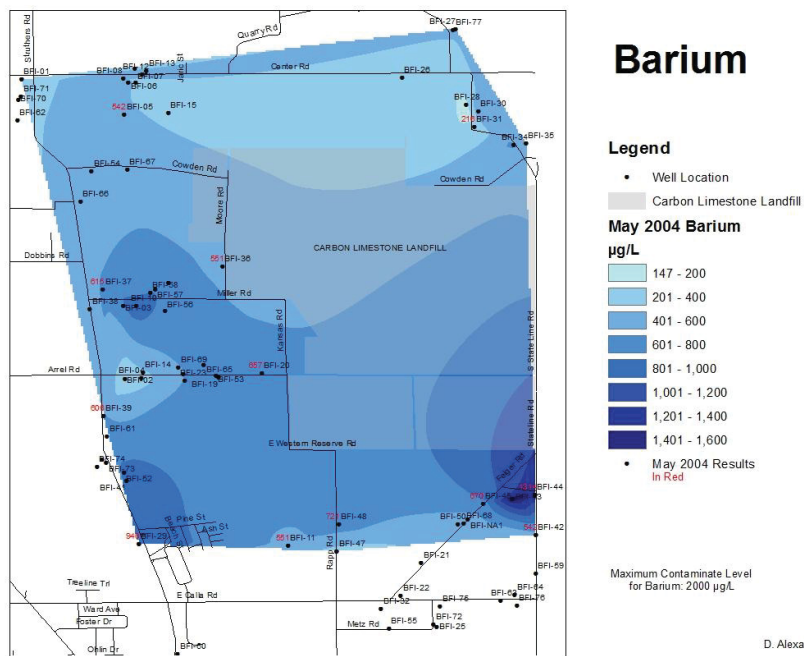


Figure 5-29: May 2004 Barium

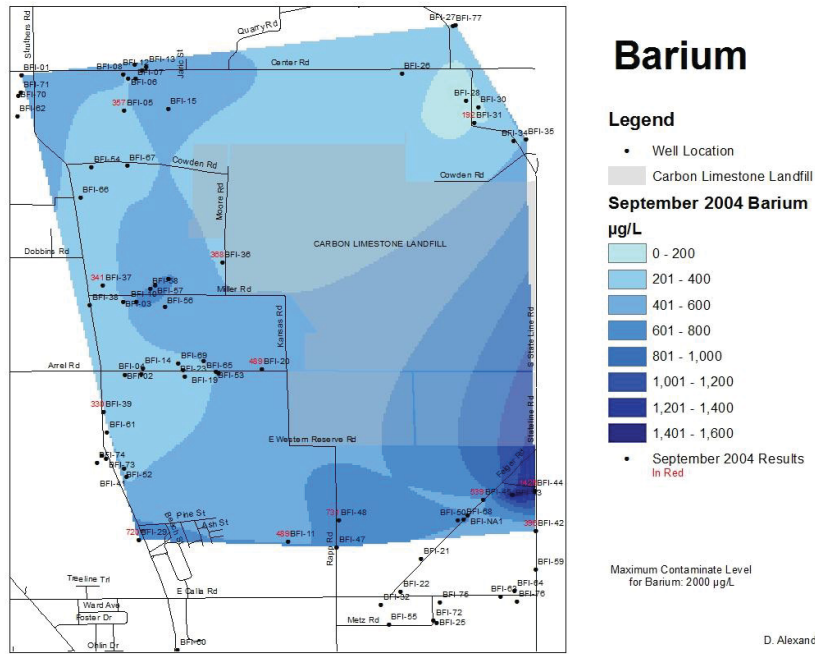


Figure 5-30: September 2004 Barium

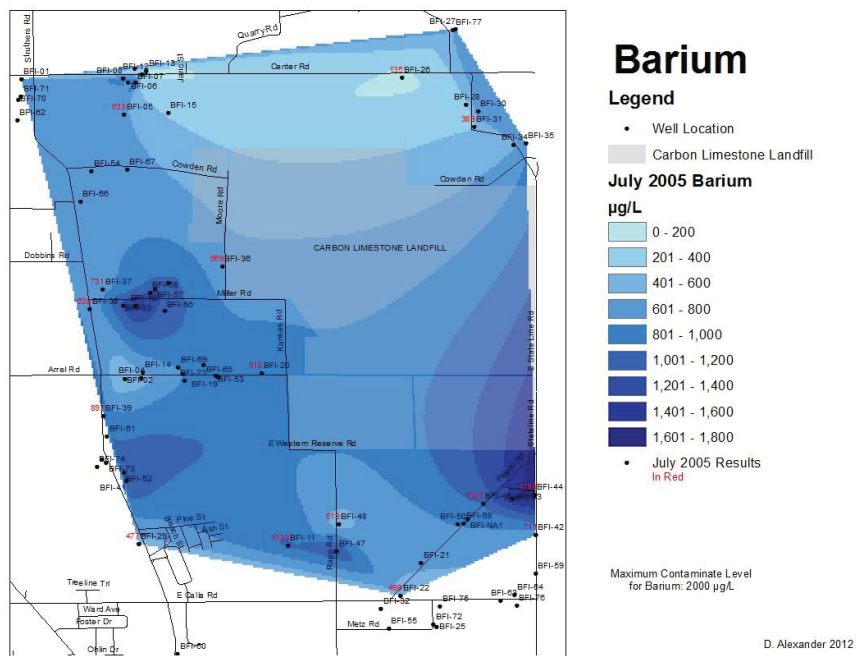


Figure 5-31: July 2005 Barium

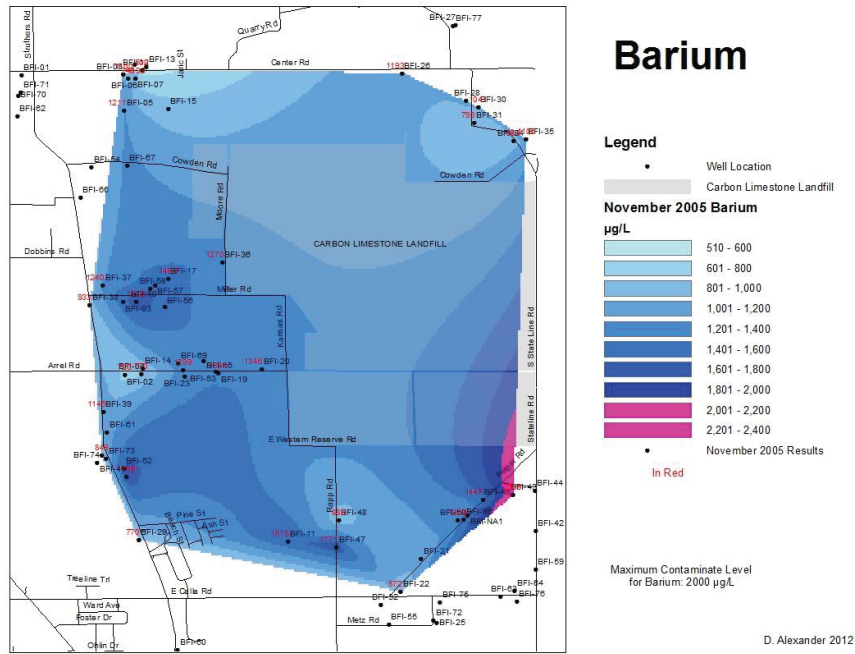


Figure 5-32: November 2005 Barium

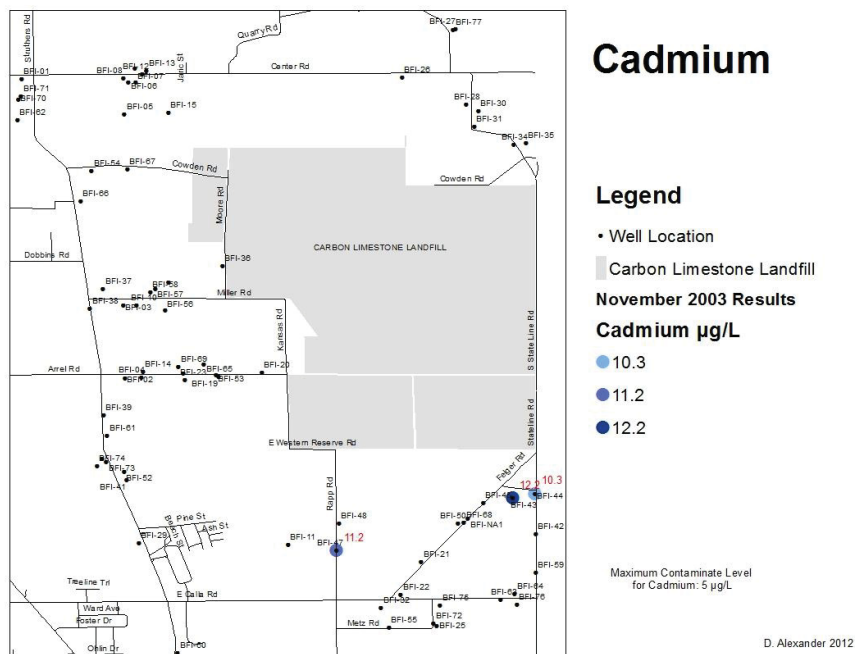


Figure 5-33: November 2003 Cadmium



## Chromium

No resulting concentrations of chromium were above the MCL of 100 µg/L.

However, in September, 2009, concentrations were elevated in six participating wells, as seen in Figure 5-34.

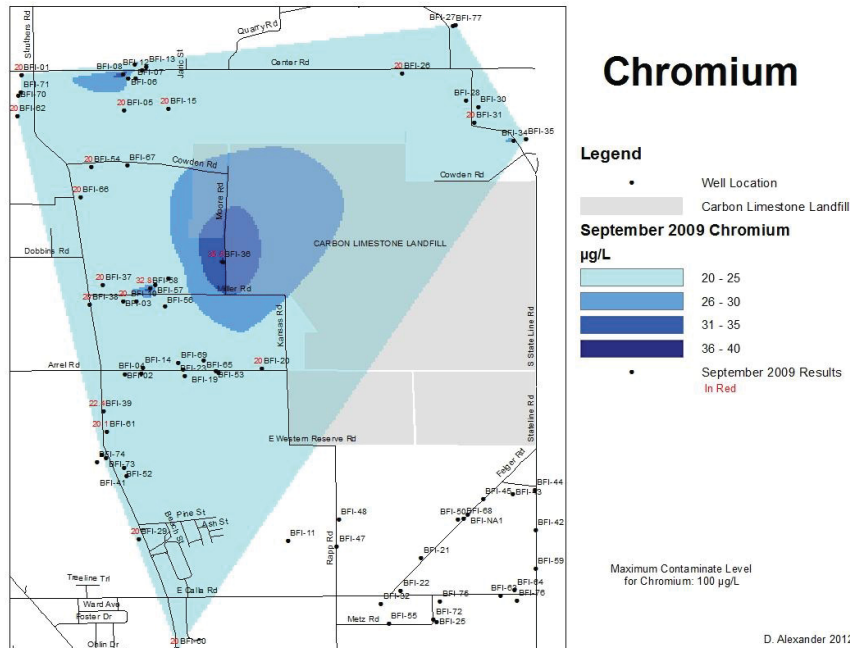


Figure 5-34: September 2009 Chromium

## Fluoride

Participating wells throughout the May 2003 – September 2010 did not result in any fluoride concentration above the MCL of 4 mg/L. The highest concentration was 2.0 mg/L in July 2007 for BFI-19. No maps were created.

## Mercury

Concentrations of mercury were not detected in the entire sampling period from May 2003 – September 2010. No maps were created.

## Nitrate

One participating well, BFI-47, resulted in elevated levels of nitrate during two sampling events, November 2003 and August 2006 as shown in Figure 5-35 and Figure 5-36. The MCL for nitrate is 10 mg/L, with each of the sampled concentrations being higher than the MCL.

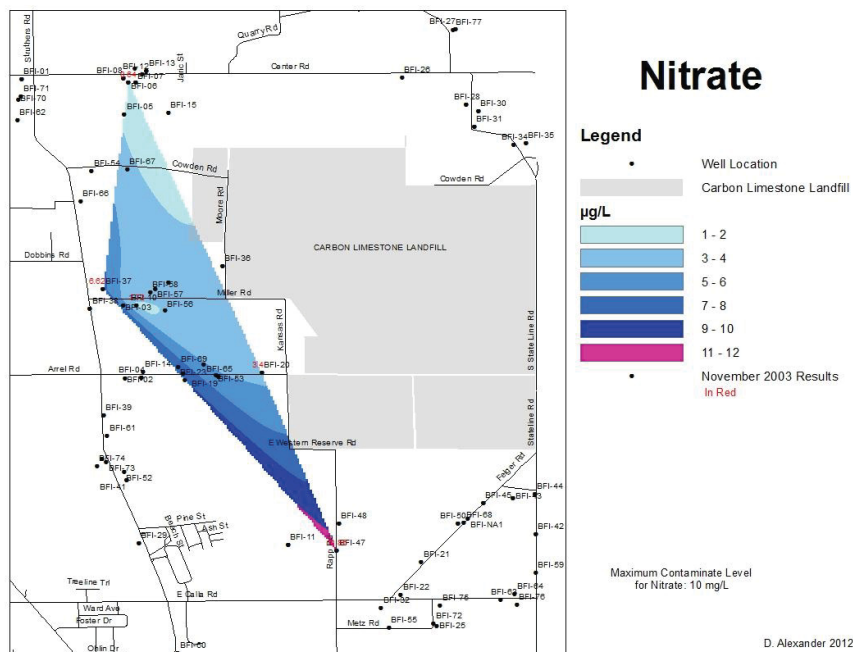


Figure 5-35: November 2003 Nitrate

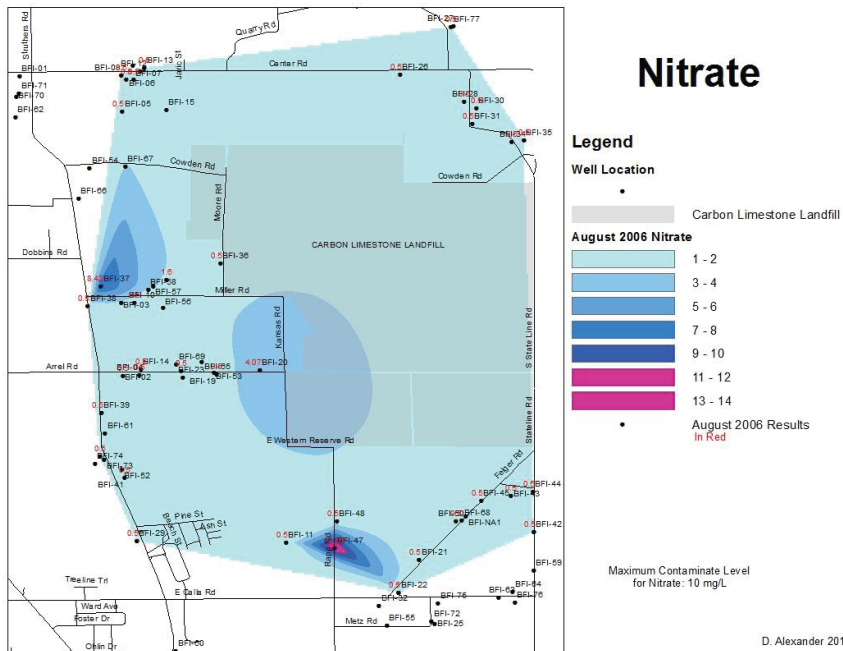


Figure 5-36: August 2006 Nitrate

### Selenium

The May, 2004 sampling event was the only event that resulted in detectable selenium. BFI-08 had a concentration of 24.1  $\mu\text{g/L}$ , however, that concentration is below the MCL of 50  $\mu\text{g/L}$ , and was not mapped due to being a single data point.

### Chloride

Chloride levels were above the SMCL of 250 mg/L in seven different sampling events. Only two wells were affected by elevated levels, BFI-47 and BFI-48, as shown in Figure 5-37 to Figure 5-43.

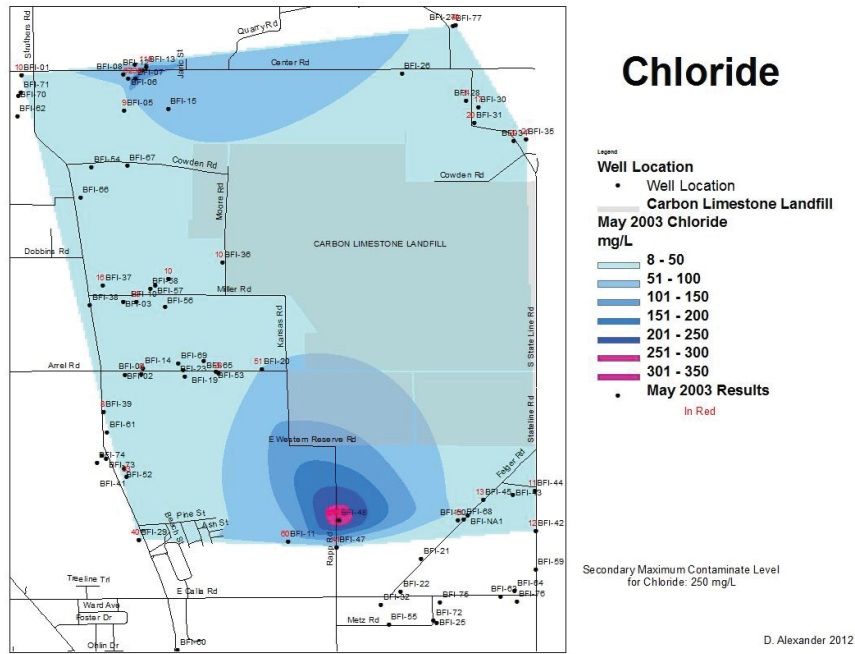


Figure 5-37: May 2003 Chloride

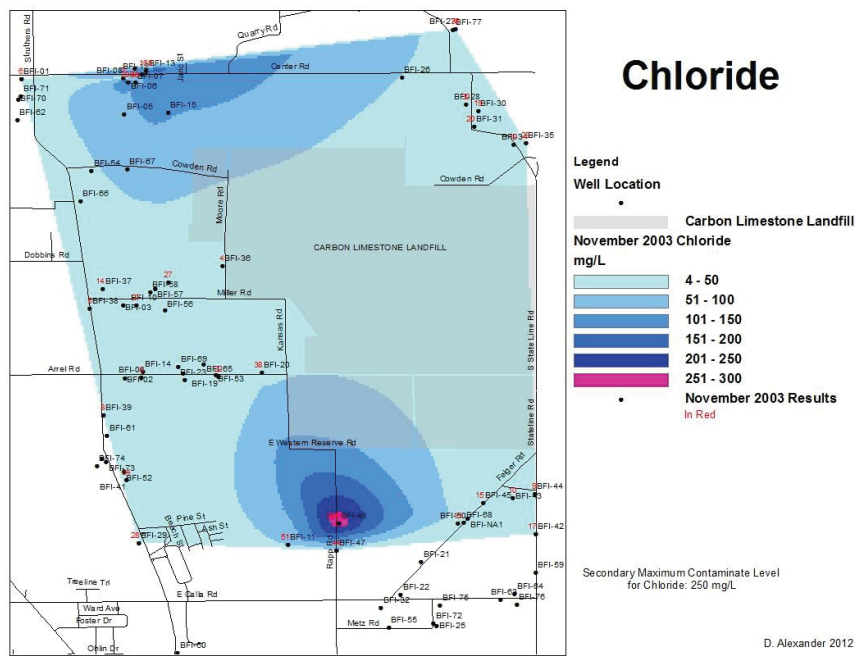


Figure 5-38: November 2003 Chloride

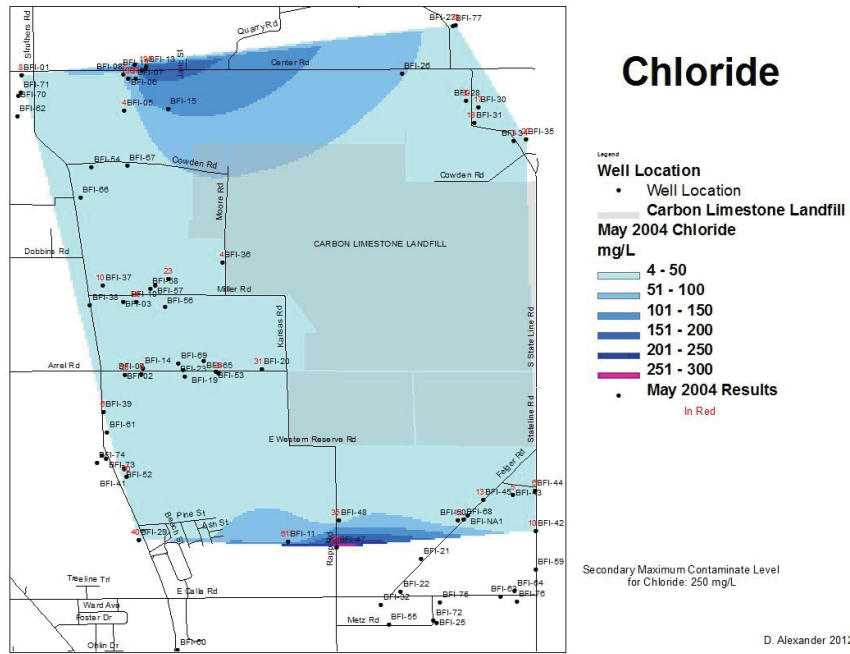


Figure 5-39: May 2004 Chloride

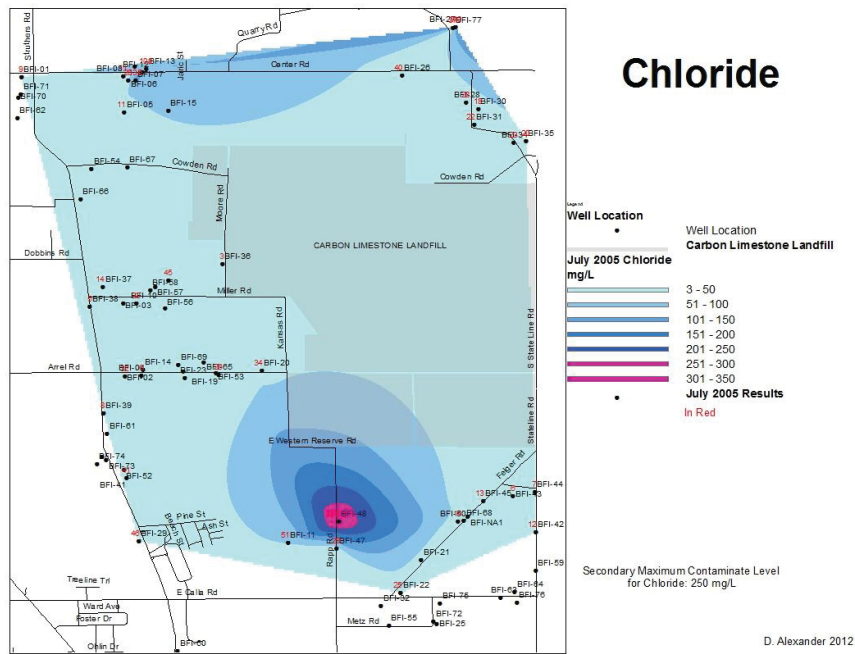


Figure 5-40: July 2005 Chloride

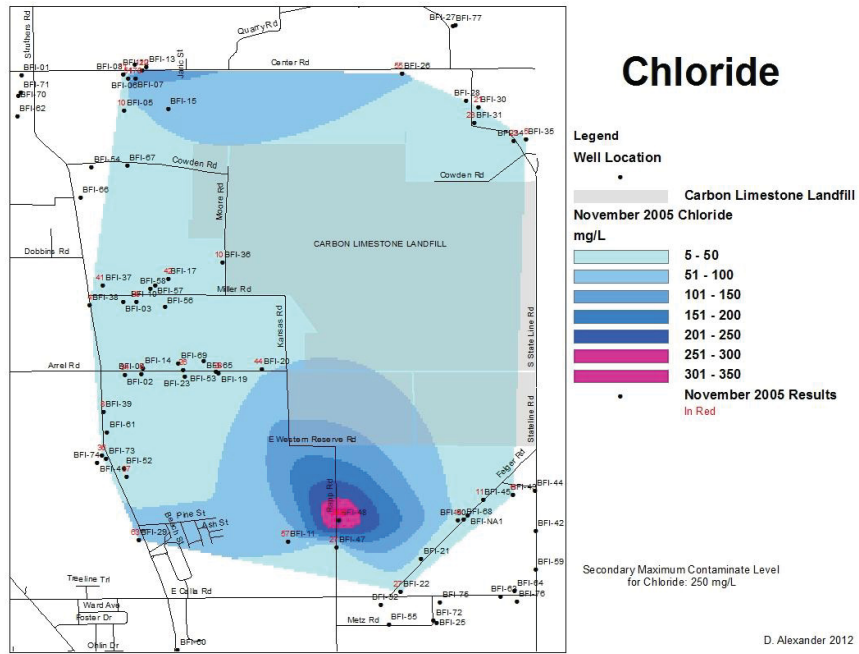


Figure 5-41: November 2005 Chloride

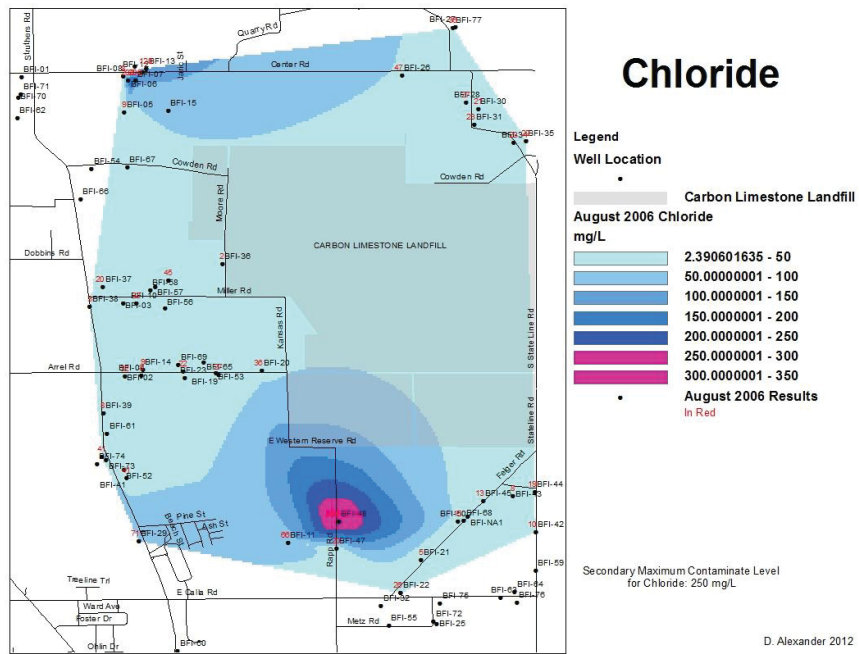


Figure 5-42: August 2006 Chloride

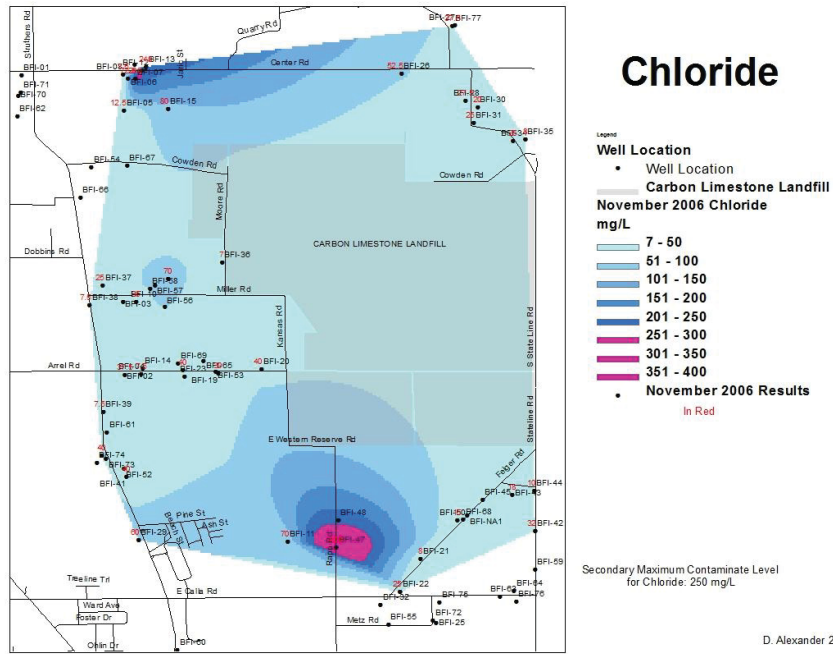


Figure 5-43: November 2006 Chloride

## Total Dissolved Solids

During the sampling period of May 2003 – September 2010, in which 21 sampling events took place, dissolved solid concentrations were above the SMCL (500 mg/L) fifteen different times. Appendix J includes individual maps of each of the sampling events with high concentrations of dissolved solids.

## Iron

Iron concentrations were elevated above the SMCL of iron (300 µg/L) in all sampling events from May 2003 – September 2010. The highest concentration was found in BFI-62 during the May 2004 sampling, with an iron concentration of 18.069 µg/L. Maps showing results of iron concentrations from each sampling are located in Appendix G.

## Manganese

Manganese concentrations from the sampling period of May 2003 – September 2010 were elevated in each of the 21 sampling events. Manganese has a SMCL of 50 µg/L and the highest detected concentration was 1,183 µg/L during the November 2003 sampling of BFI-11. Maps of manganese concentrations are located in Appendix H.

## pH



pH was not mapped for this research, however, pH may be used in the discussion section for elevated concentrations of other analytes.

## Silver

Silver was not included in the mapping for this research. The levels of silver never exceeded the minimum detection limit of 10 µg/L.

## Sulfate

Sulfate levels were elevated in all sampling events. The SMCL of sulfate is 250 mg/L, with the highest concentration of 559.4 mg/L during the November 2003 sampling date of well BFI-44. Sulfate concentration maps for each of the sampling events are located in Appendix I.

## Zinc

During the April 2009 sampling, BFI-27 had an elevated concentration of zinc with the result of 5,170 µg/L. The SMCL for zinc is 5,000 µg/L. Figure 5-44 shows the concentrations of zinc for the April 2009 sampling event.

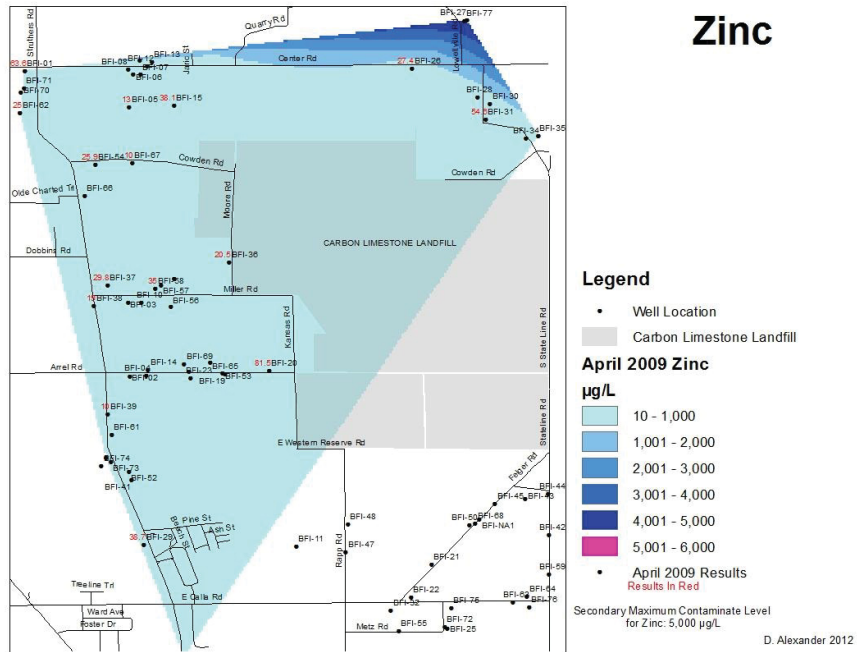


Figure 5-44: April 2009 Zinc

## Copper

During the May 2009 sampling, one well, BFI-14, had an elevated concentration of copper at 2,802 µg/L, above the 1,300 µg/L Action Level, as shown in Figure 5-45.

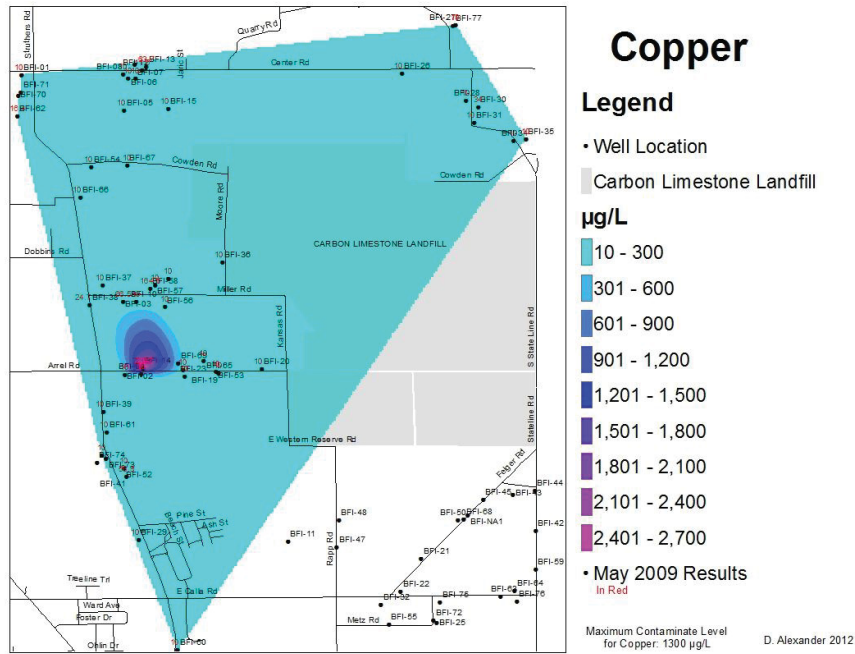


Figure 5-45: Copper May 2009

## Lead

Elevated lead concentrations were shown in BFI-12, BFI-39, BFI-40, and BFI-71 during three sampling dates. July, 2007 samples were unable to create a natural neighbor raster for lack of multiple data points. May 2003 and April 2009 are shown in Figure 5-46 and Figure 5-47.

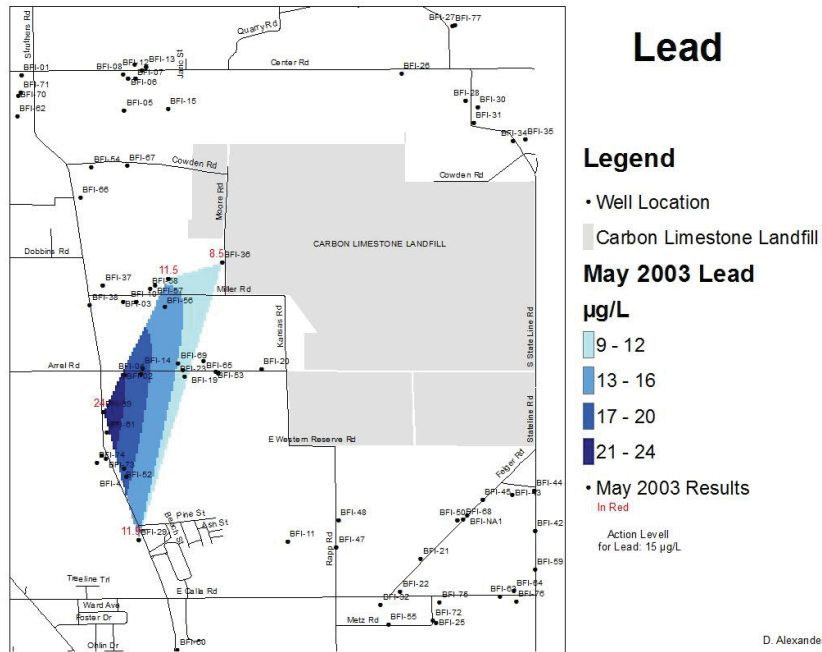


Figure 5-46: Lead May 2003

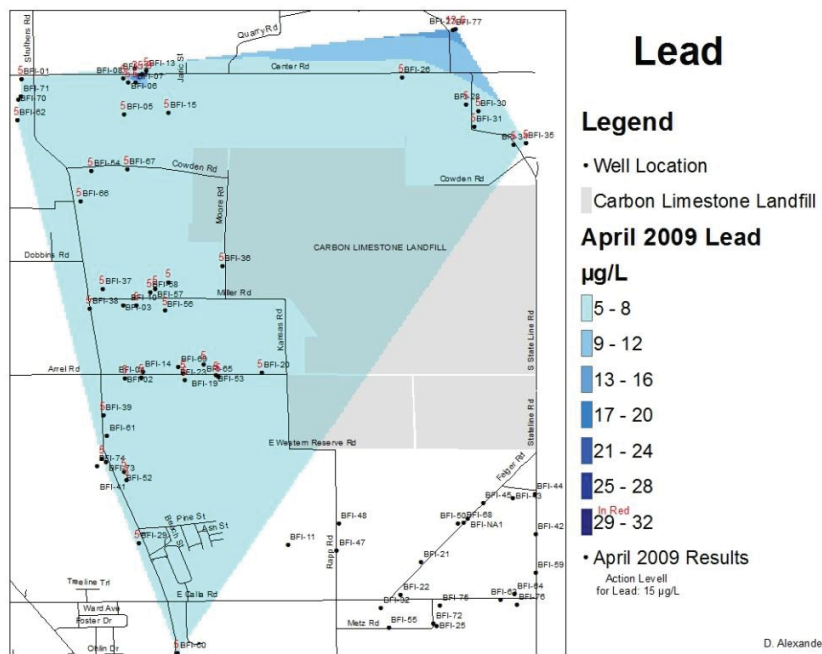


Figure 5-47: Lead April 2009

## Sodium

Two sampling events, May 2004 and November 2006, had levels above the recommended of 200 mg/L. Each elevated concentration was found at BFI-47 and are shown in Figure 5-5-48 and Figure 5-5-49.

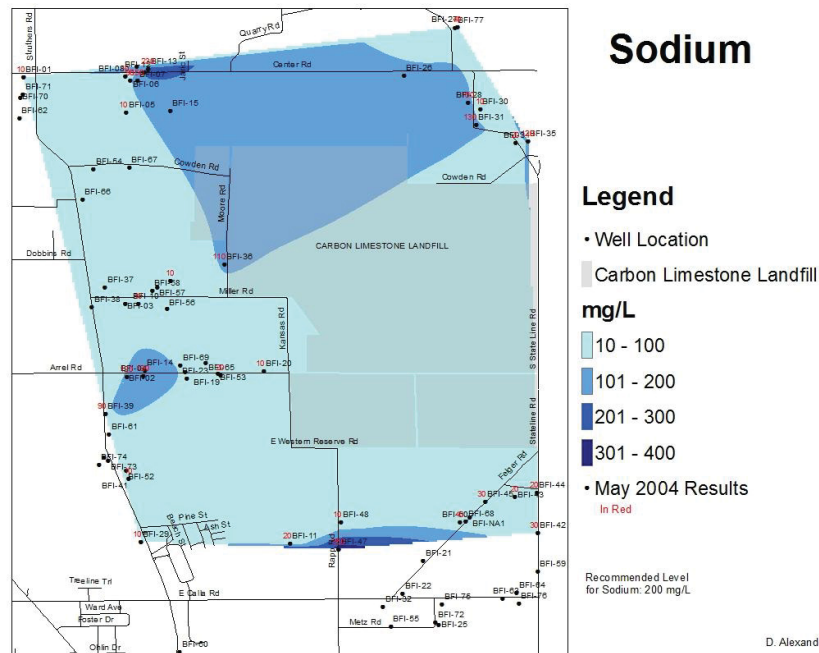


Figure 5-5-48: Sodium May 2004

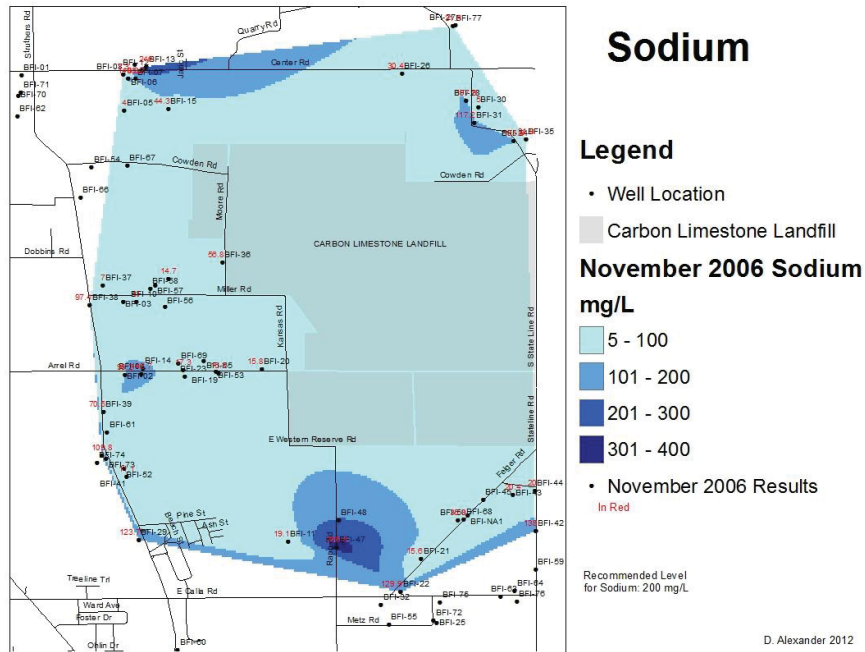


Figure 5-5-49: Sodium November 2006

### Results of Mapping of Sampling Results in Combination with On-site Monitoring Data

Four dates, May 2003, November 2003, May 2004, and November 2005, were combined with on-site sampling results. In the May 2003 sampling event, arsenic, barium, lead, manganese, and chloride were re-mapped after combining off-site (residential wells) with on-site well data. These parameters were chosen due to the residential data showing abnormalities or trends of higher than average results. Data was not available for iron, nitrate, sulfate, and Total Dissolved Solids for the May 2003 on-site monitoring program; therefore, no changes would have been shown on a new map.

Data from the November 2003 residential sampling and the on-site data were combined for the following parameters: barium, chloride, iron, manganese, sulfate, and Total Dissolved Solids. Data was not available from the on-site sampling for the following parameters: arsenic and lead.

Data from the May 2004 sampling event was combined and barium, chloride, iron, manganese, sulfate, and TDS were re-mapped. Data was not available from the on-site sampling for the following parameters: arsenic, lead, and nitrate.

The November 2005 data was combined to map barium, iron, manganese, sulfate, and TDS. Data was not available for the following parameters for the on-site sampling: arsenic, lead, chloride, and nitrate.

#### Arsenic

On-site Carbon Limestone Landfill data was combined for arsenic for the May 2003 sampling date. Data for November 2003, May 2004, and November 2005 was unavailable. The May 2003 map of combined data is shown in Figure 5-50.

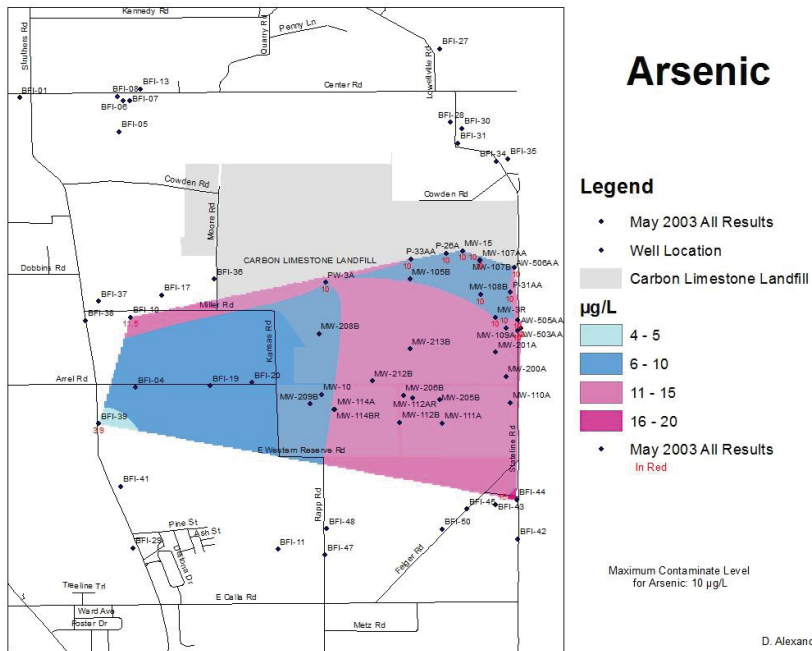


Figure 5-50: May 2003 Combined Data for Arsenic

## Barium

On-site data for barium concentrations was combined with residential sampling results for May 2003, November 2003, May 2004 and November 2005 as shown in Figure 5-51, Figure 5-52, Figure 5-53, and Figure 5-54.



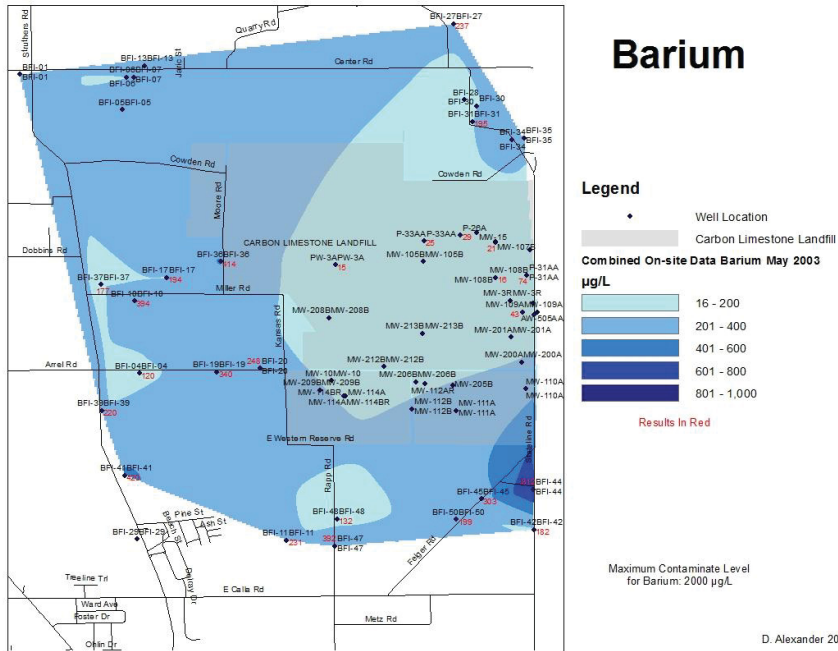


Figure 5-51: May 2003 Combined Data for Barium

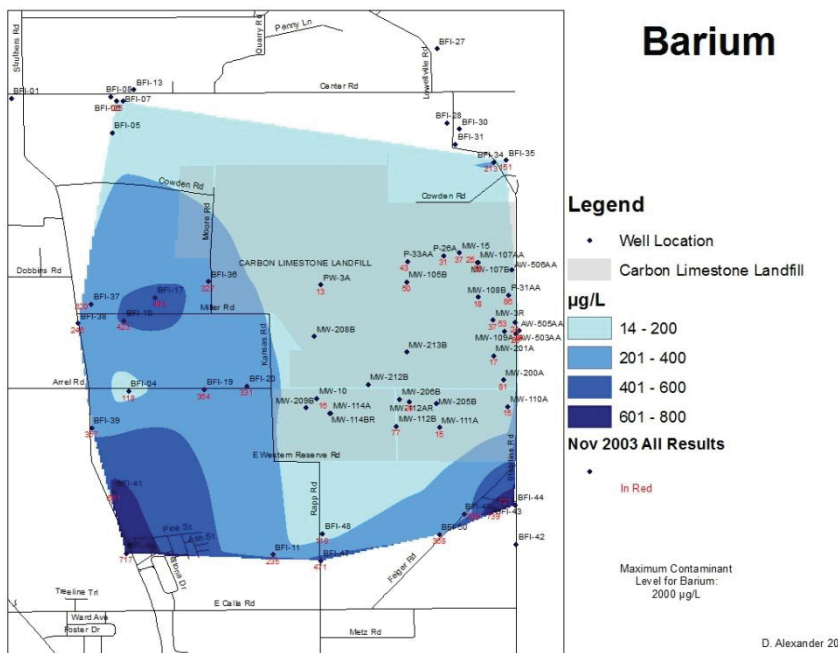


Figure 5-52: November 2003 Combined Data for Barium

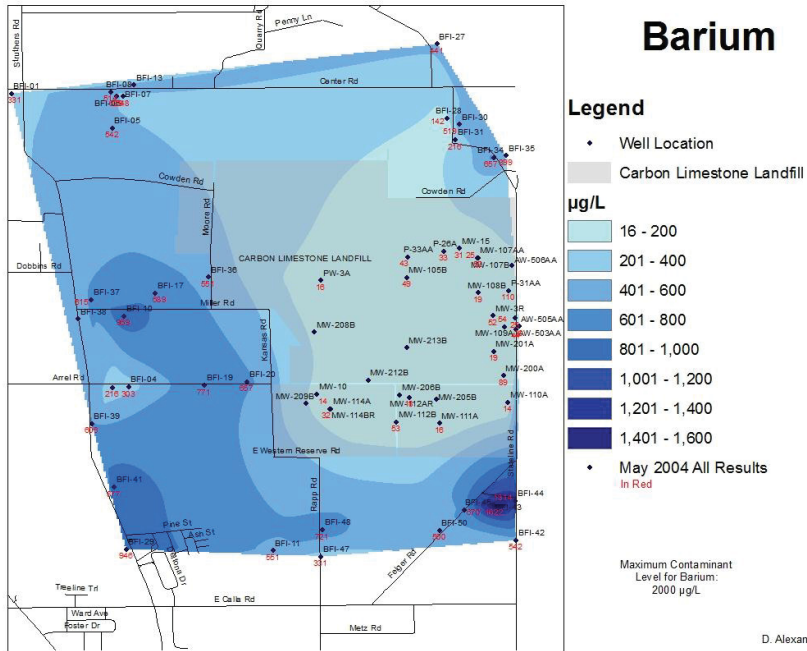


Figure 5-53: May 2004 Combined Data for Barium

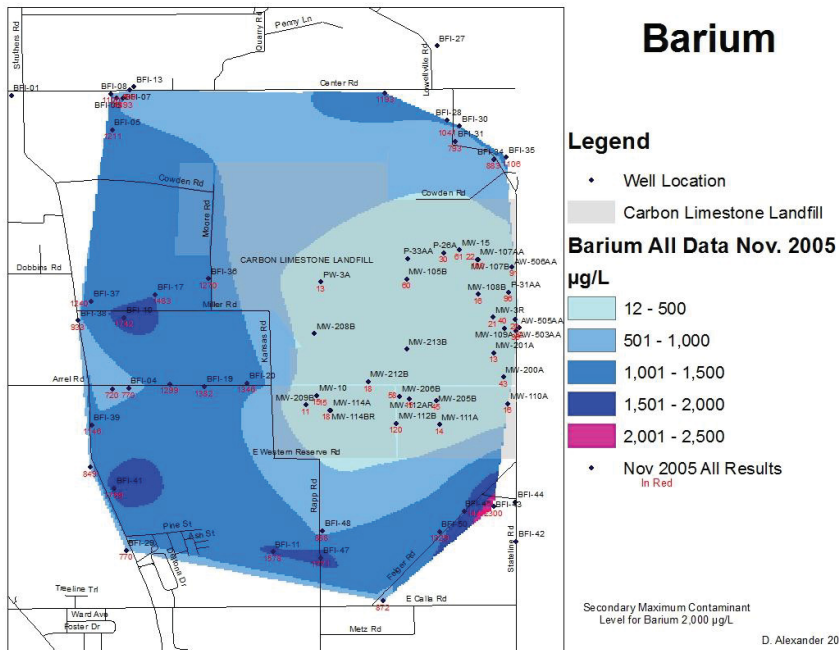


Figure 5-54: November 2005 Combined Data for Barium

# Lead

On-site Carbon Limestone Landfill data was combined for lead for the May 2003 sampling date. Data for November 2003, May 2004, and November 2005 was unavailable. The May 2003 map of combined data is shown in Figure 5-55.

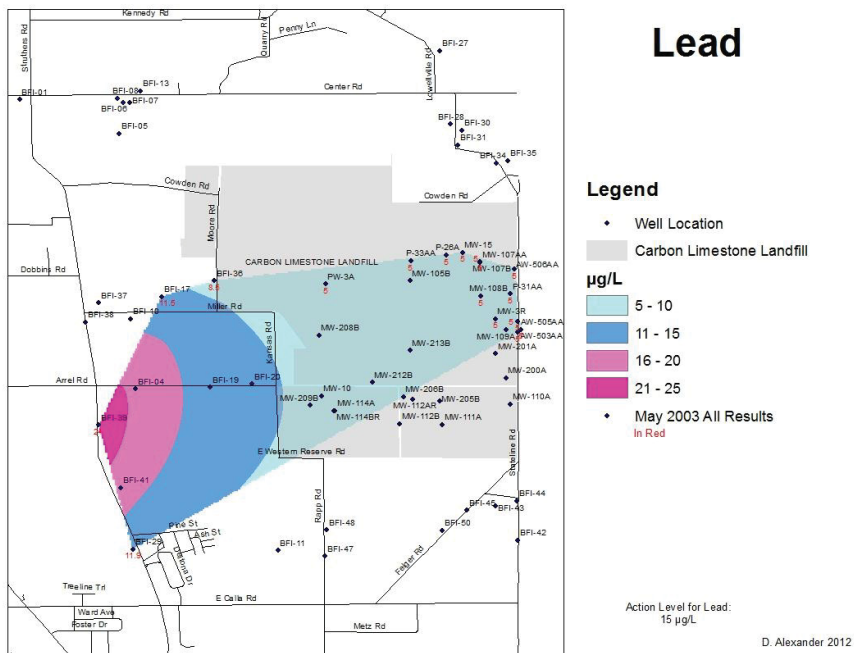


Figure 5-55: May 2003 Combined Data for Lead

# Manganese

On-site data for manganese concentrations was combined with residential sampling results for May 2003, November 2003, May 2004 and November 2005 as shown in Figure 5-56, Figure 5-57, Figure 5-58, and Figure 5-59.

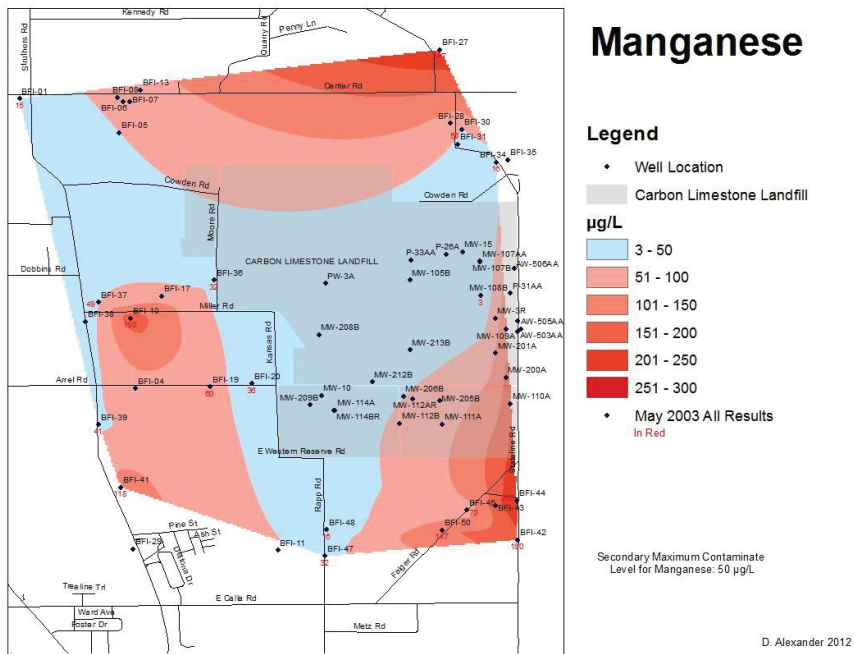


Figure 5-56: May 2003 Combined Data for Manganese

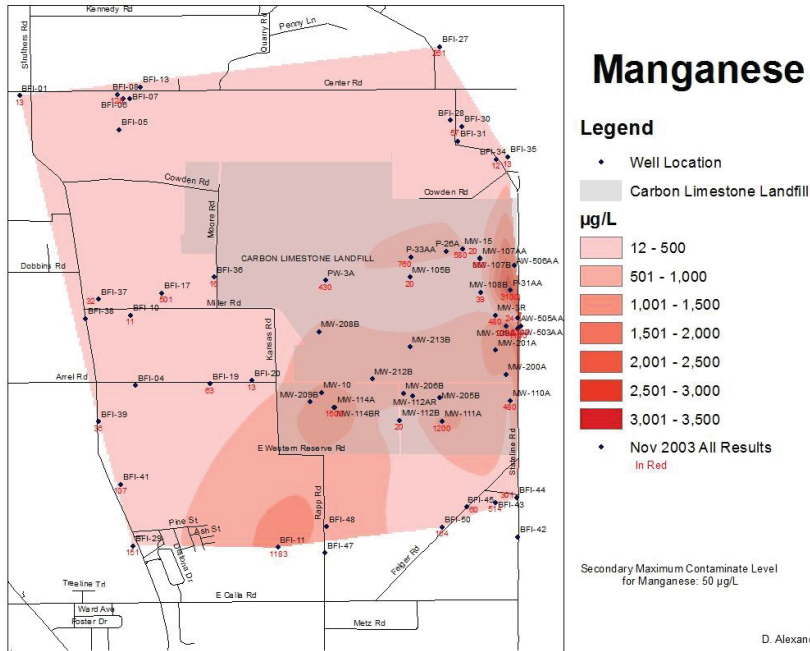


Figure 5-57: November 2003 Combined Data for Manganese

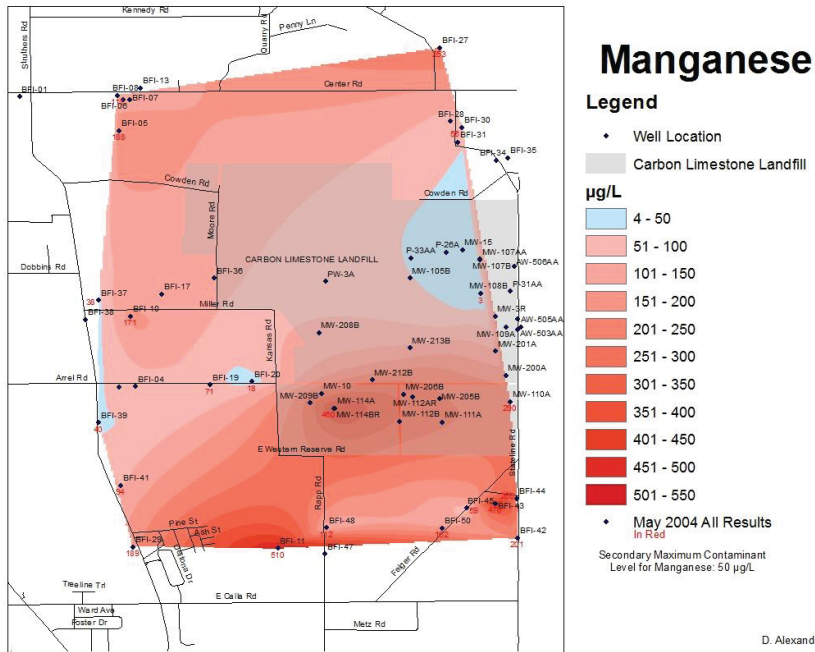


Figure 5-58: May 2004 Combined Data for Manganese

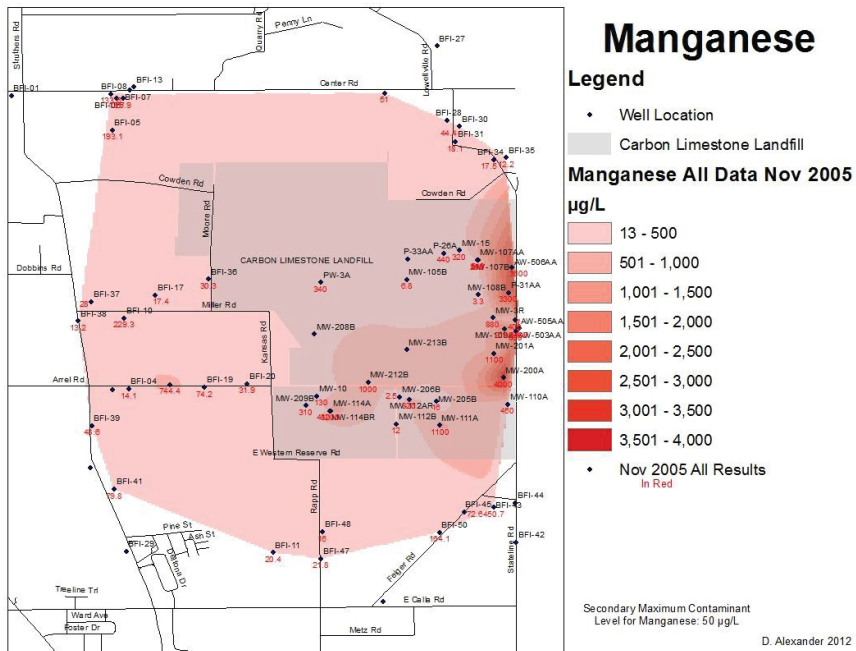


Figure 5-59: November 2005 Combined Data for Manganese

### Chloride

Combined data of on-site results with off-site chloride results were mapped for May 2003 (Figure 5-60), November 2003 (Figure 5-61), May 2004 (Figure 5-62), and November 2005 (Figure 5-63).

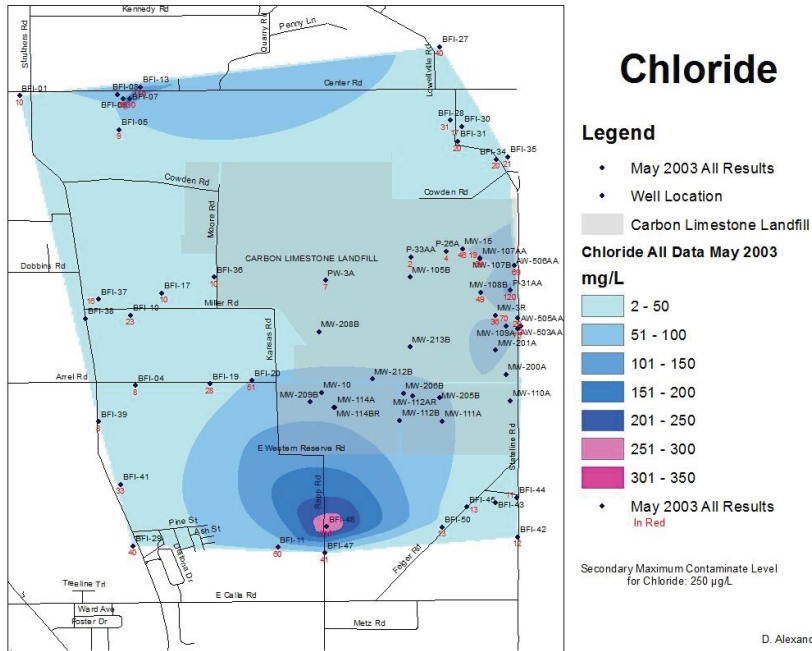


Figure 5-60: May 2003 Combined Data for Chloride

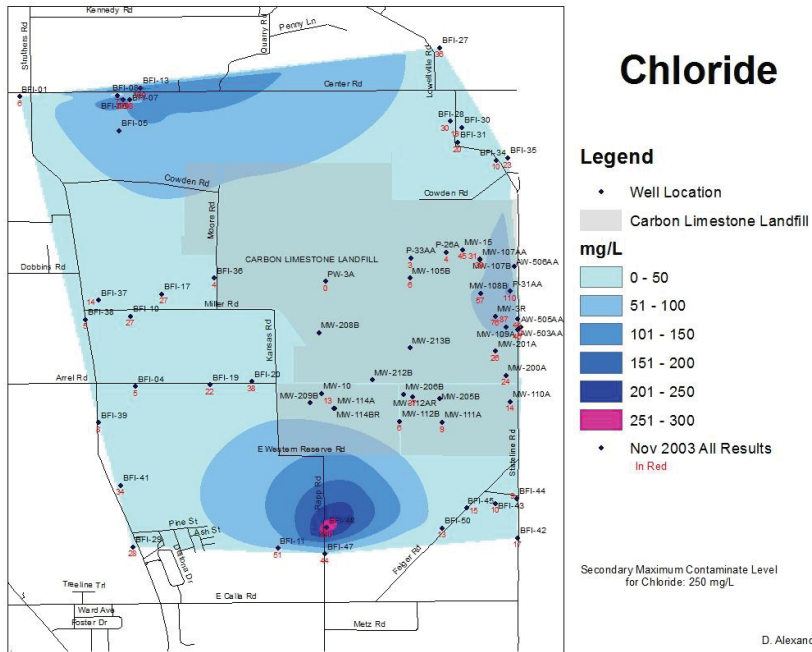


Figure 5-61: November 2003 Combined Data for Chloride

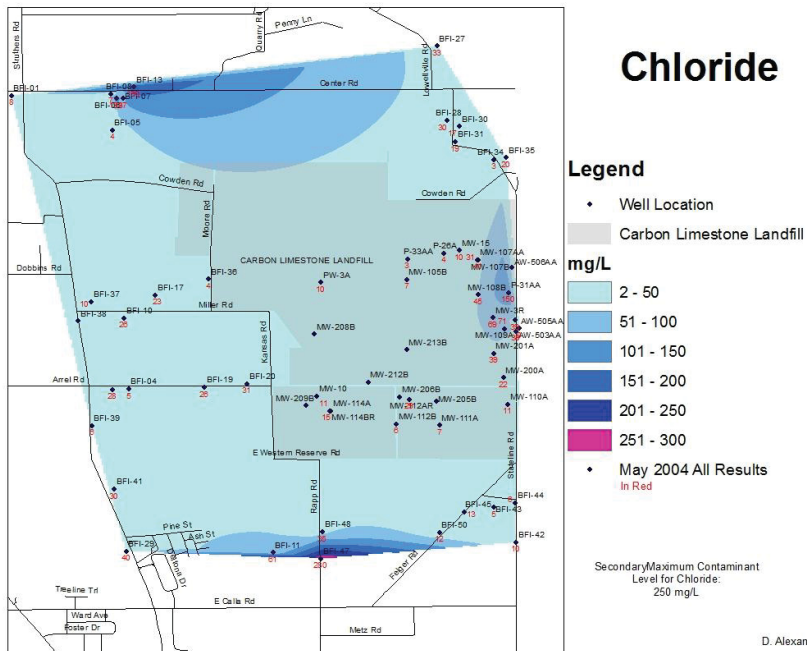


Figure 5-62: May 2004 Combined Data for Chloride

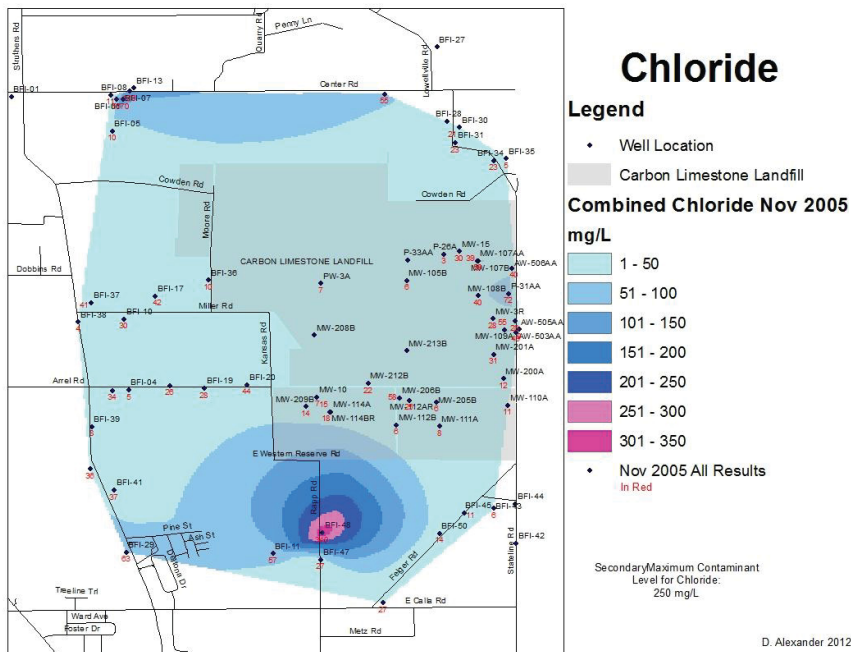


Figure 5-63: November 2005 Combined Data for Chloride



# Iron

On-site data for iron was combined with residential data for November 2003, May 2004, and November 2005, as shown in Figure 5-64, Figure 5-65, and Figure 5-66. Data was not available for the May 2003 on-site sampling.

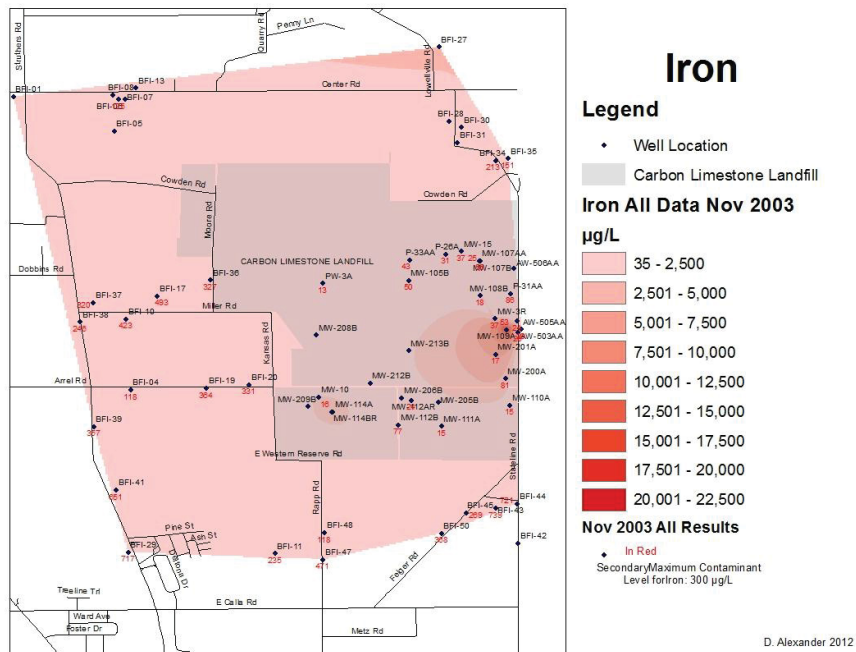


Figure 5-64: November 2003 Combined Data for Iron

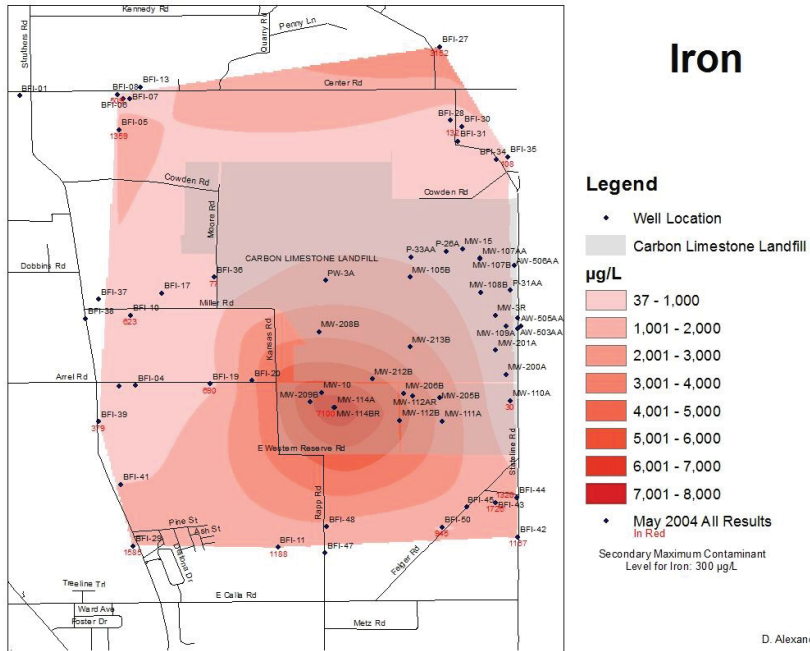


Figure 5-65: May 2004 Combined Data for Iron

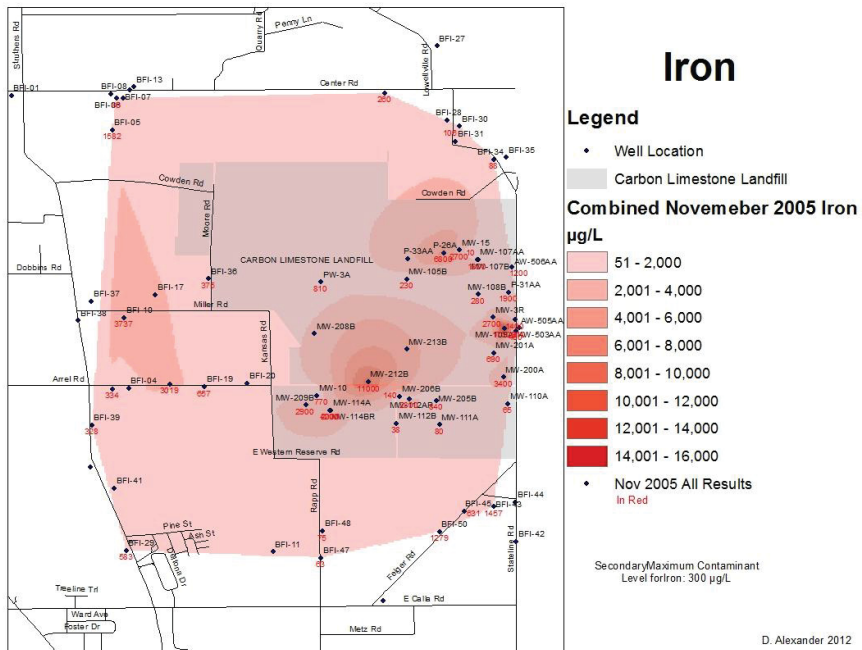


Figure 5-66: November 2005 Combined Data for Iron

# Sulfate

Combined sulfate results were mapped for November 2003 (Figure 5-67), May 2004 (Figure 5-68), and November 2005 (Figure 5-69). Data was unavailable for the May 2003 on-site sampling event.

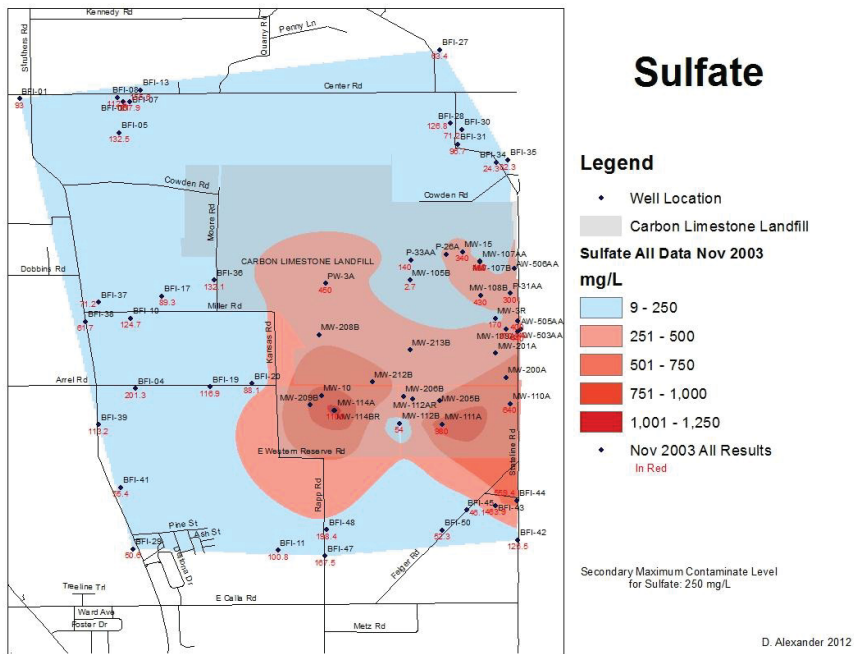


Figure 5-67: November 2003 Combined Data for Sulfate

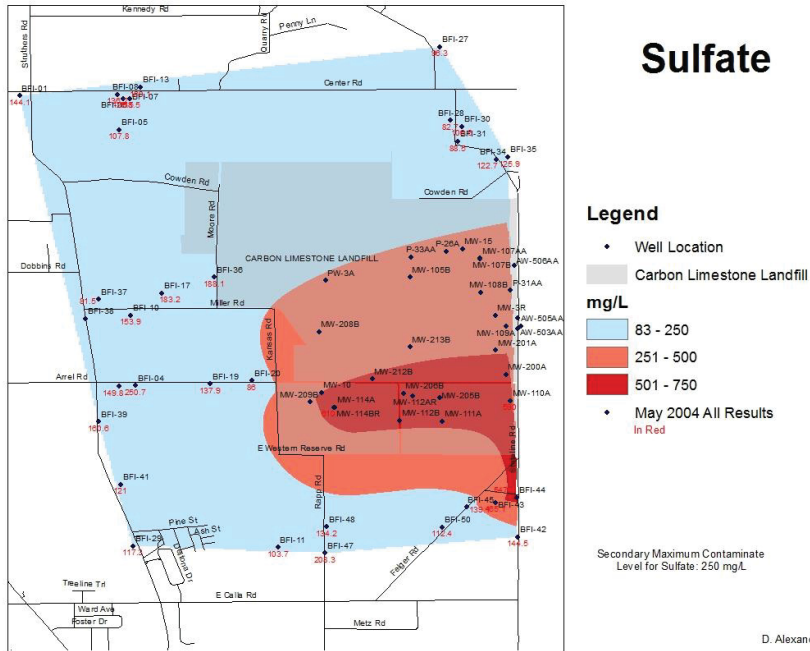


Figure 5-68: May 2004 Combined Data for Sulfate

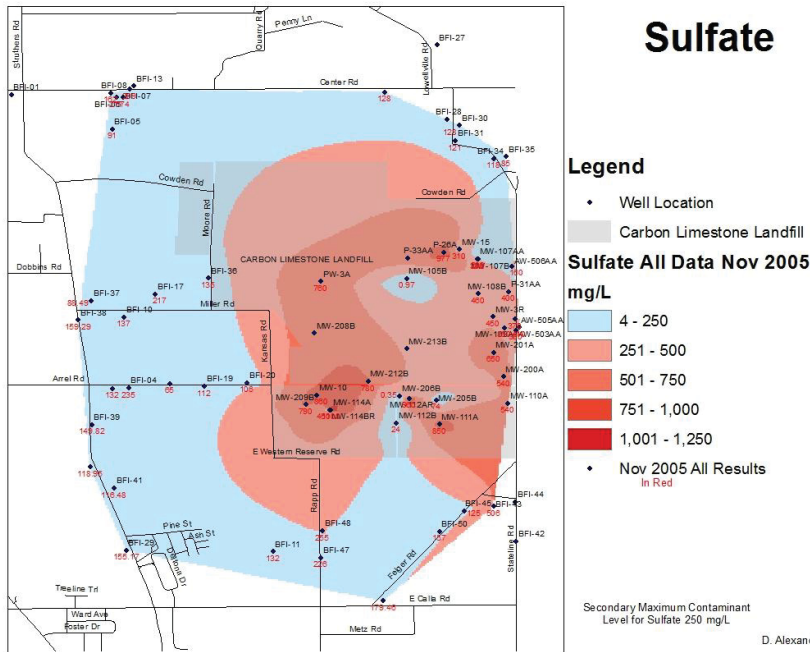


Figure 5-69: November 2005 Combined Data for Sulfate

## Total Dissolved Solids (TDS)

Total Dissolved Solids (TDS) were mapped using combined on-site data and residential data for November 2003, May 2004, and November 2005, as shown in Figure 5-70, Figure 5-71, and Figure 5-72. Data was not obtained for the May 2003 on-site sampling event.

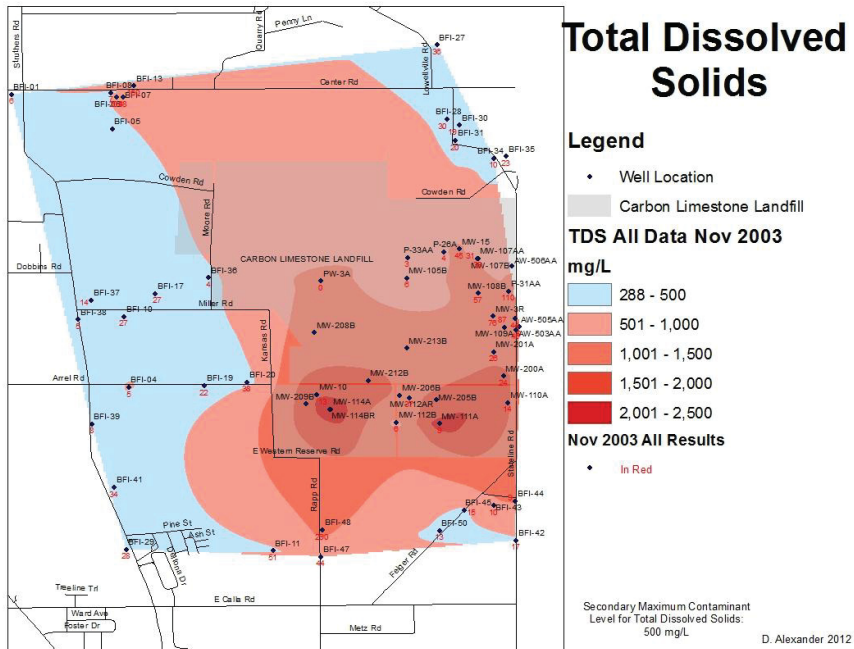


Figure 5-70: November 2003 Combined Data for TDS

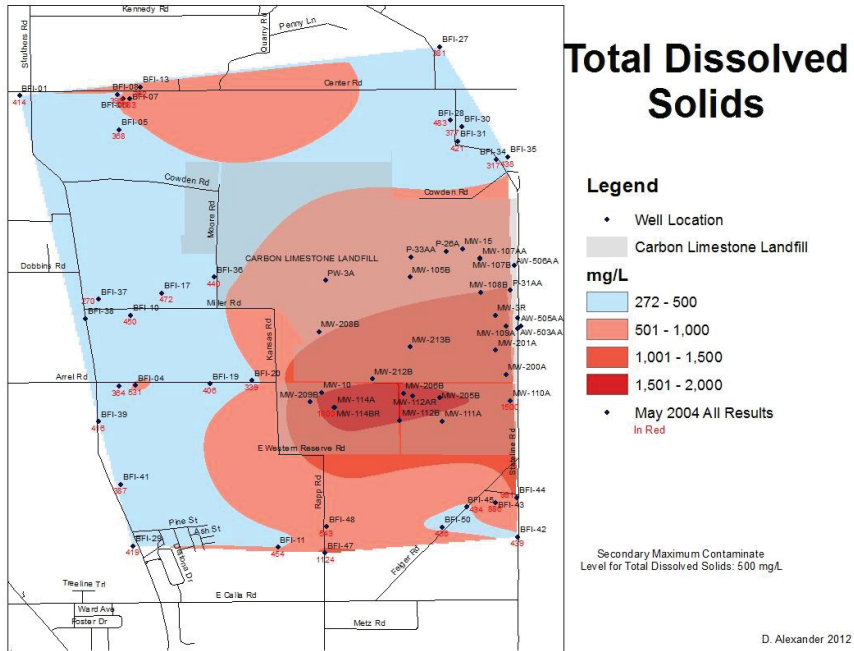


Figure 5-71: May 2004 Combined Data for TDS

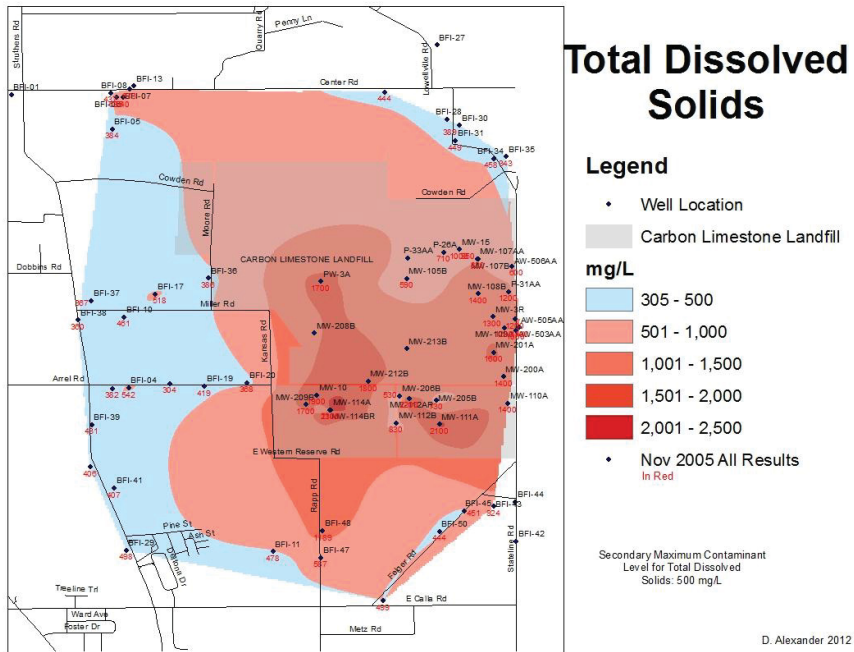


Figure 5-72: November 2005 Combined Data for TDS

## Chapter 6 Discussion of Results

### Introduction

The abnormalities or elevated concentrations of each analyte were individually researched to determine if the Carbon Limestone Landfill has an impact on the groundwater supply to residential wells within a one mile radius. Individual wells were researched to determine the aquifer used. All wells participating in this research were sandstone completions, except BFI-25, which is completed in sand and gravel.

### Arsenic

The arsenic concentration recorded for BFI-18 was 276.7  $\mu\text{g/L}$  for the April 2009 sample. Because all other analysis were below detection limit (Table 6-1), the April 2009 result was considered erroneous and omitted from further analysis.

Arsenic concentration levels were elevated in BFI-10, BFI-44, and BFI-NA1 during the May 2003 sampling event above the MCL of 10  $\mu\text{g/L}$ . However, the following sampling event, November 2003, arsenic levels were undetected or not analyzed as shown in Table 6-2.

Table 6-1: BFI-18 Arsenic

Sampling Date	BFI-18
May-03	Not Analyzed
Nov-03	BDL
May-04	BDL
Sep-04	BDL
Jul-05	BDL
Nov-05	BDL
Aug-06	BDL
Nov-06	BDL
Apr-07	BDL
Jul-07	Not Analyzed
Feb-08	Not Analyzed
Jun-08	BDL
Nov-08	BDL
Apr-09	276.70
May-09	Not Analyzed
Sep-09	BDL
Oct-09	Not Analyzed
Mar-10	BDL
Apr-10	Not Analyzed
Aug-10	BDL
Sep-10	Not Analyzed



Table 6-2: Arsenic Concentrations of BFI-44

Sampling Date	BFI-10	BFI-44	BFI-NA1
May-03	11.5	15.3	15.4
Nov-03	Not Analyzed	BDL	Not Analyzed
May-04	Not Analyzed	BDL	Not Analyzed
Sep-04	Not Analyzed	BDL	Not Analyzed
Jul-05	Not Analyzed	BDL	Not Analyzed
Nov-05	Not Analyzed	BDL	Not Analyzed
Aug-06	BDL	BDL	Not Analyzed
Nov-06	BDL	BDL	Not Analyzed
Apr-07	BDL	Not Analyzed	Not Analyzed
Jul-07	Not Analyzed	BDL	Not Analyzed
Feb-08	Not Analyzed	BDL	Not Analyzed
Jun-08	BDL	BDL	Not Analyzed
Nov-08	BDL	BDL	Not Analyzed
Apr-09	BDL	BDL	Not Analyzed
May-09	Not Analyzed	BDL	Not Analyzed
Sep-09	BDL	Not Analyzed	Not Analyzed
Oct-09	Not Analyzed	Not Analyzed	Not Analyzed
Mar-10	Not Analyzed	Not Analyzed	Not Analyzed
Apr-10	BDL	Not Analyzed	Not Analyzed
Aug-10	Not Analyzed	Not Analyzed	Not Analyzed
Sep-10	BDL	Not Analyzed	Not Analyzed

BDL: Below minimum detection limit

As shown in Table 6-2, a lack of complete data complicates the ability to show a trend in arsenic concentrations. The inclusion of on-site data does not clarify any possible trends. Without having complete knowledge of all sampling concentrations, it is difficult to determine the exact source of the elevated levels.

## Barium

Appendix E contains all the time series charts of barium concentrations of wells in which elevated levels can be seen from May 2003 – November 2005. Although barium is common in Ohio groundwater due to the mineral barite, an elevated level across a small time suggests a higher than normal concentration of barium introduced into the aquifer. As seen in Figure 5-27 Figure 5-32, the higher concentrations of barium are located in the southeast portion of the study area. It is assumed that any impacts from the Carbon Limestone Landfill would be seen nearest to the landfill, then spreading out over time. However, the higher concentrations maintain the same localities throughout the sampling period.

An anthropogenic source of elevated barium levels in groundwater is from oil and gas drilling. Barium is commonly used in oil and gas drilling to ‘weight’ the drilling fluid. After investigation into this area, there were no oil and gas drilling occurring during the time of higher than normal barium concentrations. However, a possibility of an oil and gas well located across the state line, in Pennsylvania, was never ruled out.

## Cadmium

As shown in Figure 5-9, Figure 5-10, Figure 5-11, and Figure 5-33, cadmium levels for three wells in the November 2003 sampling were elevated. The elevated wells, BFI-43, BFI-44, and BFI-47, are located south of the CLL. The remaining participating wells having limits below the minimum detection limit.

The cadmium concentrations for each of the three wells are displayed in Table 16. BFI-43 was only analyzed one time for cadmium, leaving an incomplete data set. BFI-44 and BFI-47 had elevated results for one sampling event, and the rest of the concentrations were below detection limit.

Table 6-3: Cadmium Concentrations of BFI-43, BFI-44, & BFI-47

Date	BFI-43	BFI-44	BFI-47
14-May-03	Not Analyzed	BDL	BDL
7-Nov-03	12.2	10.3	11.2
4-May-04	Not Analyzed	BDL	BDL
9-Sep-04	Not Analyzed	BDL	BDL
12-Jul-05	Not Analyzed	BDL	BDL
8-Nov-2005	Not Analyzed	BDL	BDL
23-Aug-2006	Not Analyzed	BDL	BDL
1-Nov-2006	Not Analyzed	BDL	BDL
10-Apr-2007	Not Analyzed	BDL	BDL
10-Jul-2007	Not Analyzed	BDL	BDL
4-Feb-2008	Not Analyzed	BDL	BDL
17-Jun-2008	Not Analyzed	BDL	BDL
3-Nov-08	Not Analyzed	BDL	BDL
6-Apr-09	Not Analyzed	BDL	BDL
4-May-2009	Not Analyzed	BDL	BDL
23-Sep-09	Not Analyzed	Not Analyzed	BDL
13-Oct-2009	Not Analyzed	Not Analyzed	Not Analyzed
23-Mar-10	Not Analyzed	Not Analyzed	Not Analyzed
6-Apr-2010	Not Analyzed	Not Analyzed	Not Analyzed
9-Aug-10	Not Analyzed	Not Analyzed	Not Analyzed
8-Sep-2010	Not Analyzed	Not Analyzed	Not Analyzed

BDL: Below minimum detection limit

Sources of elevated cadmium in groundwater are both natural and anthropogenic. Natural weathering of rocks and soils containing trace amounts of cadmium can lead to

elevated concentrations within the water supply. Anthropogenic introductions of cadmium can occur from mining operations, smelting, and landfill leachate.

Without further data, it is undeterminable what the exact source is of the elevated levels of cadmium in the November 2003 sampling.

### Nitrate

BFI-47 showed increased concentrations of nitrate when compared to the other participating wells. Nitrate is usually linked with agricultural practices, and this area of study is mainly rural. Figure 5-14 is the time-series chart for nitrates of BFI-47. Figure 5-35 and Figure 5-36 show mapped concentration levels of nitrates. The higher than average concentrations appear to only affect BFI-47, therefore, it is not believed the Carbon Limestone Landfill impacted the nitrate levels.

### Chloride

Elevated levels of chloride in groundwater are naturally occurring from weathering of sedimentary rocks and minerals. Anthropogenic sources include road de-icing, landfill leachate, water softening systems, etc. As seen in Figure 5-17, Figure 5-18, and Figure 5-37 - Figure 5-43, the elevated chloride concentrations are surrounding two wells, BFI-47 and BFI-48. All other participating wells are below the SMCL of 250 mg/L. With only two wells affected in the area, it is unlikely the source of the impact is

the Carbon Limestone Landfill. However, the observed elevated values are more likely tied to road salt de-icing activity, and possibly water softening.

## Chromium

Elevated levels of chromium were observed in six residential wells for the September 2009 sampling event, although all concentrations were below the MCL. These wells, BFI-08, BFI-34, BFI-36, BFI-39, BFI-58, and BFI-61 are located to the west of the Carbon Limestone Landfill property, as shown in Figure 5-34. The results from the data do not establish which form of chromium, chromium – III or the toxic chromium – VI, is present within the sample. Chromium (either – III or – VI) can occur in drinking water from naturally occurring deposits within the subsurface.

During the sampling events following September 2009 (October 2009 and March 2010) all concentrations of Chromium returned to minimum detection limit of 20 µg/L. Without an increasing trend of concentrations or the inclusion of additional data (i.e. on-site monitoring results), it is undeterminable the cause of the increased levels of chromium for the September 2009 sampling event.

## Total Dissolved Solids

Total dissolved solids (TDS) are a measure of the inorganic and organics within a water sample. It is no surprise that many of the participating wells have TDS above the SMCL. Groundwater in Ohio, from the ambient monitoring network, has a mean value

of TDS of 543 mg/L (ODNR, 2012). Although some wells had higher ranges, it is not uncommon for groundwater in Ohio's aquifers to have a higher concentration of TDS.

Time-series charts (Appendix F) and concentration maps (Appendix J) show the concentrations of TDS throughout the study. Increased levels of analytes such as chloride and barium will be directly related to an increase in TDS.

## Iron

Ohio's groundwater contains a high level of iron due to the geology of the area. Iron is usually from minerals contained within the bedrock, especially limestones and shales, and coal. The sandstone aquifers of Ohio have inter-bedded layers of all three of these types of rock, leading to a high iron concentration. Concentration maps for iron are located in Appendix G and time-series charts, organized by well name, are located in Appendix D.

## Manganese

Manganese is naturally occurring in the geology of Ohio, and is often found in association with iron. Manganese becomes soluble in reducing conditions and can lead to elevated concentrations in water samples. The time-series graphs for manganese concentrations are located in Appendix D, organized by well name, and the concentration maps are located in Appendix H.

## Sulfate

Sulfate concentrations were elevated throughout the sampling period, in a majority of the wells. Again, similar to iron and manganese, the concentrations of sulfates are geologically controlled. Similar to the results of manganese and iron, sulfates are commonly seen in the time-series charts (Appendix D) as elevated levels throughout the sampling period. Concentrations of sulfate for the sampling map are located on individual maps located in Appendix I.

## Zinc

Only one instance of elevated concentration of zinc occurred, as seen in the time-series chart, Figure 5-19. BFI-27, during the April 2009 sampling event had a concentration of 5,170  $\mu\text{g/L}$ , as shown in Figure 5-44. As shown in Table 18, that was the extreme highest concentration, with levels returning below SMCL level. One possible cause of elevated concentrations of zinc is corrosion of galvanized well casings and pipes.

Table 6-4: BFI-27 Zinc

Date	Zinc
14-May-03	Not Analyzed
7-Nov-03	Not Analyzed
4-May-04	Not Analyzed
9-Sep-04	12
12-Jul-05	Not Analyzed
8-Nov-2005	Not Analyzed
23-Aug-2006	BDL
1-Nov-2006	Not Analyzed
10-Apr-2007	14.2
10-Jul-2007	55
4-Feb-2008	Not Analyzed
17-Jun-2008	96.3
3-Nov-08	50.5
6-Apr-09	5170
4-May-2009	Not Analyzed
23-Sep-09	70.5
13-Oct-2009	Not Analyzed
23-Mar-10	336
6-Apr-2010	Not Analyzed
9-Aug-10	24
8-Sep-2010	Not Analyzed

BDL: Below minimum detection

### Copper

Only one instance of elevated concentrations of copper was recorded. This occurred with BFI-14 during the May 2009 sampling event. The recorded concentration of copper was 2,802 µg/L, elevated beyond the 1,300 µg/L Action Level.



Table 6-5 displays the recorded concentration of copper in BFI-14. As shown, the level in May, 2009, was an extreme level as compared to the rest of the data. Investigating Figure 5-45, the concentration map of copper for May, 2009, it can be seen that this well was abnormally high when comparing to surrounding wells. This data point may be erroneous.

Table 6-5: BFI-14 Copper

Date	Copper
14-May-03	Not Analyzed
7-Nov-03	Not Analyzed
4-May-04	Not Analyzed
9-Sep-04	Not Analyzed
12-Jul-05	Not Analyzed
8-Nov-2005	Not Analyzed
23-Aug-2006	BDL
1-Nov-2006	Not Analyzed
10-Apr-2007	Not Analyzed
10-Jul-2007	BDL
4-Feb-2008	Not Analyzed
17-Jun-2008	BDL
3-Nov-08	BDL
6-Apr-09	Not Analyzed
4-May-2009	2802
23-Sep-09	BDL
13-Oct-2009	Not Analyzed
23-Mar-10	Not Analyzed
6-Apr-2010	BDL
9-Aug-10	Not Analyzed
8-Sep-2010	BDL

BDL: Below minimum detection level

## Lead

Elevated lead levels may arise from old plumbing, well pump, casing, possible leachate, etc. As shown in Figure 5-21 and Figure 5-22 (time-series charts), each of the affected well showed a 'spike' in the data trend, and returned to baseline levels in sampling. It is a possibility that lead is occurring in the groundwater due to well equipment and plumbing.

## Sodium

BFI-47 is the only well that had elevated sodium levels as seen in Figure 5-23, Figure, and Figure. The increase of sodium levels for this well is possibly related to collecting samples beyond the water softener. No other wells show an increase, therefore, the elevated levels are most likely occur due to home usage of water softening equipment.

## Discussion of Combined Results

### Arsenic

Comparison of mapped off-site residential arsenic results (Figure 5-24) with the combined on-site data results (**Error! Reference source not found.**) shows an inconclusive trend of concentrations. The wells sampled followed an almost perimeter-based sampling area, with no data for the wells lying in between. Investigation of these

maps for the source of arsenic concentrations is inconclusive. The lack of May 2003 arsenic concentrations prohibits the drawing of conclusions regarding potential sources. Two off-site wells, BFI-10 and BFI-44, resulted in arsenic concentrations above the MCL. No on-site wells were shown in the May 2003 sampling event to have arsenic concentrations above the MCL.

## Barium

The May 2003 combination of on- and off-site barium results indicated a lower concentration of Barium on-site, as compared in Figure 5-27 and **Error! Reference source not found.** The November 2003, May 2004, and November 2005 combined results of barium produced the same indication of lower concentrations of barium within the landfill boundaries (**Error! Reference source not found.**, and **Error! Reference source not found.**). With the inclusion of on-site data, it can be concluded that the levels of barium are the lowest within the landfill boundary, further indicating the possibility that the Carbon Limestone Landfill had no effect on the barium concentrations in the groundwater during the May 2003 sampling event.

## Chloride

Similar to the barium results, comparison of residential data and the combined data for the May 2003 Chloride concentrations (Figure 5-37 and **Error! Reference source not found.****Error! Reference source not found.**) indicate lower concentrations

on-site of the Carbon Limestone Landfill. The November 2003 combined data map (**Error! Reference source not found.**), as well as May 2004 (**Error! Reference source not found.**) and November 2005 (**Error! Reference source not found.**), also indicate lower concentrations of chloride within the landfill boundaries. This further indicates the landfill is not impacting the levels of chloride in the groundwater within the area. Possible sources of elevated chloride levels could occur from road-salt (de-icing) or from brine water interactions within the aquifer.

## Lead

The May 2003 Lead concentrations for off-site (Figure 5-46) contained four well results which covered a small area to the east of the Carbon Limestone Landfill. Inclusion of on-site lead concentrations (**Error! Reference source not found.**) shows the highest concentration of lead being located to the west of the landfill, off-site, with lead decreasing in concentration on-site. In the May 2003 sampling event, it is possible that the lead source is not the landfill, but rather plumbing related.

## Iron

Concentrations of iron from on-site wells were unavailable for the May 2003 sampling event, however the November 2003 (**Error! Reference source not found.**), May 2004 (**Error! Reference source not found.**), and November 2005 (**Error! Reference source not found.**)

**found.**) on-site sampling included results for iron. These three sampling dates show an increase of iron concentration within the boundaries of the landfill. The May 2004 sampling resulted in the highest iron concentration being located on-site, indicated by a ‘bull-eye’ of iron concentrations on the map. The three sampling results are a possible indication of the source of elevated iron concentrations in the groundwater resulting from the landfill operations. Iron is a common constituent of landfill leachate (Table 2-4). However, without including more site-specific groundwater characteristics (exact flow direction, leachate collection systems, on-site de-watering systems, etc.) it is not feasible to determine that the landfill is the exact source of the increased iron concentrations.

#### Manganese

The May 2003 manganese results were taken from 17 residential wells (Appendix H) and only one on-site well. The inclusion of one on-site well does not change the concentration map as shown in **Error! Reference source not found.** More data would need to be included from the on-site sampling results of manganese to provide a conclusion of the source of the manganese.

Manganese concentrations with the combined November 2003 (**Error! Reference source not found.**), May 2004 (**Error! Reference source not found.**), and November 2005 (**Error! Reference source not found.**) indicate elevated concentrations both on- and off-site. With the data and maps provided, it is inconclusive the actual source of the elevated manganese concentrations.

## Sulfate

The sulfate concentration map for the residential November 2003, May 2004, and November 2005 sampling events (Appendix I) as compared to the combination of on- and off-site data map (**Error! Reference source not found.**, **Error! Reference source not found.**, and **Error! Reference source not found.**, respectively) show increased levels of sulfate within the landfill boundaries. Sulfate is a common leachate constituent as shown in Table 2-4, allowing for the possibility of the Carbon Limestone Landfill impacting the sulfate concentrations of the groundwater. However, without further investigation, it is impossible to determine the actual source of increased sulfate concentrations.

## Total Dissolved Solids (TDS)

Similar to the increased on-site sulfate concentrations, total dissolved solids (TDS) results for the November 2003, May 2004, and November 2005 indicate elevated levels within the landfill boundaries. **Error! Reference source not found.**, **Error! Reference source not found.**, and **Error! Reference source not found.** illustrate the representative concentrations from the combined data. TDS is a common constituent of landfill leachate (Table 2-4), however, without further site investigation; it is implausible to determine the exact source of elevated TDS in the groundwater.

## **Chapter 7 Conclusion**

### Conclusions

This research involves a sampling period from May 2003 – September 2010 that involved 72 participating residential wells. The objective of this study was to investigate any impacts the Carbon Limestone Landfill has on surrounding groundwater. Using the residential (off-site) sampling results alone, no impact to the groundwater of the area from the Carbon Limestone Landfill was detected. However, with the inclusion of on-site sampling (May 2003, November 2003, May 2004, and November 2005), there are possibilities of impact for parameters such as iron, manganese, and total dissolved solids, which are common constituents of landfill leachate and may occur naturally at elevated concentrations. Without further data from on-site monitoring, as well as correlation with the Mahoning County District Board of Health's sampling program, it is inconclusive that there is an impact to the local groundwater from the landfill.

For future study, it is important to continue to monitor the residential wells to provide assessment of any possible future impacts to the groundwater. With future monitoring, it is recommended that all participating wells be sampled at the same time to provide a more complete and more comparable data set for investigation. Furthermore, it is also recommended that the Mahoning County DBOH and the monitoring of on-site water quality be combined together to provide data for the entire area, allowing for a more detailed investigation.

A more detailed groundwater investigation should be completed, to determine exact groundwater flow in the area, as well as investigating the on-site leachate collection

systems and passive drainage systems. This will allow for a more detailed conclusion for any possible impacts to the groundwater from the Carbon Limestone Landfill.



## Chapter 8 References

40 Code of Federal Regulations (CFR) § 258

Alloway, B. J. 1995. Cadmium. In *Heavy Metals in Soils*, edited by B. J. Alloway. Great Britain: Blackie Academic & Professional.

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. "Toxicological Profile for Mercury." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2004. "Toxicological Profile for ammonia." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2004. "Toxicological Profile for Copper." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. "Toxicological Profile for zinc." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. "Toxicological Profile for barium and compounds." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. "Toxicological Profile for Lead." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. "Toxicological Profile for arsenic." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. "Toxicological Profile for cadmium." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. "Toxicological Profile for chromium." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. "Toxicological Profile for manganese." Atlanta, GA, U.S. Department of Health and Human Services, Public Health Service.

- Ahn, Hong-Il and Hyo-Taek Chon. 1998. Assessment of groundwater contamination using geographical information systems. *Environmental Geochemistry and Health* 21; 273 – 289.
- Akinbile, Christopher Oluwakunmi. 2012. Environmental Impact on Groundwater Quality and Agricultural Soils in Nigeria. *Soil and Water Resources* (1) p 18 – 26.
- Alley, William, Thomas E. Reilly, and O. Lehn Franke. Sustainability of Groundwater Resources. United States Geological (USGS) Circular 1186.
- Alslaibi, Tamer M., K. Mogheir Yunes, and Samir Afifi. 2011. Assessment of groundwater quality due to municipal solid waste landfills leachate. *Journal of Environmental Science and Technology* 4(4): p 419 – 436.
- Angle, Michael P. 2003. Groundwater pollution potential of Mahoning County, Ohio. Ohio Department of Natural Resources Water Resources Division Report No. 51
- Brady, P. V., Brady, M. V., and Borns, D. J. 1998. *Natural Attenuation CERCLA, RBCA's and the Future of Environmental Remediation*. Boca Raton, Florida: Lewis Publishers.
- CH2MHILL. 2007. Groundwater Quality Data Evaluation, St. John's Landfill. Draft. 39 p.
- Davies, B. E. 1995. Lead. In *Heavy Metals in Soils*, edited by B. J. Alloway. Great Britain: Blackie Academic & Professional
- Eagon and Associates, Inc. 2006. November 2005 Second Semiannual Monitoring Event Results BFIO Carbon Limestone Landfill Mahoning County, Ohio.
- Fatta, Despina, Achilleas Papadopolus, and Maria Loizidou. 1999. A study on the landfill leachate and its impacts on the groundwater quality of the greater area. *Environmental Geochemistry and Health* 21; p. 175 – 190.
- Fetter, C.W. 1994. *Applied Hydrogeology*. 3<sup>rd</sup> ed. Macmillian College Publishing Company, Inc. New York, New York.
- Gan, Thian Yew and Gerry Friesen. 1991. The effectiveness of composite lining systems in controlling the leakage of leachate from sanitary landfills to groundwater, *Environmental Monitoring and Assessment* 19; p 193 – 202.
- Harris, Ann G. 1989. Preliminary geologic Report on Carbon Limestone, Browning-Ferris Landfill in Mahoning County, Poland Township, OH

- Hutson, Susan S., Nancy L. Barber, Joan F. Kenny, Kristen S. Linsey, Debroah S. Lumina, and Molly A Maupin. 2004. Estimated Use of Water in the United States in 2000. United States Geological Survey (USGS) Circular 1268.
- Kiekens, L. 1995. Zinc. In *Heavy Metals in Soils*, edited by B. J. Alloway. Great Britain: Blackie Academic & Professional.
- Kjeldsen, Peter, Aase Grundtrip, Pia Winther, and Jens S. Anderson. 1998. Characterization of an old municipal landfill (Grindsted, Denmark) as a groundwater pollution source: landfill history and leachate composition. *Waste Management and Research* 16(1); p. 3 – 13.
- Lu, James C.S., Bert Eichenberger, and Robert J. Stearns. 1985. Leachate from Municipal Landfills Production and Management. Pollution Technology Review No. 119. Noyes Publications; Park Ridge, New Jersey.
- McGrath, S. P. 1995. Chromium and Nickel. In *Heavy Metals in Soils*, edited by B. J. Alloway. Great Britain: Blackie Academic & Professional.
- Mahoning County District Board of Health. 2011. Groundwater Surveillance around Mahoning County Landfills.
- Mahoning County District Board of Health. 2009. Groundwater Surveillance In the Vicinity of Mahoning County Landfills, 2006 – 2008.
- Mahoning County District Board of Health. 2006. Groundwater Surveillance in the Vicinity of Mahoning County Landfills, 2003 – 2005.
- Matisoff, G., Khourey, K.J., and Strain, W.H. 1982. The nature and source of arsenic in northeastern Ohio groundwater. *Groundwater*, v. 20, no. 4, p. 446 - 456
- Mesner, Nancy and John Geiger. 2010. Understanding your watershed: pH. Utah State University Water Quality Extension.
- National Map Viewer. 2012. Land cover of Mahoning County shape file. <http://viewer.nationalmap.gov/viewer/>
- National Map Viewer. 2012. Roads of Mahoning County shape file. <http://viewer.nationalmap.gov/viewer/>
- Neil, R. H. 1995. Selenium. In *Heavy Metals in Soils*, edited by B. J. Alloway. Great Britain: Blackie Academic & Professional.
- Ohio Administrative Code (OAC) § 3745
- Ohio Administrative Code (OAC) § 3745: 27-01

- Ohio Administrative Code (OAC) § 3745: 27-08
- Ohio Bureau of Environmental Health, 2009. Arsenic Factsheet, 2p. Accessed October 5, 2009, at [www.odh.ohio.gov](http://www.odh.ohio.gov)
- Ohio Department of Natural Resources (ODNR). 2011. Groundwater Quality. Fact Sheet 97-47.
- Ohio Department of Natural Resource (ODNR). 2011. What's Groundwater? Division of Soil and Water Fact Sheet 95-24.
- Ohio Depart of Natural Resources (ODNR). 2010. Precipitation in Ohio. Fact Sheet 92-10.
- Ohio Department of Natural Resources (ODNR). 1997. Land use classification grid scheme.
- Ohio Department of Natural Resources Geographic Information Management Systems (GIMS). 2000. Mahoning County Land Use. .shp file
- Ohio Environmental Protection Agency (Ohio EPA). 2012. Groundwater Quality Characterization Program. Accessed April 2012 from <http://epa.ohio.gov/ddagw/gwqcp.aspx>
- Ohio Environmental Protection Agency (Ohio EPA). 2012. Municipal Solid Waste Landfill Program. Accessed April 2012 from <http://www.epa.ohio.gov/dmwm/Home/MunicipalSWLandfills.aspx>.
- Ohio Environmental Protection Agency (Ohio EPA). 2012. Piper Diagram of Ohio's Major Aquifers image.
- Ohio Environmental Protection Agency (Ohio EPA). 2010. Groundwater in Ohio. Accessed January 2012 from <http://www.epa.ohio.gov/portals/28/Documents/gwqcp/gwfactsht.pdf>.
- Ohio Environmental Protection Agency (Ohio EPA). 2008. Major Aquifers of Ohio image.
- Ohio Environmental Protection Agency (Ohio EPA). 2000. 305(b) Report Ohio's Groundwater Quality.
- Pais, I., and Jones, J. B. J. 1997. *The Handbook of Trace Elements*. Boca Raton, FL: St. Lucie Press.

- Paul C. Rizzo and Associates, Inc. 1991. Application for permit to install hydrogeological site investigation report. Carbon Limestone Sanitary Landfill, Poland Township, Ohio. Project No. 86-267. March 1990, Revised July 1990, October 1991.
- Paul C. Rizzo and Associates, Inc. 1990. Response to Ohio EPA comments regarding hydrogeological site investigation report, Carbon Limestone Landfill, Poland Township, Ohio. Project # 86-267.
- Ragle, Nancy, John Kissel, Jerry E. Ongrath, and Foppe B. DeWalle. 1995. Composition and variability of leachate from recent and aged areas with a municipal landfill. *Water Environment Research* 67(2); p 238 – 243.
- Rapti-Caputo, D. and Carmela Vaccaro. 2006. Geochemical evidences of landfill leachate in groundwater. *Engineering Geology* 85; pg 111 – 121.
- Ravenscroft, P. Brammer, H., and Richards, K, 2009. *Arsenic pollution: a global synthesis*, Chichester, U.K.; Malden, MA: Wiley-Blackwell
- Republic Services. 2012. Drive. Leading the Way. Annual Report. 188 pgs.
- Rose, S., and Shea, J. A. 2007. Environmental Geochemistry of Trace Metal Pollution in Urban Watersheds. In, edited by D. Sakar, R. Datta and R. Hannigan. Amsterdam, Netherlands: Elsevier, Ltd.
- Spielgelman, Helen and Bill Seehan, PhD. 2005. Unintended consequences: Municipal Solid Waste Management and the throwaway society. Product Policy Institute. 20 p.
- StackExchange. 2012. VBA programming. Stackoverflow post dated May 8, 2012.
- Steinnes, E. 1995. Mercury. In *Heavy Metals in Soils*, edited by B. J. Alloway. Great Britain: Blackie Academic & Professional.
- Swistock, B.R, W.E Sharp, and J.A. Clark. 2003. Water Tests: What do the Numbers Mean? The Pennsylvania State University, University Park, PA.
- Thomas, M.A., Schumann, T.L., Pletsch, B.A., 2005. Arsenic in ground water in selected parts of southwestern Ohio, 2002-03: U.S. Geological Scientific Investigations Report 2005-5138, 30 p.
- United States Department of the Interior, Bureau of Reclamation. 1999. Alkalinity Fact Sheet.
- United States Environmental Protection Agency (US EPA), 2001. EPA to implement 10 ppb standard for arsenic in drinking water: Office of Water Fact Sheet, EPA 815-F-01-010, Updated September, 2006. Accessed October 5, 2009 at: [http://www.epa.gov/safewater/arsenic/regulations\\_factsheet.html](http://www.epa.gov/safewater/arsenic/regulations_factsheet.html)

- United States Environmental Protection Agency (USEPA). 2012. Water: Monitoring and Assessment. Accessed April 2012 from <http://water.epa.gov>.
- United States Environmental Protection Agency (USEPA). 2012. Municipal Solid Waste. Accessed April 2012 from <http://www.epa.gov/epawaste/nonhaz/municipal/index.html>.
- United States Environmental Protection Agency (USEPA). 2011. Basic information of Contaminate Levels and Your Drinking Water. <http://water.epa.gov>. Accessed July 20, 2011.
- United States Environmental Protections Agency (USEPA). 2011. Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Fact and Figures for 2010. Accessed May 2012 from <http://epa.gov/wastes>
- United States Environmental Protection Agency (USEPA). 2011. Water: Total Coliform Rule. <http://water.epa.gov>. Accessed July 20, 2011.
- United States Environmental Protection Agency (USEPA). 2009. Drinking Water Contaminates: List of Contaminates and MCLs. 2009 [cited 10/16/09 2009]. Available from <http://www.epa.gov/safewater/contaminants/index.html>.
- United States Environmental Protection Agency (USEPA). 2001. Geosynthetic Clay Liners Used in Municipal Solid Waste Landfills. EPA Fact Sheet EPA530-F-97-002.
- United States Census Bureau. 2011. State and County Quick Facts, Mahoning County, Ohio. <http://quickfacts.census.gov>. Accessed July 7, 2011.
- United States Geological Survey (USGS). 2012. Water properties: pH. Accessed August 2012 from <http://ga.water.usgs.gov/edu/ph.html>
- United States Geological Survey (USGS). 2010. Groundwater quality. Accessed April, 2012 from <http://water.usgs.gov/ogw/data.html#quality>
- United States Geological Survey (USGS). 2001. What is Groundwater? Open File Report 93-643. Reprinted April 2001.
- United States Census Bureau. 2011. Mahoning County, Ohio Quick Facts. Accessed April 2012 from <http://quickfacts.census.gov/qfd/states/39/39099.html>
- World Health Organization (WHO). 2009. Background document for the development of WHO *Guidelines for Drinking Water Quality*.

Yenigül, N. Buket, Amrom M. Elfeki, Johannes C. Gehreis, Cees vanden Akker, André T. Hensbergen, and F. Michel Dekking. 2005. Reliability Assessment of groundwater monitoring networks at landfill sites. *Journal of Hydrology* 308; P. 1 – 17.

## **APPENDIX A: Time-Series Equations**



Named Range	Formula	Description
ACopper	=OFFSET(ActionLv!\$B\$3,0,0,COUNTA(ActionLv!\$B:\$B)-2,1)	Action Level for Copper
ALead	=OFFSET(ActionLv!\$C\$3,0,0,COUNTA(ActionLv!\$C:\$C)-2,1)	Action Level for Lead
ID	=OFFSET(Data!\$C\$2,0,0,COUNTA(Data!\$C:\$C)-1,1)	Mahoning County DBOH Well Identification
mcArsenic	=OFFSET(MCL!\$C\$3,0,0,COUNTA(MCL!\$C:\$C)-2,1)	MCL
mcBacteria	=OFFSET(MCL!\$J\$3,0,0,COUNTA(MCL!\$J:\$J)-2,1)	MCL
mcBarium	=OFFSET(MCL!\$D\$3,0,0,COUNTA(MCL!\$D:\$D)-2,1)	MCL
mcCadmium	=OFFSET(MCL!\$E\$3,0,0,COUNTA(MCL!\$E:\$E)-2,1)	MCL
mcChromium	=OFFSET(MCL!\$F\$3,0,0,COUNTA(MCL!\$F:\$F)-2,1)	MCL
mcFluoride	=OFFSET(MCL!\$B\$3,0,0,COUNTA(MCL!\$B:\$B)-2,1)	MCL
MChloride	=OFFSET(DLimit!\$E\$3,0,0,COUNTA(DLimit!\$E:\$E)-2,1)	MCL
MChromium	=OFFSET(DLimit!\$K\$3,0,0,COUNTA(DLimit!\$K:\$K)-2,1)	MCL
mcMercury	=OFFSET(MCL!\$G\$3,0,0,COUNTA(MCL!\$G:\$G)-2,1)	MCL
mcNitrate_EPA	=OFFSET(MCL!\$I\$3,0,0,COUNTA(MCL!\$I:\$I)-2,1)	MCL
mcSelenium	=OFFSET(MCL!\$H\$3,0,0,COUNTA(MCL!\$H:\$H)-2,1)	MCL
MAalkalinity	=OFFSET(DLimit!\$C\$3,0,0,COUNTA(DLimit!\$B:\$B)-2,1)	Minimum Detection Limit
MAmmonia	=OFFSET(DLimit!\$D\$3,0,0,COUNTA(DLimit!\$D:\$D)-2,1)	Minimum Detection Limit
Manganese	=OFFSET(Data!\$U\$4,0,0,COUNTA(Data!\$U:\$U)-1,1)	Minimum Detection Limit
MArsenic	=OFFSET(DLimit!\$H\$3,0,0,COUNTA(DLimit!\$H:\$H)-2,1)	Minimum Detection Limit
MBacteria	=OFFSET(DLimit!\$AB\$3,0,0,COUNTA(DLimit!\$AB:\$AB)-2,1)	Minimum Detection Limit
MBarium	=OFFSET(DLimit!\$I\$3,0,0,COUNTA(DLimit!\$I:\$I)-2,1)	Minimum Detection Limit
MCadmium	=OFFSET(DLimit!\$J\$3,0,0,COUNTA(DLimit!\$J:\$J)-2,1)	Minimum Detection Limit

MCOD	=OFFSET(DLimit!\$X\$3,0,0,COUNTA(DLimit!\$X:\$X)-2,1)	Minimum Detection Limit
Mconductivity	=OFFSET(DLimit!\$F\$3,0,0,COUNTA(DLimit!\$F:\$F)-2,1)	Minimum Detection Limit
MCopper	=OFFSET(DLimit!\$L\$3,0,0,COUNTA(DLimit!\$L:\$L)-2,1)	Minimum Detection Limit
MFluoride	=OFFSET(DLimit!\$G\$3,0,0,COUNTA(DLimit!\$G:\$G)-2,1)	Minimum Detection Limit
MIron	=OFFSET(DLimit!\$M\$3,0,0,COUNTA(DLimit!\$M:\$M)-2,1)	Minimum Detection Limit
MLead	=OFFSET(DLimit!\$N\$3,0,0,COUNTA(DLimit!\$N:\$N)-2,1)	Minimum Detection Limit
MMagnesium	=OFFSET(DLimit!\$T\$3,0,0,COUNTA(DLimit!\$T:\$T)-2,1)	Minimum Detection Limit
MManganese	=OFFSET(DLimit!\$O\$3,0,0,COUNTA(DLimit!\$O:\$O)-2,1)	Minimum Detection Limit
MMercury	=OFFSET(DLimit!\$P\$3,0,0,COUNTA(DLimit!\$P:\$P)-2,1)	Minimum Detection Limit
MNitrate_EPA	=OFFSET(DLimit!\$W\$3,0,0,COUNTA(DLimit!\$W:\$W)-2,1)	Minimum Detection Limit
MpH	=OFFSET(DLimit!\$Y\$3,0,0,COUNTA(DLimit!\$Y:\$Y)-2,1)	Minimum Detection Limit
MPotassium	=OFFSET(DLimit!\$U\$3,0,0,COUNTA(DLimit!\$U:\$U)-2,1)	Minimum Detection Limit
MSelenium	=OFFSET(DLimit!\$Q\$3,0,0,COUNTA(DLimit!\$Q:\$Q)-2,1)	Minimum Detection Limit
MSilver	=OFFSET(DLimit!\$R\$3,0,0,COUNTA(DLimit!\$R:\$R)-2,1)	Minimum Detection Limit
MSodium	=OFFSET(DLimit!\$V\$3,0,0,COUNTA(DLimit!\$V:\$V)-2,1)	Minimum Detection Limit
MSolids__Dissolved	=OFFSET(DLimit!\$Z\$3,0,0,COUNTA(DLimit!\$Z:\$Z)-2,1)	Minimum Detection Limit
MSulfate	=OFFSET(DLimit!\$AA\$3,0,0,COUNTA(DLimit!\$AA:\$AA)-2,1)	Minimum Detection Limit
MTurbidity	=OFFSET(DLimit!\$AC\$3,0,0,COUNTA(DLimit!\$AC:\$AC)-2,1)	Minimum Detection Limit
MZinc	=OFFSET(DLimit!\$S\$3,0,0,COUNTA(DLimit!\$S:\$S)-2,1)	Minimum Detection Limit
Alkalinity	=OFFSET(Data!\$I\$2,0,0,COUNTA(Data!\$I:\$I)-1,1)	Parameter Results
Ammonia	=OFFSET(Data!\$J\$2,0,0,COUNTA(Data!\$J:\$J)-1,1)	Parameter Results
Arsenic	=OFFSET(Data!\$N\$2,0,0,COUNTA(Data!	Parameter Results

	=OFFSET(Data!\$N:\$N)-1,1)	
Bacteria	=OFFSET(Data!\$AH\$2,0,0,COUNTA(Data!\$AH:\$AH)-1,1)	Parameter Results
Barium	=OFFSET(Data!\$O\$2,0,0,COUNTA(Data!\$O:\$O)-1,1)	Parameter Results
Cadmium	=OFFSET(Data!\$P\$2,0,0,COUNTA(Data!\$P:\$P)-1,1)	Parameter Results
Chloride	=OFFSET(Data!\$K\$2,0,0,COUNTA(Data!\$K:\$K)-1,1)	Parameter Results
Chromium	=OFFSET(Data!\$Q\$2,0,0,COUNTA(Data!\$Q:\$Q)-1,1)	Parameter Results
COD	=OFFSET(Data!\$AD\$2,0,0,COUNTA(Data!\$AD:\$AD)-1,1)	Parameter Results
Conductivity	=OFFSET(Data!\$L\$2,0,0,COUNTA(Data!\$L:\$L)-1,1)	Parameter Results
Copper	=OFFSET(Data!\$R\$2,0,0,COUNTA(Data!\$R:\$R)-1,1)	Parameter Results
Fluoride	=OFFSET(Data!\$M\$2,0,0,COUNTA(Data!\$M:\$M)-1,1)	Parameter Results
Iron	=OFFSET(Data!\$S\$2,0,0,COUNTA(Data!\$S:\$S)-1,1)	Parameter Results
Lead	=OFFSET(Data!\$T\$2,0,0,COUNTA(Data!\$T:\$T)-1,1)	Parameter Results
Magnesium	=OFFSET(Data!\$Z\$2,0,0,COUNTA(Data!\$Z:\$Z)-1,1)	Parameter Results
Mercury	=OFFSET(Data!\$V\$2,0,0,COUNTA(Data!\$V:\$V)-1,1)	Parameter Results
Nitrate_EPA	=OFFSET(Data!\$AC\$2,0,0,COUNTA(Data!\$AC:\$AC)-1,1)	Parameter Results
pH	=OFFSET(Data!\$AE\$2,0,0,COUNTA(Data!\$AE:\$AE)-1,1)	Parameter Results
Potassium	=OFFSET(Data!\$AA\$2,0,0,COUNTA(Data!\$AA:\$AA)-1,1)	Parameter Results
Selenium	=OFFSET(Data!\$W\$2,0,0,COUNTA(Data!\$W:\$W)-1,1)	Parameter Results
Silver	=OFFSET(Data!\$X\$2,0,0,COUNTA(Data!\$X:\$X)-1,1)	Parameter Results
Sodium	=OFFSET(Data!\$AB\$2,0,0,COUNTA(Data!\$AB:\$AB)-1,1)	Parameter Results
Solids__Dissolved	=OFFSET(Data!\$AF\$2,0,0,COUNTA(Data!\$AF:\$AF)-1,1)	Parameter Results
Sulfate	=OFFSET(Data!\$AG\$2,0,0,COUNTA(Data!\$AG:\$AG)-1,1)	Parameter Results

Turbidity	=OFFSET(Data!\$A1\$2,0,0,COUNTA(Data!\$A1:\$A1)-1,1)	Parameter Results
Zinc	=OFFSET(Data!\$Y\$2,0,0,COUNTA(Data!\$Y:\$Y)-1,1)	Parameter Results
RSodium	=OFFSET(Reclv!\$B\$3,0,0,COUNTA(Reclv!\$B:\$B)-2,1)	Recommended Level
Date	=OFFSET(Data!\$B\$2,0,0,COUNTA(Data!\$B:\$B))	Sample Date
SMChloride	=OFFSET(SMCL!\$B\$3,0,0,COUNTA(SMCL!\$B:\$B)-2,1)	SMCL
SMHighpH	=OFFSET(SMCL!\$G\$3,0,0,COUNTA(SMCL!\$G:\$G)-2,1)	SMCL
SMIron	=OFFSET(SMCL!\$C\$3,0,0,COUNTA(SMCL!\$C:\$C)-2,1)	SMCL
SMLowpH	=OFFSET(SMCL!\$H\$3,0,0,COUNTA(SMCL!\$H:\$H)-2,1)	SMCL
SMManganese	=OFFSET(SMCL!\$D\$3,0,0,COUNTA(SMCL!\$D:\$D)-2,1)	SMCL
SMSilver	=OFFSET(SMCL!\$E\$3,0,0,COUNTA(SMCL!\$E:\$E)-2,1)	SMCL
SMSolids__Dissolved	=OFFSET(SMCL!\$I\$3,0,0,COUNTA(SMCL!\$I:\$I)-2,1)	SMCL
SMSulfate	=OFFSET(SMCL!\$J\$3,0,0,COUNTA(SMCL!\$J:\$J)-2,1)	SMCL
SMZinc	=OFFSET(SMCL!\$F\$3,0,0,COUNTA(SMCL!\$F:\$F)-2,1)	SMCL

**APPENDIX B: ODNR Well Logs for Participating Residential Wells**

Pages 161 through 194 have been removed. Please refer to the print version of this thesis available at Youngstown State University, Maag Library.

**APPENDIX C: Original Data**

May 14, 2003

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-01		4573 Center Road	Lowellville	Ohio	44436			10		0.29	ND
BFI-04		4921 Arrel Road	Lowellville	Ohio	44436			8		1.72	ND
BFI-05		4969 Center Road	Lowellville	Ohio	44436			9		0.29	ND
BFI-06		4983A Center Road	Lowellville	Ohio	44436			67		1.06	ND
BFI-07		4983B Center Road	Lowellville	Ohio	44436			230		0.26	ND
BFI-10		5027 Miller Road	Lowellville	Ohio	44436			23		0.23	11.5
BFI-11		9624 Rapp Road	New Middletown	Ohio	44442			60		0.17	ND
BFI-13		5076 Center Road	Lowellville	Ohio	44436			110		0.65	ND
BFI-17		5110 Miller Road	Lowellville	Ohio	44436			10		0.23	ND
BFI-19		5425 Arrel Road	Lowellville	Ohio	44436			28		0.21	ND
BFI-20		5724 Arrel Road	Lowellville	Ohio	44436			51		0.19	ND
BFI-27		6495 Lowellville Road	Lowellville	Ohio	44436			40		0.23	ND
BFI-28		6670 Stymie Road	Lowellville	Ohio	44436			31		0.63	ND
BFI-29		9612 Struthers Road	New Middletown	Ohio	44442			40		0.21	ND
BFI-30		6729 Stymie Road	Lowellville	Ohio	44436			17		0.26	ND
BFI-31		6815 Stymie Road	Lowellville	Ohio	44436			20		0.55	ND
BFI-33		6839 Stymie Road	Lowellville	Ohio	44436			19		0.34	ND
BFI-34		6850 Stymie Road	Lowellville	Ohio	44436			20		0.46	ND
BFI-35		6931 Stymie Road	Lowellville	Ohio	44436			21		0.57	ND
BFI-36		7660 Moore Road	Lowellville	Ohio	44436			10		0.44	ND
BFI-37		7965 Struthers Road	Poland	Ohio	44514			16		0.19	ND
BFI-39		8915 Struthers Road	New Middletown	Ohio	44442			8		1.25	3.9
BFI-41		9191 Struthers Road	New Middletown	Ohio	44442			33		0.21	ND
BFI-42		9572 State Line Rd	New Middletown	Ohio	44436			12		0.35	ND
BFI-44		9320 S. Stateline Road	New Middletown	Ohio	44442			11		0.19	15.3
BFI-45		9370 Felger Road	New Middletown	Ohio	44442			13		0.36	ND
BFI-47	Outside	9491 Rapp Road	New Middletown	Ohio	44442			41		0.2	ND
BFI-48	Inside	9491 Rapp Road	New Middletown	Ohio	44442			310		2.17	ND
BFI-50		9494 Felger Road	New Middletown	Ohio	44442			13		0.39	ND
BFI-NA 1 *		9480 Felger Road	New Middletown	Ohio	44436			18		0.31	15.4
BFI-NA 2 *		5016 Poland Center	Lowellville	Ohio	44436			30		0.47	ND

\* never identified



May 14, 2003

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc
BFI-01	262	ND	ND	19	155	ND	15	ND	ND	ND	53
BFI-04	120	ND	ND	ND	59	ND	ND	ND	ND	ND	ND
BFI-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BFI-06	154	ND	ND	36	73	ND	ND	ND	ND	ND	ND
BFI-07	406	ND	ND	97	127	ND	ND	ND	ND	ND	42
BFI-10	394	ND	ND	ND	3564	ND	180	ND	ND	ND	15
BFI-11	231	ND	ND	15	120	ND	ND	ND	ND	ND	15
BFI-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BFI-17	194	ND	ND	15	62	11.5	ND	ND	ND	ND	567
BFI-19	340	ND	ND	28	770	ND	60	ND	ND	ND	14
BFI-20	248	ND	ND	32	159	ND	36	ND	ND	ND	75
BFI-27	237	ND	ND	ND	3812	ND	247	ND	ND	ND	ND
BFI-28	120	ND	ND	ND	51	ND	ND	ND	ND	ND	ND
BFI-29	ND	ND	ND	37	168	11.9	ND	ND	ND	ND	16
BFI-30	199	ND	ND	29	184	ND	50	ND	ND	ND	17
BFI-31	195	ND	ND	107	762	ND	ND	ND	ND	ND	107
BFI-33	217	ND	ND	12	91	ND	ND	ND	ND	ND	22
BFI-34	346	ND	ND	ND	153	ND	16	ND	ND	ND	ND
BFI-35	235	ND	ND	ND	372	ND	ND	ND	ND	ND	ND
BFI-36	414	ND	ND	166	1032	8.5	32	ND	ND	ND	16
BFI-37	177	ND	ND	37	ND	ND	49	ND	ND	ND	17
BFI-39	220	ND	ND	ND	522	24	41	ND	ND	ND	ND
BFI-41	420	ND	ND	20	ND	ND	118	ND	ND	ND	11
BFI-42	182	ND	ND	ND	873	ND	180	ND	ND	ND	ND
BFI-44	812	ND	ND	11	1325	ND	259	ND	ND	ND	32
BFI-45	303	ND	ND	ND	1438	ND	70	ND	ND	ND	22
BFI-47	392	ND	ND	36	80	ND	32	ND	ND	ND	955
BFI-48	132	ND	ND	ND	136	ND	16	ND	ND	ND	ND
BFI-50	199	ND	ND	11	825	ND	147	ND	ND	ND	11
BFI-NA 1 *	249	ND	ND	ND	380	ND	110	ND	ND	ND	365
BFI-NA 2 *	589	ND	ND	105	96	ND	51	ND	ND	ND	33

\* never iden

May 14, 2003

ID	Magnesium	Potassium	Sodium	Nitrate EP	COD	Ph	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	13.3		10	ND			396	211.6		
BFI-04	0.4		130	ND			798	263		
BFI-05	ND		90	ND			363	204.6		
BFI-06	5.5		100	ND			590	223.9		
BFI-07	14.4		60	0.39			809	166.7		
BFI-10	13		10	ND			413	16.5		
BFI-11	12.7		10	ND			439	110.3		
BFI-13	ND		150	ND			616	229.7		
BFI-17	12.5		10	1.28			371	100.8	POS	
BFI-19	13.1		10	ND			389	56.4	POS	
BFI-20	10.6		10	2.31			367	27.8	POS	
BFI-27	9.1		30	ND			367	94.7		
BFI-28	0.9		120	ND			462	126		
BFI-29	ND		110	ND			391	155.2		
BFI-30	11.8		10	ND			347	66.7		
BFI-31	2.6		90	ND			403	114.4		
BFI-33	9.7		20	ND			296	49.8		
BFI-34	9.2		40	ND			404	114.8	POS	
BFI-35	3.8		80	ND			417	137.9		
BFI-36	10.7		40	ND			354	116.5		
BFI-37	9.9		10	2.66			291	67.9		
BFI-39	8		60	ND			392	136.2		
BFI-41	11.7		10	ND			370	81.1		
BFI-42	12.8		30	ND			415	114.4		
BFI-44	16		20	ND			985	552.8		
BFI-45	11.8		20	ND			411	73.7	POS	
BFI-47	14.3		10	9.09			549	189.7		
BFI-48	0.4		270	ND			1073	252.7		
BFI-50	11.9		40	ND			407	102.1		
BFI-NA 1 *	11.9		30	ND			418	116.5	POS	
BFI-NA 2 *	12.3		40	ND			437	141.6		

\* never iden

Nov 7, 2003

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-01		4573 Center Road	Lowellville	Ohio	44436			6		0.34	ND
BFI-04		4921 Arrel Road	Lowellville	Ohio	44436			5		1.92	ND
BFI-05		4969 Center Road	Lowellville	Ohio	44436			ND		0.44	2.8
BFI-06		4983A Center Road	Lowellville	Ohio	44436			200		0.39	ND
BFI-07		4983B Center Road	Lowellville	Ohio	44436			48		1.15	ND
BFI-08		5005 Center Road	Lowellville	Ohio	44436			7		0.47	ND
BFI-10		5027 Miller Road	Lowellville	Ohio	44436			27		0.45	ND
BFI-11		9624 Rapp Road	New Middletown	Ohio	44442			51		0.3	ND
BFI-13		5076 Center Road	Lowellville	Ohio	44436			160		0.6	ND
BFI-17		5110 Miller Road	Lowellville	Ohio	44436			27		0.46	ND
BFI-19		5425 Arrel Road	Lowellville	Ohio	44436			22		0.36	2.5
BFI-20		5724 Arrel Road	Lowellville	Ohio	44436			38		0.34	ND
BFI-27		6495 Lowellville Road	Lowellville	Ohio	44436			36		0.36	ND
BFI-28		6670 Stymie Road	Lowellville	Ohio	44436			30		0.71	ND
BFI-29		9612 Struthers Road	New Middletown	Ohio	44442			28		0.35	ND
BFI-30		6729 Stymie Road	Lowellville	Ohio	44436			19		0.42	ND
BFI-31		6815 Stymie Road	Lowellville	Ohio	44436			20		0.66	ND
BFI-33		6839 Stymie Road	Lowellville	Ohio	44436			16		0.54	ND
BFI-34		6850 Stymie Road	Lowellville	Ohio	44436			10		0.59	ND
BFI-35		6931 Stymie Road	Lowellville	Ohio	44436			23		0.65	ND
BFI-36		7660 Moore Road	Lowellville	Ohio	44436			4		1.01	ND
BFI-37		7965 Struthers Road	Poland	Ohio	44514			14		0.38	ND
BFI-38		8095 Struthers Road	New Middletown	Ohio	44442			5		0.44	ND
BFI-39		8915 Struthers Road	New Middletown	Ohio	44442			8		1.15	4.3
BFI-41		9191 Struthers Road	New Middletown	Ohio	44442			34		0.37	ND
BFI-42		9572 State Line Rd	New Middletown	Ohio	44436			17		0.45	ND
BFI-43		9315 Felger Road	New Middletown	Ohio	44442			10		0.34	2.3
BFI-44		9320 S. State Line Road	New Middletown	Ohio	44442			9		0.36	ND
BFI-45		9370 Felger Road	New Middletown	Ohio	44442			15		0.45	ND
BFI-47	Outside	9491 Rapp Road	New Middletown	Ohio	44442			44		0.3	ND
BFI-48	Inside	9491 Rapp Road	New Middletown	Ohio	44442			290		2.16	ND
BFI-50		9494 Felger Road	New Middletown	Ohio	44442			13		0.46	ND

Nov 7, 2003

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium
BFI-01	ND	ND	ND	14	131	ND	13	ND	ND	ND	34	19	
BFI-04	118	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.7	
BFI-05	ND	ND	ND	ND	85	ND	ND	ND	ND	ND	ND	0.8	
BFI-06	125	ND	ND	27	ND	ND	ND	ND	ND	ND	ND	20.8	
BFI-07	ND	ND	ND	12	ND	ND	ND	ND	ND	ND	ND	6.2	
BFI-08	ND	ND	ND	11	479	ND	128	ND	ND	ND	ND	18.2	
BFI-10	423	ND	ND	53	203	9.9	11	ND	ND	ND	255	19.3	
BFI-11	235	ND	ND	24	37	ND	1183	ND	ND	ND	12	17.9	
BFI-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
BFI-17	493	ND	ND	ND	666	ND	501	ND	ND	ND	ND	18	
BFI-19	364	ND	ND	17	513	ND	63	ND	ND	ND	ND	18.2	
BFI-20	331	ND	ND	28	105	ND	13	ND	ND	ND	33	12.2	
BFI-27	ND	ND	ND	ND	3401	ND	261	ND	ND	ND	ND	12.7	
BFI-28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.9	
BFI-29	717	ND	ND	ND	1586	ND	151	ND	ND	ND	14	17	
BFI-30	ND	ND	ND	12	272	ND	57	ND	ND	ND	ND	16.8	
BFI-31	ND	ND	ND	ND	108	ND	ND	ND	ND	ND	ND	3.3	
BFI-33	118	ND	ND	30	78	ND	ND	ND	ND	ND	ND	13.2	
BFI-34	213	ND	ND	18	132	ND	12	ND	ND	ND	ND	13.8	
BFI-35	151	ND	ND	ND	158	ND	13	ND	ND	ND	ND	6.3	
BFI-36	327	ND	ND	14	123	ND	16	ND	ND	ND	ND	12.2	
BFI-37	320	ND	ND	55	ND	ND	32	ND	ND	ND	ND	12.8	
BFI-38	246	ND	ND	31	ND	ND	ND	ND	ND	ND	ND	1.8	
BFI-39	357	ND	ND	ND	385	ND	36	ND	ND	ND	ND	10.8	
BFI-41	651	ND	ND	21	ND	ND	107	ND	ND	ND	ND	16	
BFI-42	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
BFI-43	739	12.2	ND	27	1871	ND	514	ND	ND	ND	ND	23.9	
BFI-44	721	10.3	ND	11	1422	ND	301	ND	ND	ND	23	24.5	
BFI-45	269	ND	ND	ND	841	ND	60	ND	ND	ND	ND	16.5	
BFI-47	471	11.2	ND	26	68	ND	ND	ND	ND	ND	1218	21	
BFI-48	118	ND	ND	ND	72	ND	ND	ND	ND	ND	ND	0.5	
BFI-50	368	ND	ND	12	789	ND	164	ND	ND	ND	ND	16.8	

Nov 7, 2003

ID	Sodium	Nitrate EPA	COD	Ph	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	10	ND			401	93		
BFI-04	150	ND			511	201.3		
BFI-05	100	ND			378	132.5		
BFI-06	70	0.64			823	121		
BFI-07	150	ND			563	167.9		
BFI-08	10	ND			399	112.4		
BFI-10	20	1.72			458	124.7		
BFI-11	10	ND			454	100.8		
BFI-13	260	ND			778	155.6		
BFI-17	10	ND			426	89.3		
BFI-19	10	ND			401	116.9		
BFI-20	10	3.4			337	88.1		
BFI-27	30	ND			381	63.4		
BFI-28	140	ND			481	126.8		
BFI-29	10	ND			375	50.6		
BFI-30	10	ND			368	71.2		
BFI-31	210	ND			425	96.7		
BFI-33	20	ND			311	46.1		
BFI-34	40	ND			359	24.3		
BFI-35	90	ND			ND	82.3		
BFI-36	80	ND			416	132.1		
BFI-37	10	6.62			286	71.2		
BFI-38	80	ND			353	61.7		
BFI-39	70	ND			412	113.2		
BFI-41	10	ND			385	55.4		
BFI-42	110	ND			457	125.5		
BFI-43	20	ND			909	463.9		
BFI-44	20	ND			1035	559.4		
BFI-45	30	ND			426	46.1		
BFI-47	10	10.86			637	167.5		
BFI-48	270	ND			1120	198.4		
BFI-50	30	ND			427	52.3		

May 4, 2004

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic	Barium
BFI-01		4573 Center Road	Lowellville	Ohio	44436			8		0.33	ND	331
BFI-02		4911 Arrel Road	Lowellville	Ohio	44436			28		0.29	ND	216
BFI-04		4921 Arrel Road	Lowellville	Ohio	44436			5		1.61	ND	303
BFI-05		4969 Center Road	Lowellville	Ohio	44436			4		0.33	5.3	542
BFI-06		4983A Center Road	Lowellville	Ohio	44436			190		0.3	ND	629
BFI-07		4983B Center Road	Lowellville	Ohio	44436			37		0.99	ND	248
BFI-08		5005 Center Road	Lowellville	Ohio	44436			7		0.34	ND	514
BFI-10		5027 Miller Road	Lowellville	Ohio	44436			26		0.25	ND	969
BFI-11		9624 Rapp Road	New Middletown	Ohio	44442			61		0.23	ND	551
BFI-13		5076 Poland Center	Lowellville	Ohio	44436			190		0.44	ND	ND
BFI-17		5110 Miller Road	Lowellville	Ohio	44436			23		0.3	ND	689
BFI-19		5425 Arrel Road	Lowellville	Ohio	44436			26		0.24	ND	771
BFI-20		5724 Arrel Road	Lowellville	Ohio	44436			31		0.19	ND	657
BFI-27		6495 Lowellville Road	Lowellville	Ohio	44436			33		0.26	ND	441
BFI-28		6670 Stymie Road	Lowellville	Ohio	44436			30		0.66	ND	142
BFI-29		9612 Struthers Road	New Middletown	Ohio	44442			40		0.21	ND	946
BFI-30		6729 Stymie Road	Lowellville	Ohio	44436			17		0.33	ND	519
BFI-31		6815 Stymie Road	Lowellville	Ohio	44436			19		0.62	ND	216
BFI-33		6839 Stymie Road	Lowellville	Ohio	44436			16		0.4	ND	422
BFI-34		6850 Stymie Road	Lowellville	Ohio	44436			3		0.48	ND	657
BFI-35		6931 Stymie Road	Lowellville	Ohio	44436			20		0.56	ND	399
BFI-36		7660 Moore Road	Lowellville	Ohio	44436			4		1.09	ND	551
BFI-37		7965 Struthers Road	Poland	Ohio	44514			10		0.23	ND	615
BFI-39		8915 Struthers Road	New Middletown	Ohio	44442			6		1.11	ND	606
BFI-41		9191 Struthers Road	New Middletown	Ohio	44442			30		0.21	ND	877
BFI-42		9572 State Line Rd	New Middletown	Ohio	44436			10		0.28	ND	542
BFI-43		9315 Felger Road	New Middletown	Ohio	44442			5		0.39	ND	1622
BFI-44		9320 S. State Line Road	New Middletown	Ohio	44442			6		0.31	ND	1314
BFI-45		9370 Felger Road	New Middletown	Ohio	44442			13		0.42	ND	670
BFI-47	OUTSIDE	9491 Rapp Road	New Middletown	Ohio	44442			280		0.22	ND	331
BFI-48	INSIDE	9491 Rapp Road	New Middletown	Ohio	44442			35		0.23	ND	721
BFI-50		9494 Felger Road	New Middletown	Ohio	44442			12		0.22	ND	500

May 4, 2004

ID	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-01	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	23		10
BFI-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		120
BFI-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4		190
BFI-05	ND	ND	ND	1359	ND	188	ND	ND	ND	ND	19		10
BFI-06	ND	ND	25	ND	ND	ND	ND	ND	ND	ND	28		90
BFI-07	ND	ND	285	ND	ND	ND	ND	ND	ND	ND	10.5		150
BFI-08	ND	ND	ND	509	ND	111	ND	24.1	ND	ND	21		10
BFI-10	ND	ND	ND	623	ND	171	ND	ND	ND	ND	21		10
BFI-11	ND	ND	31	1188	7.3	510	ND	ND	ND	ND	19		20
BFI-13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		230
BFI-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	24		10
BFI-19	ND	ND	ND	690	ND	71	ND	ND	ND	16	21		20
BFI-20	ND	ND	15	ND	ND	18	ND	ND	ND	ND	11		10
BFI-27	ND	ND	ND	3152	ND	253	ND	ND	ND	ND	11		40
BFI-28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.9		160
BFI-29	ND	ND	ND	1585	ND	189	ND	ND	ND	11	19		10
BFI-30	ND	ND	ND	132	ND	56	ND	ND	ND	ND	18		10
BFI-31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3		130
BFI-33	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13		30
BFI-34	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14		20
BFI-35	ND	ND	ND	108	ND	ND	ND	ND	ND	ND	5.4		120
BFI-36	ND	ND	85	77	ND	ND	ND	ND	ND	ND	9.2		110
BFI-37	ND	ND	31	ND	ND	38	ND	ND	ND	ND	11		ND
BFI-39	ND	ND	11	379	ND	40	ND	ND	ND	ND	10.6		90
BFI-41	ND	ND	28	ND	ND	94	ND	ND	ND	ND	16		10
BFI-42	ND	ND	17	1167	ND	201	ND	ND	ND	ND	20		30
BFI-43	ND	ND	18	1726	ND	470	ND	ND	ND	ND	46		20
BFI-44	ND	ND	14	1320	ND	265	ND	ND	ND	ND	54		20
BFI-45	ND	ND	ND	ND	ND	59	ND	ND	ND	ND	18		30
BFI-47	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3		350
BFI-48	ND	ND	13	ND	ND	112	ND	ND	ND	1061	25		10
BFI-50	ND	ND	ND	945	ND	162	ND	ND	ND	ND	17		40

May 4, 2004

ID	Nitrate EPA	COD	Ph	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	ND			414	144.1		
BFI-02	ND			364	149.8		
BFI-04	ND			531	250.7	POS	
BFI-05	ND			368	107.8		
BFI-06	1.09			811	125.5	POS	
BFI-07	ND			583	158.5		
BFI-08	ND			399	136.2		
BFI-10	ND			450	153.9		
BFI-11	ND			454	103.7		
BFI-13	ND			762	160.1		
BFI-17	2.91			472	183.2		
BFI-19	ND			406	137.9	POS	
BFI-20	3.07			339	86		
BFI-27	ND			381	96.3		
BFI-28	ND			483	82.7		
BFI-29	ND			419	117.3		
BFI-30	ND			377	106.6		
BFI-31	ND			421	88.5		
BFI-33	0.46			309	93.4		
BFI-34	0.56			317	122.7		
BFI-35	ND			438	125.9		
BFI-36	ND			440	188.1		
BFI-37	4.86			270	81.5		
BFI-39	ND			416	160.6		
BFI-41	ND			387	121		
BFI-42	ND			439	144.5		
BFI-43	ND			886	465.1		
BFI-44	ND			991	547.4		
BFI-45	ND			434	139.1		
BFI-47	ND			1124	208.3		
BFI-48	6.14			543	134.2	POS	
BFI-50	ND			436	112.4		



Sept 27, 2004

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-01		4573 Center Rd.	Lowellville	Ohio	44511	320	ND	8	629	0.244	ND
BFI-03		4911 Miller Road	Lowellville	Ohio	44436	470	ND	45	674	0.975	ND
BFI-04		4921 Arrel Road	Lowellville	Ohio	44436	510	ND	22	779	1.35	ND
BFI-05		4969 Center Road	Lowellville	Ohio	44436	270	ND	7	562	0.241	ND
BFI-06		4983A Center Road	Lowellville	Ohio	44436	400	ND	91	993	0.655	ND
BFI-07		4983B Center Road	Lowellville	Ohio	44436	310	ND	210	1263	0.248	ND
BFI-08		5005 Center Road	Lowellville	Ohio	44436	260	ND	12	612	0.257	ND
BFI-10		5027 Miller Road	Lowellville	Ohio	44436	260	ND	31	667	0.277	ND
BFI-11		9624 Rapp Road	Middletown	Ohio	44442	230	ND	40	700	0.133	ND
BFI-13		5076 Poland Center	Lowellville	Ohio	44436	320	ND	165	1185	0.358	ND
BFI-17		5110 Miller Road	Lowellville	Ohio	44436	250	0.0241	52	782	0.283	ND
BFI-19		5425 Arrel Road	Lowellville	Ohio	44436	270	ND	32	602	0.158	ND
BFI-20		5724 Arrel Road	Lowellville	Ohio	44436	170	ND	5	523	0.113	ND
BFI-26		6349 Center Road	Lowellville	Ohio	44436	270	ND	47	635	0.362	ND
BFI-27		6495 Lowellville Road	Lowellville	Ohio	44436	270	ND	35	585	0.285	ND
BFI-28		6670 Stymie Road	Lowellville	Ohio	44436	410	ND	27	727	0.589	ND
BFI-29		9612 Struthers Road	Middletown	Ohio	44442	250	ND	33	629	0.149	ND
BFI-31		6815 Stymie Road	Lowellville	Ohio	44436	400	ND	21	665	0.607	ND
BFI-33		6839 Stymie Road	Lowellville	Ohio	44436	260	ND	17	512	0.373	ND
BFI-34		6850 Stymie Road	Lowellville	Ohio	44436	410	ND	21	665	0.556	ND
BFI-35		6931 Stymie Road	Lowellville	Ohio	44436	370	ND	16	604	0.413	ND
BFI-36		7660 Moore Road	Lowellville	Ohio	44436	460	ND	3	648	1.01	ND
BFI-37		7965 Struthers Road	Poland	Ohio	44514	460	ND	12	435	0.175	ND
BFI-39		8915 Struthers Road	Middletown	Ohio	44442	370	ND	6	523	1.09	ND
BFI-41		9191 Struthers Road	Middletown	Ohio	44442	260	ND	7	597	0.143	ND
BFI-42		9572 State Line Rd	Middletown	Ohio	44436	380	0.118	11	671	0.235	ND
BFI-43		9315 Felger Road	Middletown	Ohio	44442	450	ND	16	1360	0.12	ND
BFI-44		9320 S. State Line Road	Middletown	Ohio	44442	470	ND	22	1560	0.151	ND
BFI-45		9370 Felger Road	Middletown	Ohio	44442	300	ND	15	655	0.278	ND
BFI-47	OUTSIDE	9491 Rapp Road	Middletown	Ohio	44442	340	0.0565	49	876	0.161	ND

Sept 27, 2004

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-48	INSIDE	9491 Rapp Road	Middletown	Ohio	44442	340	0.0565	49	876	0.161	ND
BFI-50		9494 Felger Road	Middletown	Ohio	44442	300	ND	16	658	0.261	ND

Sept 27, 2004

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium
BFI-01	451	ND	ND	14	142	ND	11	ND	ND	ND	30	25	3.52
BFI-03	330	ND	ND	38	53	ND	ND	ND	ND	ND	ND	3.94	4.94
BFI-04	220	ND	ND	ND	28	ND	ND	ND	ND	ND	ND	0.94	1.83
BFI-05	357	ND	ND	ND	1391	ND	205	ND	ND	ND	ND	20	2.21
BFI-06	341	ND	ND	66	26	ND	10	ND	ND	ND	ND	14	2.32
BFI-07	495	ND	ND	18	36	ND	ND	ND	ND	ND	ND	25	1.92
BFI-08	429	ND	ND	84	305	ND	140	ND	ND	ND	11	20	1.59
BFI-10	660	ND	ND	19	633	ND	160	ND	ND	ND	ND	20	1.26
BFI-11	489	ND	ND	49	98	ND	930	ND	ND	ND	274	20	1.31
BFI-13	ND	ND	ND	11	21	ND	ND	ND	ND	ND	ND	ND	0.28
BFI-17	627	ND	ND	ND	28	ND	ND	ND	ND	ND	21	23	1.25
BFI-19	407	ND	ND	ND	574	ND	70	ND	ND	ND	ND	19	2.95
BFI-20	489	ND	ND	15	44	ND	12	ND	ND	ND	26	11	1.42
BFI-26	ND	ND	ND	20	71	ND	ND	ND	ND	ND	ND	ND	0.38
BFI-27	346	ND	ND	ND	3207	ND	264	ND	ND	ND	12	10	1.91
BFI-28	22	ND	ND	ND	32	ND	ND	ND	ND	ND	ND	0.79	2.7
BFI-29	720	ND	ND	88	2628	10.7	186	ND	ND	ND	42	15	1.7
BFI-31	192	ND	ND	ND	81	ND	ND	ND	ND	ND	ND	3.34	4.05
BFI-33	275	ND	ND	23	113	ND	ND	ND	ND	ND	42	11	3.7
BFI-34	324	ND	ND	ND	158	ND	ND	ND	ND	ND	ND	6.23	5.02
BFI-35	434	ND	ND	ND	114	ND	15	ND	ND	ND	12	11	6.95
BFI-36	368	ND	ND	11	121	ND	12	ND	ND	ND	ND	9	4.24
BFI-37	341	ND	ND	35	36	ND	58	ND	ND	ND	13	11	0.97
BFI-39	330	ND	ND	43	403	ND	45	ND	ND	ND	ND	9	2.32
BFI-41	363	ND	ND	12	45	ND	165	ND	ND	ND	ND	16	1.36
BFI-42	396	ND	ND	24	975	ND	220	ND	ND	ND	ND	19	2.82
BFI-43	1480	ND	ND	13	1642	ND	528	ND	ND	ND	ND	46	2.98
BFI-44	1426	ND	ND	ND	1371	ND	341	ND	ND	ND	33	53	4.14
BFI-45	539	ND	ND	ND	775	ND	66	ND	ND	ND	29	16	4.82
BFI-47	731	ND	ND	17	47	ND	384	ND	ND	ND	2160	22	4.46

Sept 27, 2004

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium
BFI-48	731	ND	ND	17	47	0.161	384	ND	ND	ND	2160	22	4.46
BFI-50	632	ND	ND	15	926	ND	186	ND	ND	ND	25	17	2.94

Sept 27, 2004

ID	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	20	ND	ND	8.38	471	80	POS	0.14
BFI-03	50	ND	1.79	9.55	452	128	NEG	0.17
BFI-04	180	ND	ND	9.01	522	176.9	NEG	0.3
BFI-05	10	ND	ND	8.23	315	50.6	POS	2.04
BFI-06	130	ND	ND	8.13	663	151	NEG	0.15
BFI-07	80	2.29	ND	7.7	845	68	POS	0.28
BFI-08	10	ND	ND	8.08	408	71.6	NEG	0.07
BFI-10	10	ND	ND	8.52	446	32	POS	1.06
BFI-11	20	ND	6.26	8.44	467	76	NEG	0.16
BFI-13	250	ND	ND	7.78	796	165	NEG	0.51
BFI-17	20	ND	ND	8.5	522	55	POS	0.12
BFI-19	20	ND	4.028	8.61	403	37.8	NEG	1.16
BFI-20	10	3.52	ND	8.65	350	43	POS	0.18
BFI-26	130	ND	ND	8.16	424	67.5	POS	0.57
BFI-27	40	ND	ND	8.35	391	50.6	NEG	1.47
BFI-28	150	ND	ND	8.58	486	158	NEG	0.51
BFI-29	10	ND	ND	8.55	420	47	NEG	2.43
BFI-31	130	ND	ND	8.56	445	133	POS	0.35
BFI-33	40	ND	ND	8.36	342	50.2	POS	0.28
BFI-34	110	ND	ND	8.36	446	129.6	POS	0.18
BFI-35	70	0.611	ND	8.2	404	24.2	POS	0.2
BFI-36	100	ND	ND	8.93	433	48	NEG	1.13
BFI-37	10	6.84	ND	8.31	291	30	POS	0.25
BFI-39	80	ND	ND	8.72	417	72	NEG	0.6
BFI-41	10	ND	ND	8.61	399	38.7	NEG	0.13
BFI-42	30	ND	ND	8.19	448	34.9	POS	0.81
BFI-43	20	ND	ND	7.96	910	374.9	NEG	0.92
BFI-44	20	ND	ND	7.86	1042	536.7	NEG	0.4
BFI-45	30	ND	ND	8.47	438	60	POS	2.02
BFI-47	20	8.31	ND	8.78	585	85.6	NEG	0.41

Sept 27, 2004

ID	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-48	20	8.31	ND	8.78	585	85.6	NEG	0.41
BFI-50	40	ND	33.12	8.54	440	45.7	NEG	1.46

July 12, 2005

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic	Barium
BFI-01		4573 Center Road	Lowellville	Ohio	44436	500	ND	9	616	0.238	ND	622
BFI-02		4911 Arrel Road	Lowellville	Ohio	44436	340	ND	32	552	0.211	ND	368
BFI-04		4921 Arrel Road	Lowellville	Ohio	44436	860	0.301	6	787	0.872	ND	493
BFI-05		4969 Center Road	Lowellville	Ohio	44436	480	0.101	11	547	0.219	ND	633
BFI-06		4983 A Center Road	Lowellville	Ohio	44436	590	0.122	20	1053	0.339	ND	742
BFI-07		4983 B Center Road	Lowellville	Ohio	44436	490	ND	135	1082	0.209	ND	959
BFI-08	Rental Unit	5005 Center Rd.	Lowellville	Ohio	44436	520	ND	11	594	0.212	ND	861
BFI-10		5027 Miller Road	Lowellville	Ohio	44436	580	ND	32	667	0.22	ND	1496
BFI-11		9624 Rapp Road	New Middletown	Ohio	44442	420	ND	51	692	0.129	ND	1033
BFI-13		5076 Poland Center	Lowellville	Ohio	44436	670	ND	100	922	0.39	ND	140
BFI-17		5110 Miller Road	Lowellville	Ohio	44436	540	ND	45	764	0.261	ND	1075
BFI-19		5425 Arrel Road	Lowellville	Ohio	44436	550	0.181	26	602	0.183	ND	970
BFI-20		5724 Arrel Road	Lowellville	Ohio	44436	340	ND	34	541	0.189	ND	918
BFI-22		6334 East Calla Rd	New Middletown	Ohio	44442	430	ND	25	708	0.193	ND	498
BFI-26		6349 Center Road	Lowellville	Ohio	44436	480	ND	40	581	0.163	ND	135
BFI-27		6495 S-Lowellville Road	Lowellville	Ohio	44436	440	ND	140	991	0.13	ND	711
BFI-28		6670 Stymie Road	Lowellville	Ohio	44436	660	0.409	28	688	0.284	ND	322
BFI-29		9612 Struthers Road	New Middletown	Ohio	44442	620	ND	46	806	0.171	ND	477
BFI-30		6729 Stymie Road	Lowellville	Ohio	44436	380	0.0286	18	561	0.166	ND	736
BFI-31		6815 Stymie Road	Lowellville	Ohio	44436	720	0.428	22	639	0.295	ND	389
BFI-33		6839 Stymie Road	Lowellville	Ohio	44436	410	ND	17	470	0.227	ND	607
BFI-34		6850 Stymie Road	Lowellville	Ohio	44436	670	0.568	23	658	0.293	ND	529
BFI-35		6931 Stymie Road	Lowellville	Ohio	44436	610	0.521	20	624	0.254	ND	762
BFI-36		7660 Moore Road	Lowellville	Ohio	44436	690	0.519	3	640	0.609	ND	669
BFI-37		7965 Struthers Road	Poland	Ohio	44514	240	ND	14	401	0.18	ND	731
BFI-38		8095 Struthers Road	New Middletown	Ohio	44442	580	0.223	5	526	0.202	ND	638
BFI-39		8915 Struthers Road	New Middletown	Ohio	44442	560	0.257	8	579	0.488	ND	897
BFI-41		9191 Struthers Road	New Middletown	Ohio	44442	420	ND	41	582	0.167	ND	1218
BFI-42		9572 S State Line Rd.	New Middletown	Ohio	44436	490	0.225	12	651	0.207	ND	711
BFI-43		9315 Felger Road	New Middletown	Ohio	44442	800	0.168	6	1291	0.175	ND	1577

July 12, 2005

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic	Barium
BFI-44		9320 S. Stateline Road	New Middletown	Ohio	44442	420	0.224	7	1345	0.185	ND	1788
BFI-45		9370 Felger Road	New Middletown	Ohio	44442	680	0.418	13	650	0.206	ND	1007
BFI-47	Outside	9491 O-Rapp Road	New Middletown	Ohio	44442	500	ND	29	805	0.197	ND	1256
BFI-48	Inside	9491 I-Rapp Road	New Middletown	Ohio	44442	900	0.458	325	1742	1.02	ND	513
BFI-50		9494 Felger Road	New Middletown	Ohio	44442	600	0.225	14	646	0.224	ND	809
BFI-77		6495 K-Lowellville Road	Lowellville	Ohio	44436	400	ND	37	568	0.132	ND	571



July 12, 2005

ID	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium	Nitrate EPA
BFI-01	ND	ND	10	ND	ND	ND	ND	ND	ND	33.5	25.3	3.398	18.1	ND
BFI-02	ND	ND	ND	103	ND	ND	ND	ND	ND	ND	ND	0.245	132.5	ND
BFI-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.363	1.185	135.7	ND
BFI-05	ND	ND	ND	898	ND	159.5	ND	ND	ND	ND	18.2	1.78	5.6	ND
BFI-06	ND	ND	12	141	ND	14.1	ND	ND	ND	ND	17.8	2.118	100.8	ND
BFI-07	ND	ND	38	ND	ND	ND	ND	ND	ND	16.9	24	1.75	72.1	ND
BFI-08	ND	ND	ND	ND	ND	106.7	ND	ND	ND	ND	22	1.46	7.1	ND
BFI-10	ND	ND	ND	1747	ND	197.9	ND	ND	ND	10.1	23.5	1.041	9.3	ND
BFI-11	ND	ND	ND	529	ND	646.2	ND	ND	ND	ND	18.3	0.926	14.1	ND
BFI-13	ND	ND	32	ND	ND	ND	ND	ND	ND	19.2	ND	0.343	151.5	ND
BFI-17	ND	ND	ND	ND	ND	ND	ND	ND	ND	47.2	27.1	0.994	15.1	2.11
BFI-19	ND	ND	33	412	ND	63.9	ND	ND	ND	25.4	20.3	2.367	17	ND
BFI-20	ND	ND	11	ND	ND	ND	ND	ND	ND	42.8	13.1	1.307	16.9	2.56
BFI-22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.155	155	ND
BFI-26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.983	80.4	ND
BFI-27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.7	2.986	61.7	2.07
BFI-28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.802	2.436	134	ND
BFI-29	ND	ND	37	4900	7.77	ND	ND	ND	ND	52.2	ND	ND	181.6	ND
BFI-30	ND	ND	19	136	ND	53.3	ND	ND	ND	ND	19.5	2.238	8.6	ND
BFI-31	ND	ND	ND	ND	ND	11.5	ND	ND	ND	ND	3.03	3.335	81.1	ND
BFI-33	ND	ND	ND	ND	ND	ND	ND	ND	ND	21	11.7	3.19	28.8	ND
BFI-34	ND	ND	ND	ND	ND	ND	ND	ND	ND	22.2	4.727	3.818	101.9	ND
BFI-35	ND	ND	ND	ND	ND	16.6	ND	ND	ND	ND	10.5	6.451	61.3	ND
BFI-36	ND	ND	76	ND	ND	11.6	ND	ND	ND	ND	9.152	3.174	86.6	ND
BFI-37	ND	ND	32	ND	ND	ND	ND	ND	ND	10.1	11.7	0.708	5.1	6.8
BFI-38	ND	ND	43	ND	ND	ND	ND	ND	ND	36.6	1.902	1.886	93.5	ND
BFI-39	ND	ND	ND	371	ND	46.8	ND	ND	ND	ND	11	1.957	65	ND
BFI-41	ND	ND	14	ND	ND	117.3	ND	ND	ND	ND	15.3	1.1	8.9	ND
BFI-42	ND	ND	ND	745	ND	168.1	ND	ND	ND	ND	18.1	2.095	20.7	ND
BFI-43	ND	ND	ND	1066	ND	401.5	ND	ND	ND	ND	44.8	2.362	17.3	ND

July 12, 2005

ID	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium	Nitrate EPA
BFI-44	ND	ND	ND	916	ND	298.8	ND	ND	ND	34.6	45.8	3.105	23.9	ND
BFI-45	ND	ND	ND	692	ND	87.8	ND	ND	ND	72.8	13.8	4.436	20	ND
BFI-47	ND	ND	19	ND	ND	ND	ND	ND	ND	796.7	25.5	2.587	22.7	5.65
BFI-48	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.443	2.549	324.7	ND
BFI-50	ND	ND	ND	654	ND	138.1	ND	ND	ND	ND	14.9	2.01	25.4	ND
BFI-77	ND	ND	ND	4983	ND	247.3	ND	ND	ND	ND	11.7	1.669	32.5	ND

July 12, 2005

ID	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	ND	7.16	412	137.47	NEG	0.13
BFI-02	ND	7.41	370	131	NEG	0.67
BFI-04	ND	8.5	525	269	POS	0.21
BFI-05	ND	7.19	364	100.84	POS	9.01
BFI-06	ND	7.26	706	179.05	NEG	0.4
BFI-07	ND	6.89	723	124.72	POS	ND
BFI-08	11.218	7.16	397	161.35	NEG	3.52
BFI-10	ND	7.59	445	152	NEG	10.03
BFI-11	ND	6.97	464	92	NEG	0.45
BFI-13	ND	7.39	616	131.71	NEG	0.16
BFI-17	ND	7.32	510	142	NEG	0.17
BFI-19	ND	7.31	403	174	POS	0.62
BFI-20	ND	6.98	361	102	NEG	0.22
BFI-22	ND	6.89	473	178	NEG	ND
BFI-26	ND	7.26	389	89.73	POS	0.31
BFI-27	ND	6.88	664	100.02	POS	1.02
BFI-28	ND	8.35	457	146.12	NEG	0.12
BFI-29	ND	7.25	538	208	NEG	3.06
BFI-30	ND	7.22	376	96.73	NEG	0.97
BFI-31	ND	8.05	426	109.07	POS	0.4
BFI-33	ND	7.52	315	68.33	POS	0.14
BFI-34	ND	7.93	441	92.2	POS	0.64
BFI-35	ND	7.61	415	ND	NEG	0.52
BFI-36	ND	8.07	429	150.2	NEG	0.33
BFI-37	ND	6.95	268	75.3	NEG	ND
BFI-38	ND	7.65	351	130	NEG	0.13
BFI-39	ND	7.72	387	147	POS	1.71
BFI-41	ND	7.09	389	141	NEG	ND
BFI-42	ND	7.36	436	94.2	NEG	8.81
BFI-43	ND	6.99	861	410	NEG	13.77

July 12, 2005

ID	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-44	ND	6.89	899	475.8	POS	13.42
BFI-45	ND	7.24	435	98	NEG	4.06
BFI-47	ND	7.47	539	155	NEG	0.33
BFI-48	ND	8.47	1164	189	POS	0.21
BFI-50	ND	7.43	430	126	NEG	8.84
BFI-77	ND	6.88	380	76.56	NEG	40.4

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ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic	Barium
BFI-02		4911 Arrel Road	Lowellville	Ohio	44436	310	ND	34	571	0.134	ND	720
BFI-04		4921 Arrel Road	Lowellville	Ohio	44436	480	0.064	5	811	0.771	ND	770
BFI-05		4969 Center Road	Lowellville	Ohio	44436	460	0.0724	10	574	0.171	ND	1211
BFI-06		4983 A Center Road	Lowellville	Ohio	44436	800	0.217	51	947	0.568	ND	748
BFI-07		4983 B Center Road	Lowellville	Ohio	44436	490	ND	170	1113	0.167	ND	1193
BFI-08	Rental Unit	5005 Center Rd.	Lowellville	Ohio	44436	480	ND	11	654	0.185	ND	1100
BFI-10		5027 Miller Road	Lowellville	Ohio	44436	970	ND	30	690	0.205	ND	1742
BFI-11		9624 Rapp Road	New Middletown	Ohio	44442	620	ND	57	714	0.101	ND	1578
BFI-12		5050 Poland Center	Lowellville	Ohio	44436	570	ND	120	1008	0.232	ND	500
BFI-17		5110 Miller Road	Lowellville	Ohio	44436	390	ND	42	775	0.188	ND	1483
BFI-18	Outside	5296 Arrel Rd	Lowellville	OH	44436	310	ND	26	455	0.153	ND	1299
BFI-19		5425 Arrel Road	Lowellville	Ohio	44436	780	ND	28	627	0.155	ND	1382
BFI-20		5724 Arrel Road	Lowellville	Ohio	44436	580	ND	44	549	0.147	ND	1346
BFI-22		6334 East Calla Rd	New Middletown	Ohio	44442	480	ND	27	747	0.173	ND	872
BFI-26		6349 Center Road	Lowellville	Ohio	44436	470	ND	55	662	0.153	ND	1193
BFI-29		9612 Struthers Road	New Middletown	Ohio	44442	580	ND	63	745	0.145	ND	770
BFI-30		6729 Stymie Road	Lowellville	Ohio	44436	470	ND	21	585	0.152	ND	1041
BFI-31		6815 Stymie Road	Lowellville	Ohio	44436	800	ND	23	669	0.304	ND	793
BFI-33		6839 Stymie Road	Lowellville	Ohio	44436	480	ND	20	549	0.241	ND	950
BFI-34		6850 Stymie Road	Lowellville	Ohio	44436	680	ND	23	684	0.302	ND	883
BFI-35		6931 Stymie Road	Lowellville	Ohio	44436	600	0.0333	5	514	0.237	ND	1106
BFI-36		7660 Moore Road	Lowellville	Ohio	44436	480	ND	10	579	0.25	ND	1270
BFI-37		7965 Struthers Road	Poland	Ohio	44514	510	ND	41	547	0.129	ND	1240
BFI-38		8095 Struthers Road	New Middletown	Ohio	44442	570	ND	4	546	0.146	ND	933
BFI-39		8915 Struthers Road	New Middletown	Ohio	44442	360	0.275	8	645	0.67	ND	1146
BFI-40	Outside	9026 Struthers Rd	New Middletown	OH	44442	420	ND	36	607	0.122	ND	849
BFI-41		9191 Struthers Road	New Middletown	Ohio	44442	650	ND	37	608	0.15	ND	1759
BFI-43		9315 Felger Road	New Middletown	Ohio	44442	550	0.189	6	1378	0.144	ND	2300
BFI-45		9370 Felger Road	New Middletown	Ohio	44442	750	ND	11	676	0.193	ND	1447
BFI-47	Outside	9491 Rapp Road	New Middletown	Ohio	44442	590	0.522	27	884	0.118	ND	1771

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ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic	Barium
BFI-48	Inside	9491 Rapp Road	New Middletown	Ohio	44442	390	ND	340	1779	0.932	ND	888
BFI-50		9494 Felger Road	New Middletown	Ohio	44442	780	ND	14	661	0.208	ND	1329

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ID	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium	Nitrate EPA
BFI-02	ND	ND	11	334	ND	ND	ND	ND	ND	ND	ND	0.323	126	ND
BFI-04	ND	ND	ND	ND	ND	14.1	ND	ND	ND	ND	0.2	1.291	194	ND
BFI-05	ND	40	ND	1582	ND	193.1	ND	ND	ND	ND	18.6	2.118	6.2	ND
BFI-06	ND	ND	ND	83	ND	17.7	ND	ND	ND	ND	7	1.741	151	ND
BFI-07	ND	ND	17	ND	ND	25.9	ND	ND	ND	ND	21.6	1.82	72	ND
BFI-08	ND	ND	81	ND	ND	133.6	ND	ND	ND	ND	17.7	1.312	8.8	ND
BFI-10	ND	ND	ND	3737	ND	229.3	ND	ND	ND	35.7	19.2	1.122	13.5	ND
BFI-11	ND	ND	11	ND	ND	20.4	ND	ND	ND	16.2	17.8	1.111	18.8	ND
BFI-12	ND	ND	16	ND	ND	ND	ND	ND	ND	ND	ND	0.441	216	ND
BFI-17	ND	ND	ND	ND	ND	17.4	ND	ND	ND	51.4	22.6	1.139	18.9	1.28
BFI-18	ND	ND	17	3019	ND	744.4	ND	ND	ND	ND	13.5	1.978	11.2	ND
BFI-19	ND	ND	20	657	ND	74.2	ND	ND	ND	23.2	19.5	2.449	20.8	ND
BFI-20	ND	ND	20	ND	ND	31.9	ND	ND	ND	81.9	11.4	1.386	22.6	3.14
BFI-22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.393	169	ND
BFI-26	ND	ND	ND	260	ND	51	ND	ND	ND	ND	16.7	4.723	33.8	ND
BFI-29	ND	ND	82	583	8.95	ND	ND	ND	ND	ND	ND	0.17	159	ND
BFI-30	ND	ND	24	106	ND	44.4	ND	ND	ND	ND	15.2	1.967	6.4	ND
BFI-31	ND	ND	ND	ND	ND	18.1	ND	ND	ND	ND	3	3.997	133	ND
BFI-33	ND	21	26	75	ND	18.3	ND	ND	ND	ND	8.9	3.724	73.1	0.414
BFI-34	ND	ND	ND	88	ND	17.5	ND	ND	ND	57	4.6	4.265	125	ND
BFI-35	ND	ND	14	ND	ND	12.2	ND	ND	ND	ND	12.2	5.753	18.3	0.765
BFI-36	ND	ND	62	375	ND	30.3	ND	ND	ND	20	13.5	5.627	60.5	ND
BFI-37	ND	ND	43	ND	ND	28	ND	ND	ND	15.3	14.1	1.007	9.6	3.35
BFI-38	ND	ND	18	ND	ND	13.2	ND	ND	ND	ND	1.4	2.12	110	ND
BFI-39	ND	ND	ND	328	ND	48.6	ND	ND	ND	ND	8.3	2.024	96.5	ND
BFI-40	ND	21.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.168	133	ND
BFI-41	ND	ND	40	ND	ND	79.8	ND	ND	ND	ND	14.5	1.15	13	ND
BFI-43	ND	ND	11	1457	ND	450.7	ND	ND	ND	ND	43.1	2.516	23.1	ND
BFI-45	ND	ND	ND	631	ND	72.6	ND	ND	ND	ND	16.7	4.538	32.1	ND
BFI-47	ND	21.5	20	63	ND	21.8	ND	ND	ND	946.6	27.8	2.246	13.2	1.91

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ID	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium	Nitrate EPA
BFI-48	ND	ND	ND	75	ND	16	ND	ND	ND	ND	1.4	3.112	395	ND
BFI-50	ND	ND	ND	1279	ND	164.1	ND	ND	ND	ND	16.6	2.683	43.9	ND



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ID	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-02	ND	7.59	382	132	NEG	1.89
BFI-04	ND	8.84	542	235	NEG	0.25
BFI-05	ND	8.11	384	91	POS	10.06
BFI-06	ND	8.07	635	217	POS	0.17
BFI-07	ND	7.25	740	174	NEG	0.12
BFI-08	ND	7.74	437	162	NEG	0.15
BFI-10	ND	7.62	461	137	NEG	28.3
BFI-11	ND	6.89	478	132	NEG	0.2
BFI-12	ND	7.78	673	209	NEG	0.12
BFI-17	ND	7.42	518	217	POS	0.1
BFI-18	ND	7.2	304	65	NEG	26.8
BFI-19	ND	7.61	419	112	NEG	4.01
BFI-20	ND	7.37	368	106	NEG	0.12
BFI-22	ND	7.22	499	179.46	NEG	ND
BFI-26	ND	7.61	444	128	POS	2.04
BFI-29	ND	7.43	498	155.17	NEG	8.06
BFI-30	ND	7.79	389	128	NEG	0.6
BFI-31	ND	8.34	449	121	POS	0.33
BFI-33	ND	7.96	365	93	NEG	0.28
BFI-34	ND	8.3	458	118	NEG	0.25
BFI-35	ND	7.72	343	85	NEG	0.18
BFI-36	ND	7.71	386	135	NEG	4.14
BFI-37	ND	7.39	367	88.49	NEG	0.1
BFI-38	ND	8.05	360	159.29	NEG	ND
BFI-39	ND	8.3	431	149.82	NEG	0.46
BFI-40	ND	7.1	406	118.95	NEG	0.25
BFI-41	ND	7.42	407	116.48	NEG	0.13
BFI-43	ND	7.45	924	506	NEG	24.9
BFI-45	ND	7.53	451	125	NEG	5.07
BFI-47	ND	7.56	587	226	POS	0.49

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ID	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-48	ND	8.7	1189	255	NEG	0.23
BFI-50	ND	7.55	444	157	NEG	9.67

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ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-02	Outside	4911 Arrel Road	Lowellville	Ohio	44436	170	0.0205	32	543	0.362	<5
BFI-04	Kitchen	4921 Arrel Road	Lowellville	Ohio	44436	370	<0.02	8	741	1.7	<5
BFI-05	Outside	4969 Center Road	Lowellville	Ohio	44436	220	0.0847	9	564	0.285	<5
BFI-06	Kitchen	4983A Center Road	Lowellville	Ohio	44436	240	0.0415	200	1208	0.267	<5
BFI-07	Outside	4983B Center Road	Lowellville	Ohio	44436	230	0.0507	200	1215	0.629	<5
BFI-08	Rental Unit-Outside	5005 Center Rd.	Lowellville	Ohio	44436	280	0.0361	8	593	0.314	<5
BFI-10	Outside	5027 Miller Road	Lowellville	Ohio	44436	240	<0.02	32	652	0.247	<5
BFI-11	Barn	9624 Rapp Road	New Middletown	Ohio	44442	220	0.0779	66	717	0.147	<5
BFI-13	Outside	5076 Poland Center				310	<0.02	120	943	0.957	<5
BFI-14	Basment	5084 Arrel Rd				160	0.0495	9	452	0.252	<5
BFI-17	Outside	5110 Miller Road	Lowellville	Ohio	44436	240	<0.02	45	746	0.283	<5
BFI-18	Outside	5296 Arrel Rd	Lowellville	OH	44436	150	0.157	22	437	0.211	<5
BFI-19	Outside	5425 Arrel Road	Lowellville	Ohio	44436	240	0.707	27	610	0.193	<5
BFI-20	Outside	5724 Arrel Road	Lowellville	Ohio	44436	160	0.0382	36	533	0.22	<5
BFI-21	Outside	9746 Felger	New Middletown		44442	310	0.212	5	637	0.362	<5
BFI-22	Outside	6334 East Calla Rd	New Middletown	Ohio	44442	210	<0.02	26	702	0.362	<5
BFI-26	Basement	6349 Center Road	Lowellville	Ohio	44436	200	0.198	47	597	0.278	<5
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	290	0.428	27	648	0.563	<5
BFI-29	Outside	9612 Struthers Road	New Middletown	Ohio	44442	230	<0.02	71	702	0.211	<5
BFI-30	Outside	6729 Stymie Road	Lowellville	Ohio	44436	190	<0.02	21	658	0.292	<5
BFI-31	Outside	6815 Stymie Road	Lowellville	Ohio	44436	310	0.116	23	636	0.708	<5
BFI-33	Garage	6839 Stymie Road	Lowellville	Ohio	44436	190	<0.02	21	458	0.388	<5
BFI-34	Outside	6850 Stymie Rd	Lowellville		44436	310	0.357	23	645	0.64	<5
BFI-35		6931 Stymie Road	Lowellville	Ohio	44436	280	0.12	22	592	0.508	<5
BFI-36	Outside	7660 Moore Road	Lowellville	Ohio	44436	100	<0.02	2	570	0.64	<5
BFI-37	Outside	7965 Struthers Road	Poland	Ohio	44514	130	<0.02	20	469	0.187	<5
BFI-38	Kitchen	8095 Struthers Road	New Middletown	Ohio	44442	270	<0.02	3	526	0.239	<5
BFI-39	Outside	8915 Struthers Road	New Middletown	Ohio	44442	280	0.125	8	606	1.27	<5
BFI-40	Outside	9026 Struthers Rd	New Middletown	OH	44442	180	<0.02	41	606	0.173	<5
BFI-41	Outside	9191 Struthers Road	New Middletown	Ohio	44442	210	<0.02	41	582	0.193	<5
BFI-42	Basement	9572 S State Line Rd	New Middletown	Ohio	44436	290	0.154	10	643	0.402	<5

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ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-43	Outside	9315 Felger Road	New Middletown	Ohio	44442	360	0.108	8	1271	0.215	<5
BFI-44	Outside	9320 S. Stateline Road	New Middletown	Ohio	44442	370	0.159	19	1326	0.218	<5
BFI-45	Outside	9370 Felger Road	New Middletown	Ohio	44442	310	0.264	13	642	0.379	<5
BFI-47	Outside	9491 Rapp Road	New Middletown	Ohio	44442	320	<0.02	20	856	0.219	<5
BFI-48	Inside-Kitchen	9491 Rapp Road	New Middletown	Ohio	44442	490	0.166	350	1750	2.68	<5
BFI-50	Foyer	9494 Felger Road	New Middletown	Ohio	44442	340	<0.02	15	638	0.441	<5
BFI-77	Kitchen	6495 Lowellville Road	Lowellville	Ohio	44436	170	0.0446	36	571	0.227	<5

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ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-02	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	0.1	138
BFI-04	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.4	0.6	196
BFI-05	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.7	1.3	138
BFI-06	<100	<10	<20	18	<50	<5	<10	<0.20	<2	<10	<10	18.9	1.1	97.6
BFI-07	<100	<10	<20	<10	<50	<5	12.5	<0.20	<2	<10	<10	15	1.3	129.4
BFI-08	<100	<10	<20	50.7	<50	<5	109.8	<0.20	<2	<10	<10	15.1	0.91	8.2
BFI-10	154.8	<10	<20	<10	624	<5	130	<0.20	<2	<10	<10	13.6	0.68	12.1
BFI-11	<100	<10	<20	<10	662	<5	461.5	<0.20	<2	<10	<10	12.3	0.6	21.6
BFI-13	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	0.2	231.1
BFI-14	192.2	<10	<20	<10	<50	<5	268.6	<0.20	<2	<10	<10	11.2	0.6	8.8
BFI-17	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	54.1	15.9	0.7	18.6
BFI-18	171	<10	<20	<10	2441	<5	547.3	<0.20	<2	<10	<10	9.5	1.5	22.1
BFI-19	123.7	<10	<20	76.2	298	<5	54	<0.20	<2	<10	<10	12.9	1.4	22.4
BFI-20	<100	<10	<20	14	<50	<5	<10	<0.20	<2	<10	19.5	7.6	0.8	26.6
BFI-21	<100	<10	<20	<10	521	<5	168.6	<0.20	<2	<10	<10	15.5	2	21.5
BFI-22	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	175
BFI-26	<100	<10	<20	<10	77.4	<5	37.4	<0.20	<2	<10	<10	12.5	2.5	37.3
BFI-28	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	1.2	1.7	147.5
BFI-29	<100	<10	<20	50	<50	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	181.3
BFI-30	<100	<10	<20	15.3	<50	<5	32	<0.20	<2	<10	<10	11.2	1.2	5.4
BFI-31	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	1.8	1.7	145.2
BFI-33	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	64.3	8.5	1.8	40
BFI-34	163.9	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	3.7	2.5	133.4
BFI-35	170.1	<10	<20	<10	<50	<5	20.5	<0.20	<2	<10	<10	8.1	3.3	79.8
BFI-36	131.5	<10	<20	11.2	<50	<5	18.8	<0.20	<2	<10	<10	7.6	2.4	81.7
BFI-37	<100	<10	<20	14.5	<50	<5	21.2	<0.20	<2	<10	<10	8.7	0.52	7.6
BFI-38	<100	<10	<20	19.6	<50	<5	<10	<0.20	<2	<10	21.4	1.3	1.1	117
BFI-39	<100	<10	<20	<10	<50	<5	31.5	<0.20	<2	<10	<10	5.6	1	95
BFI-40	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	137
BFI-41	171.8	<10	<20	<10	<50	<5	69.4	<0.20	<2	<10	<10	10.7	0.71	13
BFI-42	<100	<10	<20	<10	1878	<5	180.6	<0.20	<2	<10	<10	14.1	1.5	34.3

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ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-43	<100	<10	<20	<10	1110	<5	410.8	<0.20	<2	<10	<10	26.5	1.5	24.5
BFI-44	<100	<10	<20	<10	990	<5	263	<0.20	<2	<10	<10	27.5	1.8	28.8
BFI-45	<100	<10	<20	<10	376	<5	50.2	<0.20	<2	<10	18.8	10.4	2.4	34.4
BFI-47	<100	<10	<20	30.2	<50	<5	<10	<0.20	<2	<10	512.7	18.6	2.2	16.8
BFI-48	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.4	1.4	411
BFI-50	<100	<10	<20	10	460	<5	159.3	<0.20	<2	<10	<10	12.6	1.5	48
BFI-77	<100	<10	<20	<10	2108	<5	206.4	<0.20	<2	<10	<10	7.4	0.92	44

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ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-02	<0.5	<10	7.37	361	110.72	NEG	0.26
BFI-04	<0.5	<10	8.41	491	197.98	POS	0.14
BFI-05	<0.5	<10	7.54	377	116.07	NEG	0.13
BFI-06	<0.5	<10	7.16	808	145.71	POS	<0.1
BFI-07	<0.5	10.29	7.57	813	93.43	NEG	0.12
BFI-08	<0.5	<10	7.44	396	111.96	NEG	1.35
BFI-10	<0.5	<10	7.58	436	83.73	POS	13
BFI-11	<0.5	22.65	7.27	480	76.56	POS	4.77
BFI-13	<0.5	<10	7.9	629	119.78	NEG	<0.1
BFI-14	<0.5	<10	7.66	302	52.27	NEG	2.08
BFI-17	1.6	<10	7.43	498	120.6	NEG	<0.1
BFI-18	<0.5	<10	7.23	292	49.39	POS	20.3
BFI-19	<0.5	<10	7.49	407	84.79	POS	2.66
BFI-20	4.07	<10	7.23	357	65.44	NEG	0.12
BFI-21	<0.5	<10	7.25	424	66.68	NEG	2.58
BFI-22	<0.5	<10	7.29	470	182.75	NEG	<0.1
BFI-26	<0.5	43.24	7.58	399	56.39	NEG	2.1
BFI-28	<0.5	<10	8.44	433	75.32	POS	<0.1
BFI-29	<0.5	<10	7.4	468	101.25	POS	0.42
BFI-30	<0.5	<10	7.62	379	72.03	NEG	0.53
BFI-31	<0.5	<10	8.73	423	107.02	POS	0.44
BFI-33	<0.5	<10	7.74	305	50.22	NEG	0.42
BFI-34	<0.5	<10	8.16	432	116.89	POS	0.65
BFI-35	<0.5	<10	7.71	395	80.26	NEG	0.17
BFI-36	<0.5	<10	7.67	381	39.1	NEG	0.72
BFI-37	8.42	<10	7.12	313	54.33	POS	0.1
BFI-38	<0.5	<10	8.04	351	84.79	NEG	<0.1
BFI-39	<0.5	<10	8.14	406	95.9	POS	0.77
BFI-40	<0.5	<10	7.09	397	104.96	NEG	<0.1
BFI-41	<0.5	<10	7.46	389	78.2	NEG	0.19
BFI-42	<0.5	10.29	7.51	432	86.85	NEG	21.2

Aug 23, 2006

ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-43	<0.5	<10	7.34	850	436.3	NEG	14.66
BFI-44	<0.5	<10	7.21	888	456.05	NEG	2.72
BFI-45	<0.5	<10	7.43	428	69.56	POS	4.26
BFI-47	12.92	<10	7.43	572	148.59	POS	<0.1
BFI-48	<0.5	<10	8.61	1171	239.55	NEG	<0.1
BFI-50	<0.5	<10	7.6	427	108.25	POS	4.54
BFI-77	<0.5	<10	7.21	383	53.92	NEG	30.9



Nov 1, 2006

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-02	Outside	4911 Arrel Road	Lowellville	Ohio	44436	180	<0.02	37.5	555	0.217	<5
BFI-04	Kitchen	4921 Arrel Road	Lowellville	Ohio	44436	300	<0.02	7.5	736	1.45	<5
BFI-05	Outside	4969 Center Road	Lowellville	Ohio	44436	260	<0.02	12.5	549	0.314	<5
BFI-06	Kitchen	4983A Center Road	Lowellville	Ohio	44436	380	0.137	72.5	943	1.28	<5
BFI-07	Outside	4983B Center Road	Lowellville	Ohio	44436	250	<0.02	280	1358	0.271	<5
BFI-08	Rental Unit-Outside	5005 Center Rd.	Lowellville	Ohio	44436	260	<0.02	7.5	597	0.348	<5
BFI-10	Outside	5027 Miller Road	Lowellville	Ohio	44436	230	<0.02	35	659	0.264	<5
BFI-11	Barn	9624 Rapp Road	New Middletown	Ohio	44442	210	<0.02	70	728	0.162	<5
BFI-13	Outside	5076 Poland Center	Lowellville	Ohio	44436	260	<0.02	240	1304	0.345	<5
BFI-15	Outside	5091 Center Rd	Lowellville	Ohio	44436	270	<0.02	80	854	0.427	<5
BFI-17	Outside	5110 Miller Road	Lowellville	Ohio	44436	250	<0.02	70	809	0.306	<5
BFI-18	Outside	5296 Arrel Rd	Lowellville	OH	44436	210	0.105	40	587	0.172	<5
BFI-19	Outside	5425 Arrel Road	Lowellville	Ohio	44436	250	<0.02	30	615	0.226	<5
BFI-20	Outside	5724 Arrel Road	Lowellville	Ohio	44436	160	<0.02	40	536	0.171	<5
BFI-21	Outside	9746 Felger	New Middletown	Ohio	44442	340	<0.02	8	660	0.348	<5
BFI-22	Outside	6334 East Calla Rd	New Middletown	Ohio	44442	220	<0.02	25	711	0.326	<5
BFI-26	Basement	6349 Center Road	Lowellville	Ohio	44436	230	<0.02	52.5	618	0.281	<5
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	310	0.341	27.5	661	0.545	<5
BFI-29	Outside	9612 Struthers Road	New Middletown	Ohio	44442	280	<0.02	60	683	0.185	<5
BFI-30	Outside	6729 Stymie Road	Lowellville	Ohio	44436	210	<0.02	20	564	0.294	<5
BFI-31	Outside	6815 Stymie Road	Lowellville	Ohio	44436	340	<0.02	25	665	0.646	<5
BFI-33	Garage	6839 Stymie Road	Lowellville	Ohio	44436	190	<0.02	17.5	464	0.385	<5
BFI-34	Outside	6850 Stymie Road	Lowellville	Ohio	44436	320	<0.02	25	660	0.57	<5
BFI-35		6931 Stymie Road	Lowellville	Ohio	44436	270	<0.02	8	492	0.415	<5
BFI-36	Outside	7660 Moore Road	Lowellville	Ohio	44436	190	<0.02	7	563	0.527	<5
BFI-37	Outside	7965 Struthers Road	Poland	Ohio	44514	160	<0.02	25	497	0.203	<5
BFI-38	Kitchen	8095 Struthers Road	New Middletown	Ohio	44442	280	0.182	7.5	531	0.25	<5
BFI-39	Outside	8915 Struthers Road	New Middletown	Ohio	44442	290	0.233	7.5	614	1.22	<5
BFI-40	Outside	9026 Struthers Rd	New Middletown	OH	44442	190	<0.02	40	620	0.169	<5
BFI-41	Outside	9191 Struthers Road	New Middletown	Ohio	44442	180	<0.02	40	593	0.182	<5
BFI-42	Basement	9572 S State Line Rd	New Middletown	Ohio	44436	170	0.0205	32	543	0.362	<5

Nov 1, 2006

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-43	Outside	9315 Felger Road	New Middletown	Ohio	44442	360	0.0436	18	1280	0.228	<5
BFI-44	Outside	9320 S. Stateline Road	New Middletown	Ohio	44442	260	0.126	10	1323	0.242	<5
BFI-47	Outside	9491 Rapp Road	New Middletown	Ohio	44442	310	0.291	400	1762	2.16	<5
BFI-50	Foyer	9494 Felger Road	New Middletown	Ohio	44442	290	<0.02	15	645	0.403	<5
BFI-77	Kitchen	6495 Lowellville Road	Lowellville	Ohio	44436	120	<0.02	37.5	580	0.252	<5

Nov 1, 2006

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium	Nitrate EPA
BFI-02	<100	<10	<20	<10	86	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	98.2	<0.5
BFI-04	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	146.7	<0.5
BFI-05	<100	<10	<20	<10	<50	<5	158.8	<0.20	<2	<10	<10	13.5	1.2	4	<0.5
BFI-06	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	7.2	1	140.3	<0.5
BFI-07	<100	<10	<20	26.1	<50	<5	<10	<0.20	<2	<10	<10	20	1	85.2	1.86
BFI-08	<100	<10	<20	<10	<50	<5	107.3	<0.20	<2	<10	<10	14.9	<0.1	7.3	<0.5
BFI-10	148.4	<10	<20	52.5	<50	<5	84.4	<0.20	<2	<10	<10	13.9	<0.1	11	<0.5
BFI-11	<100	<10	<20	<10	<50	<5	310.6	<0.20	<2	<10	<10	13.8	<0.1	19.1	<0.5
BFI-13	<100	<10	<20	15	<50	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	246	<0.5
BFI-15	<100	<10	<20	<10	<50	<5	14.3	<0.20	<2	<10	<10	15.6	1.5	44.3	<0.5
BFI-17	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	25.9	17.8	<0.1	14.7	<0.5
BFI-18	131	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	10.6	<0.1	17.3	<0.5
BFI-19	120.7	<10	<20	13.4	<50	<5	57.6	<0.20	<2	<10	<10	14	1.4	16.8	<0.5
BFI-20	<100	<10	<20	10	<50	<5	<10	<0.20	<2	<10	<10	8.5	<0.1	15.8	3.46
BFI-21	<100	<10	<20	<10	<50	<5	162.6	<0.20	<2	<10	16.6	16.4	1.9	15.6	<0.5
BFI-22	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	129.9	<0.5
BFI-26	<100	<10	<20	<10	<50	<5	28.9	<0.20	<2	<10	<10	11.5	2.5	30.4	<0.5
BFI-28	<100	<10	<20	67.8	<50	<5	<10	<0.20	<2	<10	<10	1.2	1.6	107.9	<0.5
BFI-29	<100	<10	<20	16.9	53	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	123.7	<0.5
BFI-30	<100	<10	<20	<10	<50	<5	37.4	<0.20	<2	<10	<10	12.9	1.3	5	<0.5
BFI-31	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	1.8	1.7	117.2	<0.5
BFI-33	<100	<10	<20	<10	<50	<5	13	<0.20	<2	<10	<10	8.5	1.7	26.9	<0.5
BFI-34	138.3	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	3.4	2.2	105.9	<0.5
BFI-35	150.3	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	9.4	3.3	31.9	<0.5
BFI-36	146.5	<10	<20	16.9	<50	<5	15.5	<0.20	<2	<10	<10	8.5	2.6	56.8	<0.5
BFI-37	<100	<10	<20	19.3	<50	<5	40.5	<0.20	<2	<10	<10	9.6	<0.1	7	7.63
BFI-38	<100	<10	<20	13.3	<50	<5	<10	<0.20	<2	<10	<10	1.3	1	97.4	<0.5
BFI-39	<100	<10	<20	<10	<50	<5	31.7	<0.20	<2	<10	<10	6	1	70.5	<0.5
BFI-40	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	109.8	<0.5
BFI-41	166	<10	<20	17.6	<50	<5	70.1	<0.20	<2	<10	<10	11	<0.1	11.1	<0.5
BFI-42	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	0.1	138	<0.5

Nov 1, 2006

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium	Nitrate EPA
BFI-43	<100	<10	<20	<10	<50	<5	398.4	<0.20	<2	<10	<10	29.7	1.5	20.4	<0.5
BFI-44	<100	<10	<20	<10	<50	<5	258.7	<0.20	<2	<10	<10	30.8	1.9	20	<0.5
BFI-47	<100	<10	<20	<10	56	<5	<10	<0.20	<2	<10	<10	<0.1	1.3	356.8	<0.5
BFI-50	<100	<10	<20	<10	<50	<5	107.3	<0.20	<2	<10	<10	12	1.4	35.8	<0.5
BFI-77	<100	<10	<20	<10	<50	<5	202	<0.20	<2	<10	<10	7.8	<0.1	31.5	<0.5

Nov 1, 2006

ID	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-02	<10	7.46	371	92.61	NEG	1.42
BFI-04	<10	8.33	492	176.99	POS	0.78
BFI-05	26.765	7.55	367	95.49	POS	9.68
BFI-06	<10	8.05	631	201.27	NEG	0.11
BFI-07	<10	7.1	909	325.58	POS	<0.1
BFI-08	<10	7.45	398	111.54	NEG	2.18
BFI-10	<10	7.45	440	120.6	POS	7.26
BFI-11	<10	7.26	488	102.9	POS	4.13
BFI-13	<10	7.33	871	189.34	NEG	<0.1
BFI-15	<10	7.22	570	117.72	NEG	0.32
BFI-17	<10	7.27	540	125.13	NEG	0.52
BFI-18	28.824	7.44	391	71.62		1.43
BFI-19	<10	7.4	412	80.26	POS	6.75
BFI-20	<10	7.05	357	88.49	POS	0.45
BFI-21	<10	7.26	442	93.43	NEG	9.31
BFI-22	<10	7.32	475	146.12	NEG	0.13
BFI-26	<10	7.53	413	78.62	POS	3.46
BFI-28	<10	8.42	442	168.34		0.2
BFI-29	<10	8.49	457	140.77	NEG	0.67
BFI-30	<10	7.48	377	86.85	NEG	0.53
BFI-31	<10	8.34	444	130.89	POS	0.18
BFI-33	<10	7.74	310	61.74	NEG	0.66
BFI-34	<10	8.18	441	86.85	POS	0.26
BFI-35	<10	7.51	328	112.37	NEG	0.15
BFI-36	<10	7.65	377	137.89	NEG	1.09
BFI-37	<10	7.45	332	81.09	POS	0.26
BFI-38	12.353	8.09	355	103.31	NEG	0.23
BFI-39	<10	8.28	410	130.89	NEG	0.88
BFI-40	<10	7.26	415	131.3	NEG	0.19
BFI-41	<10	7.75	396	86.44	NEG	0.17
BFI-42	<10	7.37	361	110.72		0.26

Nov 1, 2006

ID	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-43	<10	7.37	857	438.35	POS	15.44
BFI-44	<10	7.17	886	473.34	NEG	10.16
BFI-47	<10	8.67	1177	237.9	NEG	0.14
BFI-50	<10	7.66	431	114.01	NEG	7.39
BFI-77	<10	7.15	387	67.91	NEG	28.8

April 10, 2007

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-02	Outside	4911 Arrel Road	Lowellville	Ohio	44436	260	<0.02	31	564	<0.02
BFI-04	Kitchen	4921 Arrel Road	Lowellville	Ohio	44436	520	0.258	5.5	752	1.36
BFI-05	Outside	4969 Center Road	Lowellville	Ohio	44436	300	0.279	11	558	0.113
BFI-06	Kitchen	4983 A Center Road	Lowellville	Ohio	44436	290	<0.02	225	1259	<0.02
BFI-07	Outside	4983 B Center Road	Lowellville	Ohio	44436	530	0.297	22	831	1.38
BFI-08	Outside	5005 Center Rd.	Lowellville	Ohio	44436	320	0.0732	8	599	0.139
BFI-10	Outside	5027 Miller Road	Lowellville	Ohio	44436	360	<0.02	32.5	551	<0.02
BFI-11	Barn	9624 Rapp Road	Middletown	Ohio	44442	280	<0.02	70	738	<0.02
BFI-13	Outside	5076 Poland Center	Lowellville	Ohio	44436	340	<0.02	165	1178	0.383
BFI-15	Outside	5091 Center Rd	Lowellville	Ohio	44436	320	0.0724	140	1027	0.216
BFI-17	Outside	5110 Miller Road	Lowellville	Ohio	44436	340	<0.02	50	812	0.111
BFI-18	Outside	5296 Arrel Rd	Lowellville	OH	44436	290	0.793	35.5	582	<0.02
BFI-19	Outside	5425 Arrel Road	Lowellville	Ohio	44436	320	0.183	30	616	<0.02
BFI-20	Outside	5724 Arrel Road	Lowellville	Ohio	44436	220	<0.02	37.5	554	<0.02
BFI-21	Outside	9746 Felger	Middletown	Ohio	44442	420	0.441	5	624	<0.02
BFI-22	Outside	6334 East Calla Rd	Middletown	Ohio	44442	290	<0.02	25	717	<0.02
BFI-23	Outside	5219 Arrel Rd				180	<0.02	13	409	<0.02
BFI-25	Outside	6557 Metz Rd				480	<0.02	60	633	<0.02
BFI-26	Basement	6349 Center Road	Lowellville	Ohio	44436	280	0.398	38	568	0.119
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	410	<0.02	25	650	0.309
BFI-29	Outside	9612 Struthers Road	Middletown	Ohio	44442	370	<0.02	50	656	<0.02
BFI-30	Outside	6729 Stymie Road	Lowellville	Ohio	44436	300	0.077	22.5	576	0.0818
BFI-31	Outside	6815 Stymie Road	Lowellville	Ohio	44436	390	0.514	21	646	0.557
BFI-33	Garage	6839 Stymie Road	Lowellville	Ohio	44436	270	<0.02	17.5	473	0.185
BFI-34	Outside	6850 Stymie Road	Lowellville	Ohio	44436	430	0.752	25	660	0.466
BFI-35		6931 Stymie Road	Lowellville	Ohio	44436	340	0.203	8	512	0.295
BFI-37	Outside	7965 Struthers Road	Poland	Ohio	44514	170	<0.02	12	416	<0.02
BFI-39	Outside	8915 Struthers Road	Middletown	Ohio	44442	400	0.226	7.5	388	0.867
BFI-40	Outside	9026 Struthers Rd	Middletown	OH	44442	280	<0.02	50	667	<0.02
BFI-41	Outside	9191 Struthers Road	Middletown	Ohio	44442	270	<0.02	37.5	600	<0.02

April 10, 2007

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-42	Basement	9572 State Line Rd	Middletown	Ohio	44436	390	0.351	17	658	0.195
BFI-43	Outside	9315 Felger Road	Middletown	Ohio	44442	480	0.196	5	1284	<0.02
BFI-44	Outside	9320 S. Stateline Road	Middletown	Ohio	44442	560	0.291	8	1329	0.0329
BFI-47	Outside	9491 O-Rapp Road	Middletown	Ohio	44442	370	<0.02	25	861	<0.02
BFI-48	Inside-Kitchen	9491 K-Rapp Road	Middletown	Ohio	44442	540	0.512	325	1800	<0.02
BFI-50	Foyer	9494 Felger Road	Middletown	Ohio	44442	410	0.216	17.5	655	0.248
BFI-56	Kitchen	5733 Miller Rd				350	<0.02	52.5	777	0.0818
BFI-77	Kitchen	6495 Lowellville Road	Lowellville	Ohio	44436	260	<0.02	39	584	0.0252



April 10, 2007

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-02	<5	<100	<10	<20	34.1	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-04	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.3
BFI-05	<5	<100	<10	<20	<10	744.5	<5	172.4	<0.20	<2	<10	<10	15.1
BFI-06	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	20.2	19.4
BFI-07	<5	<100	<10	<20	14.9	<50	<5	<10	<0.20	<2	<10	<10	2.8
BFI-08	<5	<100	<10	<20	12.3	<50	<5	112.3	<0.20	<2	<10	<10	15.7
BFI-10	<5	133.1	<10	<20	<10	<50	<5	78.5	<0.20	<2	<10	10.3	13.9
BFI-11	<5	<100	<10	<20	<10	<50	<5	12.1	<0.20	<2	<10	<10	14.5
BFI-13	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-15	<5	<100	<10	<20	<10	<50	<5	105.5	<0.20	<2	<10	30.8	17.3
BFI-17	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	65.2	18.6
BFI-18	<5	150	<10	<20	<10	415.7	<5	213.8	<0.20	<2	<10	<10	11
BFI-19	<5	124.4	<10	<20	105.5	<50	<5	65.1	<0.20	<2	<10	27	14.5
BFI-20	<5	<100	<10	<20	26.3	<50	<5	<10	<0.20	<2	<10	27.2	9.3
BFI-21	<5	<100	<10	<20	<10	284.7	<5	161.8	<0.20	<2	<10	<10	16.5
BFI-22	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-23	<5	101.7	<10	<20	22.2	<50	<5	64.6	<0.20	<2	<10	<10	9
BFI-25	<5	<100	<10	<20	14.8	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-26	<5	<100	<10	<20	<10	<50	<5	44.5	<0.20	<2	<10	16.9	11.6
BFI-28	<5	102.3	<10	<20	11.4	<50	<5	10.7	<0.20	<2	<10	<10	1.9
BFI-29	<5	<100	<10	<20	47.6	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-30	<5	<100	<10	<20	14	<50	<5	59.4	<0.20	<2	<10	<10	13.8
BFI-31	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	2.2
BFI-33	<5	<100	<10	<20	11	<50	<5	<10	<0.20	<2	<10	37.5	8.6
BFI-34	<5	148.4	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	23.3	3.8
BFI-35	<5	138.7	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	10.1
BFI-37	<5	<100	<10	<20	35.3	<50	<5	48.7	<0.20	<2	<10	<10	8.9
BFI-39	<5	101.7	<10	<20	15.6	<50	<5	42.8	<0.20	<2	<10	<10	7
BFI-40	<5	<100	<10	<20	20.2	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-41	<5	162.9	<10	<20	32	<50	<5	63.3	<0.20	<2	<10	<10	11.2

April 10, 2007

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-42	<5	<100	<10	<20	40.4	257.6	<5	202.8	<0.20	<2	<10	<10	14.4
BFI-43	<5	<100	<10	<20	<10	1132	<5	476.7	<0.20	<2	<10	<10	31.1
BFI-44	<5	<100	<10	<20	<10	756.5	<5	284.6	<0.20	<2	<10	12.7	31.2
BFI-47	<5	<100	<10	<20	14.7	<50	<5	<10	<0.20	<2	<10	353.1	18.8
BFI-48	<5	<100	<10	<20	14.7	<50	<5	<10	<0.20	<2	<10	<10	0.4
BFI-50	<5	<100	<10	<20	<10	160.4	<5	165.2	<0.20	<2	<10	<10	12.5
BFI-56	<5	<100	<10	<20	16.7	<50	<5	87.5	<0.20	<2	<10	<10	18.5
BFI-77	<5	<100	<10	<20	<10	1830	<5	226.2	<0.20	<2	<10	14.2	7.6

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ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-02	<0.1	111.3	<0.5	<10	7.28	377	85.2	NEG	0.66
BFI-04	0.5	150.1	<0.5	<10	8.16	501	183.99	NEG	0.38
BFI-05	3.3	34.7	<0.5	<10	7.4	373	89.73	POS	7.68
BFI-06	0.9	83.9	2.17	<10	6.95	842	111.13	NEG	0.22
BFI-07	0.9	150	<0.5	<10	8.12	553	154.76	NEG	0.32
BFI-08	0.8	7	<0.5	<10	7.22	400	121.83	NEG	3.05
BFI-10	0.6	9.3	<0.5	<10	7.44	368	43.22	POS	4.05
BFI-11	0.6	18.8	<0.5	<10	7.08	493	87.67	NEG	0.47
BFI-13	<0.1	224.5	Not Analyzed	<10	7.19	789	146.12	NEG	0.25
BFI-15	1.5	70.6	<0.5	<10	7.08	685	133.77	NEG	2.78
BFI-17	0.6	15.6	1.88	<10	7.25	541	136.65	NEG	0.3
BFI-18	1	14.7	<0.5	<10	7.34	390	92.61	NEG	7.24
BFI-19	1.3	18.5	<0.5	<10	7.11	411	74.09	NEG	0.44
BFI-20	0.8	19.4	2.39	<10	7.02	369	89.32	NEG	0.41
BFI-21	1.9	17.3	<0.5	<10	7.2	414	78.62	NEG	7.48
BFI-22	<0.1	140	<0.5	<10	7.06	482	154.35	NEG	0.28
BFI-23	0.8	13.3	0.772	<10	6.94	273	69.15	NEG	0.22
BFI-25	0.6	123.4	<0.5	<10	7.25	424	113.6	POS	0.49
BFI-26	2.3	30	<0.5	<10	7.53	378	57.21	NEG	3.92
BFI-28	1.9	112.8	<0.5	<10	8.15	434	112.78	NEG	0.24
BFI-29	<0.1	124.1	<0.5	<10	7.35	448	89.32	NEG	0.56
BFI-30	1.3	4.5	<0.5	<10	7.39	383	81.91	NEG	1.37
BFI-31	1.7	119.2	<0.5	<10	8.04	434	143.24	POS	0.41
BFI-33	1.7	27.8	<0.5	<10	7.7	316	103.31	NEG	2.51
BFI-34	2.2	109.7	<0.5	<10	7.91	440	125.54	NEG	0.39
BFI-35	3.1	28	<0.5	<10	7.48	342	68.33	NEG	0.37
BFI-37	0.5	4.4	6.08	<10	7.05	278	71.62	POS	0.36
BFI-39	1.1	70	<0.5	<10	7.86	392	115.25	NEG	0.6
BFI-40	<0.1	120.5	<0.5	<10	6.87	445	141.18	NEG	0.27
BFI-41	0.7	9.3	<0.5	<10	7.32	400	101.25	NEG	0.5

April 10, 2007

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-42	1.3	25.5	<0.5	<10	7.3	442	104.96	NEG	9.68
BFI-43	1.4	19.3	<0.5	<10	7.3	858	441.24	NEG	15.8
BFI-44	1.8	19.9	<0.5	<10	7.12	888	459.35	NEG	0.9
BFI-47	1.5	15.9	9.32	<10	7.54	576	157.64	NEG	0.43
BFI-48	1.2	318.7	<0.5	<10	8.51	1204	215.27	NEG	1.97
BFI-50	1.3	36.2	<0.5	<10	7.64	437	54.74	NEG	4.63
BFI-56	0.8	14.5	<0.5	<10	7.22	520	141.59	NEG	0.22
BFI-77	0.8	35.5	<0.5	<10	7.12	391	90.14	NEG	234

July 10, 2007

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-02	Front of House	4911 Arrel Road	Lowellville	Ohio	44436	440	<0.02	35	807	<0.02
BFI-04	Kitchen	4921 Arrel Road	Lowellville	Ohio	44436	870	<0.02	8	1115	2
BFI-05	Back of House	4969 Center Road	Lowellville	Ohio	44436	480	<0.02	11	805	<0.02
BFI-06	Kitchen	4983 A Center Road	Lowellville	Ohio	44436	510	<0.02	180	1668	<0.02
BFI-07	Back of House	4983 B Center Road	Lowellville	Ohio	44436	890	<0.02	45	1335	2
BFI-08	Rental Unit-Outside	5005 Center Rd.	Lowellville	Ohio	44436	520	<0.02	10	867	<0.02
BFI-10	Side of House	5027 Miller Road	Lowellville	Ohio	44436	510	<0.02	35	979	<0.02
BFI-11	Shed	9624 Rapp Road	New Middletown	Ohio	44442	470	<0.02	66	1063	<0.02
BFI-13	Back of House	5076 Poland Center	Lowellville	Ohio	44436	630	<0.02	110	1382	1
BFI-14	Basment	5084 Arrel Rd	Lowellville	OH	44436	460	<0.02	10	677	<0.02
BFI-15	Side of House	5091 Center Rd	Lowellville	Ohio	44436	550	<0.02	190	1672	<0.02
BFI-17	Side of House	5110 Miller Road	Lowellville	Ohio	44436	570	<0.02	51	1150	<0.02
BFI-18	Basment	5296 Arrel Rd	Lowellville	OH	44436	470	<0.02	40	578	<0.02
BFI-19	Back of house	5425 Arrel Road	Lowellville	Ohio	44436	680	<0.02	10	935	2
BFI-20	Outside	5724 Arrel Road	Lowellville	Ohio	44436	370	<0.02	41	806	<0.02
BFI-21	Back of House	9746 Felger	New Middletown	Ohio	44442	680	<0.02	4	946	<0.02
BFI-22	Front of House	6334 East Calla Rd	New Middletown	Ohio	44442	470	<0.02	22	1039	<0.02
BFI-23	Back of House	5219 Arrel Rd	Lowellville	OH	44436	340	<0.02	10	625	<0.02
BFI-25	Basement	6557 Metz Rd	New Middletown	Ohio	44442	680	1	11	909	<0.02
BFI-26	Basement	6349 Poland Center Road	Lowellville	Ohio	44436	470	<0.02	41	825	<0.02
BFI-27	Side of House	6495 Lowellville Road	Lowellville	Ohio	44436	420	<0.02	38	841	<0.02
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	610	.40	28	940	.48
BFI-29	Back of House	9612 Struthers Road	New Middletown	Ohio	44442	490	<0.02	46	609	<0.02
BFI-30	Back of House	6729 Stymie Road	Lowellville	Ohio	44436	460	<0.02	21	843	<0.02
BFI-31	Back of House	6815 Stymie Road	Lowellville	Ohio	44436	690	<0.02	24	944	1
BFI-33	Garage	6839 Stymie Road	Lowellville	Ohio	44436	470	<0.02	19	724	<0.02
BFI-34	Side of House	6850 Stymie Road	Lowellville	Ohio	44436	680	<0.02	22	968	1
BFI-35	Back of House	6931 Stymie Road	Lowellville	Ohio	44436	580	<0.02	9	764	<0.02
BFI-36	Back of House	7660 Moore Road	Lowellville	Ohio	44436	610	<0.02	10	549	1
BFI-37	Side of House	7965 Struthers Road	Poland	Ohio	44514	270	<0.02	20	634	<0.02
BFI-38	Kitchen	8095 Struthers Road	New Middletown	Ohio	44442	600	<0.02	9	507	<0.02

July 10, 2007

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-39	Back of House	8915 Struthers Road	New Middletown	Ohio	44442	640	<0.02	9	584	1
BFI-40	Front of House	9026 Struthers Rd	New Middletown	OH	44442	600	<0.02	47	616	<0.02
BFI-41	Back of House	9191 Struthers Road	New Middletown	Ohio	44442	450	<0.02	40	578	<0.02
BFI-42	Basement	9572 S State Line Rd	New Middletown	Ohio	44436	610	<0.02	15	949	<0.02
BFI-43	Front of House	9315 Felger Road	New Middletown	Ohio	44442	780	<0.02	7	1742	<0.02
BFI-44	Back of House	9320 S. Stateline Road	New Middletown	Ohio	44442	790	<0.02	10	1784	<0.02
BFI-47	Front Yard	9491 F-Rapp Road	New Middletown	Ohio	44442	670	<0.02	20	1216	<0.02
BFI-48	Inside-Kitchen	9491 K-Rapp Road	New Middletown	Ohio	44442	890	<0.02	380	2630	2
BFI-50	Foyer	9494 Felger Road	New Middletown	Ohio	44442	670	<0.02	14	934	<0.02
BFI-52	Garage	9147 Struthers Rd				480	<0.02	76	781	<0.02

July 10, 2007

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-02	Not Analyzed	<100	<10	<20	23	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	<0.1
BFI-04	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	<0.1
BFI-05	Not Analyzed	<100	<10	<20	<10	1487	Not Analyzed	207	<0.20	Not Analyzed	<10	<10	16
BFI-06	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	20
BFI-07	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	6
BFI-08	Not Analyzed	<100	<10	<20	<10	246	Not Analyzed	141	<0.20	Not Analyzed	<10	<10	16
BFI-10	Not Analyzed	164	<10	<20	41	603	Not Analyzed	79	<0.20	Not Analyzed	<10	<10	15
BFI-11	Not Analyzed	102	<10	<20	<10	<50	Not Analyzed	39	<0.20	Not Analyzed	<10	<10	15
BFI-13	Not Analyzed	<100	<10	<20	21	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	<0.1
BFI-14	Not Analyzed	197	<10	<20	<10	119	Not Analyzed	312	<0.20	Not Analyzed	<10	12	11
BFI-15	Not Analyzed	<100	<10	<20	<10	752	Not Analyzed	152	<0.20	Not Analyzed	<10	<10	19
BFI-17	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	77	17
BFI-18	Not Analyzed	197	<10	<20	19	9298	Not Analyzed	282	<0.20	Not Analyzed	<10	<10	13
BFI-19	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	<0.1
BFI-20	Not Analyzed	<100	<10	<20	22	<50	Not Analyzed	19	<0.20	Not Analyzed	<10	<10	9
BFI-21	Not Analyzed	<100	<10	<20	<10	1381	Not Analyzed	202	<0.20	Not Analyzed	<10	<10	18
BFI-22	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	<0.1
BFI-23	Not Analyzed	139	<10	<20	<10	<50	Not Analyzed	96	<0.20	Not Analyzed	<10	<10	10
BFI-25	Not Analyzed	<100	<10	<20	<10	3860	Not Analyzed	123	<0.20	Not Analyzed	<10	<10	15
BFI-26	Not Analyzed	<100	<10	<20	<10	185	Not Analyzed	40	<0.20	Not Analyzed	<10	<10	13
BFI-27	Not Analyzed	<100	<10	<20	<10	4070	Not Analyzed	273	<0.20	Not Analyzed	<10	55	9
BFI-28	Not Analyzed	150	ND	ND	ND	ND	Not Analyzed	16	ND	Not Analyzed	ND	ND	2.2
BFI-29	Not Analyzed	204	<10	<20	<10	1416	Not Analyzed	166	<0.20	Not Analyzed	<10	<10	14
BFI-30	Not Analyzed	<100	<10	<20	65	293	Not Analyzed	28	<0.20	Not Analyzed	<10	<10	14
BFI-31	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	2
BFI-33	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	14	9
BFI-34	Not Analyzed	138	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	3
BFI-35	Not Analyzed	177	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	10
BFI-36	Not Analyzed	176	<10	<20	31	243	Not Analyzed	24	<0.20	Not Analyzed	<10	<10	10
BFI-37	Not Analyzed	<100	<10	<20	32	<50	Not Analyzed	16	<0.20	Not Analyzed	<10	<10	10
BFI-38	Not Analyzed	<100	<10	<20	16	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	1

July 10, 2007

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-39	Not Analyzed	112	<10	<20	<10	<50	Not Analyzed	45	<0.20	Not Analyzed	<10	<10	7
BFI-40	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	<0.1
BFI-41	Not Analyzed	206	<10	<20	23	<50	Not Analyzed	61	<0.20	Not Analyzed	<10	<10	13
BFI-42	Not Analyzed	<100	<10	<20	<10	2092	Not Analyzed	207	<0.20	Not Analyzed	<10	<10	15
BFI-43	Not Analyzed	<100	<10	<20	26	2316	Not Analyzed	506	<0.20	Not Analyzed	<10	<10	30
BFI-44	Not Analyzed	<100	<10	<20	51	1377	Not Analyzed	281	<0.20	Not Analyzed	<10	13	30
BFI-47	Not Analyzed	<100	<10	<20	18	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	504	18
BFI-48	Not Analyzed	<100	<10	<20	<10	<50	Not Analyzed	<10	<0.20	Not Analyzed	<10	<10	<0.1
BFI-50	Not Analyzed	108	<10	<20	<10	1372	Not Analyzed	184	<0.20	Not Analyzed	<10	10	13
BFI-52	Not Analyzed	<100	<10	<20	15	<50	Not Analyzed	306	<0.20	Not Analyzed	<10	<10	17



July 10, 2007

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-02	<0.1	118	<0.5	<10	8	533	93	NEG	1
BFI-04	1	172	<0.5	<10	8	736	244	POS	<0.1
BFI-05	1	5	<0.5	<10	7	535	99	POS	8
BFI-06	1	88	<0.5	<10	7	1109	95	NEG	<0.1
BFI-07	1	168	<0.5	<10	8	891	223	NEG	<0.1
BFI-08	1	8	<0.5	<10	7	579	115	NEG	2
BFI-10	1	11	<0.5	<10	8	646	100	NEG	7
BFI-11	1	22	<0.5	<10	7	702	100	NEG	<0.1
BFI-13	<0.1	202	<0.5	<10	8	921	141	NEG	<0.1
BFI-14	1	7	<0.5	29	8	447	192	NEG	2
BFI-15	2	81	<0.5	<10	7	1111	152	NEG	5
BFI-17	1	19	2	<10	7	755	126	POS	<0.1
BFI-18	1	14	<0.5	<10	8	382	108	NEG	14
BFI-19	<0.1	144	<0.5	<10	8	617	110	NEG	1
BFI-20	1	25	3	<10	7	532	149	NEG	<0.1
BFI-21	2	20	<0.5	<10	7	624	109	POS	9
BFI-22	<0.1	144	<0.5	<10	7	685	100	NEG	<0.1
BFI-23	1	12	<0.5	<10	7	413	189	NEG	<0.1
BFI-25	2	24	<0.5	<10	8	600	144	NEG	9
BFI-26	2	33	<0.5	<10	7	552	64	NEG	1
BFI-27	1	44	<0.5	<10	7	561	47	NEG	17
BFI-28	2.2	130	<0.5	ND	8.19	630	90	POS	.24
BFI-29	1	10	<0.5	<10	8	402	84	NEG	9
BFI-30	2	5	<0.5	<10	7	560	41	NEG	1
BFI-31	2	140	<0.5	<10	8	626	161	POS	1
BFI-33	2	34	<0.5	<10	8	481	64	NEG	1
BFI-34	2	131	<0.5	<10	8	639	184	POS	<0.1
BFI-35	4	40	<0.5	<10	8	504	130	NEG	<0.1
BFI-36	3	75	<0.5	<10	8	362	181	POS	1
BFI-37	1	7	7	<10	7	418	51	POS	<0.1
BFI-38	1	119	<0.5	<10	8	335	110	NEG	<0.1

July 10, 2007

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-39	1	88	<0.5	<10	8	385	193	NEG	1
BFI-40	<0.1	139	<0.5	<10	8	407	118	NEG	<0.1
BFI-41	1	12	<0.5	<10	8	381	90	NEG	<0.1
BFI-42	2	30	<0.5	<10	8	626	117	NEG	11
BFI-43	2	23	<0.5	<10	7	1150	349	NEG	11
BFI-44	2	23	<0.5	<10	7	1177	391	NEG	5
BFI-47	2	14	2	13	8	803	95	POS	<0.1
BFI-48	2	318	<0.5	<10	9	1736	222	NEG	<0.1
BFI-50	2	42	<0.5	<10	8	616	175	NEG	7
BFI-52	1	25	<0.5	<10	7	516	102	NEG	<0.1

Feb 4, 2008

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic	Barium	Cadmium
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	360	0.0403	40.5	454	0.502	Not Analyzed	187	<10

Feb 4, 2008

ID	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium	Nitrate EPA	COD
BFI-28	<20	14.4	<50	Not Analyzed	<10	<.20	Not Analyzed	<10	<10	2.76	3.73	143	<0.5	<10

Feb 4, 2008

ID	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-28	8.14	683	106.1928	NEG	<0.1

June 17, 2008

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-02	Front of House	4911 Arrel Rd.	Lowellville	Ohio	44436	190	<0.02	60	534	0.164	<5
BFI-04	Kitchen	4921 Arrel Rd.	Lowellville	Ohio	44436	420	0.313	6	738	1.43	<5
BFI-05	Back of House	4969 Center Rd.	Lowellville	Ohio	44436	260	0.0604	11	553	0.251	5.2
BFI-06	Kitchen	4983A Center Rd.	Lowellville	Ohio	44436	270	0.0281	240	1191	0.242	<5
BFI-07	Back of House	4983B Center Rd.	Lowellville	Ohio	44436	420	0.199	55	855	1.35	<5
BFI-08	Rental Unit-Outside	5005 Center Rd.	Lowellville	Ohio	44436	300	0.0488	10	565	0.282	<5
BFI-10	Side of House	5027 Miller Rd.	Lowellville	Ohio	44436	280	<0.02	35	796	0.21	<5
BFI-11	Shed	9624 Rapp Rd.	New Middletown	Ohio	44442	270	<0.02	58	711	0.127	<5
BFI-13	Back of House	5076 Center Rd.	Lowellville	Ohio	44436	160	0.414	60	872	0.825	<5
BFI-14	Basment	5084 Arrel Rd.	Lowellville	OH	44436	200	<0.02	10	444	0.191	<5
BFI-15	Side of House	5091 Center Rd.	Lowellville	Ohio	44436	280	0.0814	100	865	0.49	<5
BFI-17	Side of House	5110 Miller Rd.	Lowellville	Ohio	44436	280	<0.02	37	650	0.243	<5
BFI-18	Basment	5296 Arrel Rd.	Lowellville	OH	44436	250	<0.02	38	591	0.13	<5
BFI-19	Back of house	5425 Arrel Rd.	Lowellville	Ohio	44436	380	0.0281	69	616	1.3	<5
BFI-20	Outside	5724 Arrel Rd.	Lowellville	Ohio	44436	170	<0.02	40	501	0.154	<5
BFI-21	Back of House	9746 Felger Rd.	New Middletown	Ohio	44442	290	0.892	8	551	0.384	<5
BFI-22	Front of House	6334 East Calla Rd.	New Middletown	Ohio	44442	260	<0.02	27	676	0.281	<5
BFI-23	Back of House	5219 Arrel Rd.	Lowellville	OH	44436	170	<0.02	11	398	0.14	<5
BFI-25	Basement	6557 Metz Rd.	New Middletown	Ohio	44442	320	<0.02	5	607	0.238	<5
BFI-27	Side of House	6495 Lowellville Rd.	Lowellville	Ohio	44436	230	0.0533	35	548	0.198	<5
BFI-29	Back of House	9612 Struthers Rd.	New Middletown	Ohio	44442	270	<0.02	56	621	0.144	<5
BFI-30	Back of House	6729 Stymie Rd.	Lowellville	Ohio	44436	250	<0.02	19	551	0.228	<5
BFI-31	Back of House	6815 Stymie Rd.	Lowellville	Ohio	44436	90	<0.02	80	863	0.782	<5
BFI-33	Garage	6839 Stymie Rd.	Lowellville	Ohio	44436	220	<0.02	19	448	0.321	<5
BFI-34	Side of House	6850 Stymie Rd.	Lowellville	Ohio	44436	360	0.586	25	634	0.546	<5
BFI-35	Back of House	6931 Stymie Rd.	Lowellville	Ohio	44436	280	<0.02	10	492	0.368	<5
BFI-36	Back of House	7660 Moore Rd.	Lowellville	Ohio	44436	350	<0.02	7	374	0.52	<5
BFI-37	Side of House	7965 Struthers Rd.	Poland	Ohio	44514	150	<0.02	12	539	0.152	<5
BFI-38	Kitchen	8095 Struthers Rd.	New Middletown	Ohio	44442	290	<0.02	1	584	0.198	<5
BFI-39	Back of House	8915 Struthers Rd.	New Middletown	Ohio	44442	290	0.204	8	510	0.686	<5

June 17, 2008

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-40	Front of House	9026 Struthers Rd.	New Middletown	OH	44442	250	<0.02	53	649	0.121	<5
BFI-41	Back of House	9191 Struthers Rd.	New Middletown	Ohio	44442	270	<0.02	45	831	0.142	<5
BFI-43	Front of House	9315 Felger Rd.	New Middletown	Ohio	44442	390	0.172	10	1162	0.169	<5
BFI-44	Back of House	9320 S. State Line Rd.	New Middletown	Ohio	44442	470	0.195	10	1199	0.173	<5
BFI-47	Front Yard	9491 O-Rapp Rd.	New Middletown	Ohio	44442	340	<0.02	20	791	0.173	<5
BFI-48	Inside-Kitchen	9491 I-Rapp Rd.	New Middletown	Ohio	44442	400	0.629	280	1513	1.74	<5
BFI-50	Foyer	9494 Felger Rd.	New Middletown	Ohio	44442	410	0.626	110	996	0.835	<5
BFI-52	Garage	9147 Struthers Rd.				270	<0.02	80	635	0.128	<5
BFI-53		5406 Arrel Rd.	Lowellville	Ohio	44436	230	<0.02	55	629	0.177	8.3
BFI-55		6276 Metz Rd.	New Middletown	Ohio	44442	270	0.538	37	648	0.323	<5
BFI-56		5733 Miller Rd.	Lowellville	Ohio	44436	300	<0.02	54	556	0.207	<5
BFI-57		5130 Miller Rd.	Lowellville	Ohio	44436	270	0.0554	75	765	0.152	<5
BFI-58		5084 Miller Rd.	Lowellville	Ohio	44436	270	<0.02	62	713	0.25	<5
BFI-60		10337 Struthers Rd.	New Middletown	Ohio	44442	260	<0.02	35	666	0.139	<5
BFI-61		8949 Struthers Rd.	New Middletown	Ohio	44442	260	<0.02	8	499	0.295	<5

June 17, 2008

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-02	<100	<10	<20	11	<50	7.2	<10	<0.20	<2	<10	<10	<0.1	0.2	130
BFI-04	<100	<10	<20	<10	<50	6.2	<10	<0.20	<2	<10	<10	0.5	1.2	182
BFI-05	<100	<10	<20	<10	<50	5.5	<10	<0.20	<2	<10	<10	0.1	0.5	154.3
BFI-06	<100	<10	<20	<10	<50	5.2	<10	<0.20	<2	<10	18.7	27.4	1.9	104.6
BFI-07	<100	<10	<20	<10	<50	6	<10	<0.20	<2	<10	<10	6.4	1.8	207.4
BFI-08	<100	<10	<20	22.3	200.5	10	117.2	<0.20	<2	<10	<10	21.8	1.7	9.5
BFI-10	238	<10	<20	66.7	996	6.7	144.9	<0.20	<2	<10	<10	17.3	1.3	12.6
BFI-11	145.1	<10	<20	<10	330.3	5.3	526.8	<0.20	<2	<10	<10	18.7	1.2	22.3
BFI-13	<100	<10	<20	226.5	<50	6.4	<10	<0.20	<2	<10	<10	1.9	4.6	104.6
BFI-14	280.8	<10	<20	<10	520.8	10.4	229.7	<0.20	<2	<10	45.2	12.6	1	7
BFI-15	<100	<10	<20	<10	442.2	5.7	85.3	<0.20	<2	<10	<10	20.7	2.7	86.3
BFI-17	<100	<10	<20	<10	<50	5.8	10.7	<0.20	<2	<10	65	20.7	1.2	17.3
BFI-18	225	<10	<20	<10	818.1	7.3	185.7	<0.20	<2	<10	<10	12	1.8	18.1
BFI-19	<100	<10	<20	<10	<50	6.6	<10	<0.20	<2	<10	<10	0.9	1.3	149.5
BFI-20	103.4	<10	<20	29.1	<50	5.5	19	<0.20	<2	<10	23.3	10.5	1.5	20
BFI-21	233.2	<10	<20	<10	284.3	5.7	57.6	<0.20	<2	<10	<10	17.4	4.2	26.7
BFI-22	<100	<10	<20	<10	<50	5.9	<10	<0.20	<2	<10	20.5	<0.1	0.8	156.1
BFI-23	162.3	<10	<20	26.2	<50	5.8	23	<0.20	<2	<10	<10	9.7	1.6	14.7
BFI-25	<100	<10	<20	472.4	<50	<5	<10	<0.20	<2	<10	<10	0.2	1	145.7
BFI-27	124	<10	<20	<10	3046	7.1	234.2	<0.20	<2	<10	96.3	11.5	1.9	47.4
BFI-29	334.5	<10	<20	<10	1192	<5	159.1	<0.20	<2	<10	42.1	16.1	1.7	10.1
BFI-30	<100	<10	<20	20.5	<50	5.5	38.3	<0.20	<2	<10	<10	19	2.6	6.1
BFI-31	<100	<10	<20	<10	<50	9.7	<10	<0.20	<2	<10	29.4	2.2	4.5	103.8
BFI-33	144.7	<10	<20	<10	<50	6.1	<10	<0.20	<2	<10	31	12.2	3.4	34.6
BFI-34	208.7	<10	<20	<10	71.5	5.3	<10	<0.20	<2	<10	<10	4	3.8	152
BFI-35	300	<10	<20	<10	<50	5.5	10.2	<0.20	<2	<10	<10	13.5	6.2	39
BFI-36	203.6	<10	<20	76.5	<50	6.5	13.5	<0.20	<2	<10	15.8	7.3	4	92
BFI-37	<100	<10	<20	19.2	<50	5.7	<10	<0.20	<2	<10	<10	8.7	0.9	6.5
BFI-38	125.4	<10	<20	12.6	<50	5	<10	<0.20	<2	<10	24.7	4.5	2	125.3
BFI-39	192.2	<10	<20	<10	419.4	<5	45.7	<0.20	<2	<10	<10	8.7	2.3	70.6



June 17, 2008

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-40	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	0.3	142.3
BFI-41	300	<10	<20	<10	<50	5	80.8	<0.20	<2	<10	<10	13.8	1.3	12
BFI-43	<100	<10	<20	<10	1242	<5	439	<0.20	<2	<10	<10	35.8	2.6	24.7
BFI-44	<100	<10	<20	<10	1083	<5	300.5	<0.20	<2	<10	<10	37.4	3	23.9
BFI-47	<100	<10	<20	<10	<50	6.5	<10	<0.20	<2	<10	1039	29.9	2.3	11.6
BFI-48	194	<10	<20	<10	<50	5	<10	<0.20	<2	<10	<10	2.8	2.8	326.8
BFI-50	421	<10	<20	<10	<50	6	<10	<0.20	<2	<10	<10	2.6	3	217.5
BFI-52	132.4	<10	<20	<10	<50	6	272.5	<0.20	<2	<10	<10	18	1.3	29
BFI-53	181.5	<10	<20	81.8	968.7	10.5	92.8	<0.20	<2	<10	<10	22.6	2.3	19.3
BFI-55	217.8	<10	<20	<10	97	5.5	17.4	<0.20	<2	<10	<10	5.8	3	111.8
BFI-56	146	<10	<20	<10	<50	<5	156.9	<0.20	<2	<10	10.4	24.8	1.5	17.4
BFI-57	168.2	<10	<20	<10	1034	<5	173	<0.20	<2	<10	<10	18.1	1.7	19.3
BFI-58	<100	<10	<20	16.8	168	5	<10	<0.20	<2	<10	<10	23	1.1	20.2
BFI-60	121.2	<10	<20	<10	<50	<5	76.7	<0.20	<2	<10	<10	19.1	1.6	10.3
BFI-61	239.1	<10	<20	<10	788.2	<5	84.4	<0.20	<2	<10	<10	9.5	2.8	41.7

June 17, 2008

ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-02	0.556	<10	7.56	356	302.94		0.29
BFI-04	<0.5	<10	8.51	491	302.94		0.33
BFI-05	<0.5	<10	7.66	368	127.18	POS	0.38
BFI-06	1.82	<10	7.23	792	125.54		0.1
BFI-07	<0.5	<10	8.21	569	214.03		0.17
BFI-08	<0.5	<10	7.41	376	110.72		0.23
BFI-10	<0.5	<10	7.64	530	153.94		2.43
BFI-11	<0.5	<10	7.34	474	109.9		4.86
BFI-13	<0.5	<10	8.88	581	270.83		0.22
BFI-14	<0.5	<10	7.67	295	82.73	POS	4.77
BFI-15	0.547	<10	7.39	578	118.54	POS	1.08
BFI-17	2.71	<10	7.51	433	149.82		0.13
BFI-18	<0.5	<10	7.55	349	133.36		7.03
BFI-19	<0.5	<10	8.29	410	247.78		0.24
BFI-20	2.54	<10	7.23	333	83.97		<0.1
BFI-21	<0.5	<10	7.36	366	125.54		0.53
BFI-22	0.592	<10	7.23	451	178.22		0.25
BFI-23	0.662	<10	7.24	265	92.61	POS	0.17
BFI-25	<0.5	<10	7.73	404	104.96		9.1
BFI-27	<0.5	<10	7.15	365	81.5		3.12
BFI-29	<0.5	<10	7.86	446	53.1		0.82
BFI-30	<0.5	<10	7.59	367	98.78		0.71
BFI-31	0.813	<10	9.15	576	79.48		<0.1
BFI-33	<0.5	<10	7.8	298	81.91		1.21
BFI-34	<0.5	<10	8.19	422	110.31		0.59
BFI-35	<0.5	<10	7.67	378	72.44		0.11
BFI-36	<0.5	<10	7.91	249	231.73		0.97
BFI-37	6.1	<10	7.17	358	93.84		<0.1
BFI-38	<0.5	<10	8.07	389	116.89		<0.1
BFI-39	<0.5	<10	7.47	339	178.63		0.75

June 17, 2008

ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-40	<0.5	<10	7.33	434	87.67		<0.1
BFI-41	<0.5	<10	7.67	554	63.39		0.28
BFI-43	0.55	<10	7.38	773	421.48		4.11
BFI-44	0.722	<10	7.35	799	425.59		16.28
BFI-47	7.3	<10	7.09	526	160.52	POS	0.31
BFI-48	1.95	<10	8.52	1008	228.85		0.46
BFI-50	0.604	<10	8.26	663	181.93		0.32
BFI-52	1.4	<10	7.48	473	107.02		<0.1
BFI-53	<0.5	<10	7.64	453	118.13	POS	1.29
BFI-55	<0.5	<10	7.91	433	114.42		0.58
BFI-56	<0.5	<10	7.52	370	194.69	POS	0.2
BFI-57	0.514	<10	7.4	510	201.27	POS	19.71
BFI-58	1.33	<10	7.76	475	175.75		2.05
BFI-60	<0.5	<10	7.69	444	105.37	POS	<0.1
BFI-61	<0.5	<10	7.97	332	82.73	POS	5.57

Nov 3, 2008

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-01		4573 Center Road	Poland	Ohio	44514	250	<0.02	13	575	0.265	<5
BFI-02	Front of House	4911 Arrel Road	Lowellville	Ohio	44436	210	0.287	34	518	0.189	<5
BFI-03		4911 Miller Road	Lowellville	Ohio	44436	160	0.232	85	908	0.677	<5
BFI-04	Kitchen	4921 Arrel Road	Lowellville	Ohio	44436	400	<0.02	6	727	1.58	<5
BFI-05	Back of House	4969 Center Road	Lowellville	Ohio	44436	220	<0.02	13	544	0.256	<5
BFI-06	Kitchen	4983A Center Road	Lowellville	Ohio	44436	230	<0.02	170	1103	0.178	<5
BFI-07	Back of House	4983B Center Road	Lowellville	Ohio	44436	330	<0.02	111	971	0.849	<5
BFI-08	Rental Unit-Outside	5005 Center Road	Lowellville	Ohio	44436	250	<0.02	10	583	0.29	<5
BFI-10	Side of House	5027 Miller Road	Lowellville	Ohio	44436	240	<0.02	35	633	0.208	<5
BFI-11	Shed	9624 Rapp Road	New Middletown	Ohio	44442	220	<0.02	78	703	0.145	<5
BFI-13	Back of House	5076 Center Road	Lowellville	Ohio	44436	70	0.308	90	901	0.951	<5
BFI-14	Basment	5084 Arrel Road	Lowellville	OH	44436	180	<0.02	10	437	0.217	<5
BFI-15	Side of House	5091 Center Road	Lowellville	Ohio	44436	310	0.049	34	744	0.779	<5
BFI-17	Side of House	5110 Miller Road	Lowellville	Ohio	44436	250	<0.02	22	644	0.257	<5
BFI-18	Basment	5296 Arrel Road	Lowellville	OH	44436	210	<0.02	44	584	0.137	<5
BFI-19	Back of house	5425 Arrel Road	Lowellville	Ohio	44436	310	0.157	10	612	1.41	<5
BFI-20	Outside	5724 Arrel Road	Lowellville	Ohio	44436	190	<0.02	36	540	0.283	<5
BFI-21	Back of House	9746 Felger Road	New Middletown	Ohio	44442	280	0.548	8	554	0.247	<5
BFI-22	Front of House	6334 E. Calla Road	New Middletown	Ohio	44442	210	<0.02	26	666	0.233	<5
BFI-23	Back of House	5219 Arrel Road	Lowellville	OH	44436	160	<0.02	12	417	0.181	<5
BFI-25	Basement	6557 Metz Road	New Middletown	Ohio	44442	290	<0.02	7	590	0.226	<5
BFI-26	Basement	6349 Center Road	Lowellville	Ohio	44436	200	0.285	42	582	0.23	<5
BFI-27	Side of House	6495 Lowellville Road	Lowellville	Ohio	44436	200	0.0333	41	534	0.164	<5
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	290	<0.02	30	597	0.232	<5
BFI-29	Back of House	9612 Struthers Road	New Middletown	Ohio	44442	230	<0.02	60	637	0.151	<5
BFI-30	Back of House	6729 Stymie Road	Lowellville	Ohio	44436	220	<0.02	20	540	0.191	<5
BFI-31	Back of House	6815 Stymie Road	Lowellville	Ohio	44436	80	0.0898	80	913	0.641	<5
BFI-33	Garage	6839 Stymie Road	Lowellville	Ohio	44436	180	<0.02	16	439	0.342	<5
BFI-34	Side of House	6850 Stymie Road	Lowellville	Ohio	44436	320	<0.02	25	625	0.473	<5
BFI-35	Back of House	6931 Stymie Road	Lowellville	Ohio	44436	290	<0.02	17	576	0.363	<5

Nov 3, 2008

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-36	Back of House	7660 Moore Road	Lowellville	Ohio	44436	240	<0.02	4	534	0.473	<5
BFI-37	Side of House	7965 Struthers Road	Poland	Ohio	44514	160	<0.02	55	587	0.17	<5
BFI-38	Kitchen	8095 Struthers Road	New Middletown	Ohio	44442	270	<0.02	5	501	0.21	<5
BFI-39	Back of House	8915 Struthers Road	New Middletown	Ohio	44442	270	<0.02	8	522	0.618	<5
BFI-40	Front of House	9026 Struthers Road	New Middletown	OH	44442	190	<0.02	56	650	0.146	<5
BFI-41	Back of House	9191 Struthers Road	New Middletown	Ohio	44442	200	<0.02	50	586	0.144	<5
BFI-42	Basement	9572 S. State Line Road	New Middletown	Ohio	44436	270	<0.02	12	607	0.323	<5
BFI-43	Front of House	9315 Felger Road	New Middletown	Ohio	44442	330	0.143	10	614	0.149	<5
BFI-44	Back of House	9320 S. State Line Road	New Middletown	Ohio	44442	340	0.0587	10	1167	0.155	<5
BFI-47	Front Yard	9491 O-Rapp Rd.	New Middletown	Ohio	44442	300	<0.02	25	819	0.196	<5
BFI-48	Inside-Kitchen	9491 I-Rapp Rd.	New Middletown	Ohio	44442	390	0.278	31	1559	1.75	<5
BFI-50	Foyer	9494 Felger Road	New Middletown	Ohio	44442	370	<0.02	97	970	0.751	<5
BFI-52	Garage	9147 Struthers Road	New Middletown	Ohio	44442	230	0.0413	114	865	0.136	<5
BFI-53		5406 Arrel Road	Lowellville	Ohio	44436	230	<0.02	45	643	0.178	5
BFI-54		4783 Cowden Road	Poland	Ohio	44514	340	<0.02	11	683	0.868	<5
BFI-55		6276 Metz Road	New Middletown	Ohio	44442	280	0.411	35	626	0.306	<5
BFI-56		5733 Miller Road	Lowellville	Ohio	44436	250	<0.02	69	797	0.227	<5
BFI-57		5130 Miller Road	Lowellville	Ohio	44436	230	<0.02	69	770	0.144	<5
BFI-58		5084 Miller Road	Lowellville	Ohio	44436	230	<0.02	50	705	0.249	<5
BFI-59		9850 S. State Line Road	New Middletown	Ohio	44442	280	<0.02	30	711	0.24	<5
BFI-60		10337 Struthers Road	New Middletown	Ohio	44442	180	<0.02	44	690	0.132	<5
BFI-62		6738 Struthers Road	Poland	Ohio	44514	300	<0.02	80	756	0.222	<5
BFI-63	Outside	6827 E. Calla Road	New Middletown	Ohio	44442	220	<0.02	46	1129	0.259	<5
BFI-64	Kitchen	6900 E. Calla Road	New Middletown	Ohio	44442	280	0.324	15	594	0.255	<5
BFI-65	Outside	5334 Arrel Road	Lowellville	Ohio	44436	220	<0.02	60	685	0.121	<5
BFI-66	Outside	7307 Struthers Road	New Middletown	Ohio	44442	280	<0.02	11	548	0.396	<5
BFI-67	Back of House	4925 Cowden Road	Poland	Ohio	44514	270	0.708	17	546	0.299	<5

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ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-01	<100	<10	<20	10.3	451.7	<5	<10	<0.20	<2	<10	49	24.8	3.5	13.6
BFI-02	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	134.7
BFI-03	<100	<10	<20	63.7	<50	<5	<10	<0.20	<2	<10	35	5	5	104
BFI-04	<100	<10	<20	15	<50	<5	<10	<0.20	<2	<10	<10	0.6	1.2	190.5
BFI-05	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	0.6	143
BFI-06	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	24.8	2	73.6
BFI-07	144.8	<10	<20	17	393.3	<5	13.9	<0.20	<2	<10	<10	16.9	2.2	143.5
BFI-08	<100	<10	<20	<10	241.3	<5	145.1	<0.20	<2	<10	<10	24	1.8	9
BFI-10	260.2	<10	<20	<10	2306	<5	118.6	<0.20	<2	<10	16.4	20.2	1.3	12
BFI-11	118.8	<10	<20	<10	<50	<5	11.6	<0.20	<2	<10	11.6	20	1.3	23.3
BFI-13	<100	<10	<20	76.6	<50	<5	<10	<0.20	<2	<10	10.4	4.2	4.5	102.7
BFI-14	287	<10	<20	<10	571.3	<5	245.9	<0.20	<2	<10	<10	14.4	1.1	8.1
BFI-15	<100	<10	<20	<10	443.6	<5	43.8	<0.20	<2	<10	<10	16.8	2.2	90.6
BFI-17	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	85	23.2	1.2	16
BFI-18	273.2	<10	<20	<10	1860	<5	216.7	<0.20	<2	<10	<10	16.6	1.9	20
BFI-19	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	1.2	1.3	155.3
BFI-20	124.2	<10	<20	23.8	<50	<5	<10	<0.20	<2	<10	52.9	14.1	1.9	34.1
BFI-21	243.9	<10	<20	14	225	<5	54.8	<0.20	<2	<10	22.1	19.5	4.1	23.3
BFI-22	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	0.4	128
BFI-23	213.4	<10	<20	<10	<50	<5	109.2	<0.20	<2	<10	18.7	13.8	1.7	14.3
BFI-25	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.4	0.7	131.5
BFI-26	139	<10	<20	<10	281.7	<5	30.9	<0.20	<2	<10	11.8	17.2	4.5	35.3
BFI-27	126.1	<10	<20	<10	4964	<5	206	<0.20	<2	<10	50.5	10.7	2	41.8
BFI-28	250	<10	<20	<10	<50	<5	12.9	<0.20	<2	<10	<10	3.5	3.2	102
BFI-29	380	<10	<20	<10	180.3	<5	<10	<0.20	<2	<10	962.8	20.7	1.6	10
BFI-30	<100	<10	<20	17.5	<50	<5	15.6	<0.20	<2	<10	14.6	17	2.5	4.7
BFI-31	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	8	4.8	99
BFI-33	151.2	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	46.5	12.2	3.3	37.3
BFI-34	217.8	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	3.8	3.7	118.9
BFI-35	301.4	<10	<20	10.6	<50	<5	14.5	<0.20	<2	<10	<10	9.9	5.3	64.2

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ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-36	263.7	<10	<20	37.9	210	<5	14.4	<0.20	<2	<10	<10	11.7	4.6	80.3
BFI-37	<100	<10	<20	16	<50	<5	12.3	<0.20	<2	<10	<10	18	1.2	15.7
BFI-38	120.4	<10	<20	19.4	<50	<5	<10	<0.20	<2	<10	20	1.8	1.9	119.2
BFI-39	201.7	<10	<20	<10	619.5	<5	44.3	<0.20	<2	<10	<10	11.2	2.2	64.2
BFI-40	<100	<10	<20	19	<50	<5	<10	<0.20	<2	<10	21.5	<0.1	<0.1	159.3
BFI-41	315.7	<10	<20	43.4	<50	<5	35.7	<0.20	<2	<10	18.4	17.2	1.4	13.7
BFI-42	110.8	<10	<20	<10	2954	<5	188.3	<0.20	<2	<10	<10	20.6	2.7	31.9
BFI-43	<100	<10	<20	<10	4110	<5	436.2	<0.20	<2	<10	11.5	37.8	2.5	20.3
BFI-44	<100	<10	<20	<10	1667	<5	320.4	<0.20	<2	<10	<10	40.9	3.1	21.8
BFI-47	<100	<10	<20	<10	<50	<5	20.4	<0.20	<2	<10	450	31.3	2.3	16.6
BFI-48	231	<10	<20	<10	86.1	<5	<10	<0.20	<2	<10	<10	3.9	3.1	334.6
BFI-50	440.7	<10	<20	<10	141.3	<5	<10	<0.20	<2	<10	11.1	2.6	3.2	189.2
BFI-52	135.3	<10	<20	32.2	<50	<5	232.9	<0.20	<2	<10	28.2	24.6	1.6	38
BFI-53	149.2	<10	<20	<10	1689	<5	89.4	<0.20	<2	<10	30.3	26.5	2.2	16.9
BFI-54	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	2	2.2	142
BFI-55	230.6	<10	<20	<10	130.8	<5	18.9	<0.20	<2	<10	11.4	6.9	2.9	112.6
BFI-56	154.9	<10	<20	<10	<50	<5	131.3	<0.20	<2	<10	<10	26.8	1.6	20.3
BFI-57	201.5	<10	<20	<10	2815	<5	186.3	<0.20	<2	<10	18	23.8	1.8	21.9
BFI-58	<100	<10	<20	10.8	<50	<5	<10	<0.20	<2	<10	30	22.4	1.2	15.8
BFI-59	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	1	144.2
BFI-60	146.5	<10	<20	74.1	1026	<5	85.8	<0.20	<2	<10	36.6	25.7	1.6	11.6
BFI-62	116.7	<10	<20	<10	14436	<5	154.7	<0.20	<2	<10	45.8	24.8	2	29
BFI-63	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	<0.1	131.5
BFI-64	105.3	<10	<20	<10	3107	<5	141.7	<0.20	<2	<10	60.2	17.2	3.5	27.7
BFI-65	176.3	<10	<20	<10	1554	<5	250.7	<0.20	<2	<10	18	18.5	1.4	19.6
BFI-66	165.7	<10	<20	27.1	<50	<5	<10	<0.20	<2	<10	<10	1.8	1.2	114
BFI-67	103.3	<10	<20	<10	721	<5	62	<0.20	<2	<10	13.7	10.3	4.9	67.1

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ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	<0.5	<10	7.32	383	109.9	POS	1.92
BFI-02	<0.5	<10	7.2	344	116.48		0.17
BFI-03	0.617	<10	9.3	605	310.76		0.23
BFI-04	<0.5	<10	8.32	484	231.73	POS	0.18
BFI-05	<0.5	<10	7.26	362	126.36	POS	0.21
BFI-06	1.07	<10	7.06	736	152.7		0.54
BFI-07	0.679	<10	7.8	643	178.22		0.25
BFI-08	<0.5	<10	7.35	388	163.82		0.17
BFI-10	<0.5	<10	7.32	422	139.94		6.77
BFI-11	<0.5	<10	7.11	468	88.49		0.16
BFI-13	<0.5	<10	9.34	600	299.64		<0.1
BFI-14	<0.5	<10	7.3	291	96.31		0.95
BFI-15	<0.5	<10	7.35	496	104.13		1.01
BFI-17	3.76	<10	7.23	442	147.35		<0.1
BFI-18	<0.5	<10	7.3	389	138.71	POS	3.49
BFI-19	<0.5	<10	8.19	408	135.42		0.41
BFI-20	1.11	<10	7.23	360	48.57		0.13
BFI-21	<0.5	<10	7.01	369	151.56		0.19
BFI-22	<0.5	<10	7	444	225.56		0.28
BFI-23	<0.5	<10	6.96	278	88.91	POS	0.22
BFI-25	<0.5	<10	7.41	394	216.09	POS	0.15
BFI-26	<0.5	<10	7.42	388	67.91		1.31
BFI-27	<0.5	<10	7.2	355	120.19		32.2
BFI-28	<0.5	<10	8.11	398	169.17		<0.1
BFI-29	<0.5	<10	7.22	424	119.36		0.74
BFI-30	<0.5	<10	7.42	360	123.89		0.77
BFI-31	0.524	<10	9.21	607	314.46		0.18
BFI-33	<0.5	<10	7.67	292	49.8		0.3
BFI-34	<0.5	<10	8.12	417	176.99	POS	0.38
BFI-35	0.566	<10	7.66	383	158.47		0.32



Nov 3, 2008

ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-36	<0.5	<10	7.16	356	183.99	POS	0.91
BFI-37	2.85	<10	6.93	391	111.96		<0.1
BFI-38	0.524	<10	7.78	334	120.22		0.15
BFI-39	<0.5	<10	7.94	348	173.7		0.69
BFI-40	<0.5	<10	6.84	435	148.18		<0.1
BFI-41	<0.5	<10	7.29	390	97.63		0.29
BFI-42	<0.5	<10	7.42	403	169.99		15.13
BFI-43	<0.5	<10	7.45	409	428.89		24.3
BFI-44	<0.5	<10	7.09	777	443.29		6.01
BFI-47	3.18	<10	7.44	546	186.04		0.34
BFI-48	2.01	<10	8.24	1038	126.77		0.25
BFI-50	0.603	<10	8.03	645	239.96		0.23
BFI-52	0.769	<10	7.23	576	136.24		<0.1
BFI-53	<0.5	<10	7.24	428	122.25	POS	9.16
BFI-54	<0.5	<10	8.38	455	241.2		0.32
BFI-55	<0.5	<10	7.6	416	202.1		0.18
BFI-56	0.53	<10	7.38	530	129.24	POS	<0.1
BFI-57	<0.5	<10	7.49	512	169.17	POS	3.09
BFI-58	2.99	<10	7.33	471	137.89		0.18
BFI-59	<0.5	<10	7.13	474	211.56		0.23
BFI-60	<0.5	<10	7.26	459	130.38		0.24
BFI-62	<0.5	<10	7.68	503	106.19		3.82
BFI-63	<0.5	<10	7.31	749	203.74		0.63
BFI-64	<0.5	<10	7.35	395	148.59		31.4
BFI-65	<0.5	<10	7.17	459	141.59		3.6
BFI-66	<0.5	<10	7.7	364	180.69	POS	0.81
BFI-67	<0.5	<10	7.52	363	169.58	POS	5.79

April 6, 2009

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-01		4573 Center Road	Poland	Ohio	44514	250	<0.02	10	599	0.267	<5
BFI-02	Front of House	4911 Arrel Road	Lowellville	Ohio	44436	180	<0.02	36	570	0.194	<5
BFI-04	Kitchen	4921 Arrel Road	Lowellville	Ohio	44436	390	<0.02	9	767	1.62	<5
BFI-05	Back of House	4969 Center Road	Lowellville	Ohio	44436	210	0.0848	13	572	0.254	<5
BFI-06	Kitchen	4983A Center Road	Lowellville	Ohio	44436	230	<0.02	230	1267	0.202	<5
BFI-07	Back of House	4983B Center Road	Lowellville	Ohio	44436	320	0.264	150	1064	0.805	<5
BFI-08	Rental Unit-Outside	5005 Center Road	Lowellville	Ohio	44436	250	<0.02	11	585	0.281	<5
BFI-10	Side of House	5027 Miller Road	Lowellville	Ohio	44436	240	<0.02	35	555	0.205	<5
BFI-12		5050 Center Road	Lowellville	Ohio	44436	240	<0.02	230	1353	0.302	<5
BFI-13	Back of House	5076 Center Road	Lowellville	Ohio	44436	90	0.475	110	967	0.857	<5
BFI-15	Side of House	5091 Center Road	Lowellville	Ohio	44436	260	<0.02	80	862	0.326	<5
BFI-17	Side of House	5110 Miller Road	Lowellville	Ohio	44436	230	<0.02	18	660	0.278	<5
BFI-18	Basment	5296 Arrel Road	Lowellville	OH	44436	210	<0.02	42	609	0.131	276.7
BFI-19	Back of house	5425 Arrel Road	Lowellville	Ohio	44436	Not Analyzed	0.24	5	638	1.45	<5
BFI-20	Outside	5724 Arrel Road	Lowellville	Ohio	44436	140	0.24	36	508	0.123	<5
BFI-23	Back of House	5219 Arrel Road	Lowellville	OH	44436	160	<0.02	14	415	0.154	<5
BFI-26	Basement	6349 Center Road	Lowellville	Ohio	44436	220	0.379	50	601	0.224	<5
BFI-27	Side of House	6495 Lowellville Road	Lowellville	Ohio	44436	220	0.0665	40	573	0.198	<5
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	270	0.15	25	625	0.409	<5
BFI-29	Back of House	9612 Struthers Road	New Middletown	Ohio	44442	310	<0.02	60	796	0.169	<5
BFI-30	Back of House	6729 Stymie Road	Lowellville	Ohio	44436	230	<0.02	21	564	0.234	<5
BFI-31	Back of House	6815 Stymie Road	Lowellville	Ohio	44436	80	0.131	90	960	0.899	<5
BFI-33	Garage	6839 Stymie Road	Lowellville	Ohio	44436	180	<0.02	20	448	0.316	<5
BFI-34	Side of House	6850 Stymie Road	Lowellville	Ohio	44436	330	0.745	24	657	0.564	<5
BFI-35	Back of House	6931 Stymie Road	Lowellville	Ohio	44436	290	<0.02	10	611	0.441	<5
BFI-36	Back of House	7660 Moore Road	Lowellville	Ohio	44436	310	<0.02	3	578	0.611	<5
BFI-37	Side of House	7965 Struthers Road	Poland	Ohio	44514	130	0.24	21	443	0.17	<5

April 6, 2009

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-38	Kitchen	8095 Struthers Road	New Middletown	Ohio	44442	270	<0.02	6	523	0.215	<5
BFI-39	Back of House	8915 Struthers Road	New Middletown	Ohio	44442	280	0.24	8	577	0.946	<5
BFI-40	Front of House	9026 Struthers Road	New Middletown	OH	44442	200	<0.02	58	684	0.155	<5
BFI-41	Back of House	9191 Struthers Road	New Middletown	Ohio	44442	210	<0.02	48	610	0.166	<5
BFI-52	Garage	9147 Struthers Road	New Middletown	Ohio	44442	200	<0.02	85	824	0.144	<5
BFI-53		5406 Arrel Road	Lowellville	Ohio	44436	270	<0.02	55	693	0.198	7
BFI-54		4783 Cowden Road	Poland	Ohio	44514	350	<0.02	17	741	0.969	<5
BFI-56		5733 Miller Road	Lowellville	Ohio	44436	250	<0.02	55	794	0.242	<5
BFI-57		5130 Miller Road	Lowellville	Ohio	44436	240	<0.02	70	875	0.175	<5
BFI-58		5084 Miller Road	Lowellville	Ohio	44436	210	<0.02	35	651	0.297	<5
BFI-60		10337 Struthers Road	New Middletown	Ohio	44442	250	<0.02	40	692	0.168	<5
BFI-62		6738 Struthers Road	Poland	Ohio	44514	230	0.24	80	724	0.244	<5
BFI-65	Outside	5334 Arrel Road	Lowellville	Ohio	44436	220	0.24	63	741	0.142	<5
BFI-66	Outside	7307 Struthers Road	Poland	Ohio	44514	280	0.152	4	572	0.488	<5
BFI-67	Back of House	4925 Cowden Road	Poland	Ohio	44514	260	0.84	12	555	0.34	<5

April 6, 2009

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-01	<100	<10	<20	21.6	1634	<5	36.8	<0.20	<2	<10	63.6	24.9	5	15.2
BFI-02	<100	<10	<20	<10	155.5	<5	<10	<0.20	<2	<10	22.4	<0.1	0.1	119.2
BFI-04	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.5	0.7	138
BFI-05	<100	<10	<20	<10	92.9	<5	10.7	<0.20	<2	<10	13	1.2	2.1	120
BFI-06	100.8	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	28.8	28.2	1.9	92.3
BFI-07	143.7	<10	<20	<10	<50	<5	13.2	<0.20	<2	<10	38.6	15.4	1.7	139
BFI-08	<100	<10	<20	110	<50	<5	144.1	<0.20	<2	<10	50	22.3	1.2	5.5
BFI-10	237.7	<10	<20	<10	181.7	<5	76.2	<0.20	<2	<10	<10	18	0.7	7.6
BFI-12	<100	<10	<20	1272	<50	35.9	<10	<0.20	<2	<10	1004	0.1	0.4	240
BFI-13	<100	<10	<20	89.1	<50	<5	<10	<0.20	<2	<10	18.3	9	3.8	97
BFI-15	<100	<10	<20	<10	152.1	<5	62.9	<0.20	<2	<10	38.1	23	2.2	48.9
BFI-17	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	113.3	19.5	0.7	9.4
BFI-18	<100	<10	<20	<10	312.7	<5	219	<0.20	<2	<10	<10	15.2	1.1	9.9
BFI-19	101.7	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	13.4	0.93	0.76	112.2
BFI-20	128	<10	<20	24.5	<50	<5	126	<0.20	<2	<10	81.5	11.6	1.1	12.4
BFI-23	211.8	<10	<20	142.3	<50	<5	24.4	<0.20	<2	<10	22.3	11.7	1.2	10.8
BFI-26	141.7	<10	<20	<10	96.7	<5	35.8	<0.20	<2	<10	27.4	17	3.1	24.7
BFI-27	139.4	<10	<20	20.9	6559	13.6	233	<0.20	<2	<10	5170	12.1	2.1	45.8
BFI-28	263.8	<10	<20	<10	<50	<5	16.8	<0.20	<2	<10	<10	3.6	2.8	95.9
BFI-29	<100	<10	<20	128	387.4	<5	<10	<0.20	<2	<10	38.7	<0.1	<0.1	184.2
BFI-30	102.4	<10	<20	39.4	218.8	<5	25.1	<0.20	<2	<10	26.3	20	1.9	4
BFI-31	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	54.6	8.8	4.2	105
BFI-33	155.2	<10	<20	10.6	502.7	<5	15.5	<0.20	<2	<10	132.4	12.3	2.2	23.1
BFI-34	233.2	<10	<20	<10	56.3	<5	<10	<0.20	<2	<10	16.4	4.4	2.6	96.4
BFI-35	262.3	<10	<20	<10	<50	<5	13.1	<0.20	<2	<10	36.9	10.7	5	66.4
BFI-36	222.1	<10	<20	21.3	61.9	<5	13.3	<0.20	<2	<10	20.5	8.3	3.3	70.7
BFI-37	<100	<10	<20	12.4	<50	<5	20.6	<0.20	<2	<10	29.8	11.8	0.57	6.1

April 6, 2009

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-38	134.2	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	19	1.6	1.9	107
BFI-39	225	<10	<20	18	<50	<5	52.5	<0.20	<2	<10	10	10.6	1.6	40.3
BFI-40	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	0.1	136.2
BFI-41	320.2	<10	<20	<10	<50	<5	62.1	<0.20	<2	<10	16.6	15	0.8	8.2
BFI-52	132.6	<10	<20	<10	<50	<5	251.1	<0.20	<2	<10	18.1	19	1.1	22.3
BFI-53	148.3	<10	<20	<10	359.1	<5	93.4	<0.20	<2	<10	29.4	23.7	1.5	11.7
BFI-54	110	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	25.9	4.2	1.9	114.7
BFI-56	150.6	<10	<20	<10	<50	<5	128	<0.20	<2	<10	11.8	23.7	1	13.5
BFI-57	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.1	0.6	163
BFI-58	<100	<10	<20	35.7	<50	<5	<10	<0.20	<2	<10	35	18.1	0.5	10
BFI-60	131.1	<10	<20	11.6	86.7	<5	70	<0.20	<2	<10	26.2	20.3	1.8	11.3
BFI-62	145.7	<10	<20	<10	4284	<5	158.1	<0.20	<2	<10	25	20.6	1.9	24.8
BFI-65	192.4	<10	<20	<10	683.6	<5	257.8	<0.20	<2	<10	24.9	18.7	1.3	18.2
BFI-66	106.3	<10	<20	166.2	<50	<5	<10	<0.20	<2	<10	31.8	0.8	0.9	113
BFI-67	111.4	<10	<20	<10	365.1	<5	83.2	<0.20	<2	<10	<10	11.7	3.6	49.2

April 6, 2009

ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	0.197	<10	7.47	398	132.54	POS	2.2
BFI-02	<0.05	<10	7.29	379	105.78		1.82
BFI-04	<0.05	<10	8.4	510	206.62	POS	0.38
BFI-05	<0.05	<10	7.4	381	139.53	POS	0.21
BFI-06	3.01	<10	6.98	843	125.13		<0.1
BFI-07	1.07	<10	7.54	709	148.18		0.43
BFI-08	<0.05	<10	7.18	389	143.65		0.11
BFI-10	<0.05	<10	7.7	370	23.46		5.65
BFI-12	2.14	<10	7.06	900	181.93		0.19
BFI-13	0.635	<10	9.6	642	303.76		0.36
BFI-15	0.313	<10	7.15	574	110.31		0.82
BFI-17	3.16	<10	7.31	441	112.78		0.2
BFI-18	0.228	<10	7.6	406	74.91		1.47
BFI-19	<0.05	<10	8.36	424	135		0.3
BFI-20	2.12	<10	7.37	338	73.68	POS	1.16
BFI-23	0.738	<10	7.1	277	75.73		0.24
BFI-26	0.0939	<10	7.45	400	119.36	POS	3.12
BFI-27	<0.05	<10	7.09	381	107.43		11.88
BFI-28	<0.05	<10	8.49	416	138.3		0.11
BFI-29	0.253	<10	7.99	530	86.44		3.92
BFI-30	<0.05	<10	7.97	376	107.84		4.34
BFI-31	1.02	<10	9.46	640	307.88		0.17
BFI-33	<0.05	<10	8.2	298	61.74		0.49
BFI-34	<0.05	<10	8.38	437	96.73	POS	0.22
BFI-35	<0.05	<10	8.04	408	69.97		0.39
BFI-36	0.511	<10	7.88	387	107.43		1.21
BFI-37	5.41	<10	7.1	295	77.29	POS	0.55

April 6, 2009

ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-38	0.278	<10	8.03	349	59.27		0.39
BFI-39	0.194	<10	8.16	384	114.84		1.78
BFI-40	0.304	<10	6.97	456	116.48		<0.1
BFI-41	0.134	<10	7.49	407	85.2		0.1
BFI-52	0.954	<10	7.29	548	122.66		0.15
BFI-53	0.0574	<10	7.58	461	92.61	POS	1.33
BFI-54	0.318	<10	8.56	493	214.03		0.25
BFI-56	0.358	<10	7.59	527	133.36		0.17
BFI-57	0.366	<10	7.18	583	157.64	POS	0.53
BFI-58	1.47	<10	7.64	433	88.08		0.35
BFI-60	0.289	<10	7.45	460	103.72	POS	0.42
BFI-62	0.327	<10	7.41	483	102.49		25.8
BFI-65	0.304	<10	7.16	494	119.78		6.65
BFI-66	0.303	<10	7.77	380	145.29	POS	0.32
BFI-67	<0.05	<10	8.13	370	88.49		5

May 4, 2009

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-11	Shed	9624 Rapp Road	New Middletown	Ohio	44442	240	<0.02	68	720	0.122
BFI-14	Basment	5084 Arrel Road	Lowellville	OH	44436	210	<0.02	90	486	0.217
BFI-21	Back of House	9746 Felger Road	New Middletown	Ohio	44442	270	<0.02	8	529	0.297
BFI-22	Front of House	6334 East Calla Road	New Middletown	Ohio	44442	230	<0.02	25	702	0.269
BFI-25	Basement	6557 Metz Road	New Middletown	Ohio	44442	290	0.52	9	605	0.256
BFI-42	Basement	9572 South State Line Road	New Middletown	Ohio	44436	270	<0.02	11	576	0.316
BFI-43	Front of House	9315 Felger Road	New Middletown	Ohio	44442	320	<0.02	6	1111	0.202
BFI-44	Back of House	9320 South State Line Road	New Middletown	Ohio	44442	330	0.17	10	1145	0.191
BFI-47	Front Yard	9491 O-Rapp Road	New Middletown	Ohio	44442	270	<0.02	17	802	0.165
BFI-48	Inside-Kitchen	9491 I-Rapp Road	New Middletown	Ohio	44442	360	0.249	310	1645	1.87
BFI-50	Foyer	9494 Felger Road	New Middletown	Ohio	44442	370	0.558	115	1090	0.921
BFI-55		6276 Metz Road	New Middletown	Ohio	44442	250	<0.02	35	659	0.367
BFI-63	Outside	6827 East Calla Road	New Middletown	Ohio	44442	270	<0.02	50	659	0.309
BFI-64	Kitchen	6900 East Calla Road	New Middletown	Ohio	44442	280	0.388	16	537	0.304
BFI-68		9511 Felger Road	New Middletown	Ohio	44442	300	<0.02	15	587	0.339



May 4, 2009

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-11	<5	146.9	<10	<20	<10	496.5	<5	109	<0.20	<2	<10	21.5	23.2
BFI-14	<5	<100	<10	<20	2802	760.9	<5	11.6	<0.20	<2	<10	66.3	<0.1
BFI-21	<5	229	<10	<20	<10	953.3	<5	68.5	<0.20	<2	<10	19.8	22.1
BFI-22	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	10.5	<0.1
BFI-25	<5	<100	<10	<20	19.1	865	<5	80.8	<0.20	<2	<10	13.6	21.9
BFI-42	<5	127.5	<10	<20	10	1332	<5	216.6	<0.20	<2	<10	<10	22.5
BFI-43	<5	<100	<10	<20	24.8	1391	<5	463.5	<0.20	<2	<10	17.8	43.8
BFI-44	<5	<100	<10	<20	<10	417	<5	338.3	<0.20	<2	<10	23.8	48
BFI-47	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	933.8	29.5
BFI-48	<5	171.5	<10	<20	24.8	<50	<5	<10	<0.20	<2	<10	13.4	2.4
BFI-50	<5	403	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	2.7
BFI-55	<5	196.4	<10	<20	<10	192	<5	21.7	<0.20	<2	<10	11.4	6.5
BFI-63	<5	<100	<10	<20	530.6	<50	<5	<10	<0.20	<2	<10	29.2	<0.1
BFI-64	<5	145.4	<10	<20	26.4	4297	<5	214.3	<0.20	<2	<10	113.4	24.4
BFI-68	<5	138.1	<10	<20	13.1	94.6	<5	559.4	<0.20	<2	<10	10	22.1

May 4, 2009

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-11	1.3	23.4	0.423	<10	6.74	480	101.67		0.16
BFI-14	0.32	136.5	0.124	<10	7.17	322	75.73		1.14
BFI-21	5	26.8	0.0638	<10	7.15	352	62.15		7.06
BFI-22	1	176.4	0.0683	<10	6.97	468	149.82		0.65
BFI-25	12.3	70.9	0.0662	<10	7.36	402	139.12		7.49
BFI-42	3	33.5	0.0691	<10	7.47	384	109.07		2.42
BFI-43	2.9	23.5	0.0837	<10	7.15	738	415.72		14.92
BFI-44	3.2	22	0.0936	<10	7.17	762	434.65		14.75
BFI-47	3.3	15.4	9.59	<10	7.54	535	149.41	POS	0.16
BFI-48	3.3	385	2.85	<10	8.42	1096	128.01		0.25
BFI-50	4	259.7	1.03	<10	8.07	724	180.69		0.15
BFI-55	3.4	141	0.0837	<10	7.52	439	139.94		0.9
BFI-63	0.3	176.7	0.206	<10	7.51	438	116.07		0.34
BFI-64	4.3	32	0.0596	<10	7.46	357	68.74		28.1
BFI-68	3	31	0.0704	<10	7.27	392	61.74		0.84

Sept 23, 2009

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-01		4573 Center Road	Poland	Ohio	44514	250	<0.02	22	654	0.236
BFI-02	Front of House	4911 Arrel Road	Lowellville	Ohio	44436	170	<0.02	30	558	0.193
BFI-03		4911 Miller Road	Lowellville	Ohio	44436	60	0.12	95	974	0.847
BFI-04	Kitchen	4921 Arrel Road	Lowellville	Ohio	44436	380	0.309	5	797	1.62
BFI-05	Back of House	4969 Center Road	Lowellville	Ohio	44436	220	<0.02	10	591	0.223
BFI-06	Kitchen	4983A Center Road	Lowellville	Ohio	44436	240	<0.02	180	1186	0.248
BFI-07	Back of House	4983B Center Road	Lowellville	Ohio	44436	430	0.299	25	882	1.57
BFI-08	Rental Unit-Outside	5005 Center Road	Lowellville	Ohio	44436	260	<0.02	8	589	0.271
BFI-10	Side of House	5027 Miller Road	Lowellville	Ohio	44436	260	0.0352	135	662	0.201
BFI-12		5050 Center Road	Lowellville	Ohio	44436	280	<0.02	125	1015	0.663
BFI-13	Back of House	5076 Center Road	Lowellville	Ohio	44436	40	0.289	80	955	0.617
BFI-14	Basment	5084 Arrel Road	Lowellville	OH	44436	150	0.038	8	486	0.217
BFI-15	Side of House	5091 Center Road	Lowellville	Ohio	44436	260	<0.02	130	1017	0.399
BFI-17	Side of House	5110 Miller Road	Lowellville	Ohio	44436	240	<0.02	20	707	0.294
BFI-18	Basment	5296 Arrel Road	Lowellville	OH	44436	210	0.103	42	636	0.152
BFI-19	Back of house	5425 Arrel Road	Lowellville	Ohio	44436	290	0.199	5	646	1.37
BFI-20	Outside	5724 Arrel Road	Lowellville	Ohio	44436	150	<0.02	35	522	0.105
BFI-23	Back of House	5219 Arrel Road	Lowellville	OH	44436	160	<0.02	11	452	0.161
BFI-26	Basement	6349 Center Road	Lowellville	Ohio	44436	300	0.264	46	603	0.222
BFI-27	Side of House	6495 Lowellville Road	Lowellville	Ohio	44436	190	<0.02	36	587	0.183
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	260	0.714	22	630	0.399
BFI-29	Back of House	9612 Struthers Road	New Middletown	Ohio	44442	210	<0.02	51	660	0.191
BFI-30	Back of House	6729 Stymie Road	Lowellville	Ohio	44436	210	<0.02	20	578	0.214
BFI-31	Back of House	6815 Stymie Road	Lowellville	Ohio	44436	60	<0.02	81	974	0.865
BFI-33	Garage	6839 Stymie Road	Lowellville	Ohio	44436	170	<0.02	18	465	0.302
BFI-34	Side of House	6850 Stymie Road	Lowellville	Ohio	44436	300	0.634	21	669	0.514
BFI-35	Back of House	6931 Stymie Road	Lowellville	Ohio	44436	250	<0.02	6	501	0.352

Sept 23, 2009

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-36	Back of House	7660 Moore Road	Lowellville	Ohio	44436	270	0.541	6	577	0.467
BFI-37	Side of House	7965 Struthers Road	Poland	Ohio	44514	140	<0.02	50	580	0.15
BFI-38	Kitchen	8095 Struthers Road	New Middletown	Ohio	44442	260	0.129	4	542	0.231
BFI-39	Back of House	8915 Struthers Road	New Middletown	Ohio	44442	260	0.29	8	557	0.657
BFI-40	Front of House	9026 Struthers Road	New Middletown	OH	44442	200	0.0238	72	736	0.169
BFI-41	Back of House	9191 Struthers Road	New Middletown	Ohio	44442	200	<0.02	47	617	0.164
BFI-52	Garage	9147 Struthers Road	New Middletown	Ohio	44442	190	<0.02	120	929	0.156
BFI-53		5406 Arrel Road	Lowellville	Ohio	44436	220	0.078	50	663	0.163
BFI-54		4783 Cowden Road	Poland	Ohio	44514	340	<0.02	15	760	0.903
BFI-56		5733 Miller Road	Lowellville	Ohio	44436	240	<0.02	61	826	0.222
BFI-57		5130 Miller Road	Lowellville	Ohio	44436	240	<0.02	69	899	0.143
BFI-58		5084 Miller Road	Lowellville	Ohio	44436	230	<0.02	44	720	0.253
BFI-60		10337 Struthers Road	New Middletown	Ohio	44442	220	<0.02	40	695	0.181
BFI-61		8949 Struthers Road	New Middletown	Ohio	44442	240	0.328	6	521	0.352
BFI-62		6738 Struthers Road	Poland	Ohio	44514	240	0.148	76	817	0.249
BFI-65	Outside	5334 Arrel Road	Lowellville	Ohio	44436	230	<0.02	53	758	0.122
BFI-66	Outside	7307 Struthers Road	Poland	Ohio	44514	270	0.208	5	582	0.434
BFI-67	Back of House	4925 Cowden Road	Poland	Ohio	44514	250	0.66	11	583	0.297

Sept 23, 2009

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-01	<5	<100	<10	<20	<10	352.3	<5	33.3	<0.20	<2	<10	20	25.5
BFI-02	<5	<100	<10	<20	<10	100.5	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-03	<5	<100	<10	<20	66.5	<50	<5	<10	<0.20	<2	<10	17.8	5.3
BFI-04	<5	108.2	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.5
BFI-05	<5	<100	<10	<20	<10	127.4	<5	<10	<0.20	<2	<10	<10	0.4
BFI-06	<5	104.1	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	20	24.3
BFI-07	<5	117.2	<10	<20	<10	200.3	<5	26.8	<0.20	<2	<10	27	4.3
BFI-08	<5	119.2	<10	32.2	<10	256.8	<5	196.9	<0.20	<2	<10	33.8	27.6
BFI-10	<5	352.7	<10	<20	<10	2191	<5	193.8	<0.20	<2	<10	<10	23
BFI-12	<5	<100	<10	<20	11.6	57.4	<5	<10	<0.20	<2	<10	31.6	<0.1
BFI-13	<5	<100	<10	<20	63.7	74	<5	<10	<0.20	<2	<10	32.7	10
BFI-14	<5	<100	<10	<20	<10	67.2	<5	<10	<0.20	<2	<10	17.8	<0.1
BFI-15	<5	<100	<10	<20	<10	1337	<5	100	<0.20	<2	<10	20	24.6
BFI-17	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	89.7	23.4
BFI-18	<5	215.8	<10	<20	<10	831.8	<5	172.7	<0.20	<2	<10	<10	10.5
BFI-19	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.7
BFI-20	<5	166.1	<10	<20	<10	<50	<5	25	<0.20	<2	<10	69.2	14.3
BFI-23	<5	287.9	<10	<20	<10	<50	<5	118.7	<0.20	<2	<10	12.6	14.2
BFI-26	<5	164.1	<10	<20	<10	567.6	<5	51.3	<0.20	<2	<10	26.9	20.4
BFI-27	<5	180.4	<10	<20	<10	6134	<5	307	<0.20	<2	<10	70.5	14
BFI-28	<5	433.4	<10	<20	<10	<50	<5	23.7	<0.20	<2	<10	<10	4.8
BFI-29	<5	<100	<10	<20	<10	244.3	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-30	<5	118.6	<10	<20	34	378.2	<5	27.5	<0.20	<2	<10	15.6	23
BFI-31	<5	<100	<10	<20	<10	67.4	<5	<10	<0.20	<2	<10	31.4	5.9
BFI-33	<5	188.4	<10	<20	<10	423.5	<5	38.1	<0.20	<2	<10	84.1	14
BFI-34	<5	261.3	<10	25.7	<10	166.1	<5	11.6	<0.20	<2	<10	11.3	4.7
BFI-35	<5	369.4	<10	<20	<10	1075	<5	345.8	<0.20	<2	<10	27.6	17.5

Sept 23, 2009

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-36	<5	314	<10	35.5	<10	131	<5	24.5	<0.20	<2	<10	21.6	11.2
BFI-37	<5	103.8	<10	<20	<10	<50	<5	23.8	<0.20	<2	<10	19.1	18
BFI-38	<5	203.2	<10	<20	24.7	<50	<5	<10	<0.20	<2	<10	24.9	2
BFI-39	<5	303.1	<10	22.4	<10	466.4	<5	59.2	<0.20	<2	<10	<10	11.3
BFI-40	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	10.8	<0.1
BFI-41	<5	384.6	<10	<20	53.9	<50	<5	42.7	<0.20	<2	<10	30	15.9
BFI-52	<5	132	<10	<20	<10	<50	<5	202.1	<0.20	<2	<10	16.5	17
BFI-53	<5	162.3	<10	<20	<10	169.3	<5	66.9	<0.20	<2	<10	24.6	24.1
BFI-54	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	30.8	3.6
BFI-56	<5	192.8	<10	<20	<10	<50	<5	156.9	<0.20	<2	<10	17.4	29.4
BFI-57	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-58	<5	<100	<10	32.8	164.6	<50	<5	<10	<0.20	<2	<10	35.5	22.4
BFI-60	<5	166	<10	<20	<10	<50	<5	102.3	<0.20	<2	<10	18.2	22.7
BFI-61	<5	328.7	<10	20.1	<10	1570	<5	101.1	<0.20	<2	<10	<10	11
BFI-62	<5	133.3	<10	<20	16.4	18069	<5	202	<0.20	<2	<10	29.2	26.3
BFI-65	<5	231	<10	<20	<10	2022	<5	317.2	<0.20	<2	<10	<10	20.2
BFI-66	<5	132	<10	<20	<10	130.6	<5	<10	<0.20	<2	<10	26.1	<0.1
BFI-67	<5	152.1	<10	<20	<10	2809	<5	118.5	<0.20	<2	<10	35.3	15.1

Sept 23, 2009

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	3.7	20.3	Not Analyzed	<10	7.34	437	109.9	POS	0.16
BFI-02	0.31	120	Not Analyzed	<10	7.2	372	132.12		0.32
BFI-03	5.2	103.6	Not Analyzed	<10	9.66	648	318.58		<0.1
BFI-04	1.1	184.7	Not Analyzed	<10	8.34	530	235.44	POS	0.15
BFI-05	1.2	134.6	Not Analyzed	<10	7.53	394	155.17	POS	0.21
BFI-06	2	78.1	Not Analyzed	<10	7.08	793	142.41		<0.1
BFI-07	1.7	202.3	Not Analyzed	<10	8.37	588	222.26		0.2
BFI-08	1.7	7.4	Not Analyzed	<10	7.31	392	142.83		0.11
BFI-10	1.1	10.2	Not Analyzed	<10	7.45	441	126.36		0.91
BFI-12	0.4	224.8	Not Analyzed	<10	7.72	676	170.81		<0.1
BFI-13	5.1	104	Not Analyzed	<10	9.75	636	296.35		0.9
BFI-14	0.4	103.2	Not Analyzed	<10	7.49	323	167.52		0.27
BFI-15	2.9	92.1	Not Analyzed	<10	7.16	677	150.23		0.54
BFI-17	1.1	14	Not Analyzed	<10	7.33	471	144.06		<0.1
BFI-18	1.8	15.1	Not Analyzed	<10	7.41	425	144.47		1.26
BFI-19	1.3	155	Not Analyzed	<10	8.24	429	169.17		0.25
BFI-20	1.7	15.5	Not Analyzed	<10	7.12	348	108.25	POS	0.58
BFI-23	1.5	11.8	Not Analyzed	<10	7.05	299	111.54		0.14
BFI-26	4.5	32.6	Not Analyzed	<10	7.51	402	123.07	POS	2.54
BFI-27	1.9	45.1	Not Analyzed	<10	7.21	390	129.24	POS	16.24
BFI-28	4.2	104.5	Not Analyzed	<10	8.12	418	147.35	POS	<0.1
BFI-29	<0.1	127	Not Analyzed	<10	7.31	439	144.06		0.86
BFI-30	2.5	5	Not Analyzed	<10	7.53	385	140.36		1.3
BFI-31	5.2	107.7	Not Analyzed	<10	9.62	648	288.94		<0.1
BFI-33	3.1	33.2	Not Analyzed	<10	7.8	310	89.73	POS	3.53
BFI-34	4.2	146.8	Not Analyzed	<10	8.21	446	146.12		0.33
BFI-35	6.3	28.1	Not Analyzed	<10	7.29	334	101.25		2.38

Sept 23, 2009

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-36	4.1	75.5	Not Analyzed	<10	7.76	383	168.76	POS	0.18
BFI-37	1.1	13.7	Not Analyzed	<10	6.95	386	76.97	POS	<0.1
BFI-38	2.1	121.6	Not Analyzed	<10	7.77	360	153.94		0.17
BFI-39	2.2	62.5	Not Analyzed	<10	7.52	370	144.88		1.81
BFI-40	0.6	154.5	Not Analyzed	<10	7.07	490	146.94		<0.1
BFI-41	1.3	10.7	Not Analyzed	<10	7.3	411	81.91	POS	0.22
BFI-52	1.3	31.4	Not Analyzed	<10	7.15	619	137.06		<0.1
BFI-53	1.8	14.8	Not Analyzed	<10	7.35	442	127.6	POS	0.23
BFI-54	2.9	176.2	Not Analyzed	10.742	7.71	505	176.99		0.16
BFI-56	1.4	17	Not Analyzed	<10	7.39	550	160.11	POS	<0.1
BFI-57	1.1	177.8	Not Analyzed	<10	7.35	599	262.6	POS	0.23
BFI-58	1.1	14.9	Not Analyzed	<10	7.37	480	122.66		7.32
BFI-60	1.5	9.2	Not Analyzed	<10	7.21	463	145.71		0.12
BFI-61	3	53.3	Not Analyzed	<10	7.45	348	104.96		2.37
BFI-62	2.1	32.4	Not Analyzed	<10	7.3	543	103.31		34.6
BFI-65	1.4	20.5	Not Analyzed	<10	7.24	505	142.41		2.65
BFI-66	1.1	144.6	Not Analyzed	<10	7.61	388	126.77	POS	0.4
BFI-67	5.4	71.1	Not Analyzed	<10	7.36	389	129.65	POS	14.67



Oct 13, 2009

ID	Location	Address1	Address2	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-11	Shed	9624 Rapp Road		New Middletown	Ohio	44442	220	<0.02	67.5	745	0.149
BFI-21	Back of House	9746 Felger Road		New Middletown	Ohio	44442	290	<0.02	7.5	592	0.308
BFI-22	Front of House	6334 East Calla Road		New Middletown	Ohio	44442	240	<0.02	25	715	0.298
BFI-25	Basement	6557 Metz Road		New Middletown	Ohio	44442	320	<0.02	7	636	0.295
BFI-42	Basement	9572 South State Line Road		New Middletown	Ohio	44436	230	<0.02	31	726	0.336
BFI-43	Front of House	9315 Felger Road		New Middletown	Ohio	44442	310	<0.02	65	1176	0.185
BFI-44	Back of House	9320 South State Line Road		New Middletown	Ohio	44442	350	<0.02	7.5	1221	0.219
BFI-47	Front Yard	9491 O Rapp Road		New Middletown	Ohio	44442	260	<0.02	16	840	0.185
BFI-55		6276 Metz Road		New Middletown	Ohio	44442	260	<0.02	45	714	0.406
BFI-63	Outside	6827 East Calla Road		New Middletown	Ohio	44442	240	<0.02	47.5	655	0.307
BFI-64	Kitchen	6900 East Calla Road		New Middletown	Ohio	44442	290	0.43	17.5	657	0.293
BFI-68		9511 Felger Road		New Middletown	Ohio	44442	300	<0.02	12.5	646	0.323

Oct 13, 2009

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-11	<5	103.1	<10	<20	<10	497.6	<5	715.9	<0.20	<2	<10	70.3	21.3	1.11	18.7
BFI-21	<5	268.7	<10	<20	<10	829.3	<5	72.2	<0.20	<2	<10	<10	18.1	4	19.1
BFI-22	<5	<100	<10	<20	<10	77	<5	<10	<0.20	<2	<10	<10	0.1	<0.1	130.7
BFI-25	<5	<100	<10	<20	23.7	50	<5	<10	<0.20	<2	<10	<10	<0.1	0.24	126.5
BFI-42	<5	<100	<10	<20	178	<50	<5	<10	<0.20	<2	<10	<10	0.1	0.22	135
BFI-43	<5	<100	<10	<20	31.4	3545	<5	<10	<0.20	<2	<10	<10	34.7	2.3	17.1
BFI-44	<5	<100	<10	31.8	41.5	1108	<5	367	<0.20	<2	<10	<10	34.5	2.7	17.6
BFI-47	<5	<100	<10	<20	10.6	<50	<5	<10	<0.20	<2	<10	871.5	21.6	2	10
BFI-55	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1	0.19	141.4
BFI-63	<5	199	<10	<20	<10	226.9	<5	608	<0.20	<2	<10	<10	15.1	2.4	27.9
BFI-64	<5	134.4	<10	<20	1245	3754	<5	193.8	<0.20	<2	<10	176.3	17.3	3.2	19.6
BFI-68	<5	170	<10	23.2	<10	234.9	<5	646.7	<0.20	<2	<10	26.9	18.4	2.4	21.2

Oct 13, 2009

ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Vinyl chloride
BFI-11	Not Analyzed	<10	6.76	496	110.31		
BFI-21	Not Analyzed	<10	6.78	394	421.07		
BFI-22	Not Analyzed	<10	6.94	476	167.93		
BFI-25	Not Analyzed	<10	6.99	423	421.89		
BFI-42	Not Analyzed	<10	7.07	485	Not Analyzed		
BFI-43	Not Analyzed	<10	7.06	781	153.94	POS	
BFI-44	Not Analyzed	<10	6.68	813	74.5		
BFI-47	Not Analyzed	<10	7.07	559	111.54	POS	
BFI-55	Not Analyzed	<10	7.24	476	86.85		
BFI-63	Not Analyzed	<10	7.04	437	91.79	POS	
BFI-64	Not Analyzed	<10	7.14	435	178.63		
BFI-68	Not Analyzed	<10	7.08	432	165.46		

March 23, 2010

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-01		4573 Center Road	Poland	Ohio	44514	260	<0.02	43	615	0.242	<5
BFI-05	Back of House	4969 Center Road	Lowellville	Ohio	44436	275	0.589	19	510	0.237	<5
BFI-06	Kitchen	4983 A Center Road	Lowellville	Ohio	44436	215	<0.02	245	1261	0.197	<5
BFI-07	Back of House	4983 B Center Road	Lowellville	Ohio	44436	385	0.208	120	870	1.17	<5
BFI-08	Rental Unit-Outside	5005 Center Road	Lowellville	Ohio	44436	260	<0.02	10	580	0.287	<5
BFI-12		5050 Center Road	Lowellville	Ohio	44436	255	<0.02	226	1341	0.304	<5
BFI-15	Side of House	5091 Center Road	Lowellville	Ohio	44436	230	0.147	133	1007	0.292	<5
BFI-26	Basement	6349 Center Road	Lowellville	Ohio	44436	215	0.281	50	570	0.195	<5
BFI-27	Side of House	6495 Lowellville Road	Lowellville	Ohio	44436	210	0.323	46	575	0.146	<5
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	290	0.633	27	614	0.375	<5
BFI-30	Back of House	6729 Stymie Road	Lowellville	Ohio	44436	230	0.838	27	567	0.196	<5
BFI-31	Back of House	6815 Stymie Road	Lowellville	Ohio	44436	65	0.302	115	965	0.971	<5
BFI-33	Garage	6839 Stymie Road	Lowellville	Ohio	44436	190	<0.02	22	457	0.278	<5
BFI-34	Side of House	6850 Stymie Road	Lowellville	Ohio	44436	280	0.534	30	647	0.556	<5
BFI-35	Back of House	6931 Stymie Road	Lowellville	Ohio	44436	280	0.478	30	585	0.419	<5
BFI-37	Side of House	7965 Struthers Road	Poland	Ohio	44514	140	<0.02	38	499	0.154	<5
BFI-38	Kitchen	8095 Struthers Road	New Middletown	Ohio	44442	280	0.366	12	507	0.195	<5
BFI-39	Back of House	8915 Struthers Road	New Middletown	Ohio	44442	250	0.215	15	479	0.257	<5
BFI-40	Front of House	9026 Struthers Road	New Middletown	OH	44442	210	<0.02	72	669	0.149	<5
BFI-41	Back of House	9191 Struthers Road	New Middletown	Ohio	44442	220	0.093	41	553	0.162	<5
BFI-52	Garage	9147 Struthers Road	New Middletown	Ohio	44442	200	<0.02	131	901	0.127	<5
BFI-54		4783 Cowden Road	Poland	Ohio	44514	340	<0.02	26	703	0.842	<5
BFI-60		10337 Struthers Road	New Middletown	Ohio	44442	350	<0.02	53	665	0.156	<5
BFI-62		6738 Struthers Road	Poland	Ohio	44514	240	<0.02	75	712	0.266	<5
BFI-66	Outside	7307 Struthers Road	Poland	Ohio	44514	290	0.127	5	553	0.468	<5
BFI-67	Back of House	4925 Cowden Road	Poland	Ohio	44514	240	0.562	16	531	0.321	<5

March 23, 2010

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride	Arsenic
BFI-70		6620 Struthers	Poland	Ohio	44514	380	0.5	17	694	0.988	<5
BFI-71		6636 Struthers	Poland	Ohio	44514	380	0.154	22	865	1.06	<5

March 23, 2010

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-01	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	62.1	23	3.4	22
BFI-05	183	<10	<20	152.3	1538	<5	190.2	<0.20	<2	<10	25.1	20	2	4.7
BFI-06	<100	<10	<20	28.1	<50	<5	<10	<0.20	<2	<10	27.5	28	1.9	88.7
BFI-07	<100	<10	<20	52.6	<50	<5	<10	<0.20	<2	<10	15.2	7	1.6	166.7
BFI-08	<100	<10	<20	33.1	<50	<5	168.6	<0.20	<2	<10	29.5	23.1	1.5	6.2
BFI-12	<100	<10	<20	25	<50	<5	<10	<0.20	<2	<10	33.8	<0.1	0.6	277.3
BFI-15	<100	<10	<20	19	287	<5	96.7	<0.20	<2	<10	72	24.5	3	72.1
BFI-26	137.7	<10	<20	<10	705.2	<5	38.3	<0.20	<2	<10	<10	15.1	3.9	31.5
BFI-27	137.3	<10	<20	42	3337	<5	242.8	<0.20	<2	<10	336.4	11.1	1.7	38.2
BFI-28	262.6	<10	<20	<10	<50	<5	16.4	<0.20	<2	<10	<10	3.7	3.8	120
BFI-30	<100	<10	<20	25.9	205.2	<5	57.1	<0.20	<2	<10	30.6	18	2.3	4.7
BFI-31	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	7.7	4.5	105.1
BFI-33	181.5	<10	<20	58.2	2606	<5	281.2	<0.20	<2	<10	197.6	12.7	3	30
BFI-34	206.8	<10	<20	<10	126.4	<5	10	<0.20	<2	<10	14.5	3.9	3.6	127.4
BFI-35	223.6	<10	<20	<10	245.2	<5	115.5	<0.20	<2	<10	32	11	5.8	61.1
BFI-37	<100	<10	<20	11	<50	<5	36	<0.20	<2	<10	20.1	17.2	0.9	11.8
BFI-38	123	<10	<20	16.1	<50	<5	<10	<0.20	<2	<10	43.8	1.8	1.7	115.5
BFI-39	220	<10	<20	12.1	691	<5	55	<0.20	<2	<10	24	13.4	2.2	32
BFI-40	136	<10	<20	413	2962	20.5	231	<0.20	<2	<10	75	20.5	1.7	22.5
BFI-41	310.3	<10	<20	22.4	<50	<5	163.1	<0.20	<2	<10	11.2	16.6	1.7	16
BFI-52	133	<10	<20	80	<50	<5	236.6	<0.20	<2	<10	36	23	1	33.7
BFI-54	134.4	<10	<20	10.4	<50	<5	<10	<0.20	<2	<10	20.5	7.5	3.6	133.2
BFI-60	126	<10	<20	<10	88.8	<5	63.7	<0.20	<2	<10	39.3	24	1.4	11.3
BFI-62	123	<10	<20	18	15893	<5	183.3	<0.20	<2	<10	33.2	28.5	1.7	24.8
BFI-66	114.1	<10	<20	17.8	<50	<5	<10	<0.20	<2	<10	25.5	1.2	1	127.4
BFI-67	<100	<10	<20	<10	892	<5	88.2	<0.20	<2	<10	<10	11.8	4.8	64.3

March 23, 2010

ID	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium	Potassium	Sodium
BFI-70	235.8	<10	<20	<10	90.4	<5	<10	<0.20	<2	<10	21.5	3	2.6	173
BFI-71	<100	<10	<20	143.1	<50	17	<10	<0.20	<2	<10	64.3	0.3	1.4	230.1

March 23, 2010

ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	Not Analyzed	<10	7.54	407	119.78	POS	0.28
BFI-05	Not Analyzed	<10	7.56	343	136.65		3.26
BFI-06	Not Analyzed	<10	7.19	842	115.25		<0.1
BFI-07	Not Analyzed	<10	7.98	581	217.74		0.29
BFI-08	Not Analyzed	<10	7.33	385	148.59		0.45
BFI-12	Not Analyzed	<10	7.25	872	191.39		0.14
BFI-15	Not Analyzed	<10	7.4	670	156.82		0.46
BFI-26	Not Analyzed	<10	7.6	381	107.43		6.36
BFI-27	Not Analyzed	<10	7.16	383	143.65		13.69
BFI-28	Not Analyzed	<10	8.21	410	139.53		<0.1
BFI-30	Not Analyzed	<10	7.48	378	133.77		1.26
BFI-31	Not Analyzed	<10	9.43	643	313.23		0.11
BFI-33	Not Analyzed	<10	8.1	304	70.8		6.35
BFI-34	Not Analyzed	<10	8.15	430	184.81		0.43
BFI-35	Not Analyzed	<10	7.67	390	137.47		1.39
BFI-37	Not Analyzed	<10	7.22	334	69.97	POS	0.1
BFI-38	Not Analyzed	<10	8.08	337	114.84		0.13
BFI-39	Not Analyzed	<10	7.72	316	86.02		3.33
BFI-40	Not Analyzed	<10	7.17	445	118.95		1.12
BFI-41	Not Analyzed	12.98	7.61	368	98.78		<0.1
BFI-52	Not Analyzed	<10	7.34	600	124.71		0.18
BFI-54	Not Analyzed	<10	8.22	467	196.33		<0.1
BFI-60	Not Analyzed	<10	7.53	445	118.95		2.08
BFI-62	Not Analyzed	<10	7.24	475	118.95		102.2
BFI-66	Not Analyzed	<10	7.61	367	146.12		0.21
BFI-67	Not Analyzed	<10	7.53	355	107.02		1.89



March 23, 2010

ID	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-70	Not Analyzed	<10	8.17	464	158.47		0.56
BFI-71	Not Analyzed	<10	8.41	575	253.96		0.26

April 6, 2010

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-02	Front of House	4911 Arrel Road	Lowellville	Ohio	44436	180	<0.02	35	542	0.105
BFI-03		4911 Miller Road	Lowellville	Ohio	44436	80	0.449	70	893	0.852
BFI-04	Kitchen	4921 Arrel Road	Lowellville	Ohio	44436	390	0.327	15	753	1.62
BFI-10	Side of House	5027 Miller Road	Lowellville	Ohio	44436	230	<0.02	40	565	0.138
BFI-11	Shed	9624 Rapp Road	New Middletown	Ohio	44442	210	<0.02	80	732	0.0485
BFI-14	Basment	5084 Arrel Road	Lowellville	OH	44436	180	<0.02	10	463	0.16
BFI-17	Side of House	5110 Miller Road	Lowellville	Ohio	44436	260	<0.02	35	695	0.214
BFI-18	Basment	5296 Arrel Road	Lowellville	OH	44436	220	0.22	41	578	0.054
BFI-19	Back of house	5425 Arrel Road	Lowellville	Ohio	44436	300	0.357	12	623	1.36
BFI-20	Outside	5724 Arrel Road	Lowellville	Ohio	44436	160	<0.02	40	485	<0.02
BFI-21	Back of House	9746 Felger Road	New Middletown	Ohio	44442	260	0.879	13	570	0.261
BFI-22	Front of House	6334 East Calla Road	New Middletown	Ohio	44442	220	<0.02	34	688	0.239
BFI-23	Back of House	5219 Arrel Road	Lowellville	OH	44436	140	<0.02	13	406	0.0548
BFI-25	Basement	6557 Metz Road	New Middletown	Ohio	44442	310	0.0929	11	610	0.194
BFI-32		6227 East Calla Road	New Middletown	Ohio	44442	270	<0.02	8	523	0.189
BFI-36	Back of House	7660 Moore Road	Lowellville	Ohio	44436	280	0.861	10	560	0.543
BFI-42	Basement	9572 South State Line Road	New Middletown	Ohio	44436	300	0.23	130	627	0.258
BFI-43	Front of House	9315 Felger Road	New Middletown	Ohio	44442	340	0.271	16	1060	0.107
BFI-44	Back of House	9320 South State Line Road	New Middletown	Ohio	44442	350	0.181	13	1181	0.142
BFI-47	Front Yard	9491 O Rapp Road	New Middletown	Ohio	44442	280	<0.02	21	771	0.113
BFI-48	Inside-Kitchen	9491 I Rapp Road	New Middletown	Ohio	44442	380	<0.02	450	1704	1.83
BFI-50	Foyer	9494 Felger Road	New Middletown	Ohio	44442	370	0.383	118	1030	0.903
BFI-55		6276 Metz Road	New Middletown	Ohio	44442	280	<0.02	50	686	0.366
BFI-56		5733 Miller Road	Lowellville	Ohio	44436	250	<0.02	72	816	0.184
BFI-57		5130 Miller Road	Lowellville	Ohio	44436	250	<0.02	74	853	0.102
BFI-58		5084 Miller Road	Lowellville	Ohio	44436	210	<0.02	31	594	0.249
BFI-59		9850 South State Line Road	New Middletown	Ohio	44442	270	0.0649	42	753	0.249

April 6, 2010

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-63	Outside	6827 East Calla Road	New Middletown	Ohio	44442	210	<0.02	51	646	0.27
BFI-64	Kitchen	6900 East Calla Road	New Middletown	Ohio	44442	280	0.491	20	632	0.268
BFI-65	Outside	5334 Arrel Road	Lowellville	Ohio	44436	220	<0.02	78	745	0.0501
BFI-68		9511 Felger Road	New Middletown	Ohio	44442	300	0.236	16	625	0.298
BFI-69		5258 Arrel Road	Lowellville	Ohio	44436	230	0.562	11	480	0.111

April 6, 2010

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-02	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-03	<5	<100	<10	<20	120.5	<50	<5	<10	<0.20	<2	<10	<10	6.9
BFI-04	<5	104.1	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	12.8	0.6
BFI-10	<5	281	<10	<20	14.1	1027	<5	98.8	<0.20	<2	<10	<10	20.4
BFI-11	<5	215	<10	<20	23	440.6	<5	130.7	<0.20	<2	<10	29.2	21.6
BFI-14	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	38.8	0.3
BFI-17	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	86.1	24.8
BFI-18	<5	341.9	<10	<20	<10	1546	<5	250.5	<0.20	<2	<10	24.6	17.4
BFI-19	<5	138	<10	<20	<10	<50	<5	11.8	<0.20	<2	<10	<10	1.5
BFI-20	<5	151.3	<10	<20	15.7	<50	<5	19.1	<0.20	<2	<10	85.1	12.7
BFI-21	<5	277.3	<10	<20	<10	298	<5	83	<0.20	<2	<10	<10	23.2
BFI-22	<5	<100	<10	<20	12.4	86.2	<5	<10	<0.20	<2	<10	18.7	<0.1
BFI-23	<5	232.3	<10	<20	57	<50	<5	32	<0.20	<2	<10	19	13.2
BFI-25	<5	<100	<10	<20	19	<50	<5	<10	<0.20	<2	<10	17.7	<0.1
BFI-32	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	26.3	<0.1
BFI-36	<5	291.2	<10	<20	55.5	51	<5	25.3	<0.20	<2	<10	31.5	10
BFI-42	<5	139.3	<10	<20	<10	2327	<5	241.6	<0.20	<2	<10	<10	22.8
BFI-43	<5	<100	<10	<20	53.5	3771	<5	537.7	<0.20	<2	<10	<10	38.4
BFI-44	<5	<100	<10	<20	<10	2569	<5	406.7	<0.20	<2	<10	40	47.4
BFI-47	<5	<100	<10	<20	<10	<50	<5	40.7	<0.20	<2	<10	1315	28.3
BFI-48	<5	241.8	<10	<20	39	132.5	<5	20	<0.20	<2	<10	90.3	3.8
BFI-50	<5	512.4	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	15.1	2.8
BFI-55	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-56	<5	176.3	<10	<20	26.3	<50	<5	163.9	<0.20	<2	<10	13.3	28
BFI-57	<5	<100	<10	<20	<10	86.4	<5	<10	<0.20	<2	<10	<10	0.7
BFI-58	<5	<100	<10	<20	22.7	<50	20.4	<10	<0.20	<2	<10	18	20.6
BFI-59	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	16.5	<0.1

April 6, 2010

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-63	<5	<100	<10	<20	22.3	<50	<5	<10	<0.20	<2	<10	18	<0.1
BFI-64	<5	148.1	<10	<20	123.4	6298	<5	202.3	<0.20	<2	<10	159	21.4
BFI-65	<5	234.2	<10	<20	<10	2323	<5	308	<0.20	<2	<10	31.4	21.2
BFI-68	<5	175.3	<10	<20	97.8	617	<5	655.8	<0.20	<2	<10	241	22.7
BFI-69	<5	548.5	<10	<20	42	1118	<5	111.1	<0.20	<2	<10	44.8	14.7

April 6, 2010

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-02	0.1	144.7	Not Analyzed	<10	7.14	361	74.5		0.39
BFI-03	5.5	115.4	Not Analyzed	<10	9.35	594	280.71		0.28
BFI-04	1.3	213.3	Not Analyzed	<10	8.25	501	188.1		0.46
BFI-10	1.3	13	Not Analyzed	<10	7.9	376	73.68		6.44
BFI-11	1.3	26.6	Not Analyzed	<10	6.77	487	90.55		0.19
BFI-14	<0.1	129.3	Not Analyzed	<10	7.17	309	77.79		0.3
BFI-17	1.2	17.8	Not Analyzed	<10	7.21	463	127.18	POS	0.76
BFI-18	2.2	15	Not Analyzed	<10	7.18	384	66.68		3.49
BFI-19	1.6	183.3	Not Analyzed	<10	8.01	416	117.31		0.32
BFI-20	1.3	14.5	Not Analyzed	<10	6.91	322	57.62		0.57
BFI-21	3.3	21.4	Not Analyzed	<10	7.11	380	91.79		0.54
BFI-22	<0.1	182.4	Not Analyzed	<10	7.02	459	143.65		0.66
BFI-23	1.7	18.4	Not Analyzed	<10	6.87	270	59.27		0.28
BFI-25	0.9	178.1	Not Analyzed	<10	7.39	406	72.44		0.68
BFI-32	<0.1	151.2	Not Analyzed	<10	7.1	348	122.66		<0.1
BFI-36	4.7	102.7	Not Analyzed	<10	7.65	373	109.9		1.18
BFI-42	2.9	31.1	Not Analyzed	<10	7.38	418	69.15		15.89
BFI-43	2.9	23.7	Not Analyzed	<10	7.18	705	333.81		12.25
BFI-44	3.6	24.7	Not Analyzed	<10	7.04	786	409.95		3.3
BFI-47	3	15.4	Not Analyzed	<10	7.42	513	122.25	POS	0.43
BFI-48	2.1	244.5	Not Analyzed	<10	8.39	1135	71.21		1.47
BFI-50	2.5	191.6	Not Analyzed	<10	8.09	686	174.26		0.16
BFI-55	<0.1	202	Not Analyzed	<10	7.68	457	88.91		<0.1
BFI-56	1.8	22.9	Not Analyzed	<10	7.39	543	125.54	POS	0.56
BFI-57	1.2	238.7	Not Analyzed	<10	7.28	571	168.34	POS	0.9
BFI-58	1.1	16	Not Analyzed	<10	7.57	395	106.6		0.45
BFI-59	1.1	210.8	Not Analyzed	<10	7.12	501	148.18		0.12

April 6, 2010

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-63	<0.1	183.5	Not Analyzed	<10	7.37	430	111.96	POS	0.12
BFI-64	4.1	33.6	Not Analyzed	<10	7.4	420	116.89		22.5
BFI-65	1.7	25.1	Not Analyzed	<10	6.99	496	100.84		8.03
BFI-68	2.7	30	Not Analyzed	<10	7.4	416	112.37		0.59
BFI-69	3	26.9	Not Analyzed	<10	7.32	319	56.39		2.28

Aug 9, 2010

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-01		4573 Center Road	Poland	Ohio	44514	260	<0.02	26	679	0.189
BFI-05	Back of House	4969 Center Road	Lowellville	Ohio	44436	250	0.141	10	535	0.169
BFI-06	Kitchen	4983 A Center Road	Lowellville	Ohio	44436	250	<0.02	160	1127	0.179
BFI-07	Back of House	4983 B Center Road	Lowellville	Ohio	44436	340	0.261	86	999	0.926
BFI-08	Rental Unit-Outside	5005 Center Road	Lowellville	Ohio	44436	250	<0.02	9	583	0.197
BFI-12		5050 Center Road	Lowellville	Ohio	44436	280	<0.02	125	991	0.69
BFI-13	Back of House	5076 Center Road	Lowellville	Ohio	44436	80	0.245	90	928	0.816
BFI-15	Side of House	5091 Center Road	Lowellville	Ohio	44436	270	0.16	130	1054	0.354
BFI-26	Basement	6349 Center Road	Lowellville	Ohio	44436	210	0.247	46	599	0.17
BFI-27	Side of House	6495 Lowellville Road	Lowellville	Ohio	44436	220	<0.02	35	568	0.131
BFI-28	Kitchen	6670 Stymie Road	Lowellville	Ohio	44436	280	0.649	24	603	0.361
BFI-30	Back of House	6729 Stymie Road	Lowellville	Ohio	44436	260	0.071	22	579	0.172
BFI-31	Back of House	6815 Stymie Road	Lowellville	Ohio	44436	70	<0.02	87	913	0.838
BFI-33	Garage	6839 Stymie Road	Lowellville	Ohio	44436	200	<0.02	20	454	0.273
BFI-34	Side of House	6850 Stymie Road	Lowellville	Ohio	44436	310	0.5	23	658	0.52
BFI-35	Back of House	6931 Stymie Road	Lowellville	Ohio	44436	270	<0.02	6	453	0.324
BFI-37	Side of House	7965 Struthers Road	Poland	Ohio	44514	120	<0.02	21	443	0.0809
BFI-38	Kitchen	8095 Struthers Road	New Middletown	Ohio	44442	280	<0.02	5	512	0.136
BFI-39	Back of House	8915 Struthers Road	New Middletown	Ohio	44442	240	0.221	12	492	0.326
BFI-40	Front of House	9026 Struthers Road	New Middletown	OH	44442	200	<0.02	60	654	0.0741
BFI-41	Back of House	9191 Struthers Road	New Middletown	Ohio	44442	210	0.0771	40	572	0.0959
BFI-52	Garage	9147 Struthers Road	New Middletown	Ohio	44442	220	0.0865	61	698	0.0852
BFI-54		4783 Cowden Road	Poland	Ohio	44514	350	<0.02	31	714	0.853
BFI-60		10337 Struthers Road	New Middletown	Ohio	44442	240	<0.02	40	682	0.0878
BFI-61		8949 Struthers Road	New Middletown	Ohio	44442	250	0.272	10	512	0.331
BFI-62		6738 Struthers Road	Poland	Ohio	44514	70	0.141	101	912	0.871



Aug 9, 2010

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-66	Outside	7307 Struthers Road	Poland	Ohio	44514	280	<0.02	4	559	0.442
BFI-67	Back of House	4925 Cowden Road	Poland	Ohio	44514	270	0.863	14	561	0.305
BFI-70		6620 Struthers Road	Poland	Ohio	44514	380	0.299	17	722	0.938
BFI-71		6636 Struthers Road	Poland	Ohio	44514	470	0.402	14	893	1.08
BFI-73		9076 Struthers Road	New Middletown	Ohio	44442	290	0.264	8	579	0.331

Aug 9, 2010

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-01	<5	126.1	<10	<20	15.8	<50	<5	22.6	<0.20	<2	<10	37	27
BFI-05	<5	223.9	<10	<20	<10	1121	<5	224.7	<0.20	<2	<10	10.6	21.8
BFI-06	<5	102.1	<10	<20	15.8	<50	<5	<10	<0.20	21.2	<10	16.1	26.9
BFI-07	<5	147.1	<10	<20	<10	<50	<5	20	<0.20	<2	<10	14.7	11.5
BFI-08	<5	<100	<10	<20	<10	128	<5	152.3	<0.20	<2	<10	25	23
BFI-12	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	14.6	<0.1
BFI-13	<5	<100	<10	<20	126.8	<50	<5	<10	<0.20	<2	<10	19.3	2.4
BFI-15	<5	101.3	<10	<20	<10	1032	<5	126.8	<0.20	<2	<10	10.3	24.5
BFI-26	<5	169	<10	<20	14	646.9	<5	32.4	<0.20	<2	<10	30	17.5
BFI-27	<5	171.4	<10	<20	<10	5690	<5	300	<0.20	<2	<10	24	12.4
BFI-28	<5	380.6	<10	<20	<10	<50	<5	21.2	<0.20	<2	<10	<10	4.6
BFI-30	<5	117	<10	<20	27.8	195.2	<5	58	<0.20	<2	<10	32.4	20.4
BFI-31	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	2.5
BFI-33	<5	190	<10	<20	12.4	<50	<5	<10	<0.20	<2	<10	62.7	12.8
BFI-34	<5	268	<10	<20	<10	68	<5	10	<0.20	<2	<10	<10	4.2
BFI-35	<5	286.3	<10	<20	<10	90.6	<5	203	<0.20	<2	<10	54.6	16.3
BFI-37	<5	<100	<10	<20	38.4	<50	<5	16.7	<0.20	<2	<10	13.5	13.2
BFI-38	<5	160.6	<10	<20	26	<50	<5	<10	<0.20	<2	<10	37	1.8
BFI-39	<5	282.3	<10	<20	18	484.3	<5	57.3	<0.20	<2	<10	<10	11.2
BFI-40	<5	174.9	<10	<20	<10	4718	<5	261.4	<0.20	<2	<10	<10	19
BFI-41	<5	160	<10	<20	<10	<50	<5	84	<0.20	<2	<10	13	16
BFI-52	<5	175.5	<10	<20	23.7	<50	<5	536.3	<0.20	<2	<10	<10	19.7
BFI-54	<5	175.4	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	17.5	7
BFI-60	<5	160	<10	<20	<10	<50	<5	84	<0.20	<2	<10	13	22.8
BFI-61	<5	298.3	<10	<20	<10	967.1	<5	90.4	<0.20	<2	<10	<10	10
BFI-62	<5	<100	<10	<20	41.8	<50	<5	<10	<0.20	<2	<10	<10	2.4

Aug 9, 2010

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-66	<5	114	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.6
BFI-67	<5	114.8	<10	<20	<10	<50	<5	46.9	<0.20	<2	<10	<10	10
BFI-70	<5	209.7	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	1.9
BFI-71	<5	<100	<10	<20	24.2	<50	<5	<10	<0.20	<2	<10	38	0.3
BFI-73	<5	<100	<10	<20	22.7	<50	<5	<10	<0.20	<2	<10	88.9	0.9

Aug 9, 2010

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-01	3.6	35.3	Not Analyzed	<10	7.56	453	130.07	POS	0.19
BFI-05	1.9	4.9	Not Analyzed	<10	7.39	355	102.9		6.92
BFI-06	1.9	104.3	Not Analyzed	<10	7.1	749	156.41	POS	<0.1
BFI-07	1.9	183.1	Not Analyzed	<10	7.77	667	173.7		0.33
BFI-08	1.6	8.5	Not Analyzed	<10	7.3	388	41.98		0.52
BFI-12	0.6	246.4	Not Analyzed	<10	7.61	657	161.35		<0.1
BFI-13	4.8	113.6	Not Analyzed	<10	9.63	620	300.47		0.13
BFI-15	2.8	95.5	Not Analyzed	<10	7.25	701	142.83	POS	0.36
BFI-26	4.2	34	Not Analyzed	<10	7.45	399	99.61		3.43
BFI-27	1.8	44.8	Not Analyzed	<10	7.16	377	97.55		32.8
BFI-28	4.5	130	Not Analyzed	<10	8.18	403	60.09	POS	<0.1
BFI-30	2.4	5.6	Not Analyzed	<10	7.48	386	202.1	POS	1.14
BFI-31	5.2	116.5	Not Analyzed	<10	9.74	602	291.41		<0.1
BFI-33	3.2	34	Not Analyzed	<10	7.68	304	93.02	POS	0.23
BFI-34	4.1	150	Not Analyzed	<10	8.09	437	106.6	POS	0.31
BFI-35	6.7	12.3	Not Analyzed	<10	7.48	302	127.18		0.3
BFI-37	0.9	8.7	Not Analyzed	<10	6.89	296	83.97	POS	0.12
BFI-38	1.7	110	Not Analyzed	<10	7.85	341	138.3		0.2
BFI-39	2.1	55	Not Analyzed	<10	7.63	326	147.76		Not Analyzed
BFI-40	1.6	19.4	Not Analyzed	<10	6.83	435	118.13		Not Analyzed
BFI-41	1.6	15.9	Not Analyzed	<10	7.31	381	111.96	POS	<0.1
BFI-52	1.2	20.7	Not Analyzed	<10	7.28	464	94.26		0.16
BFI-54	3.4	140.9	Not Analyzed	<10	8.18	475	76.56		0.18
BFI-60	1.5	11	Not Analyzed	<10	7.32	455	134.59	POS	0.22
BFI-61	2.6	58.8	Not Analyzed	<10	7.67	341	133.36		1.66
BFI-62	5.1	117	Not Analyzed	<10	9.41	606	262.6		<0.1

Aug 9, 2010

ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-66	0.9	136.2	Not Analyzed	<10	7.57	373	164.64	POS	Not Analyzed
BFI-67	3.3	59	Not Analyzed	<10	7.52	372	137.06	POS	6.3
BFI-70	2.3	193.8	Not Analyzed	<10	8.19	480	65.86		0.21
BFI-71	1.4	241.7	Not Analyzed	<10	8.51	597	83.55		0.16
BFI-73	1.4	135.6	Not Analyzed	<10	7.95	385	144.06	POS	<0.1

Sept 8, 2010

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-02	Front of House	4911 Arrel Road	Lowellville	Ohio	44436	180	<0.02	31	558	0.152
BFI-04	Kitchen	4921 Arrel Road	Lowellville	Ohio	44436	390	0.173	9	791	1.74
BFI-10	Side of House	5027 Miller Road	Lowellville	Ohio	44436	240	<0.02	39	679	0.218
BFI-11	Shed	9624 Rapp Road	New Middletown	Ohio	44442	230	<0.02	85	743	0.0953
BFI-14	Basment	5084 Arrel Road	Lowellville	OH	44436	180	<0.02	15	478	0.198
BFI-17	Side of House	5110 Miller Road	Lowellville	Ohio	44436	240	<0.02	30	711	0.267
BFI-18	Basment	5296 Arrel Road	Lowellville	OH	44436	210	<0.02	43	613	0.107
BFI-20	Outside	5724 Arrel Road	Lowellville	Ohio	44436	160	<0.02	31	516	0.093
BFI-21	Back of House	9746 Felger Road	New Middletown	Ohio	44442	280	0.81	10	604	0.32
BFI-22	Front of House	6334 East Calla Road	New Middletown	Ohio	44442	210	<0.02	26	706	0.272
BFI-23	Back of House	5219 Arrel Road	Lowellville	OH	44436	170	<0.02	14	447	0.127
BFI-25	Basement	6557 Metz Road	New Middletown	Ohio	44442	320	<0.02	7	632	0.259
BFI-29	Back of House	9612 Struthers Road	New Middletown	Ohio	44442	270	<0.02	47	625	0.141
BFI-32		6227 East Calla Road	New Middletown	Ohio	44442	250	0.265	5	551	0.235
BFI-36	Back of House	7660 Moore Road	Lowellville	Ohio	44436	280	0.807	4	564	0.487
BFI-42	Basement	9572 South Stateline Road	New Middletown	Ohio	44436	300	0.337	11	646	0.341
BFI-43	Front of House	9315 Felger Road	New Middletown	Ohio	44442	320	0.192	10	1064	0.204
BFI-44	Back of House	9320 South Stateline Road	New Middletown	Ohio	44442	370	0.201	11	1123	0.221
BFI-47	Front Yard	9491 O Rapp Road	New Middletown	Ohio	44442	300	<0.02	18	829	0.168
BFI-48	Inside-Kitchen	9491 I Rapp Road	New Middletown	Ohio	44442	350	0.825	280	1543	1.74
BFI-50	Foyer	9494 Felger Road	New Middletown	Ohio	44442	380	0.704	105	993	0.903
BFI-53		5406 Arrel Road	Lowellville	Ohio	44436	200	<0.02	66	727	0.165
BFI-55		6276 Metz Road	New Middletown	Ohio	44442	250	0.464	34	668	0.403
BFI-56		5733 Miller Road	Lowellville	Ohio	44436	250	<0.02	55	830	0.247
BFI-57		5130 Miller Road	Lowellville	Ohio	44436	210	<0.02	70	867	0.138
BFI-58		5084 Miller Road	Lowellville	Ohio	44436	210	<0.02	36	701	0.281
BFI-59		9850 South Stateline Road	New Middletown	Ohio	44442	270	0.117	35	782	0.296

Sept 8, 2010

ID	Location	Address1	City	State	Zip	Alkalinity	Ammonia	Chloride	Conduct	Fluoride
BFI-63	Outside	6827 East Calla Road	New Middletown	Ohio	44442	210	0.342	50	659	0.306
BFI-64	Kitchen	6900 East Calla Road	New Middletown	Ohio	44442	270	0.452	15	631	0.335
BFI-65	Outside	5334 Arrel Road	Lowellville	Ohio	44436	220	<0.02	66	762	0.113
BFI-68		9511 Felger Road	New Middletown	Ohio	44442	300	0.275	14	635	0.351
BFI-69		5258 Arrel Road	Lowellville	Ohio	44436	230	0.461	10	499	0.177
BFI-72		6539 Metz Road	New Middletown	Ohio	44442	300	0.832	16	692	0.511
BFI-74		9114 Struthers Road	New Middletown	Ohio	44442	240	<0.02	20	562	0.135
BFI-75		6649 Metz Road	New Middletown	Ohio	44442	270	<0.02	110	984	0.213
BFI-76		6903 East Calla Road	New Middletown	Ohio	44442	290	<0.02	14	642	0.388

Sept 8, 2010

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-02	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-04	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.3
BFI-10	<5	260	<10	<20	<10	1900	<5	140	<0.20	<2	<10	<10	15.6
BFI-11	<5	134.8	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	17.4
BFI-14	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-17	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	49.2	18.4
BFI-18	<5	261.8	<10	<20	<10	693	<5	184.8	<0.20	<2	<10	<10	12.7
BFI-20	<5	128	<10	<20	17.4	<50	<5	28.4	<0.20	<2	<10	55.4	10.1
BFI-21	<5	204.5	<10	<20	17.2	651.7	<5	66.9	<0.20	<2	<10	22.6	19.4
BFI-22	<5	<100	<10	<20	17.8	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-23	<5	198.7	<10	<20	<10	<50	<5	74.5	<0.20	<2	<10	<10	10.9
BFI-25	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-29	<5	340.2	<10	<20	<10	1860	<5	145	<0.20	<2	<10	<10	16.2
BFI-32	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-36	<5	248.3	<10	<20	<10	<50	<5	18.2	<0.20	<2	<10	<10	9
BFI-42	<5	121.9	<10	<20	<10	1678	<5	200.1	<0.20	<2	<10	20.4	18.7
BFI-43	<5	<100	<10	<20	12.4	4229	<5	448.4	<0.20	<2	<10	16.8	34.1
BFI-44	<5	<100	<10	<20	14.8	966.3	<5	329	<0.20	<2	<10	37.9	36.4
BFI-47	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	889	25.5
BFI-48	<5	205.4	<10	<20	<10	<50	<5	11.8	<0.20	<2	<10	<10	3.9
BFI-50	<5	433.4	<10	<20	17.8	<50	<5	16.6	<0.20	<2	<10	<10	2.8
BFI-53	<5	122.8	<10	<20	<10	67	<5	81.6	<0.20	<2	<10	<10	19.5
BFI-55	<5	160.3	<10	<20	16	283	<5	17.3	<0.20	<2	<10	<10	4.3
BFI-56	<5	144.1	<10	<20	<10	<50	<5	138	<0.20	<2	<10	<10	21.3
BFI-57	<5	155.3	<10	<20	<10	1019	<5	146.8	<0.20	<2	<10	<10	15.5
BFI-58	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	<0.1
BFI-59	<5	<100	<10	<20	<10	<50	<5	16	<0.20	<2	<10	20.2	<0.1



Sept 8, 2010

ID	Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Selenium	Silver	Zinc	Magnesium
BFI-63	<5	161	<10	<20	<10	206.8	<5	498	<0.20	<2	<10	14	16
BFI-64	<5	105.8	<10	<20	265.2	2543	<5	151.8	<0.20	<2	<10	49.7	16.2
BFI-65	<5	180.6	<10	<20	<10	825.3	<5	219.5	<0.20	<2	<10	10.6	15.6
BFI-68	<5	142.2	<10	<20	<10	131	<5	532.8	<0.20	<2	<10	18.6	19.3
BFI-69	<5	405.6	<10	<20	20.6	540.2	<5	74	<0.20	<2	<10	<10	11.4
BFI-72	<5	128.4	<10	<20	<10	359	<5	52.8	<0.20	<2	<10	<10	13.2
BFI-74	<5	141.8	<10	<20	<10	<50	<5	72.4	<0.20	<2	<10	<10	13.2
BFI-75	<5	<100	<10	<20	<10	468.4	<5	374.7	<0.20	<2	<10	<10	25.2
BFI-76	<5	<100	<10	<20	<10	<50	<5	<10	<0.20	<2	<10	<10	0.6

Sept 8, 2010

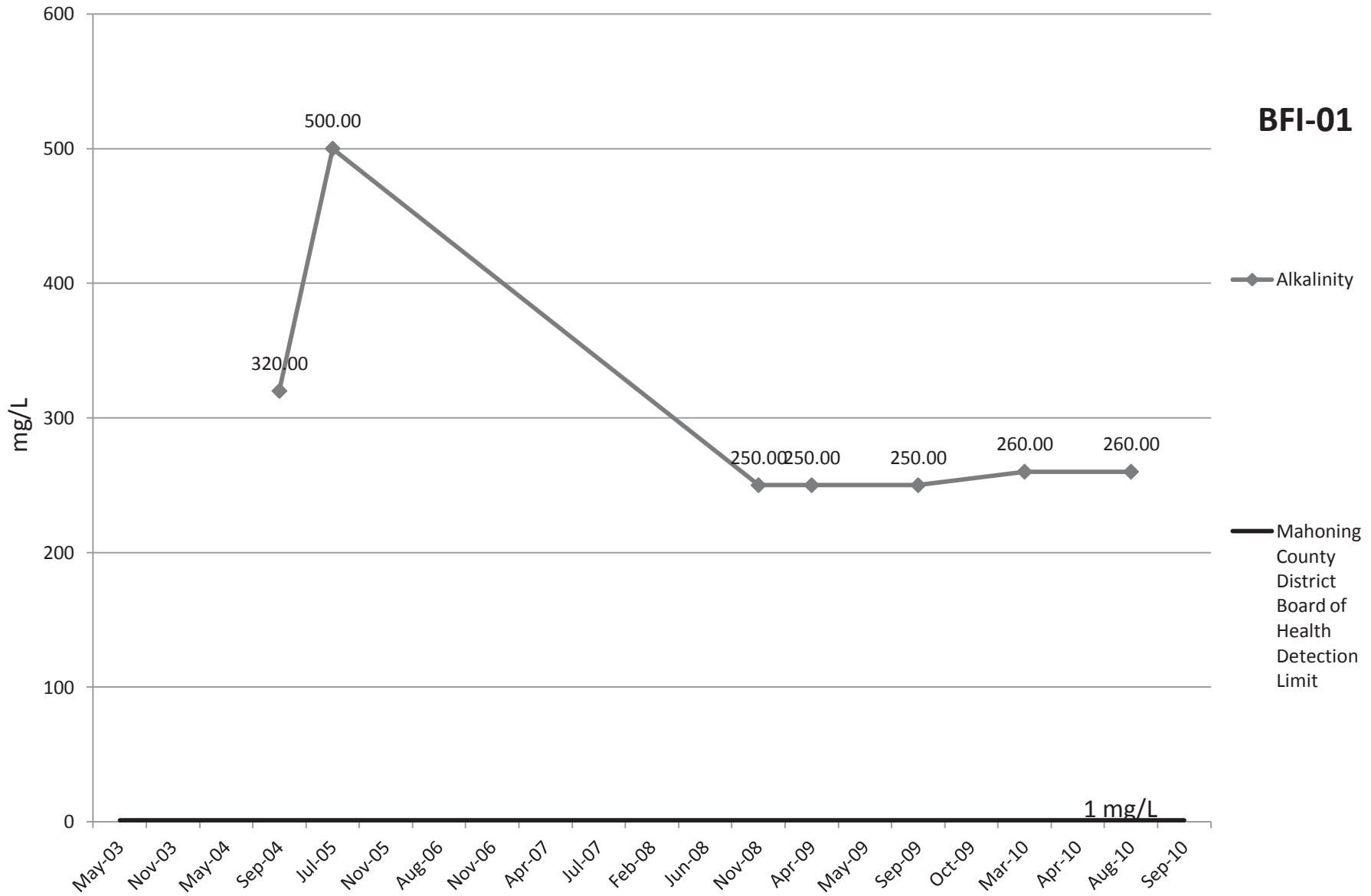
ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-02	<0.1	115.5	<0.5	<10	7.2	372	72.85	NEG	<0.1
BFI-04	1.1	177.6	<0.5	<10	8.42	526	191.39	POS	0.13
BFI-10	1.1	10.3	<0.5	<10	7.45	452	95.49	NEG	36.2
BFI-11	1.1	21.5	<0.5	<10	7.69	494	104.96	NEG	0.47
BFI-14	<0.1	101.5	<0.5	<10	7.27	317	76.15	POS	0.18
BFI-17	1.1	12.8	<0.5	<10	7.31	473	122.25	NEG	<0.1
BFI-18	1.7	14.2	<0.5	<10	7.25	407	76.15	POS	4.03
BFI-20	1.5	14.9	<0.5	<10	7	342	78.2	POS	0.13
BFI-21	4	21.5	<0.5	<10	7.08	401	89.32	POS	0.74
BFI-22	<0.1	146.7	<0.5	<10	6.95	472	162.99	NEG	0.71
BFI-23	1.4	12.8	<0.5	<10	7.05	297	71.62	NEG	<0.1
BFI-25	<0.1	139.3	<0.5	<10	7.66	422	186.04	NEG	0.38
BFI-29	1.4	8.5	<0.5	<10	7.95	417	101.67	NEG	8.2
BFI-32	0.9	123	<0.5	<10	6.92	365	101.67	NEG	<0.1
BFI-36	4.2	62.7	<0.5	<10	7.55	376	100.84	POS	0.26
BFI-42	2.4	28.8	<0.5	<10	7.36	431	84.38	POS	16.69
BFI-43	2.3	20.2	<0.5	<10	7.21	708	326.81	NEG	12.77
BFI-44	2.6	20.8	<0.5	<10	7.07	747	343.27	NEG	3.24
BFI-47	2.2	10.8	<0.5	<10	8.03	551	172.87	POS	0.35
BFI-48	3.2	271	<0.5	<10	8.48	1027	167.93	POS	0.25
BFI-50	3.3	213.2	<0.5	<10	8.03	661	133.36	NEG	0.17
BFI-53	1.8	15.4	<0.5	<10	7.25	485	81.09	POS	1.41
BFI-55	2.4	117.3	<0.5	<10	8.1	445	155.17	NEG	5.25
BFI-56	1.4	17.2	<0.5	<10	7.47	533	120.19	NEG	<0.1
BFI-57	1.3	40.2	<0.5	<10	7.25	575	120.6	POS	0.75
BFI-58	<0.1	133	<0.5	<10	7.34	467	102.08	NEG	0.11
BFI-59	<0.1	177	<0.5	<10	7.15	520	135.83	NEG	0.35

Sept 8, 2010

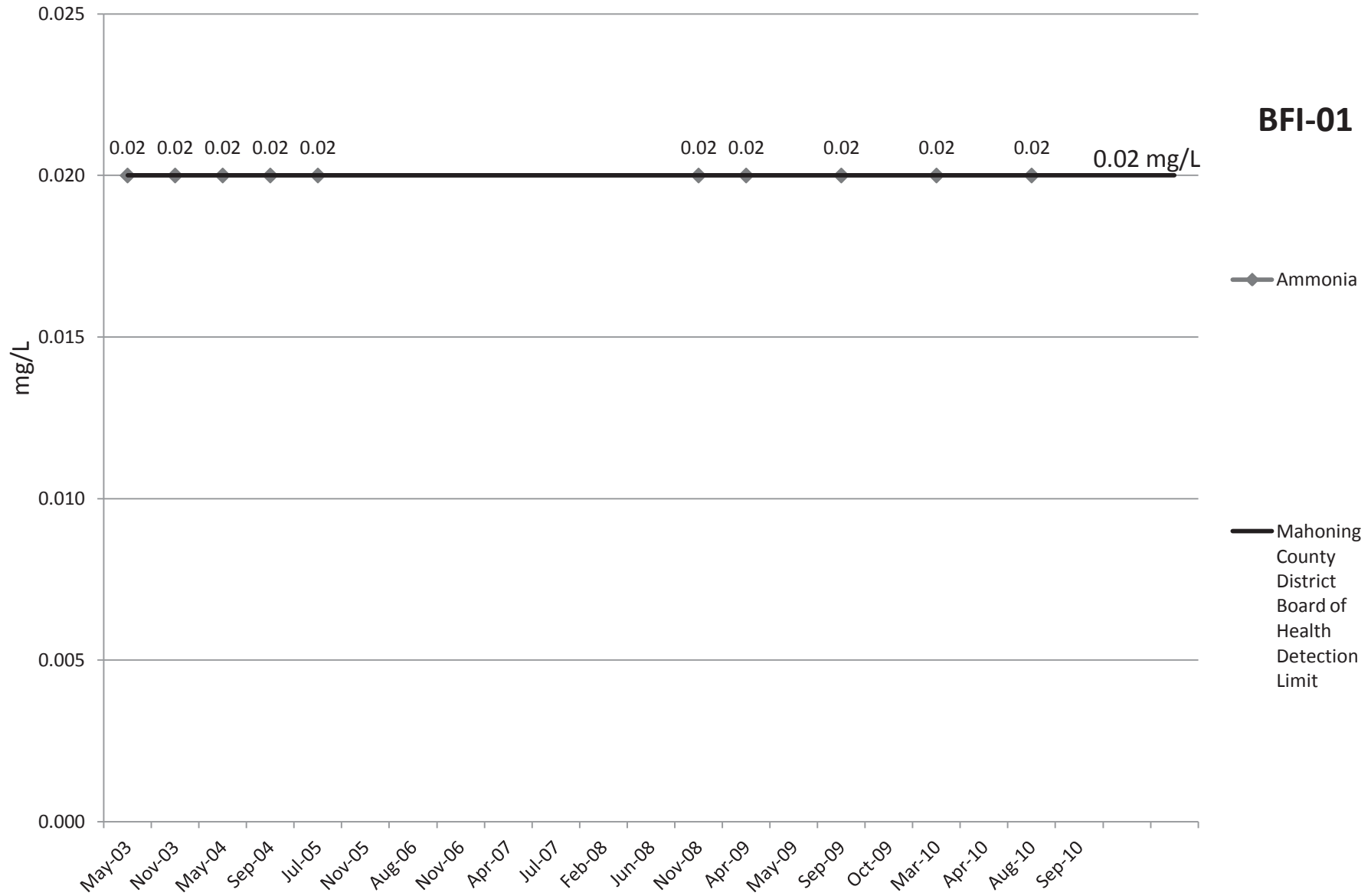
ID	Potassium	Sodium	Nitrate EPA	COD	pH	Solids, Dissolved	Sulfate	Bacteria	Turbidity
BFI-63	2.4	33.7	<0.5	<10	7.35	440	101.25	POS	0.74
BFI-64	3.2	30.1	<0.5	<10	7.49	420	118.95	NEG	2.69
BFI-65	1.3	20	<0.5	<10	7.08	506	107.43	NEG	8.22
BFI-68	2.4	27	<0.5	10	7.38	422	92.2	NEG	0.53
BFI-69	2.6	22.5	<0.5	<10	7.46	332	85.2	POS	2.29
BFI-72	3.6	52.7	<0.5	<10	8.1	418	111.54	POS	1.75
BFI-74	1.1	12.9	<0.5	<10	7.9	373	129.24	NEG	0.19
BFI-75	1.7	32.6	<0.5	<10	7.48	655	129.65	NEG	5.74
BFI-76	0.3	139	<0.5	<10	7.38	427	158.05	NEG	0.12

**APPENDIX D: All Time-Series Charts**

# Alkalinity



# Ammonia

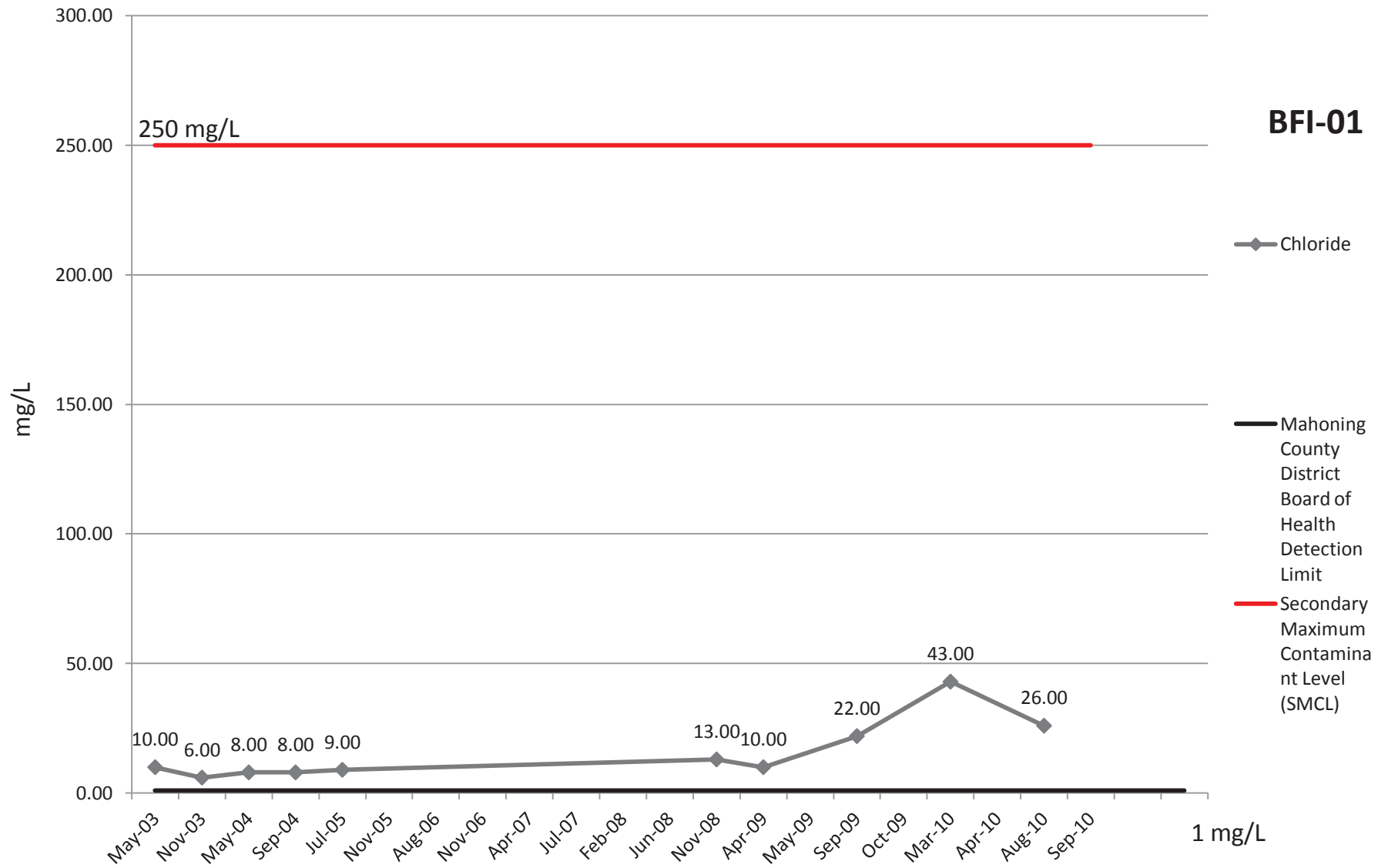


**BFI-01**

◆ Ammonia

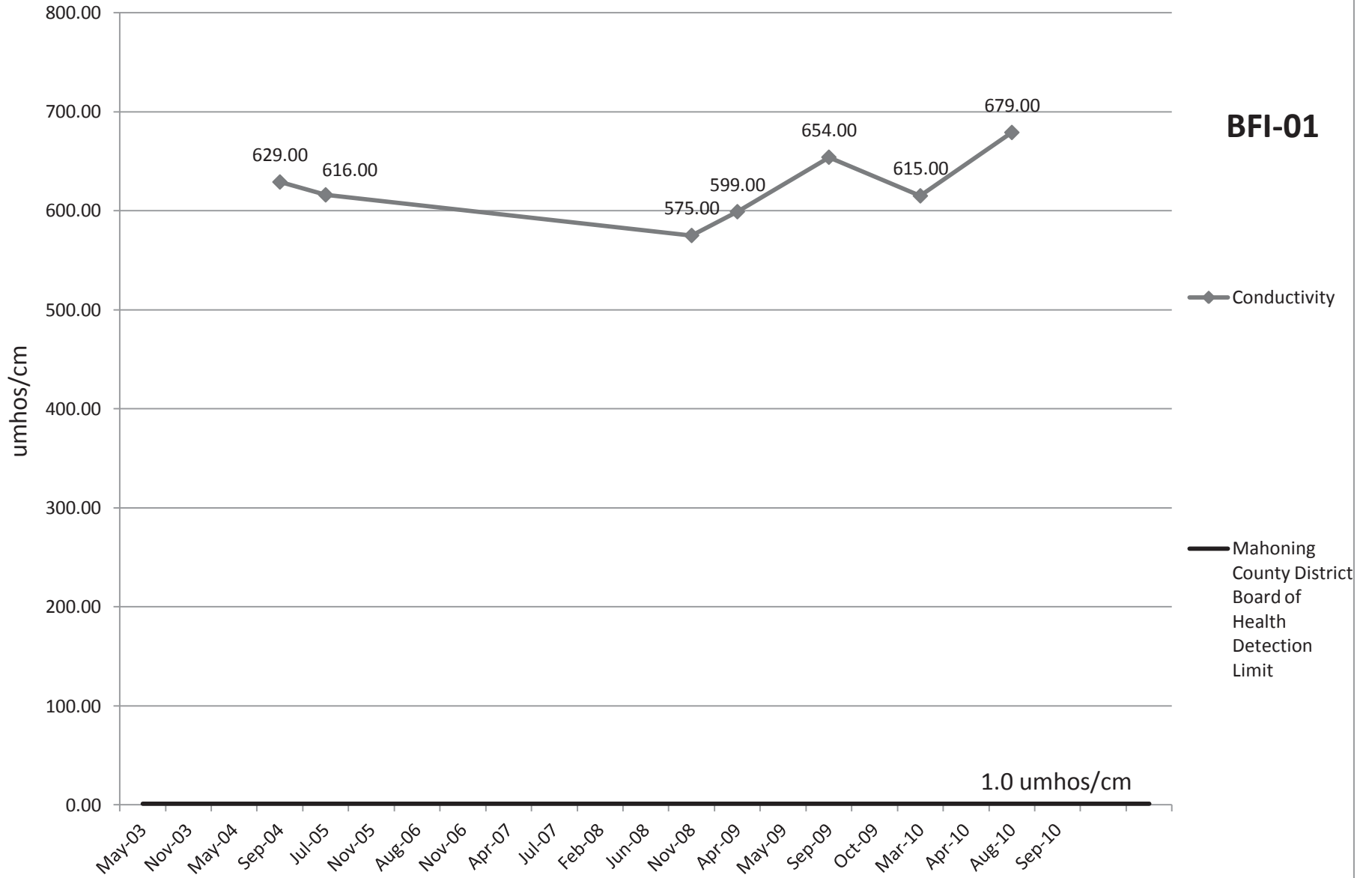
— Mahoning County District Board of Health Detection Limit

# Chloride



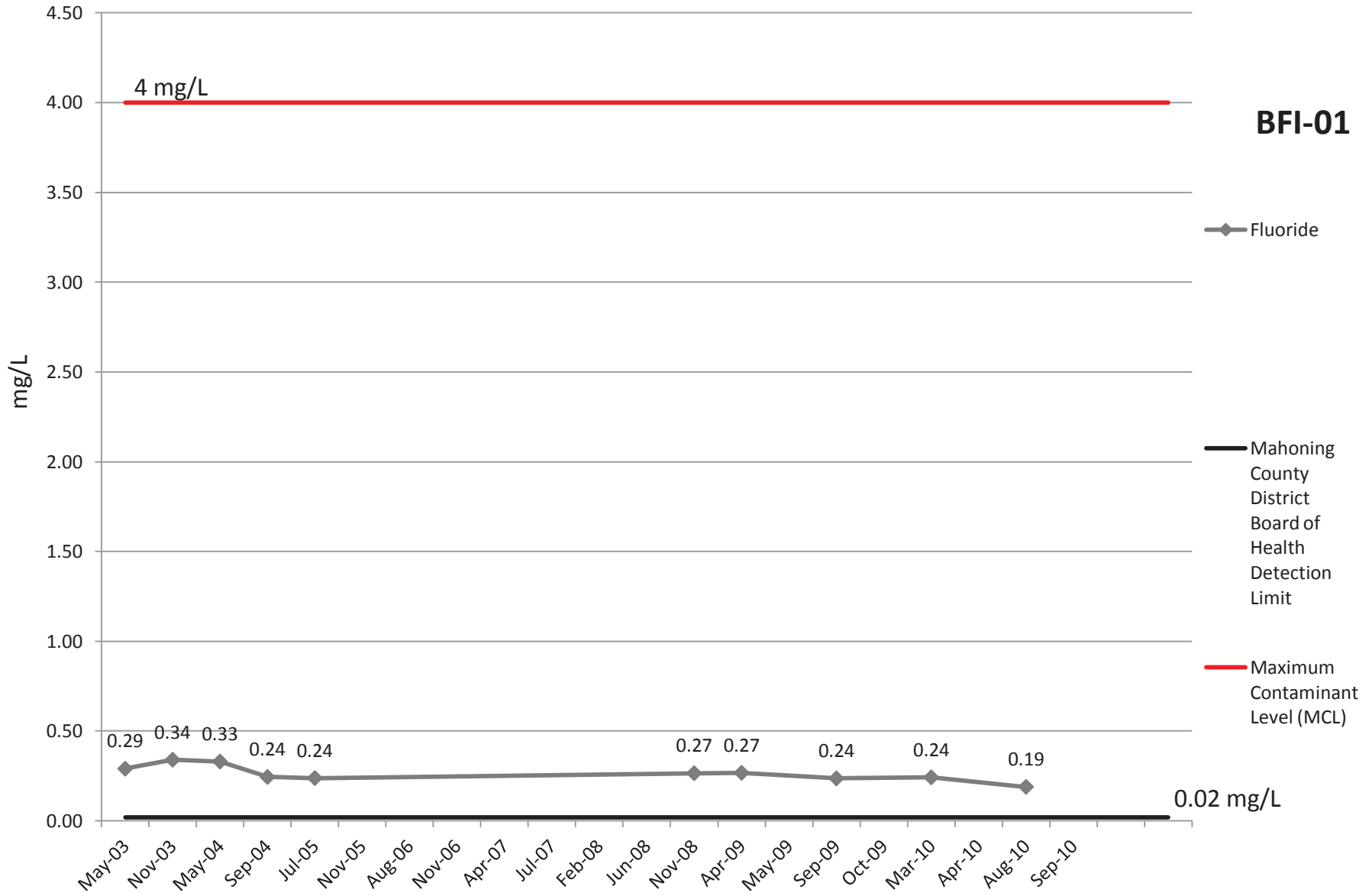
# Conductivity

**BFI-01**



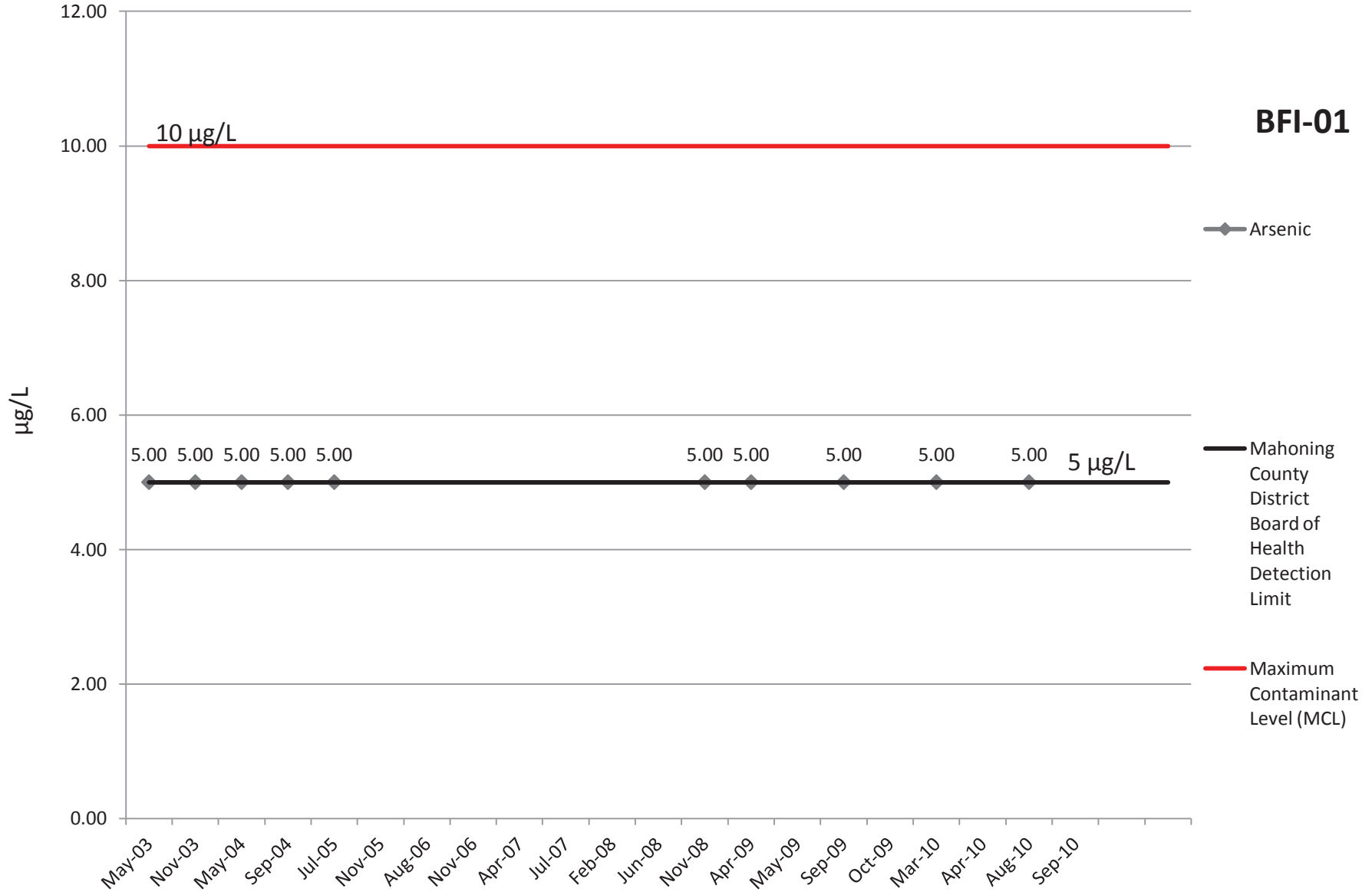


# Fluoride



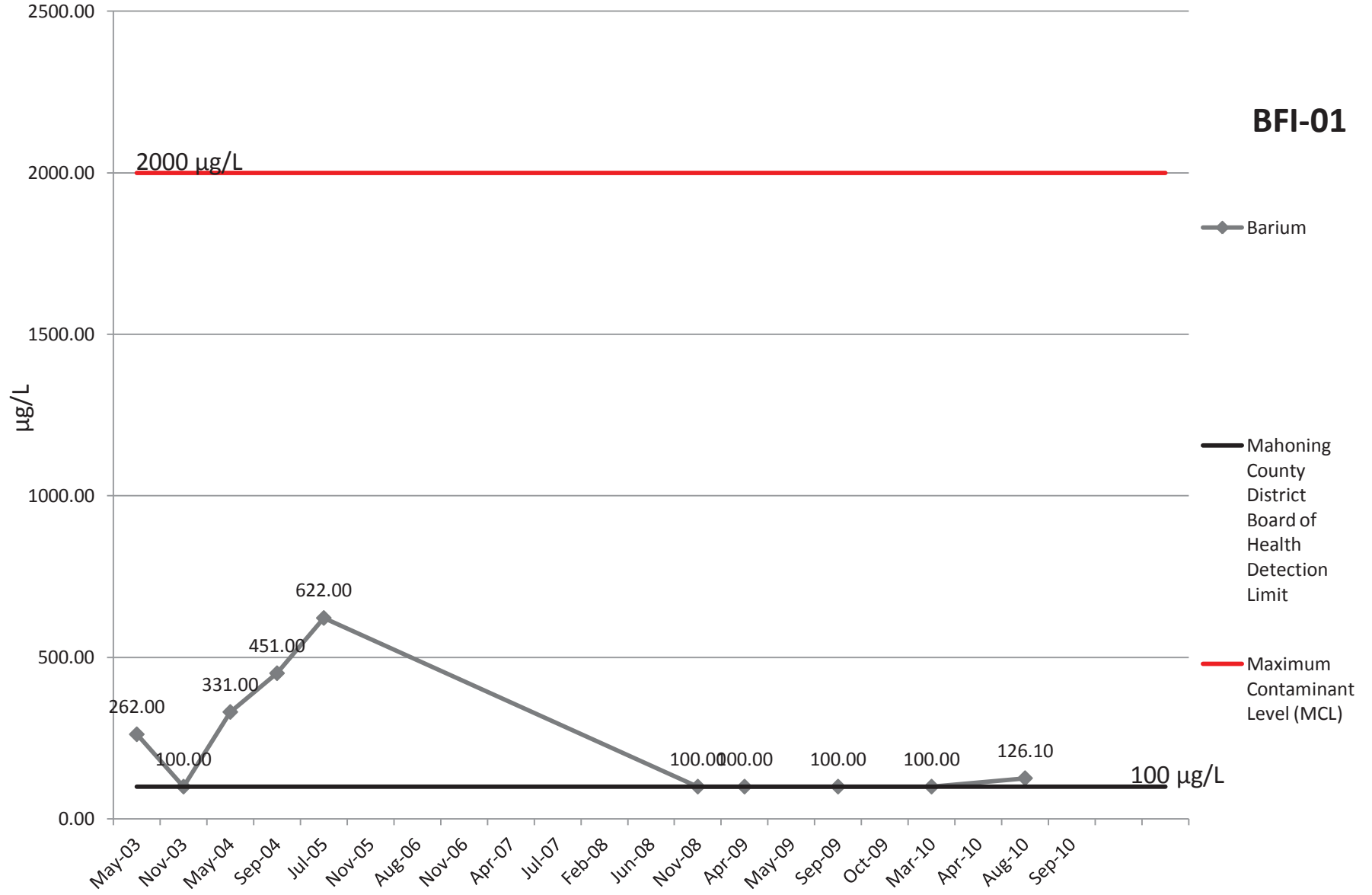
# Arsenic

**BFI-01**

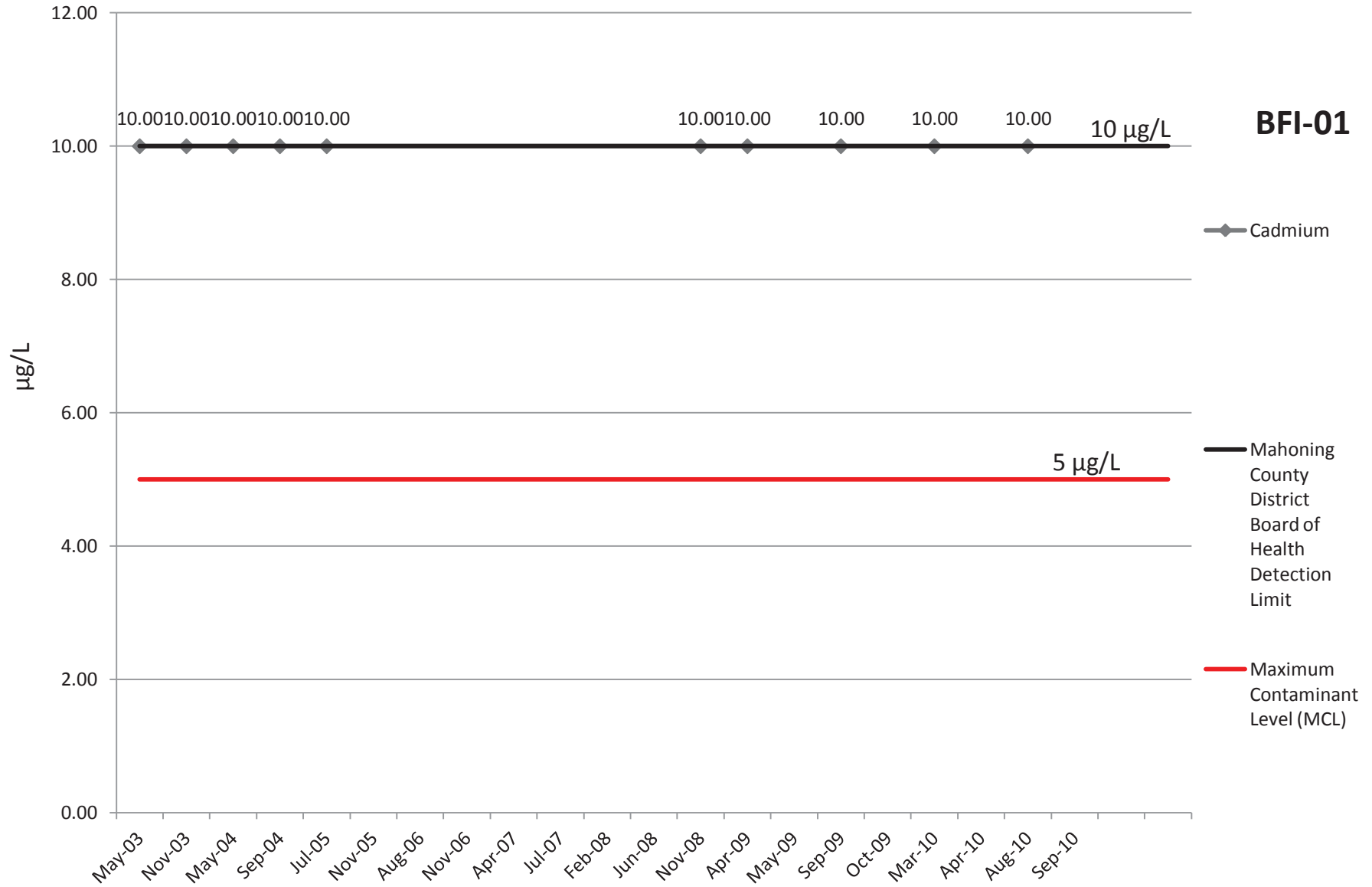


# Barium

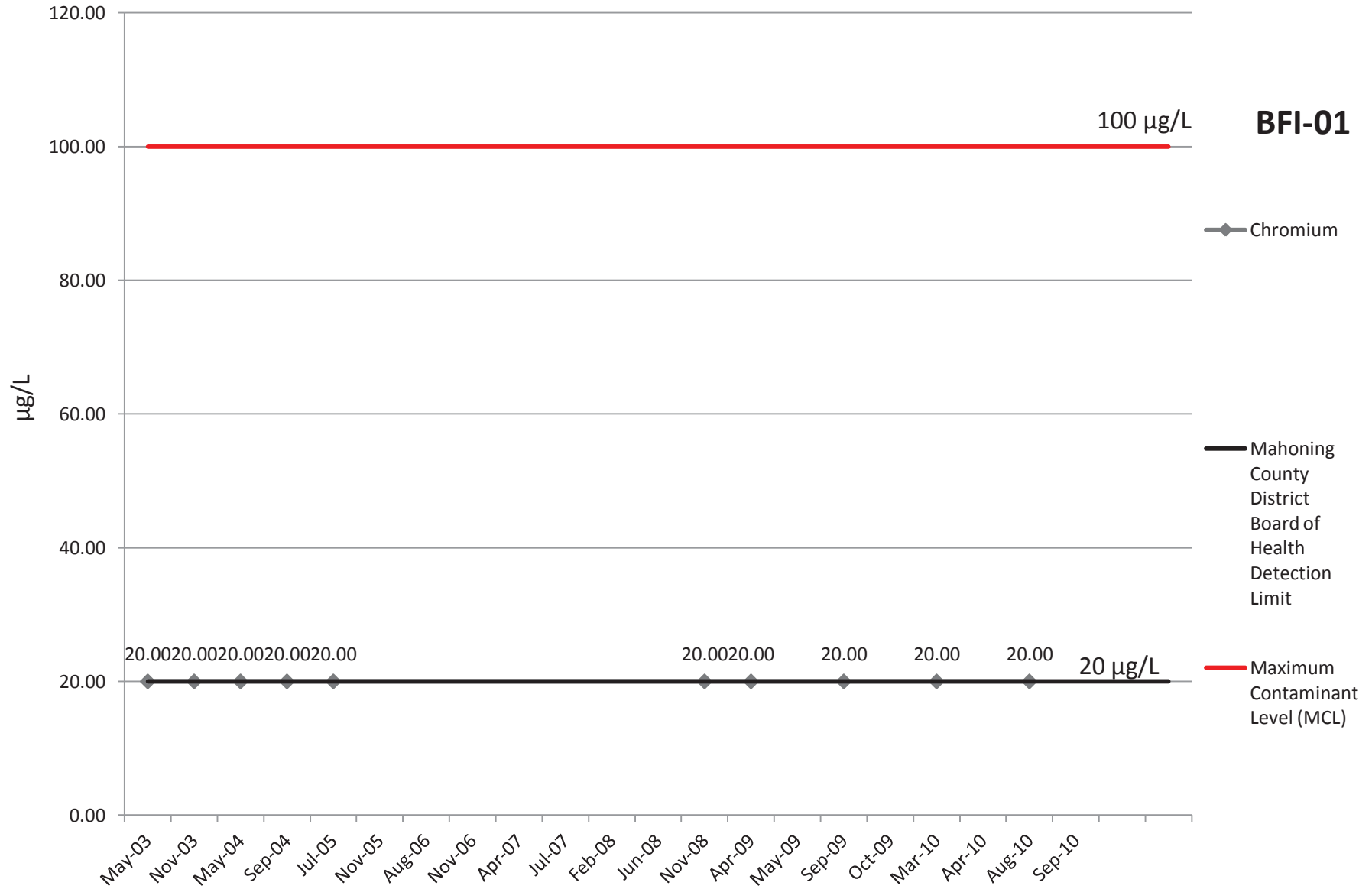
**BFI-01**



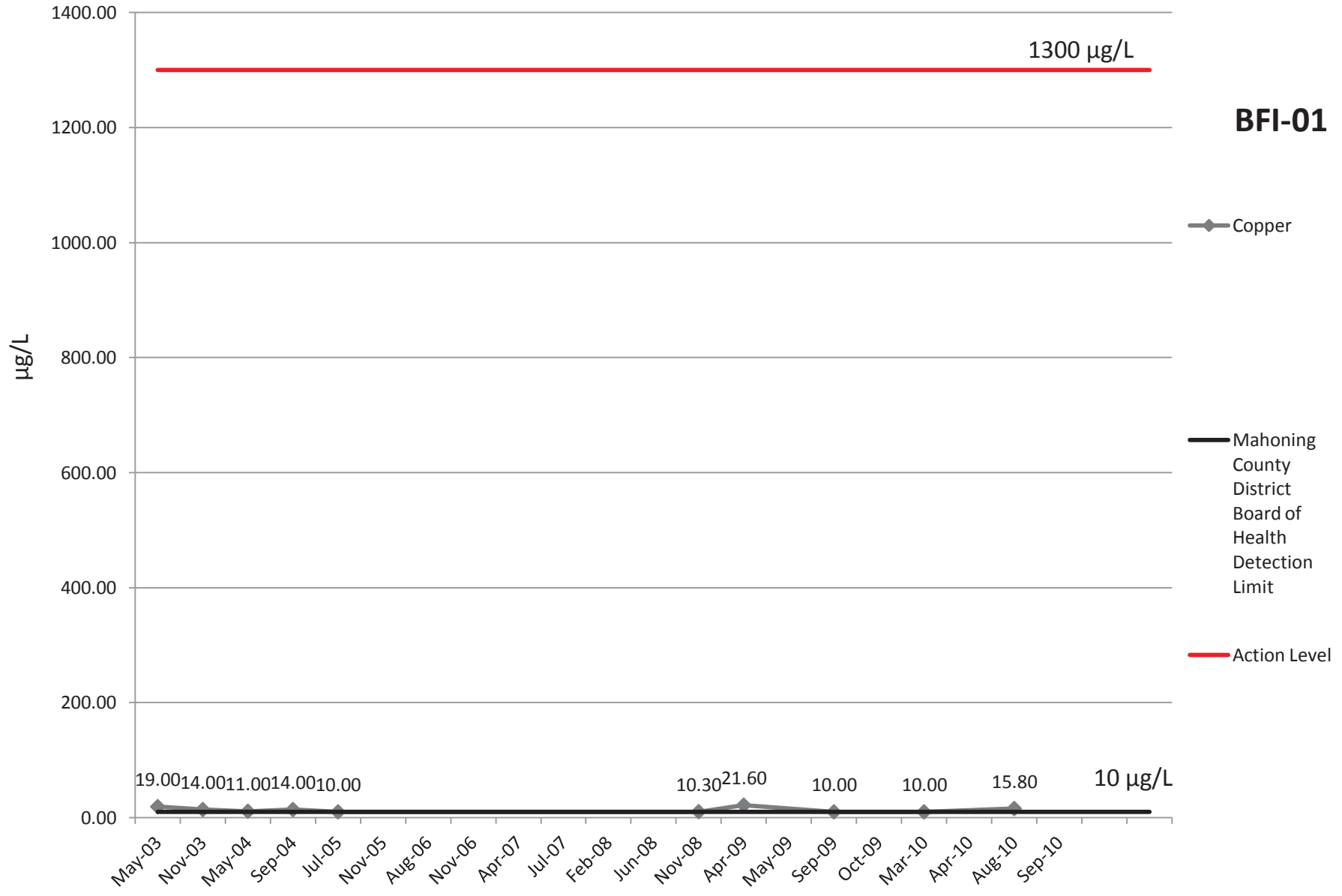
# Cadmium



# Chromium

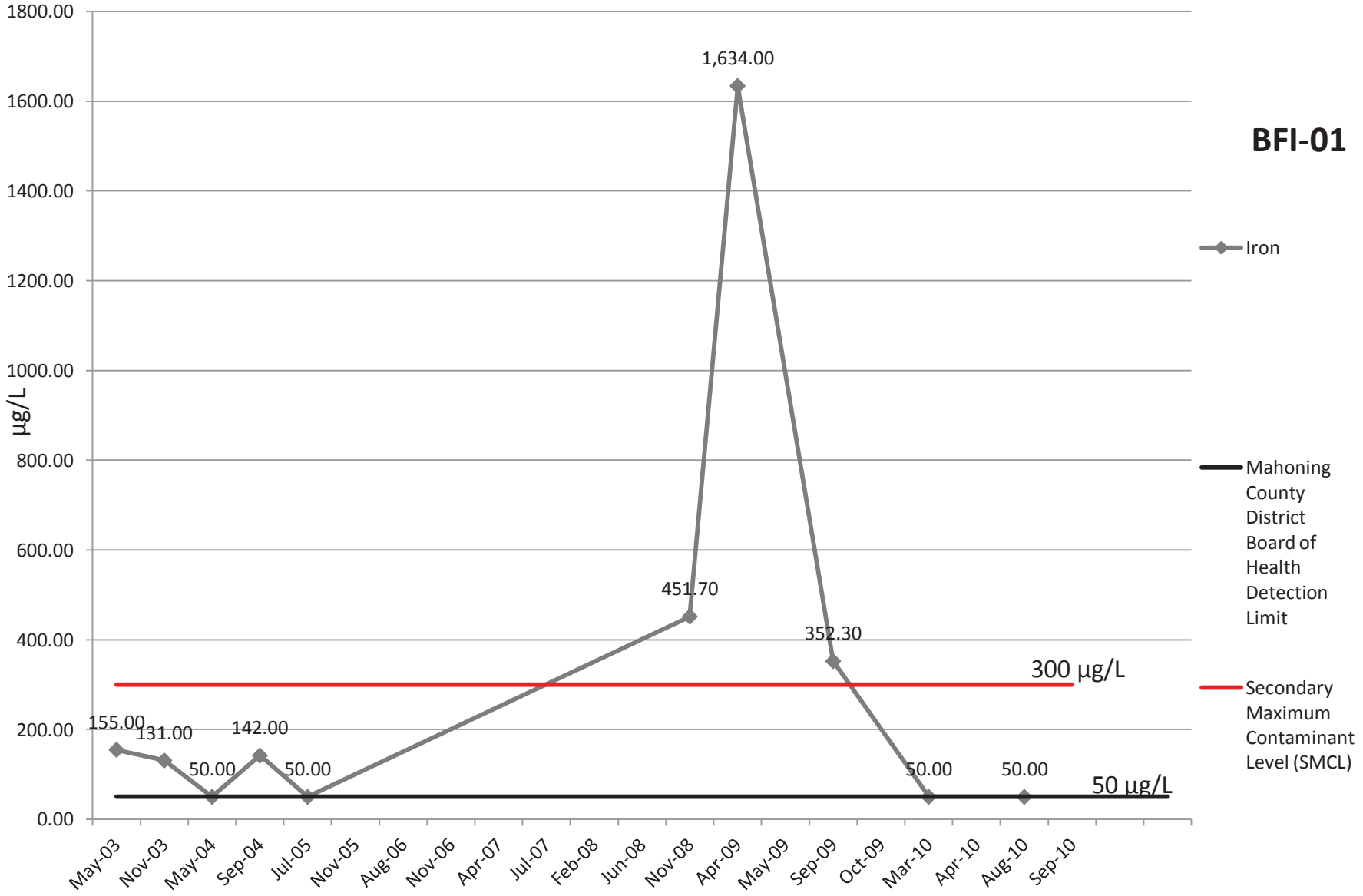


# Copper



# Iron

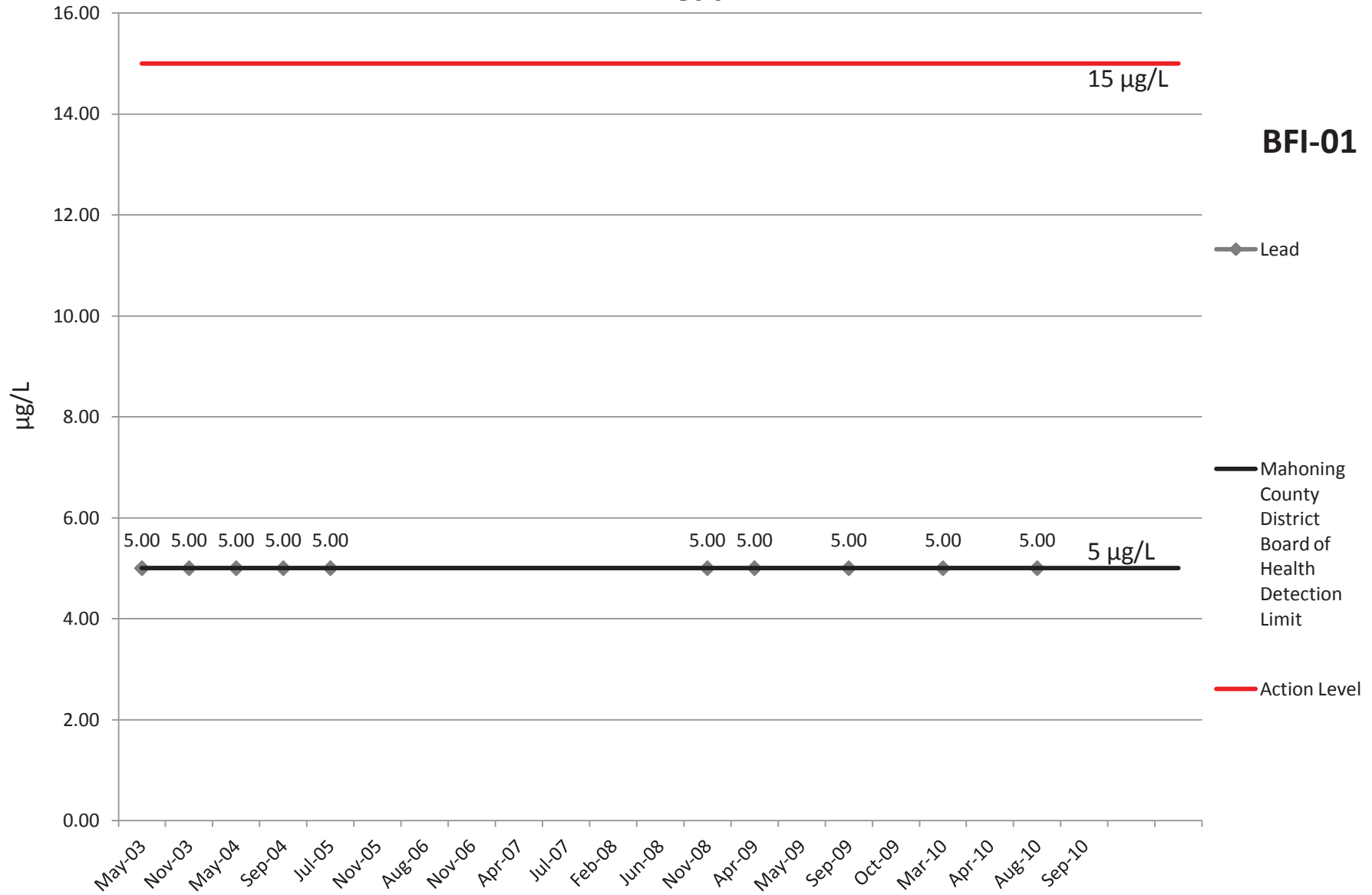
**BFI-01**



300 µg/L

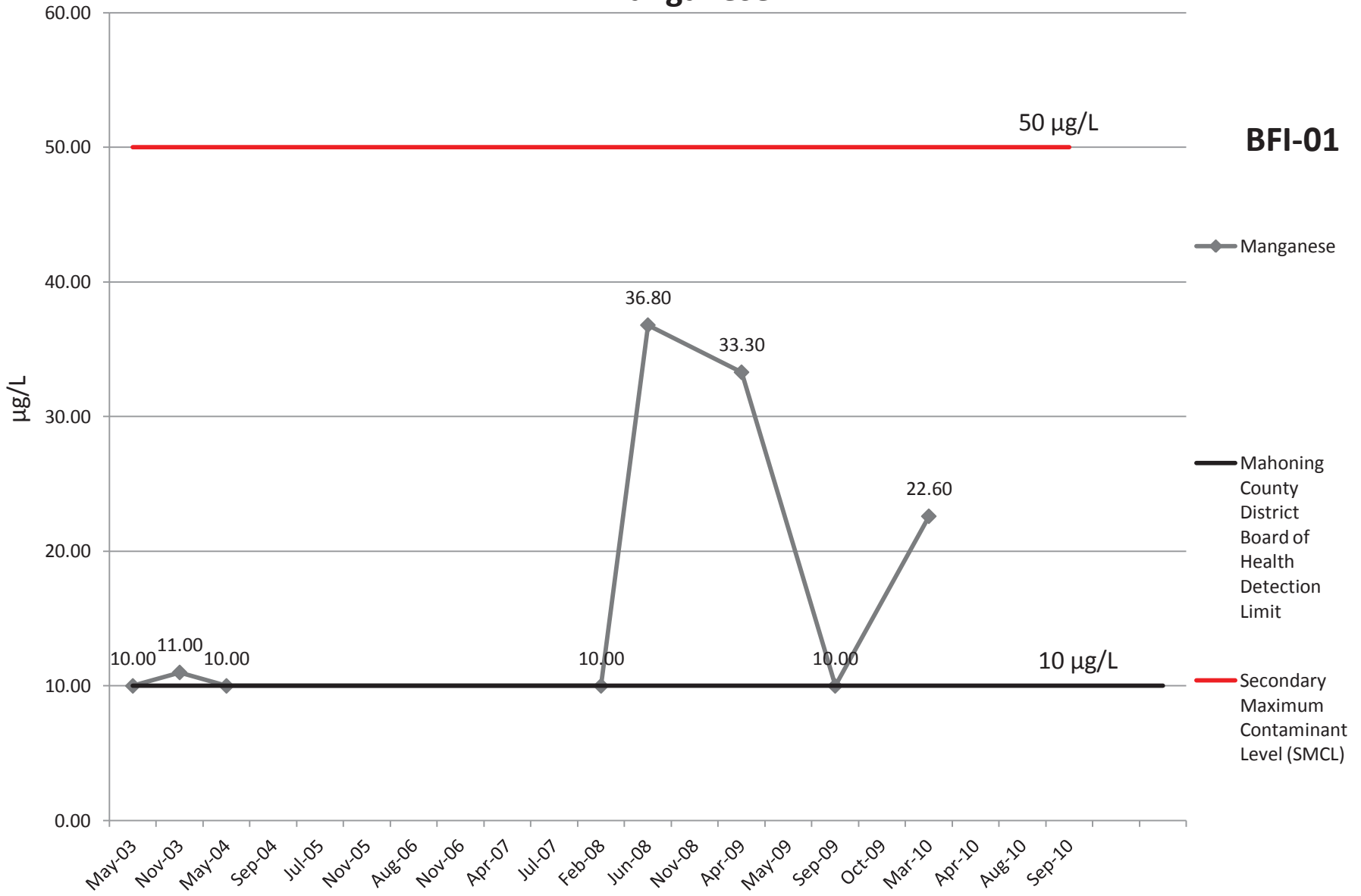
50 µg/L

# Lead





# Manganese



# Mercury

**BFI-01**

2 µg/L

2.50  
2.00  
1.50  
1.00  
0.50  
0.00

µg/L

◆ Mercury

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

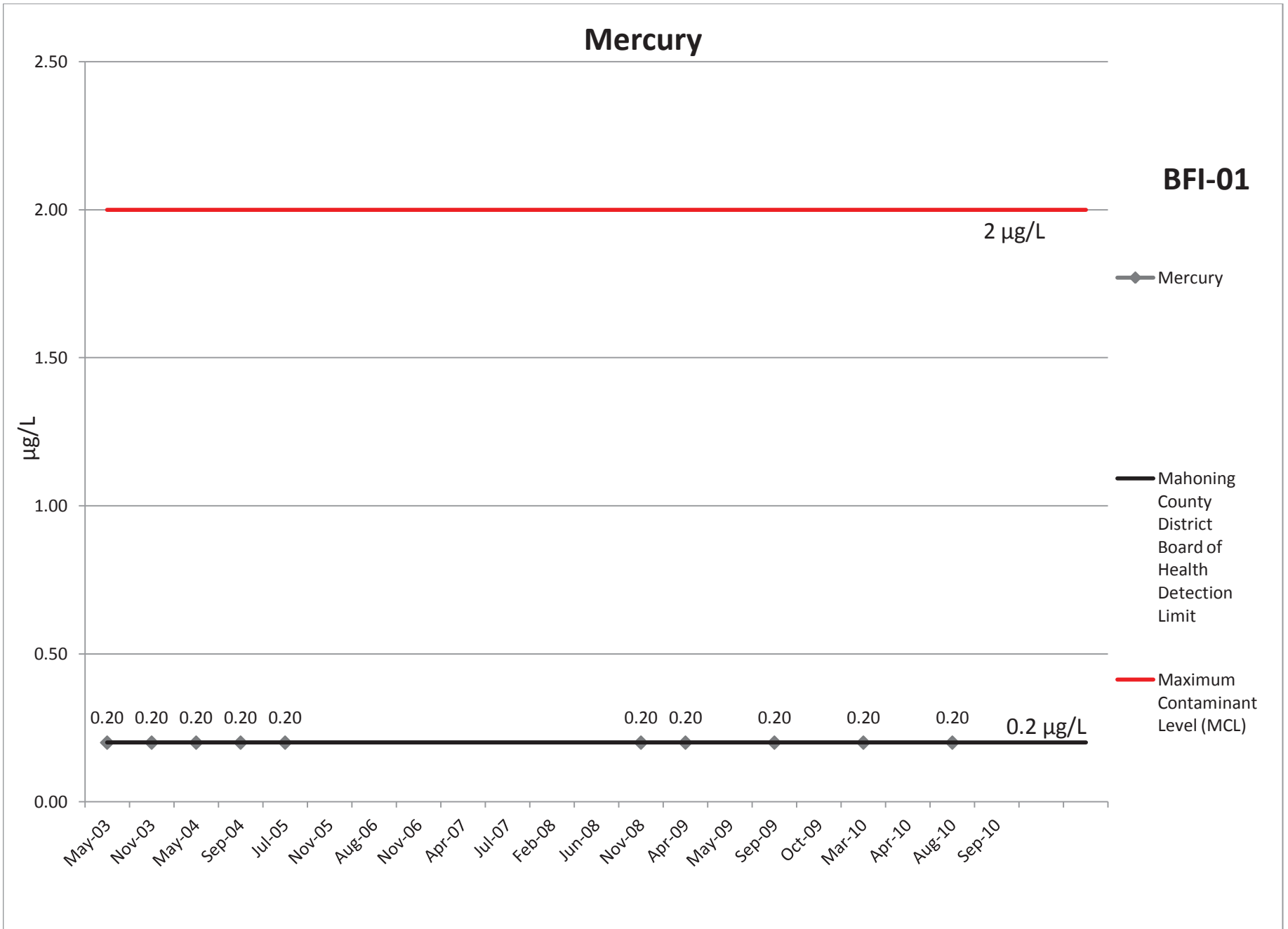
— Maximum  
Contaminant  
Level (MCL)

0.20 0.20 0.20 0.20 0.20

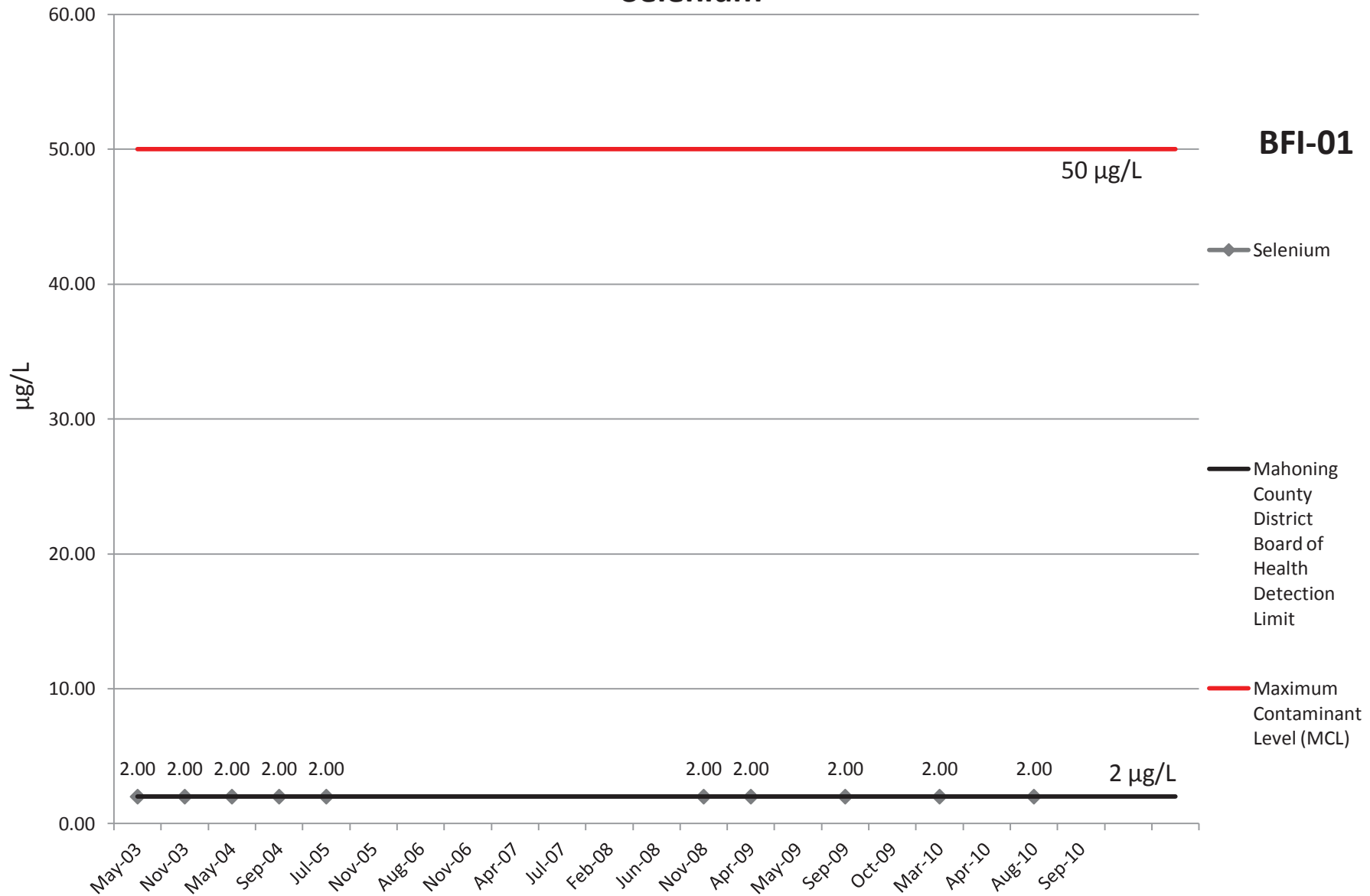
0.20 0.20 0.20 0.20 0.20

0.2 µg/L

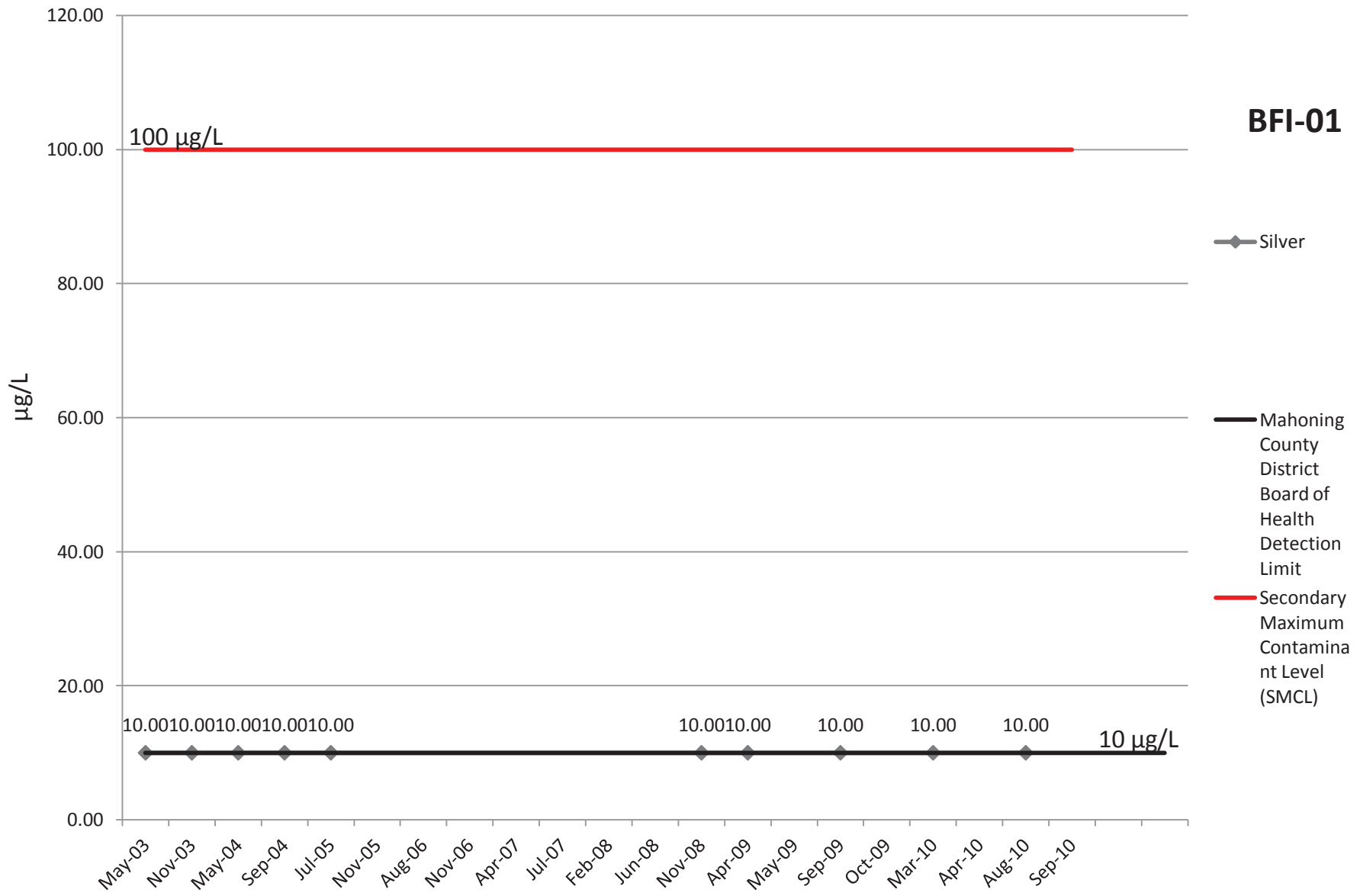
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



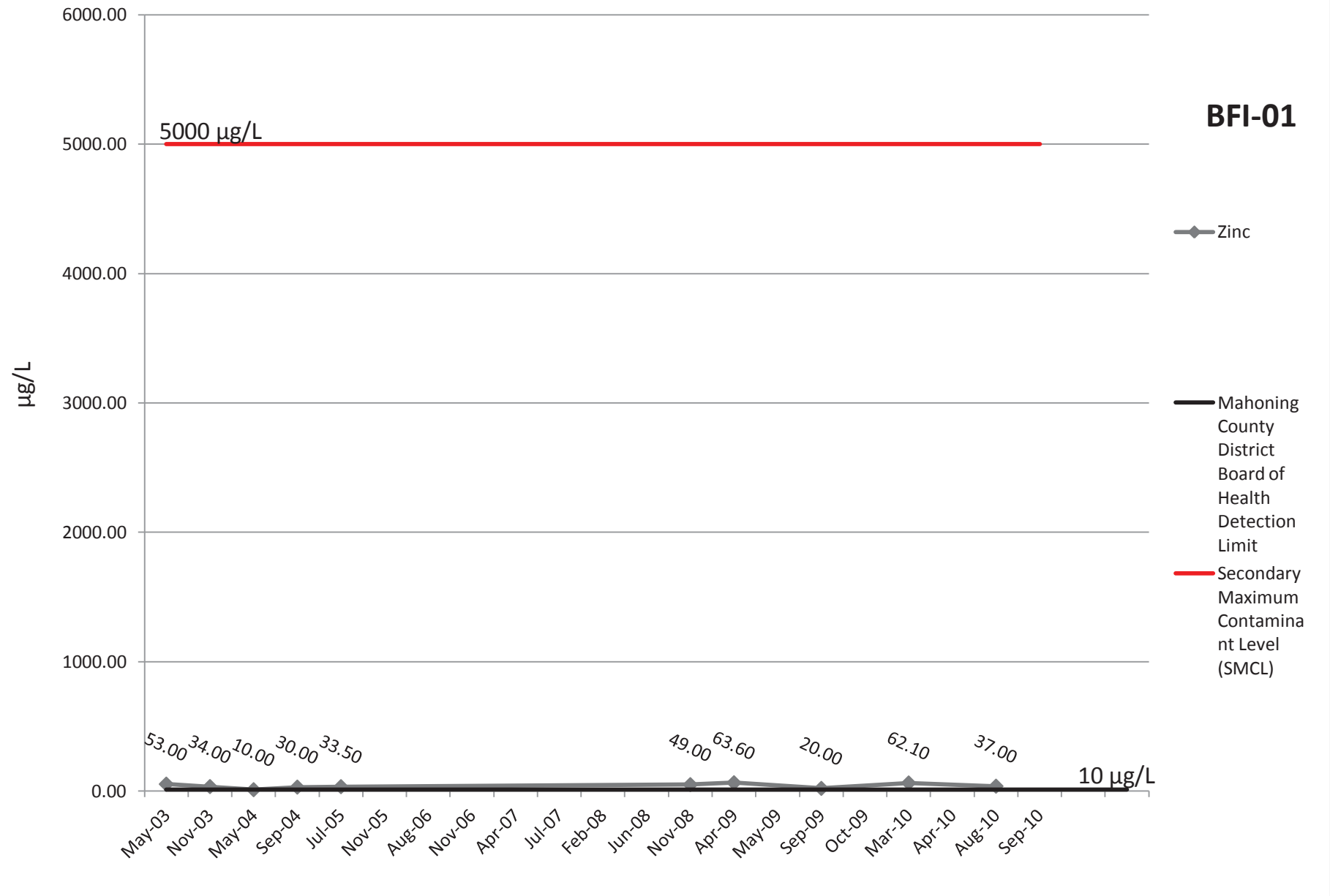
# Selenium



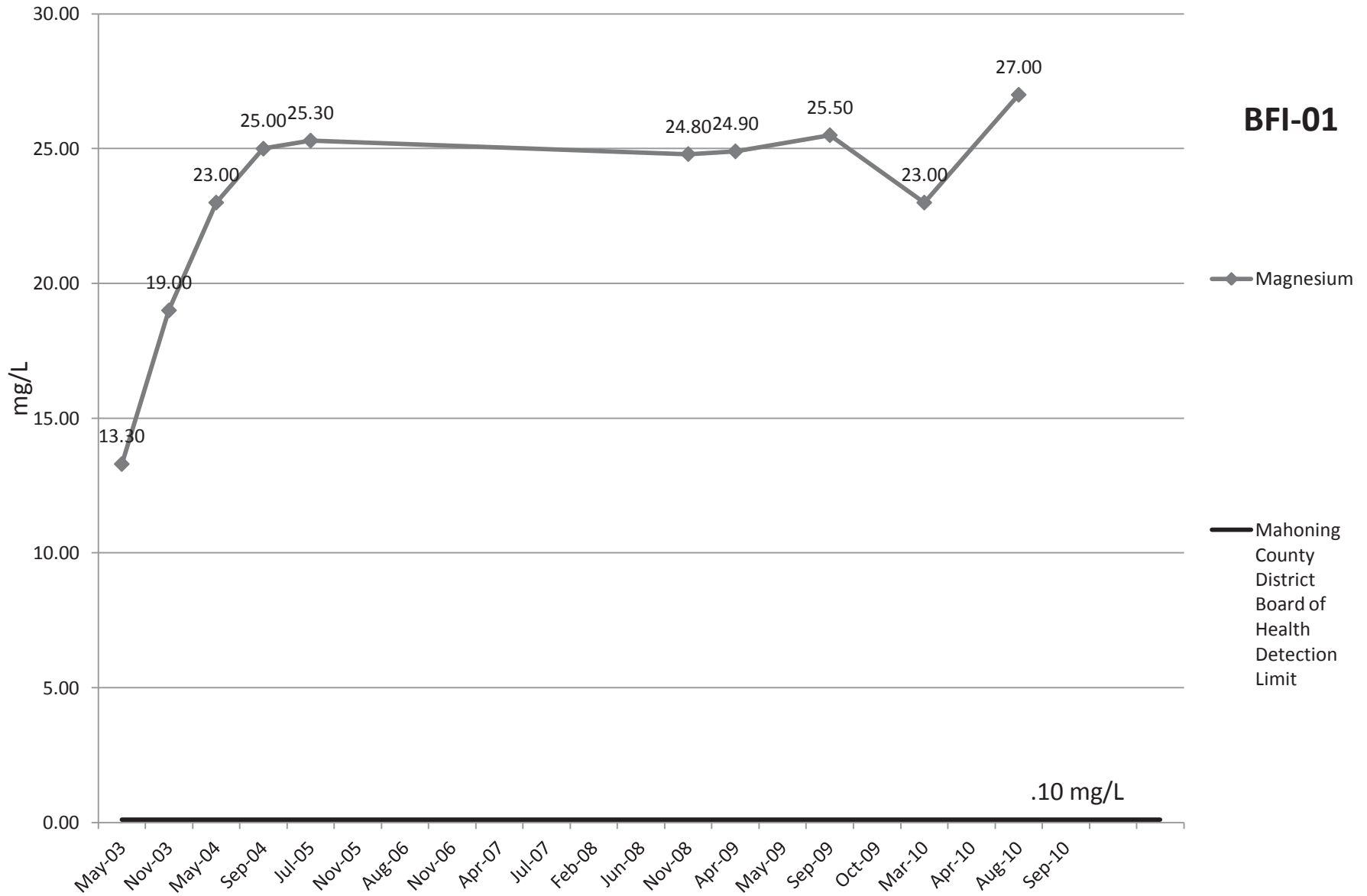
# Silver



# Zinc

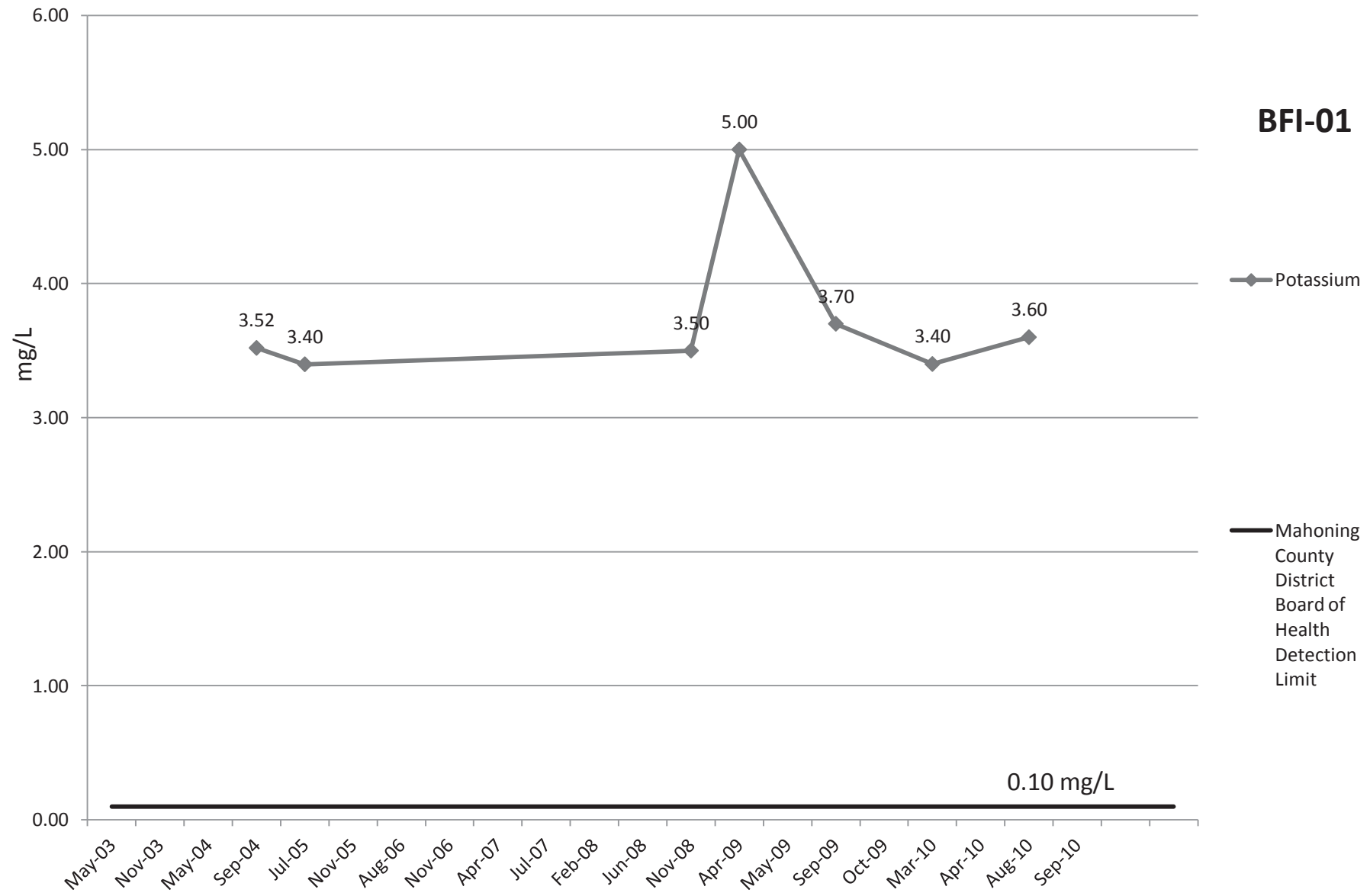


# Magnesium



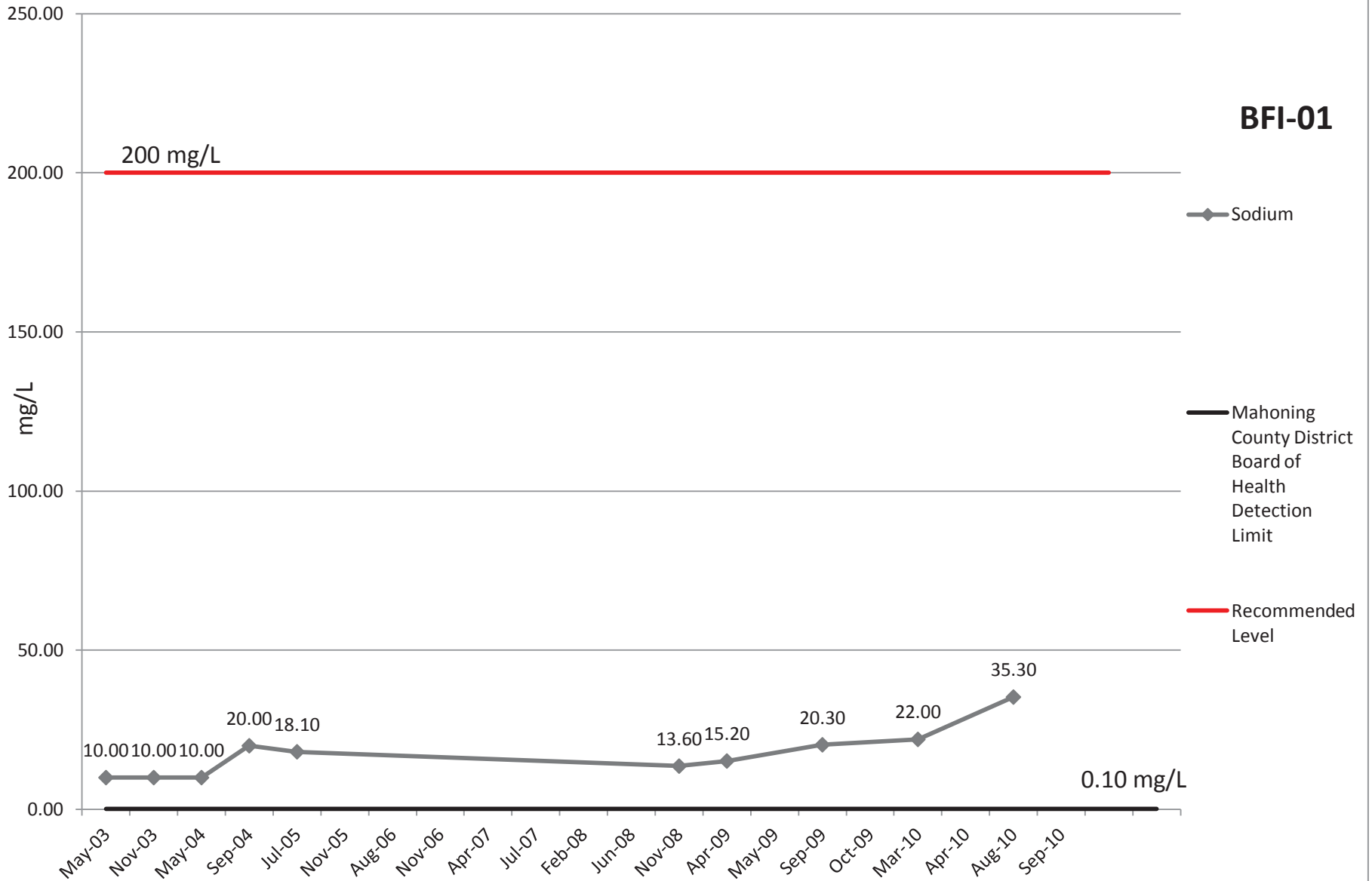
# Potassium

**BFI-01**



# Sodium

**BFI-01**





# Nitrate EPA

**BFI-01**

10 mg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

mg/L

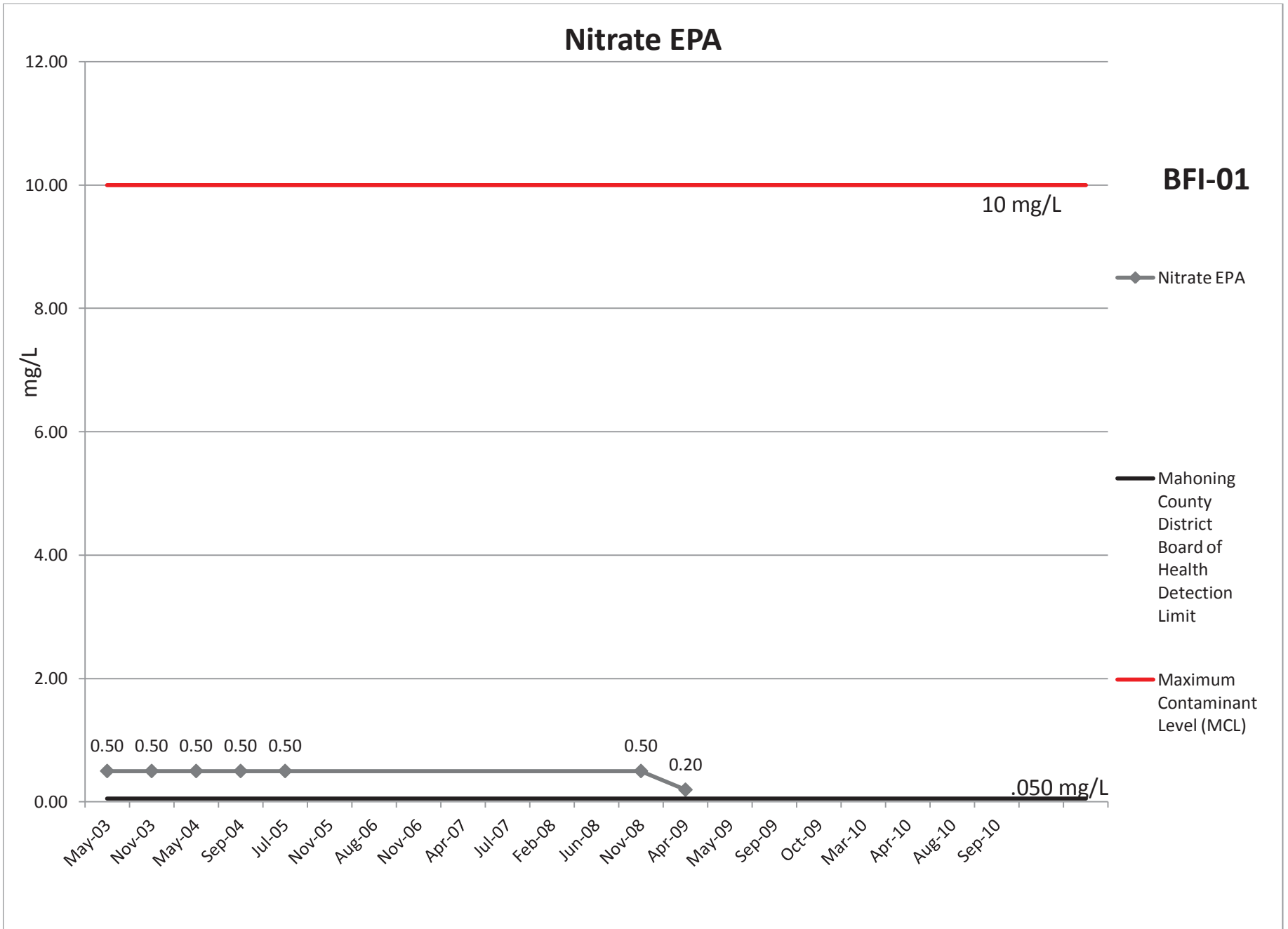
- ◆ Nitrate EPA
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

0.50 0.50 0.50 0.50 0.50

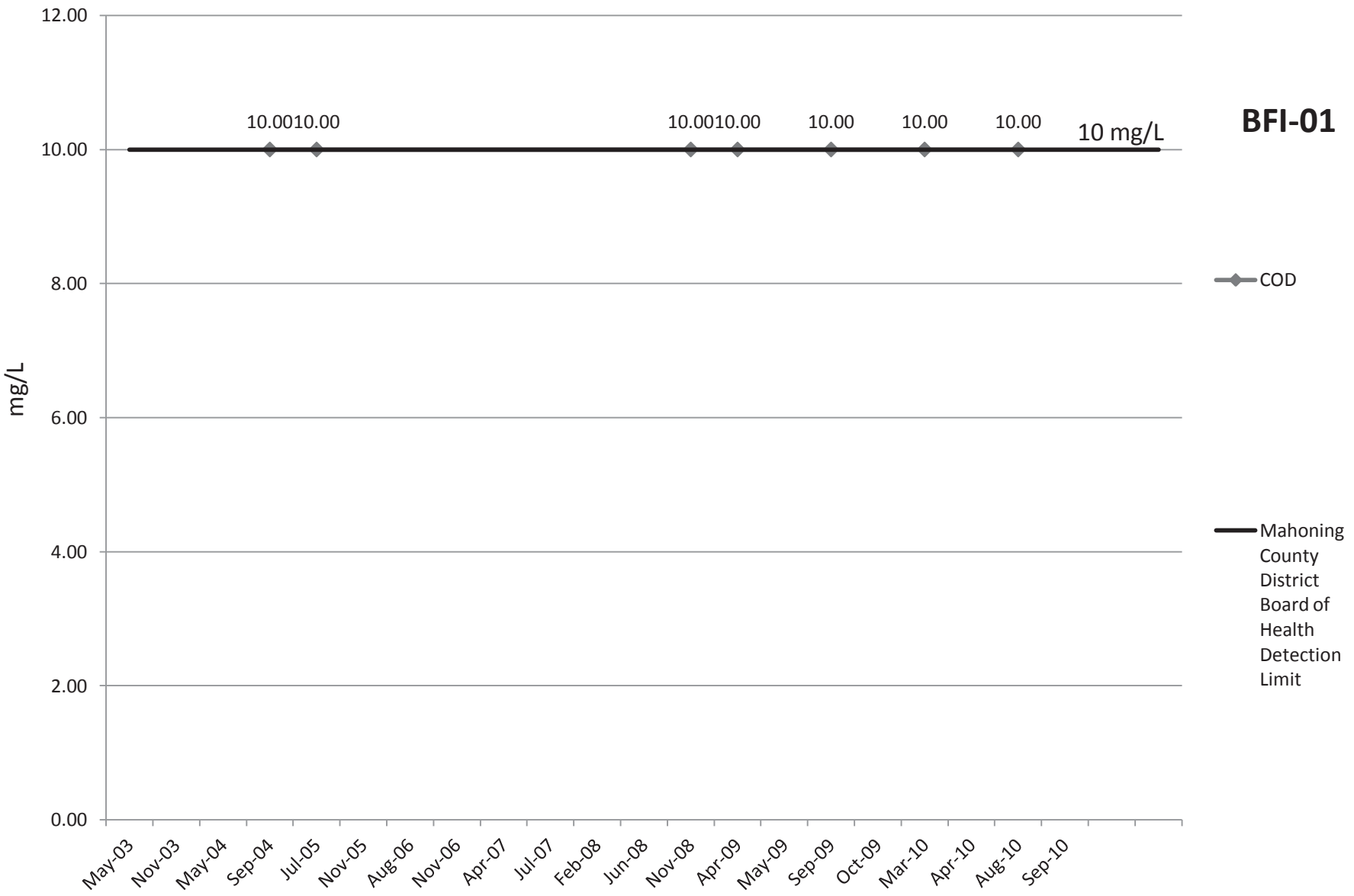
0.50 0.20

.050 mg/L

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

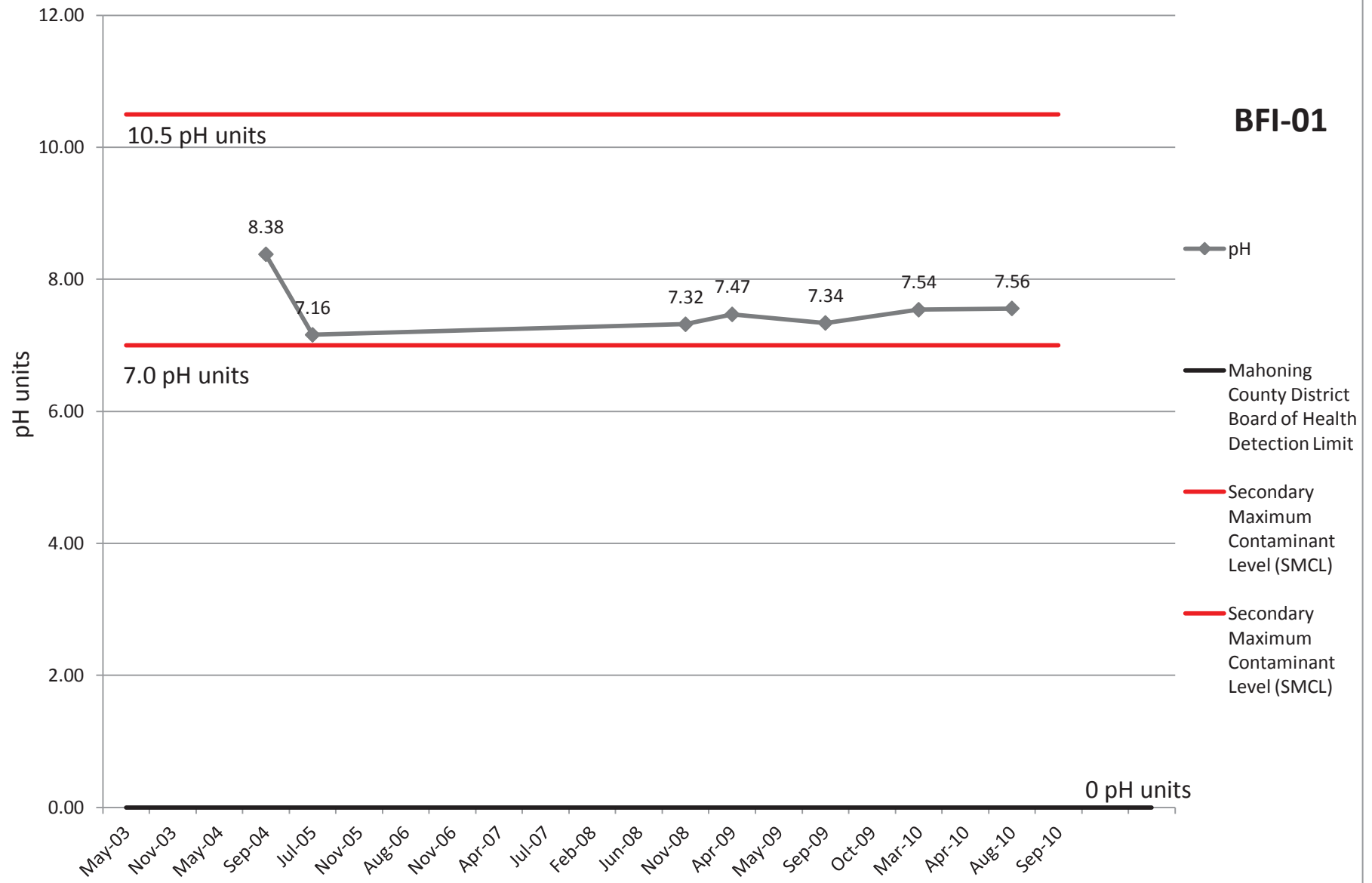


# COD

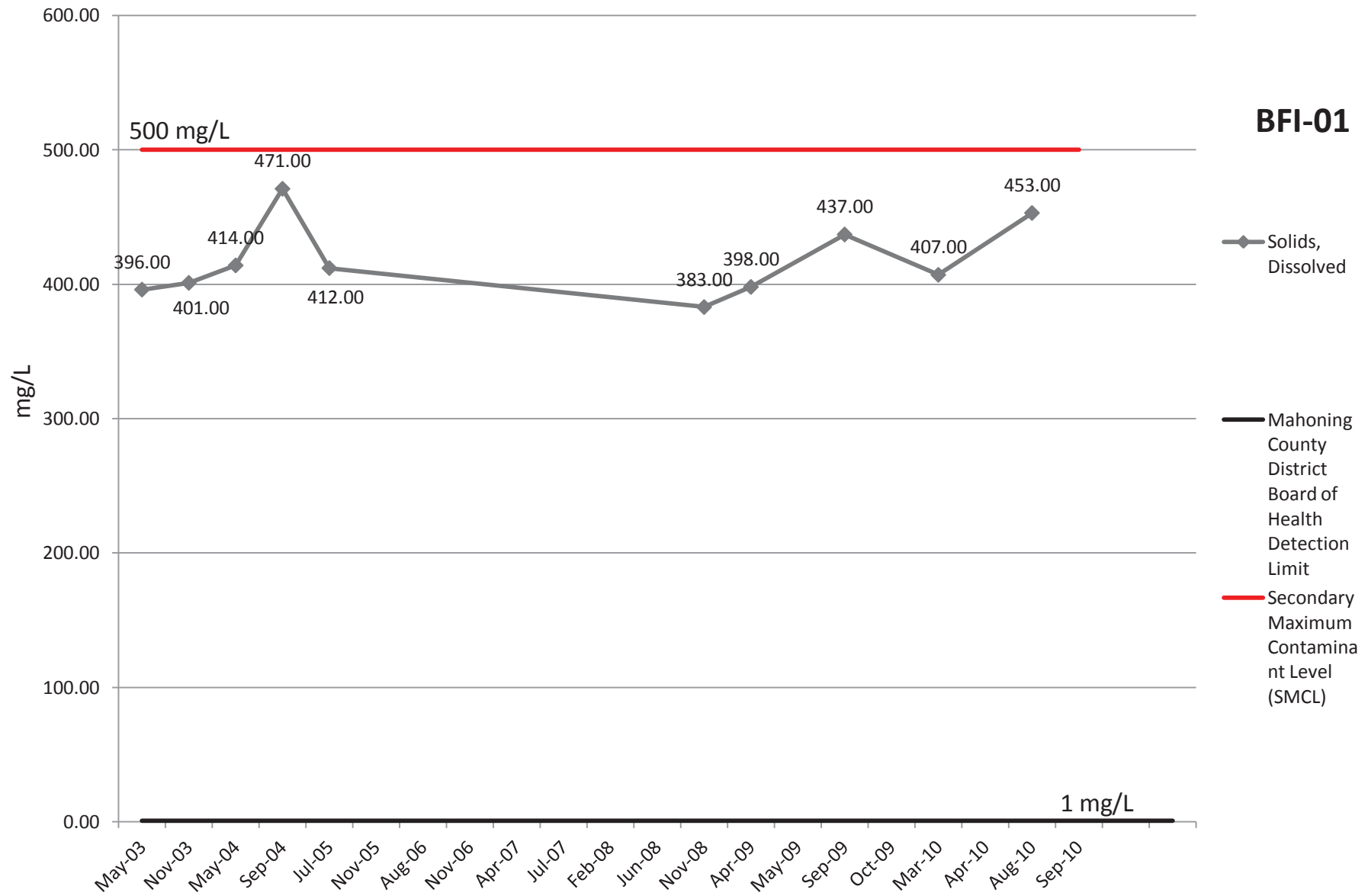


# pH

**BFI-01**

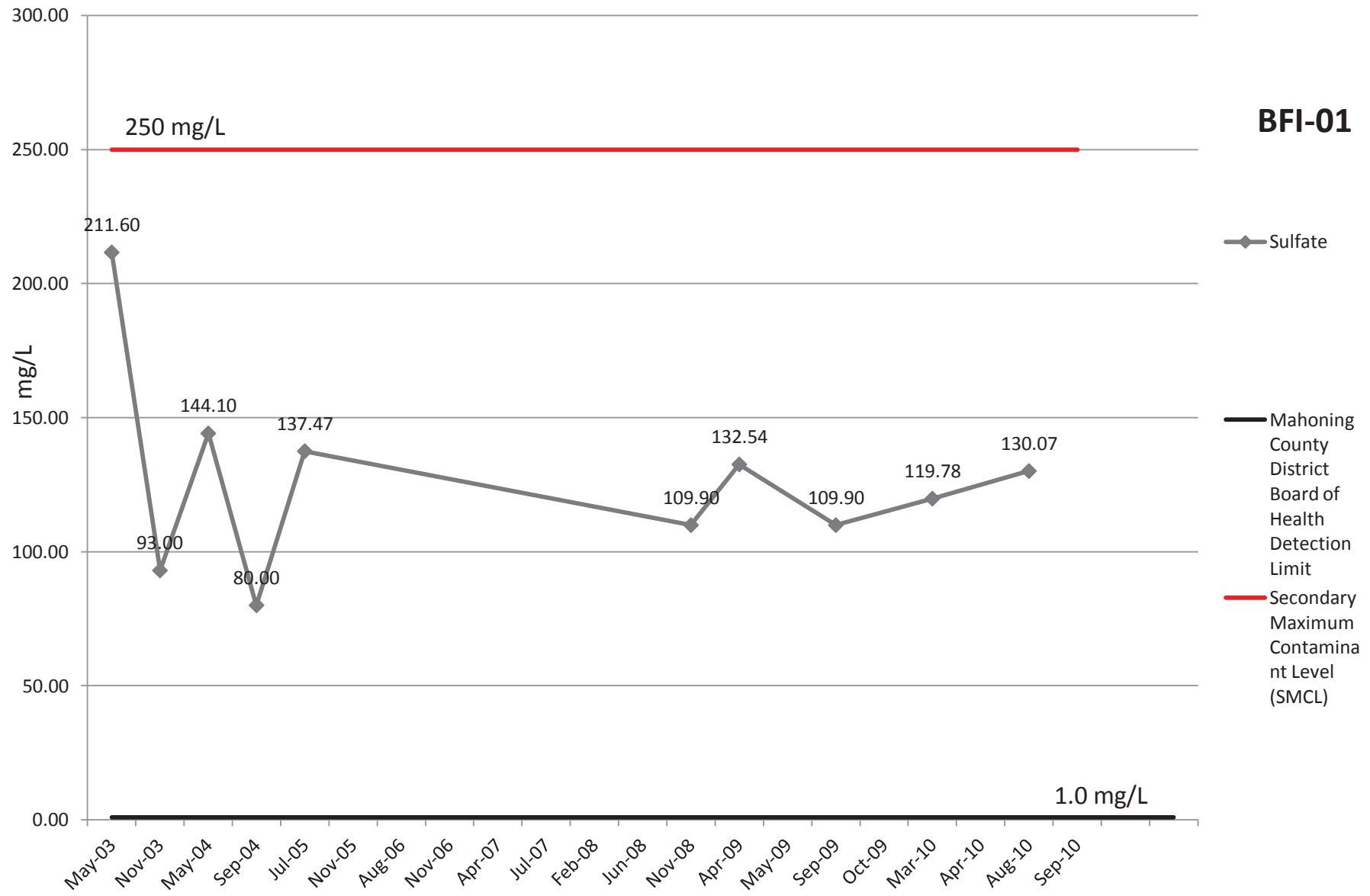


# Solids, Dissolved



# Sulfate

**BFI-01**



# Bacteria

positive (1)

**BFI-01**

Positive/Negative

◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

negative (0)

0.00 0.00

0.00 0.00

0.00

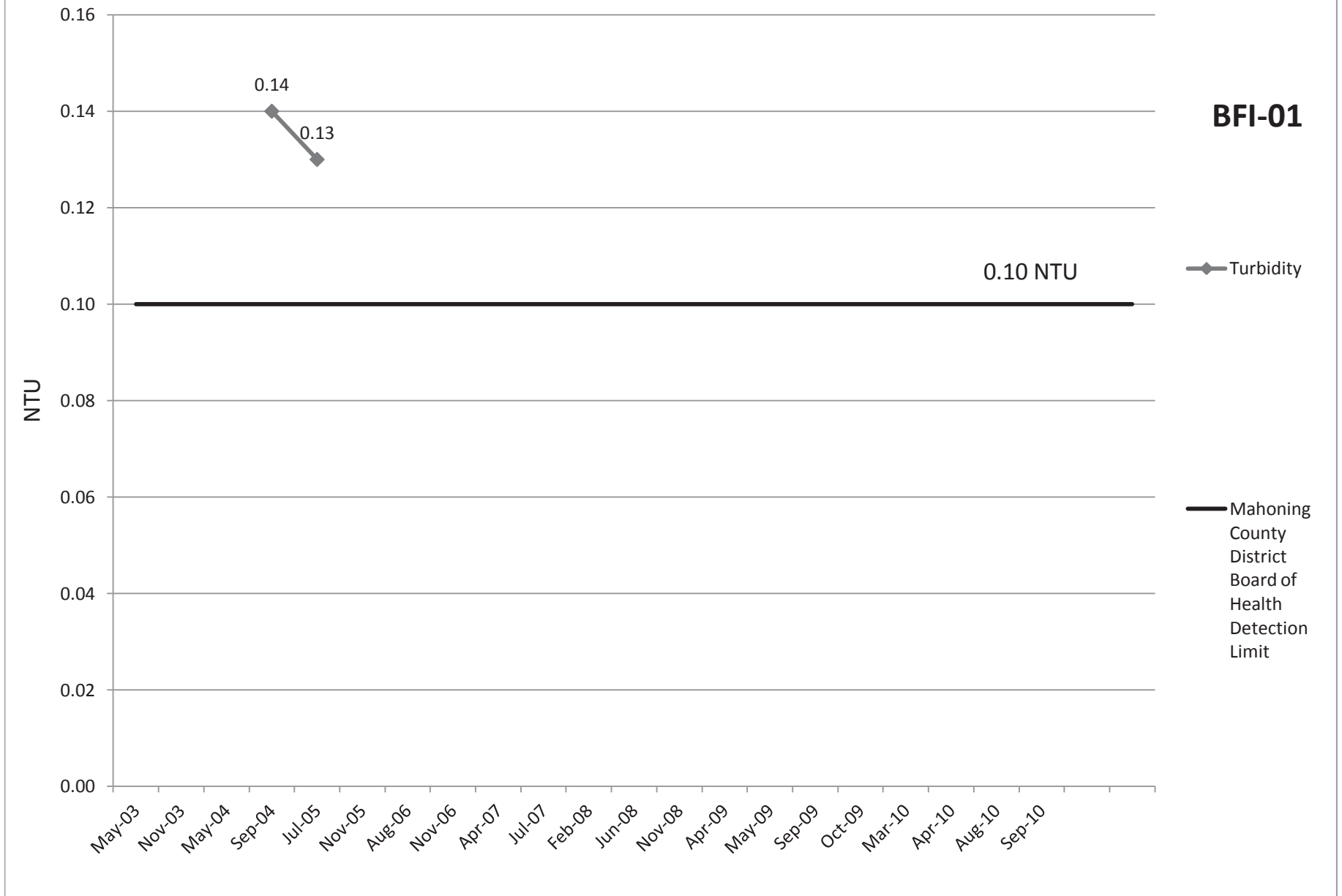
0.00

0.00

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

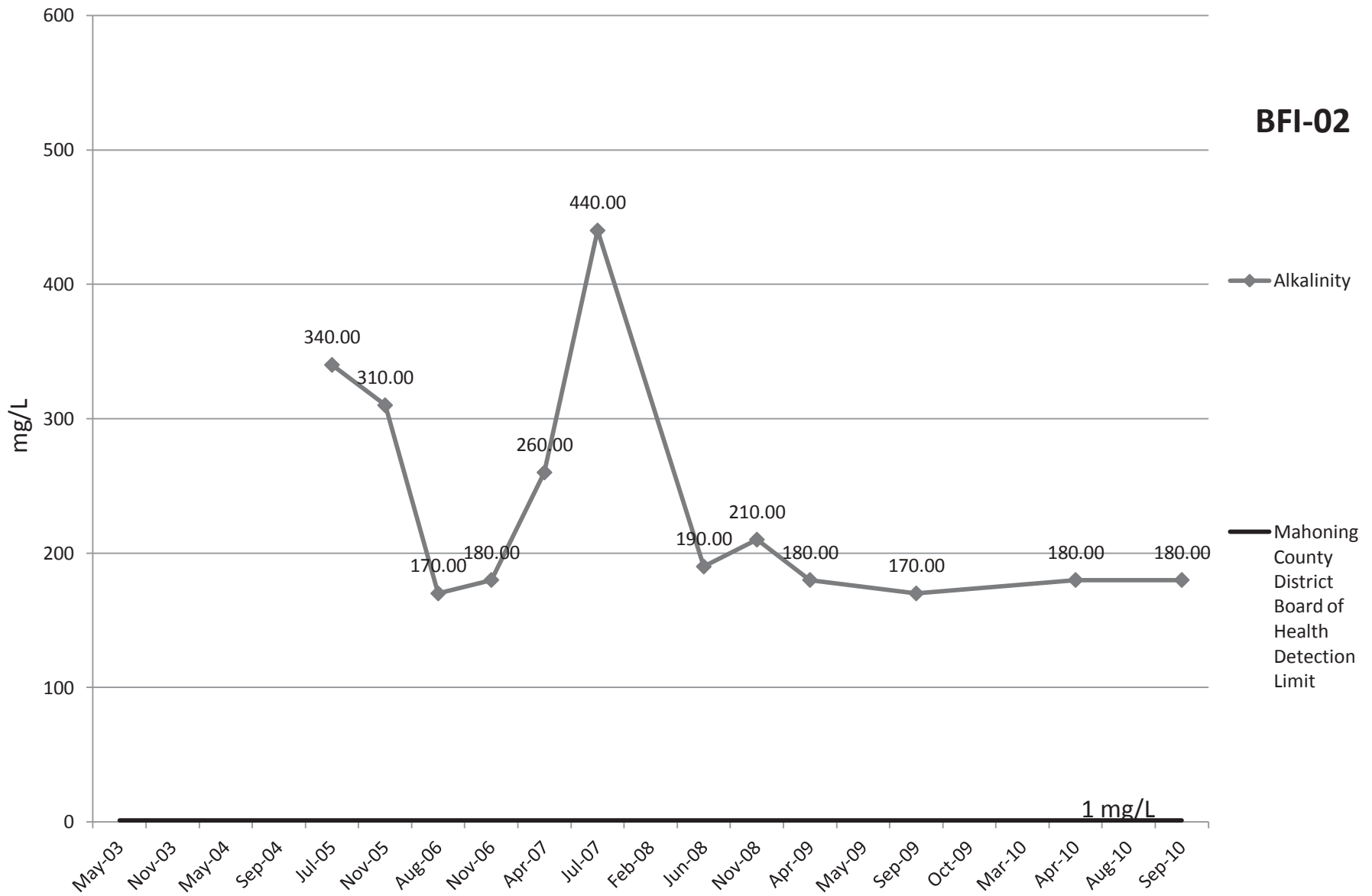


# Turbidity



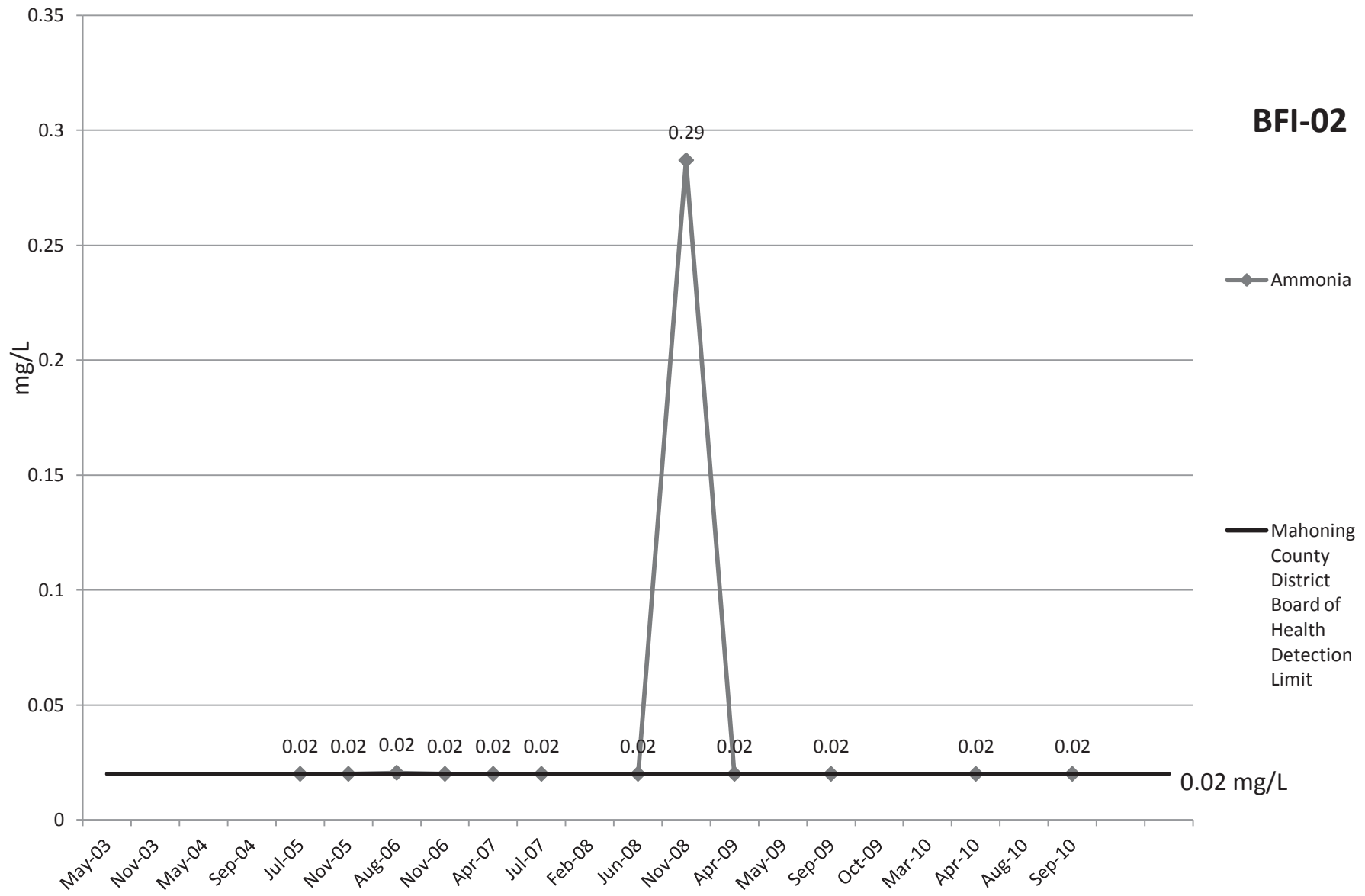
# Alkalinity

**BFI-02**





# Ammonia



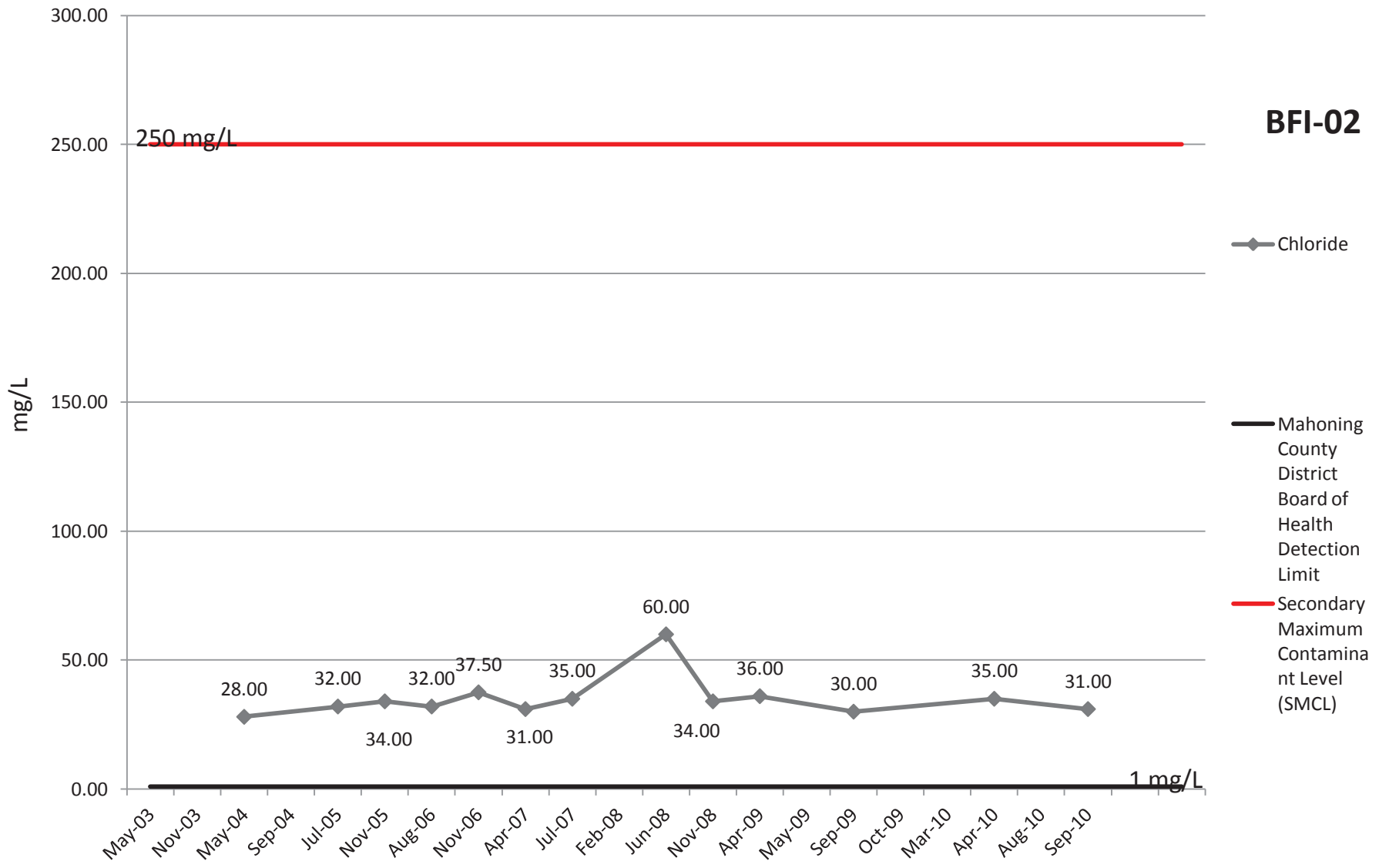
**BFI-02**

◆ Ammonia

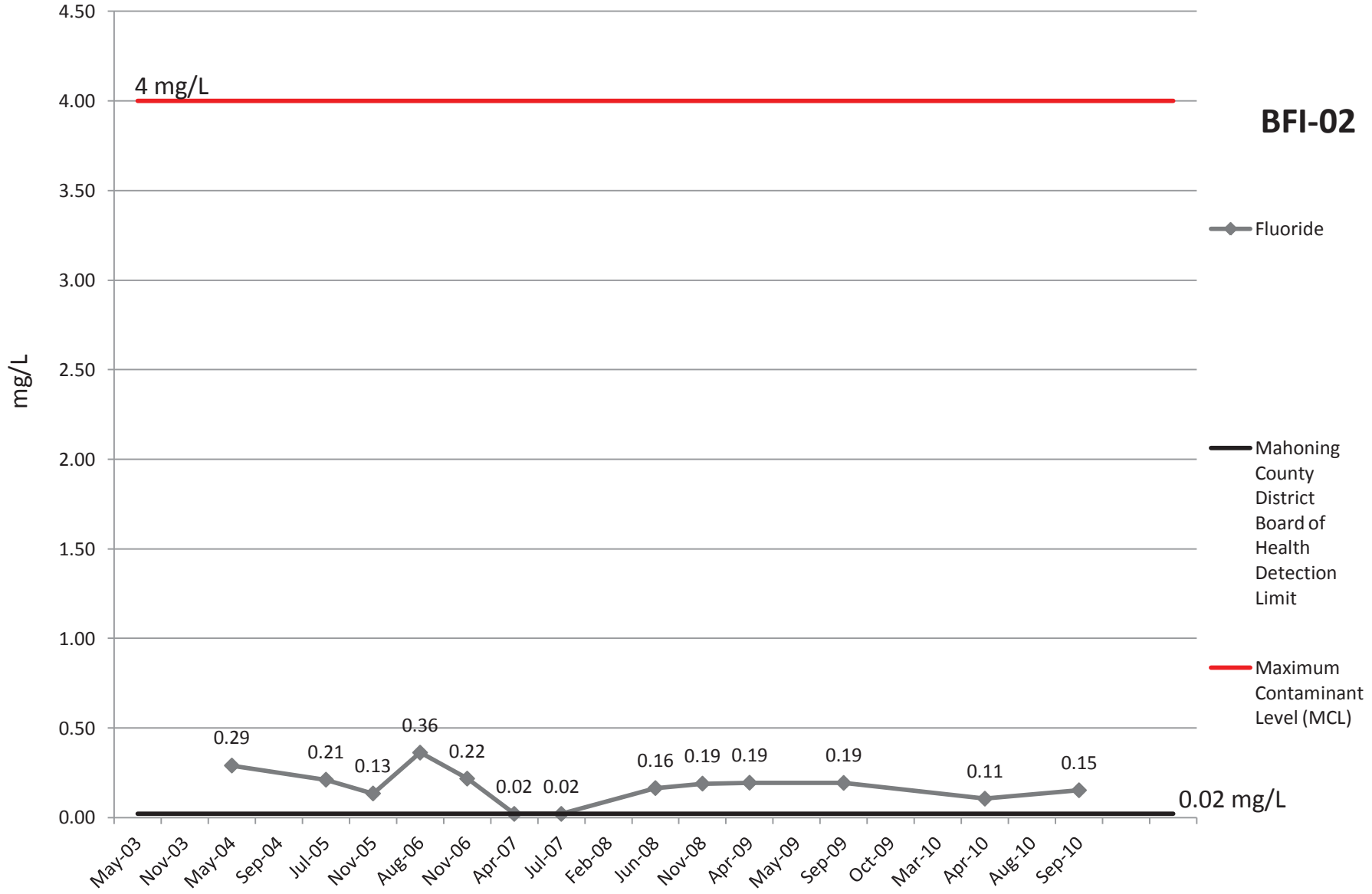
— Mahoning County District Board of Health Detection Limit

0.02 mg/L

# Chloride

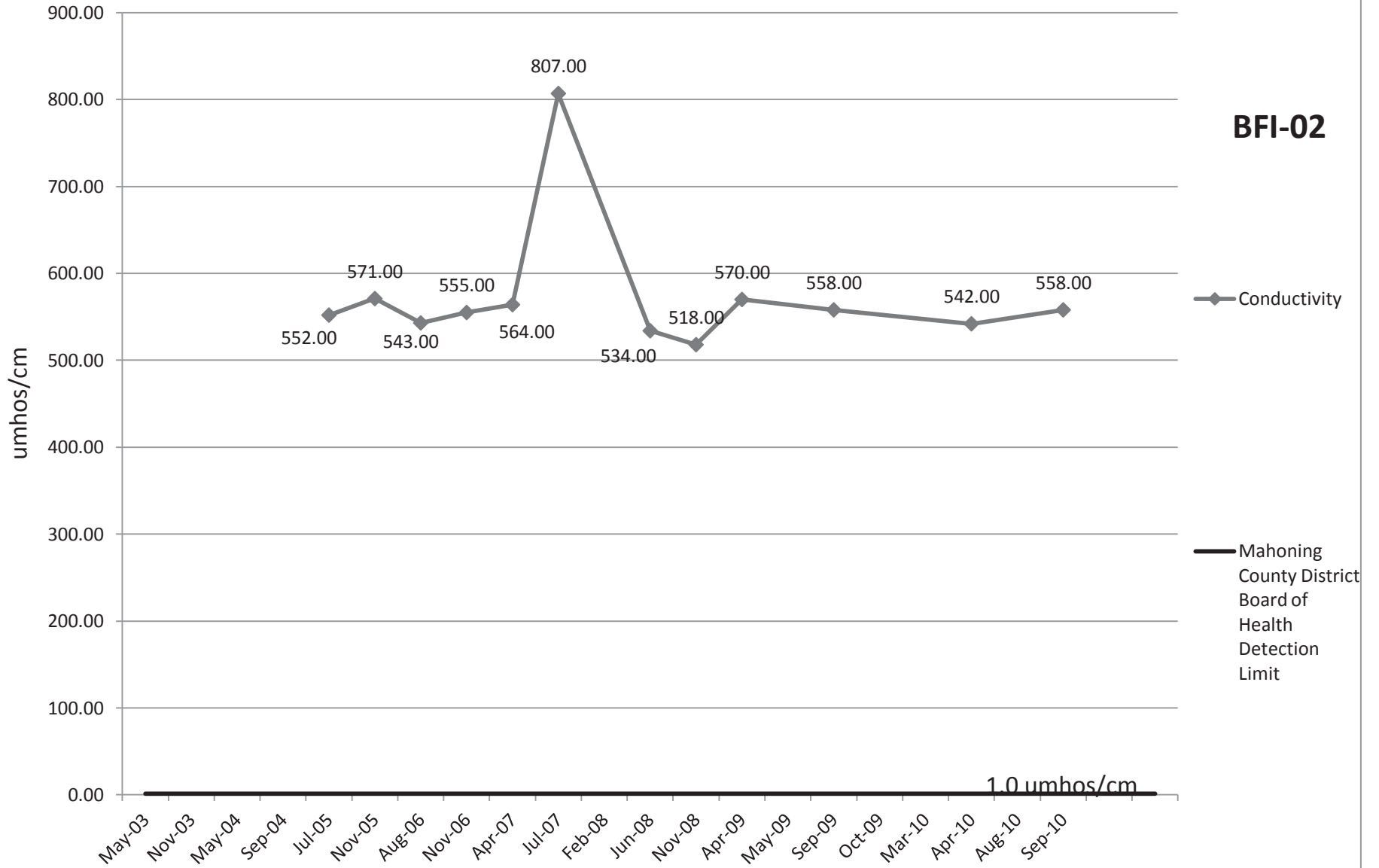


# Fluoride



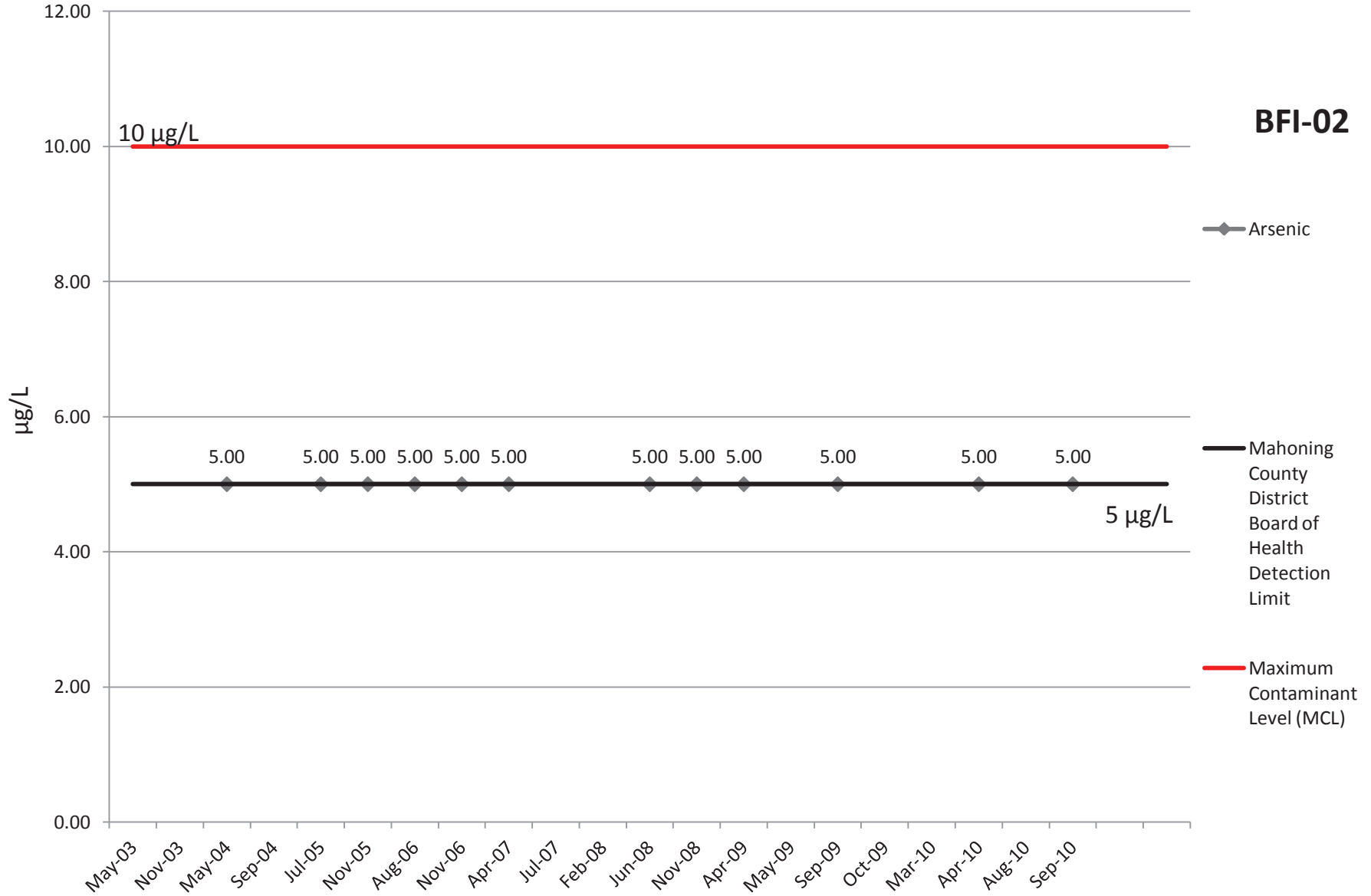
# Conductivity

**BFI-02**



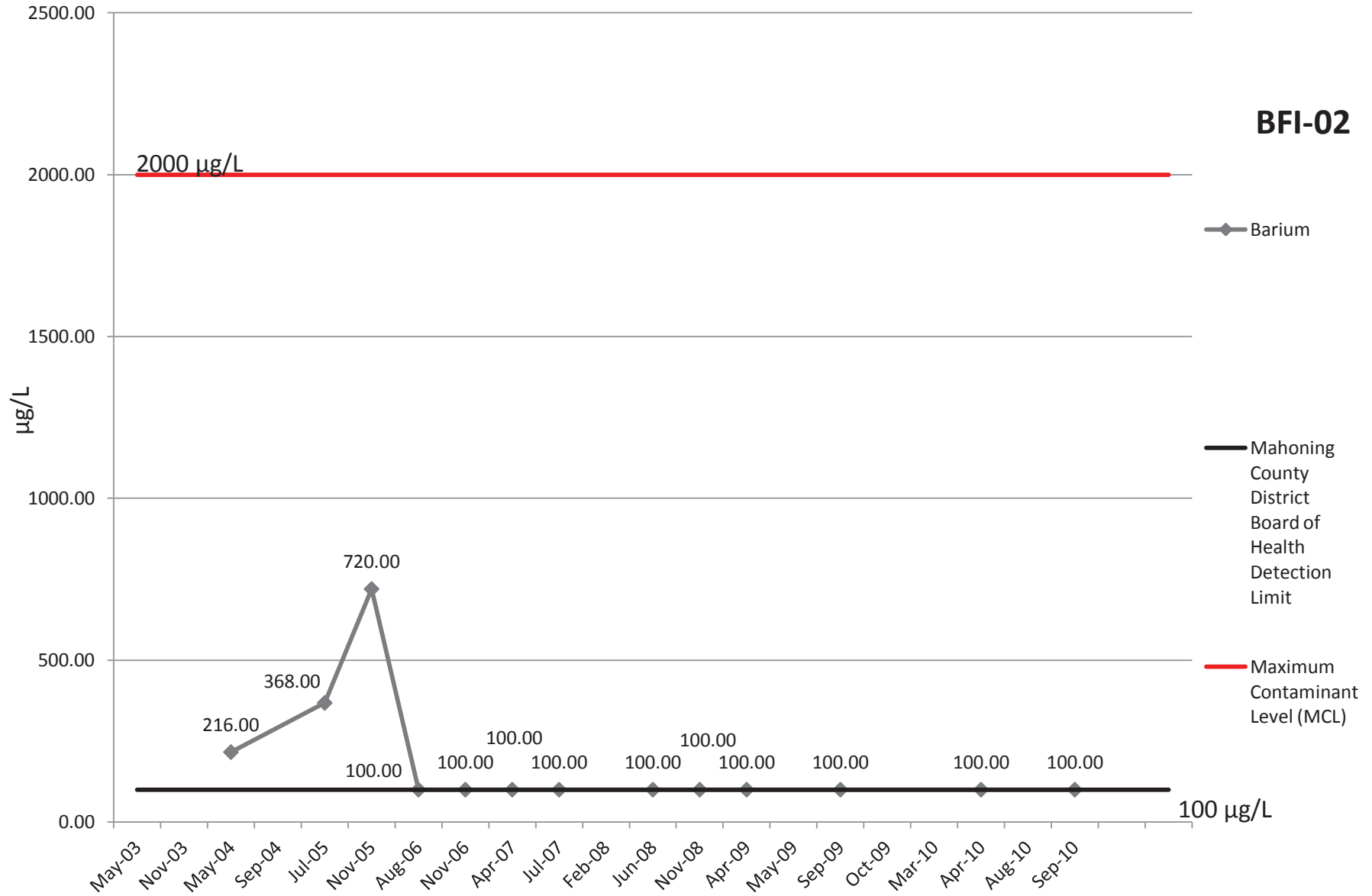
# Arsenic

**BFI-02**



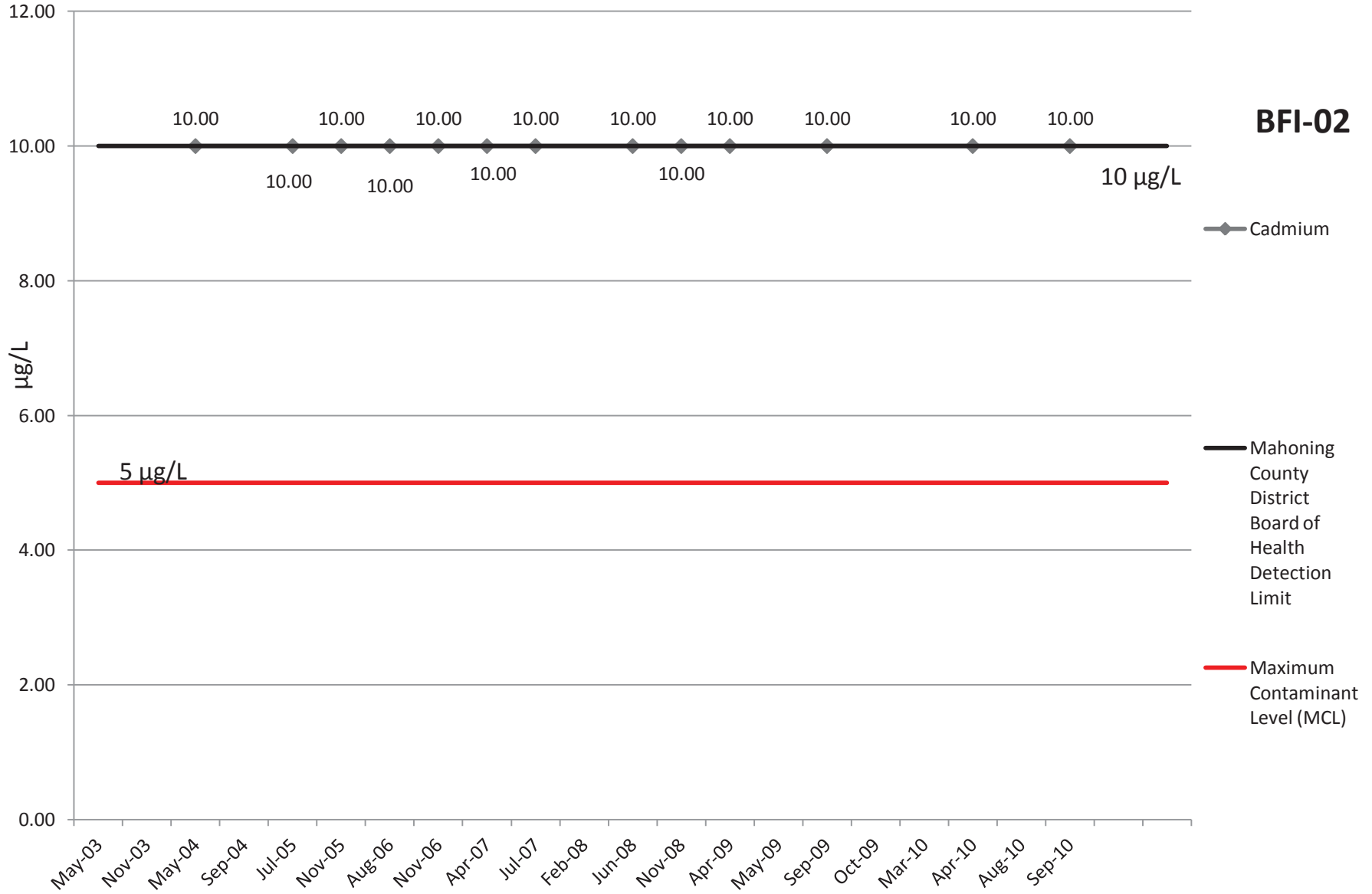
# Barium

**BFI-02**



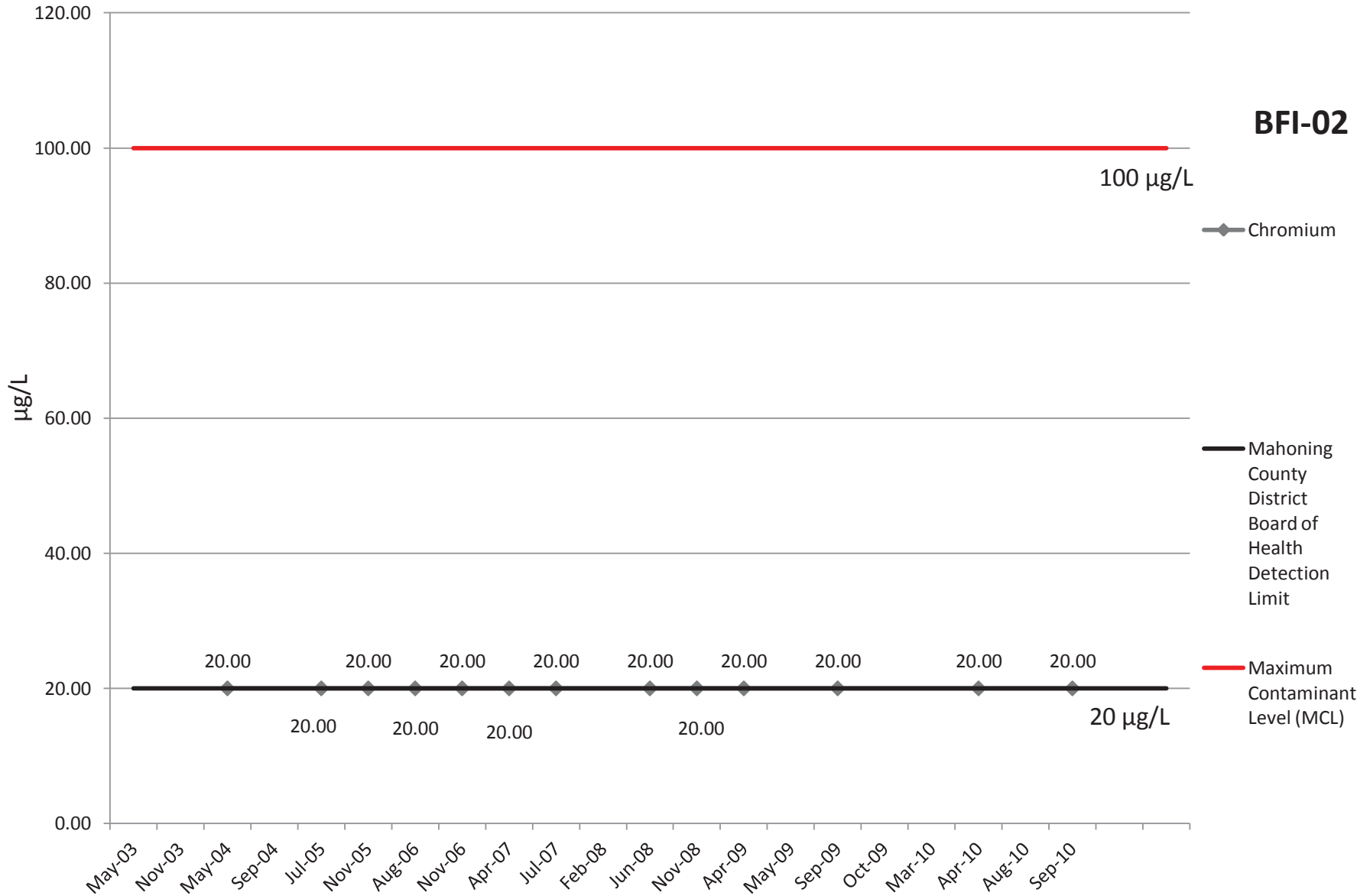
# Cadmium

**BFI-02**



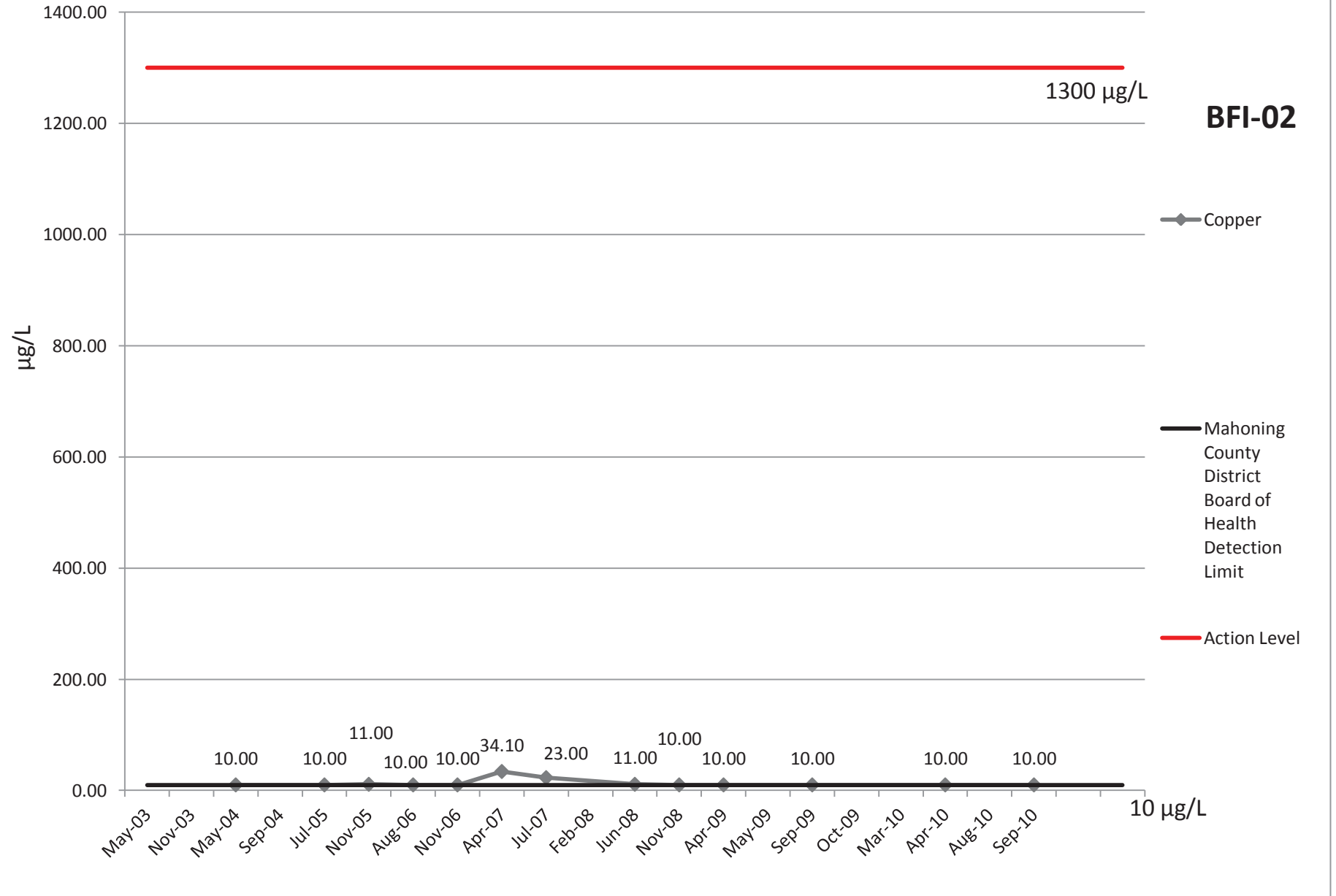
# Chromium

**BFI-02**



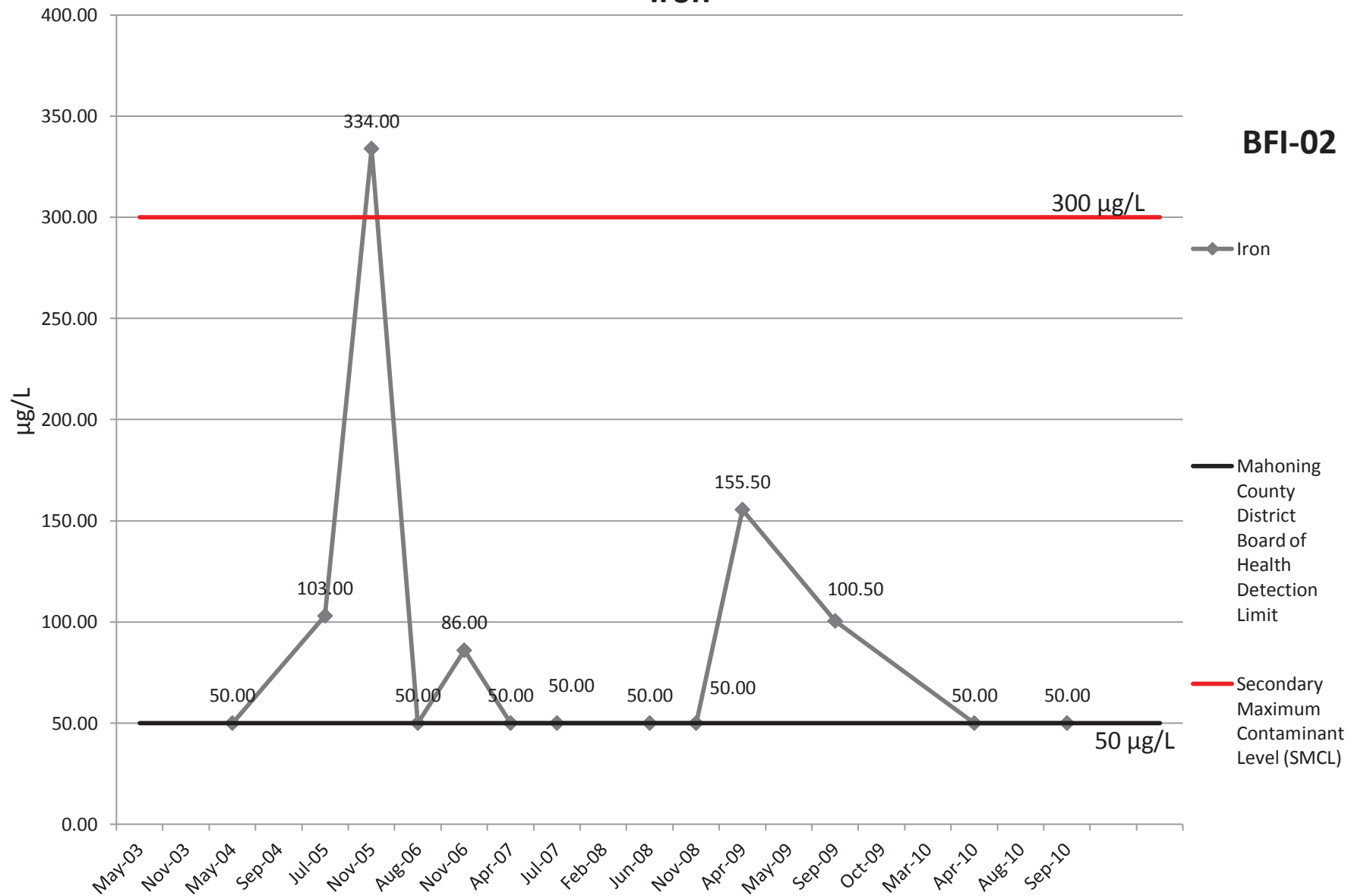


# Copper



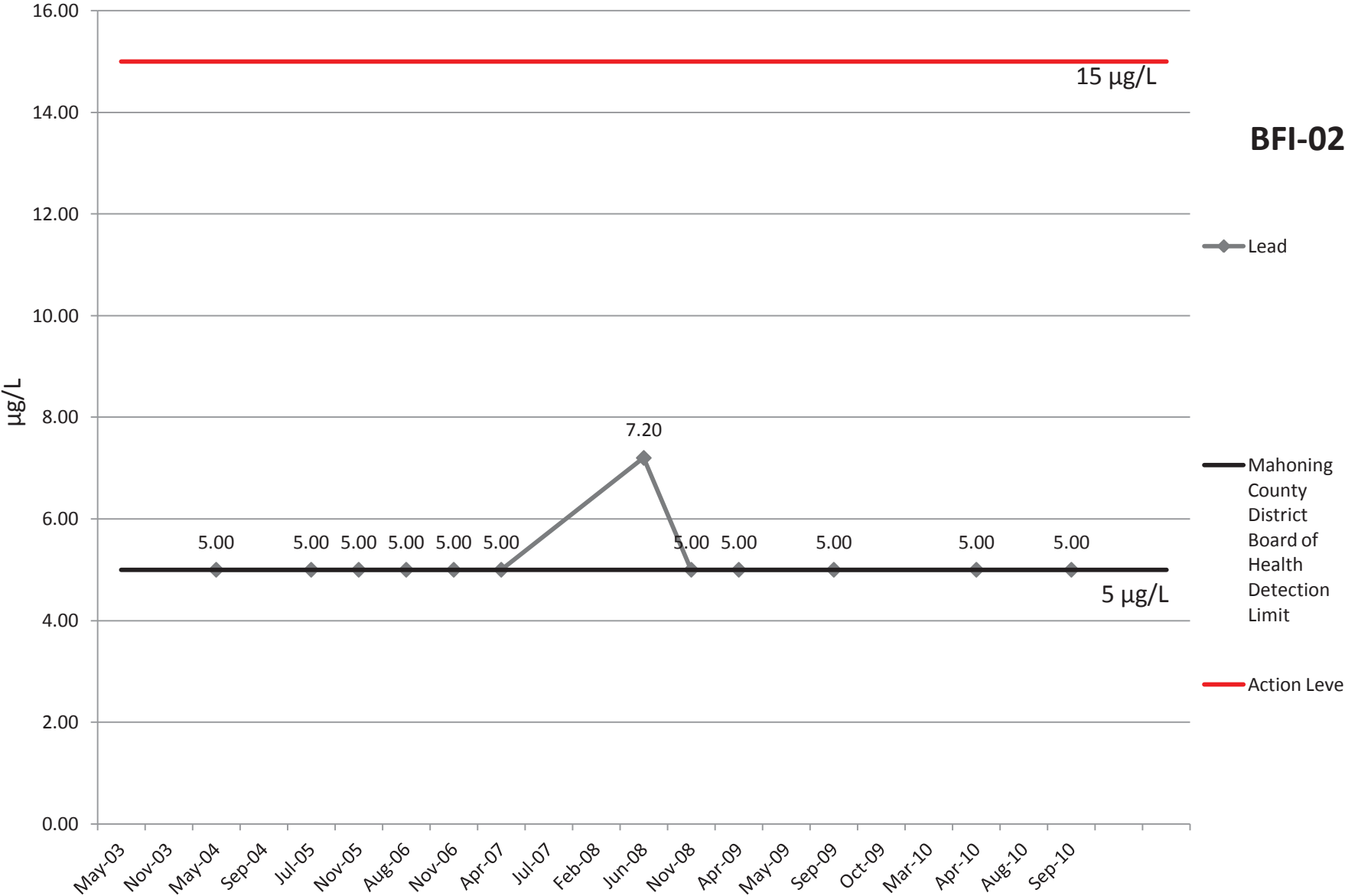
# Iron

**BFI-02**

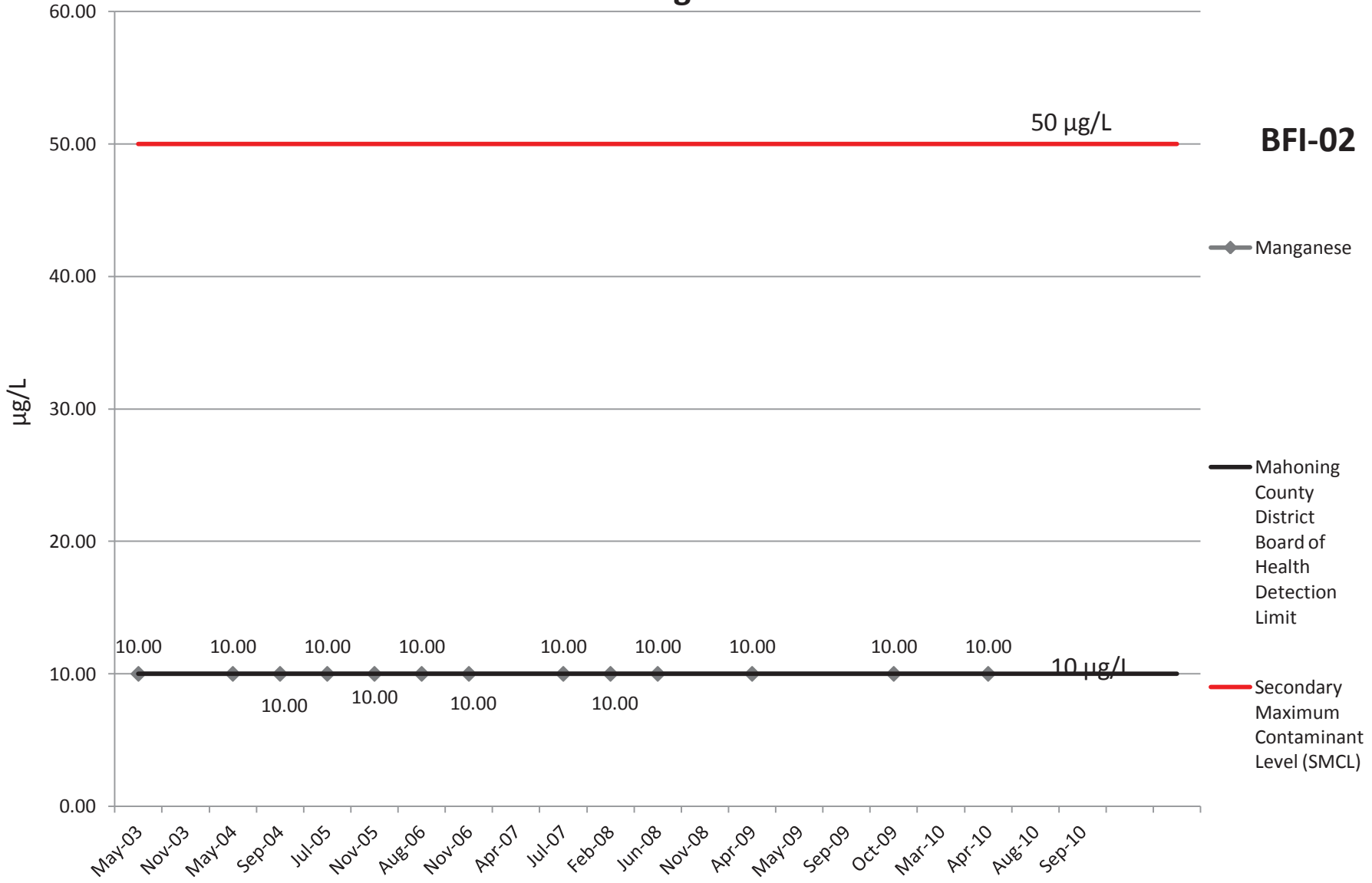


# Lead

**BFI-02**

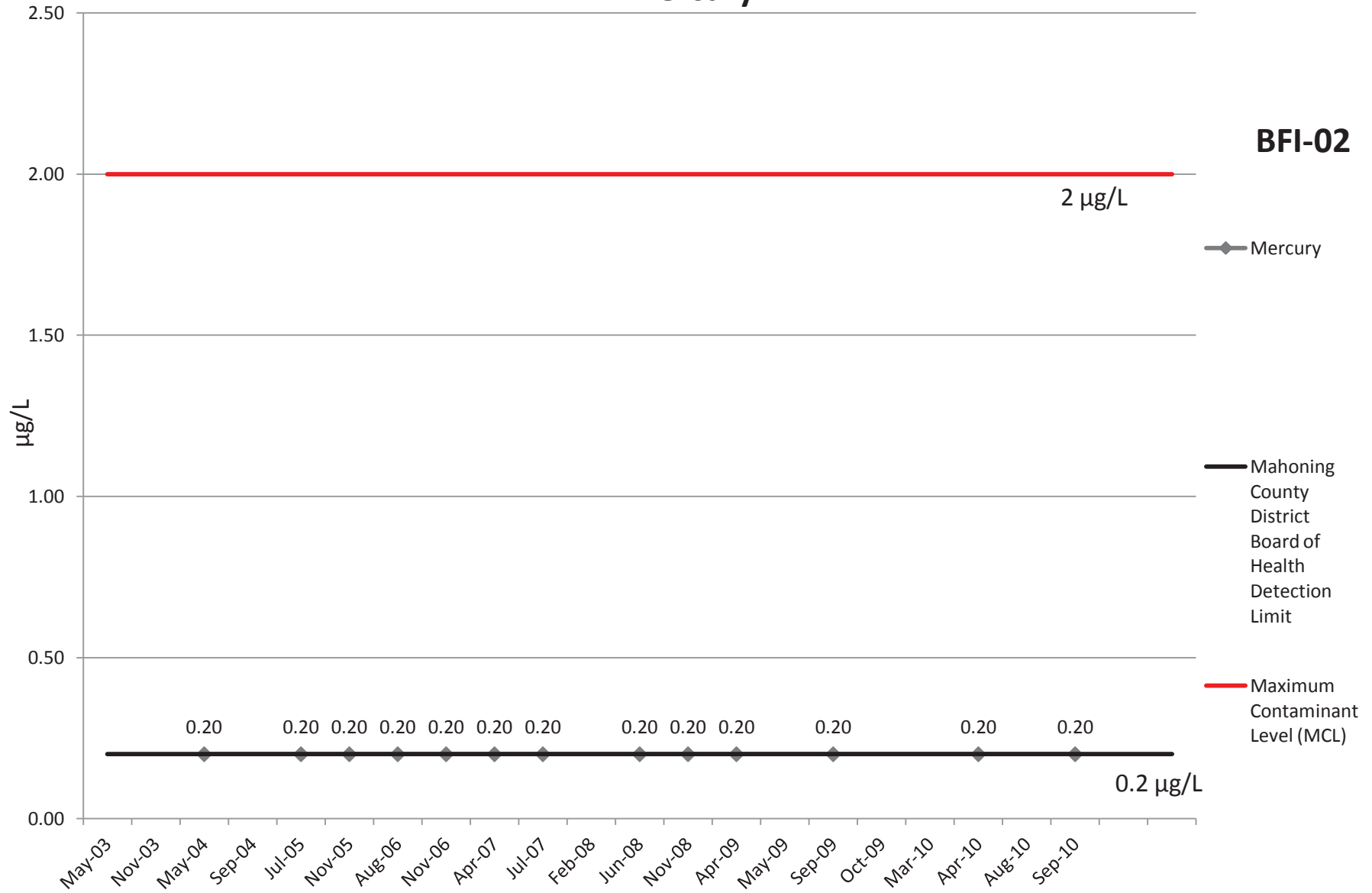


# Manganese

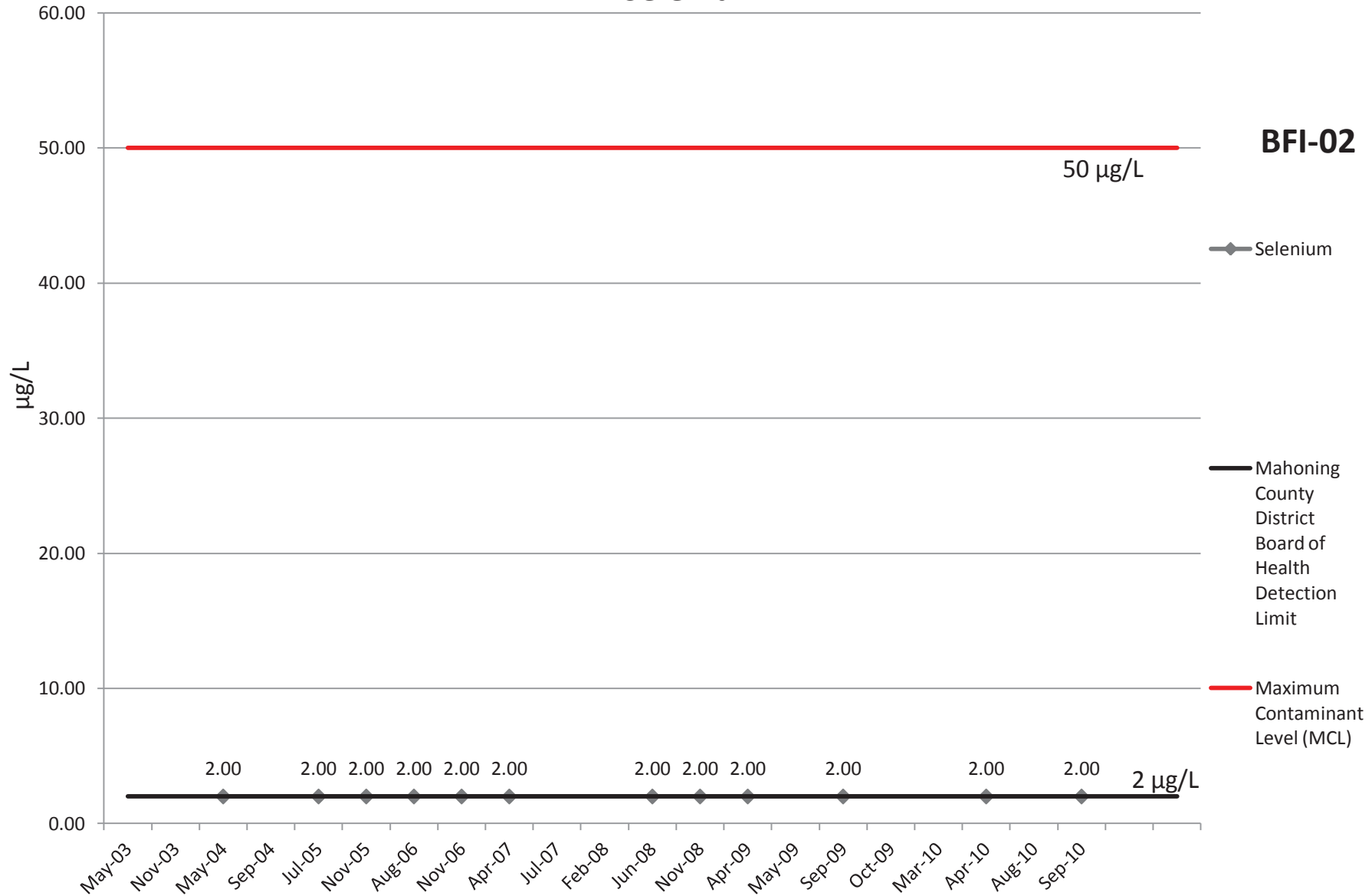


# Mercury

**BFI-02**

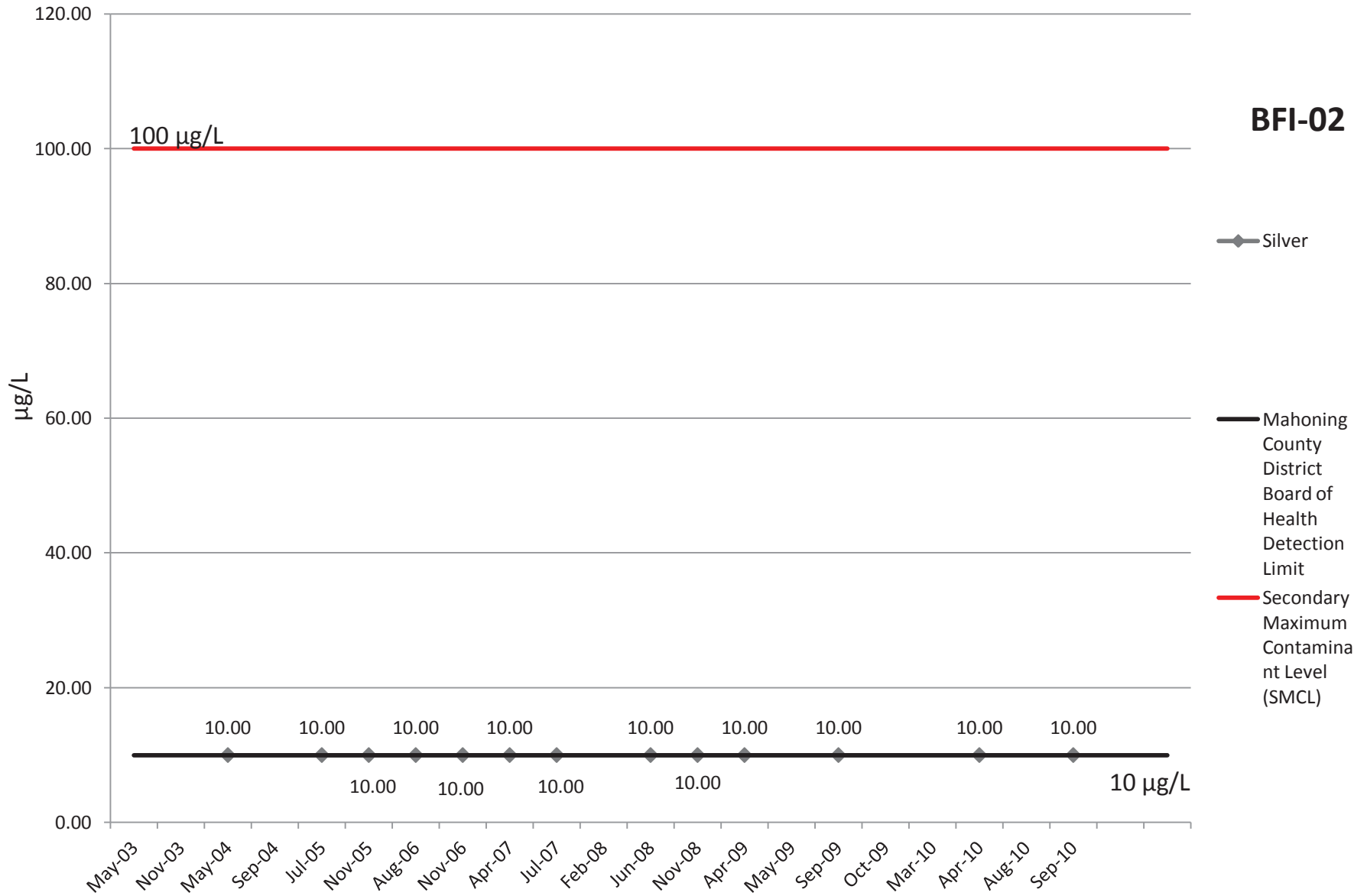


# Selenium

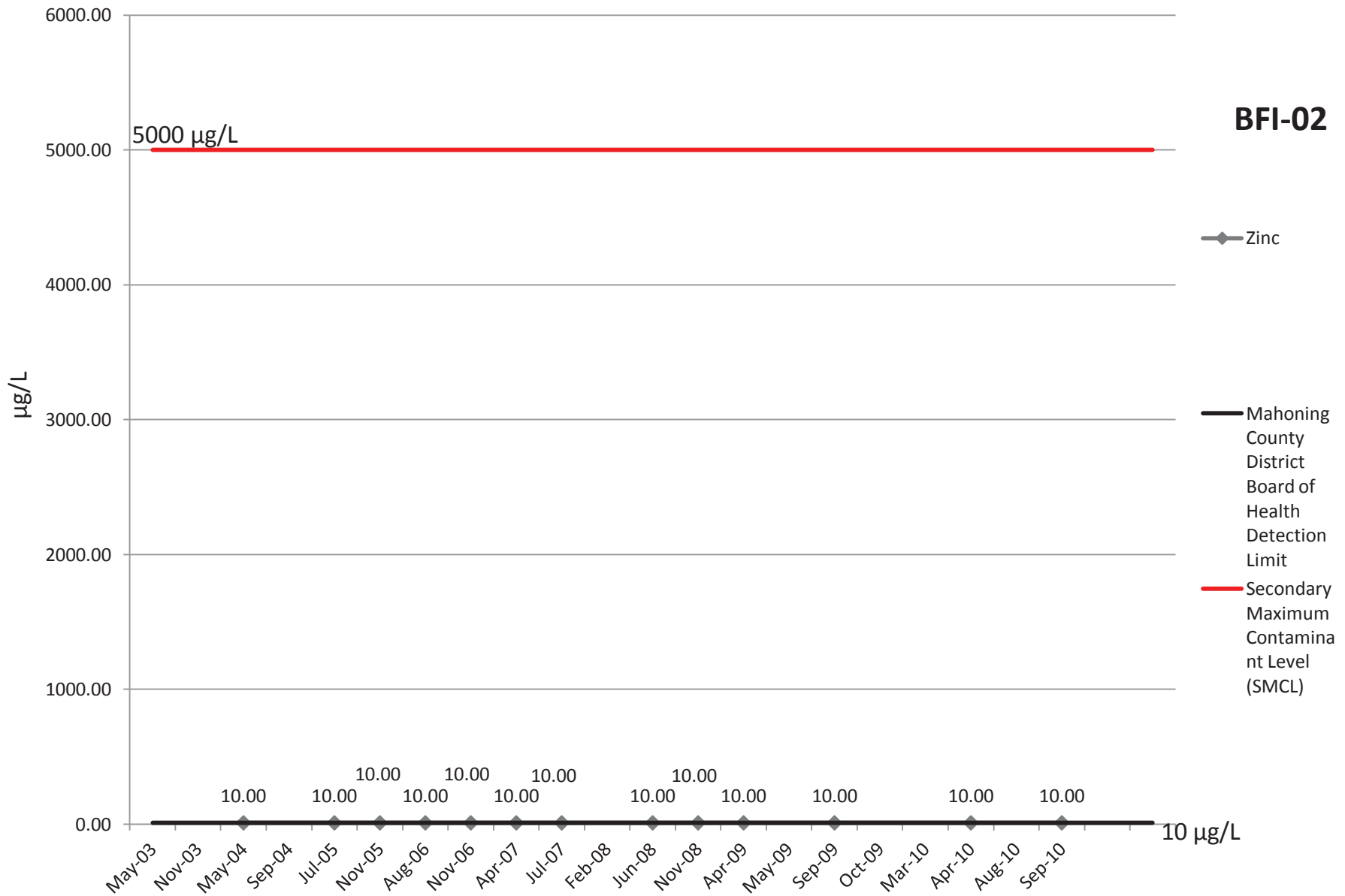


# Silver

**BFI-02**

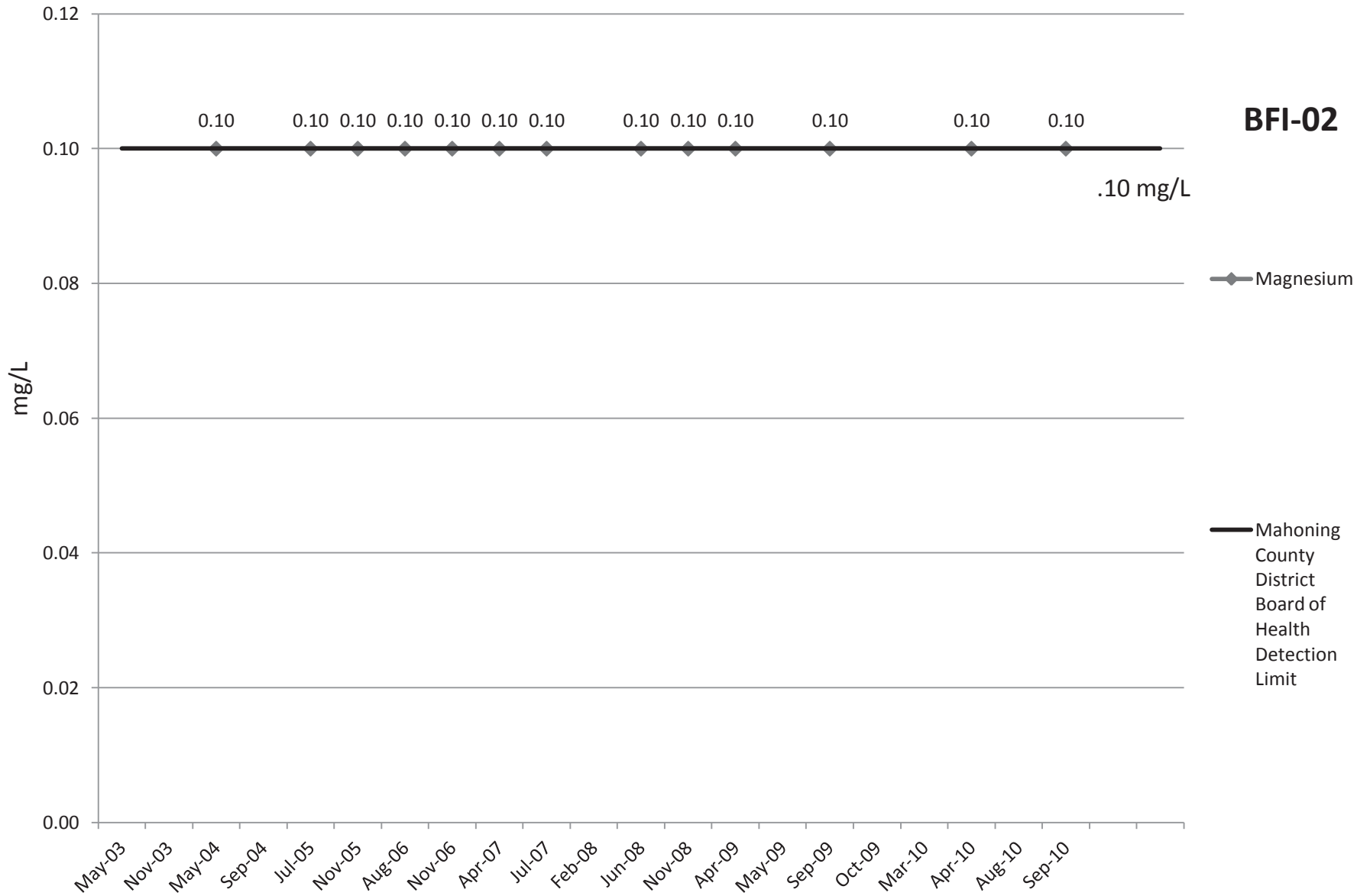


# Zinc

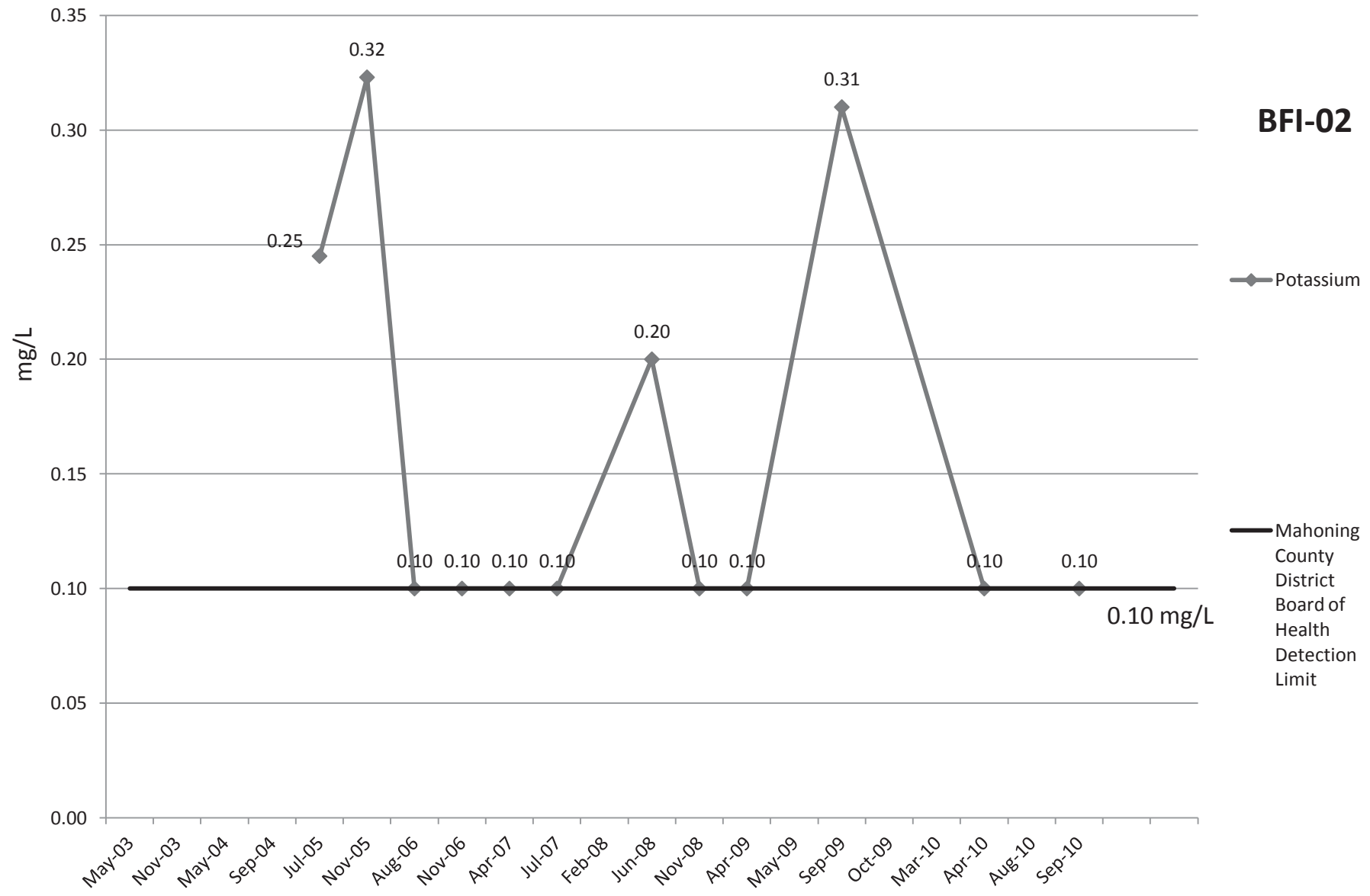




# Magnesium

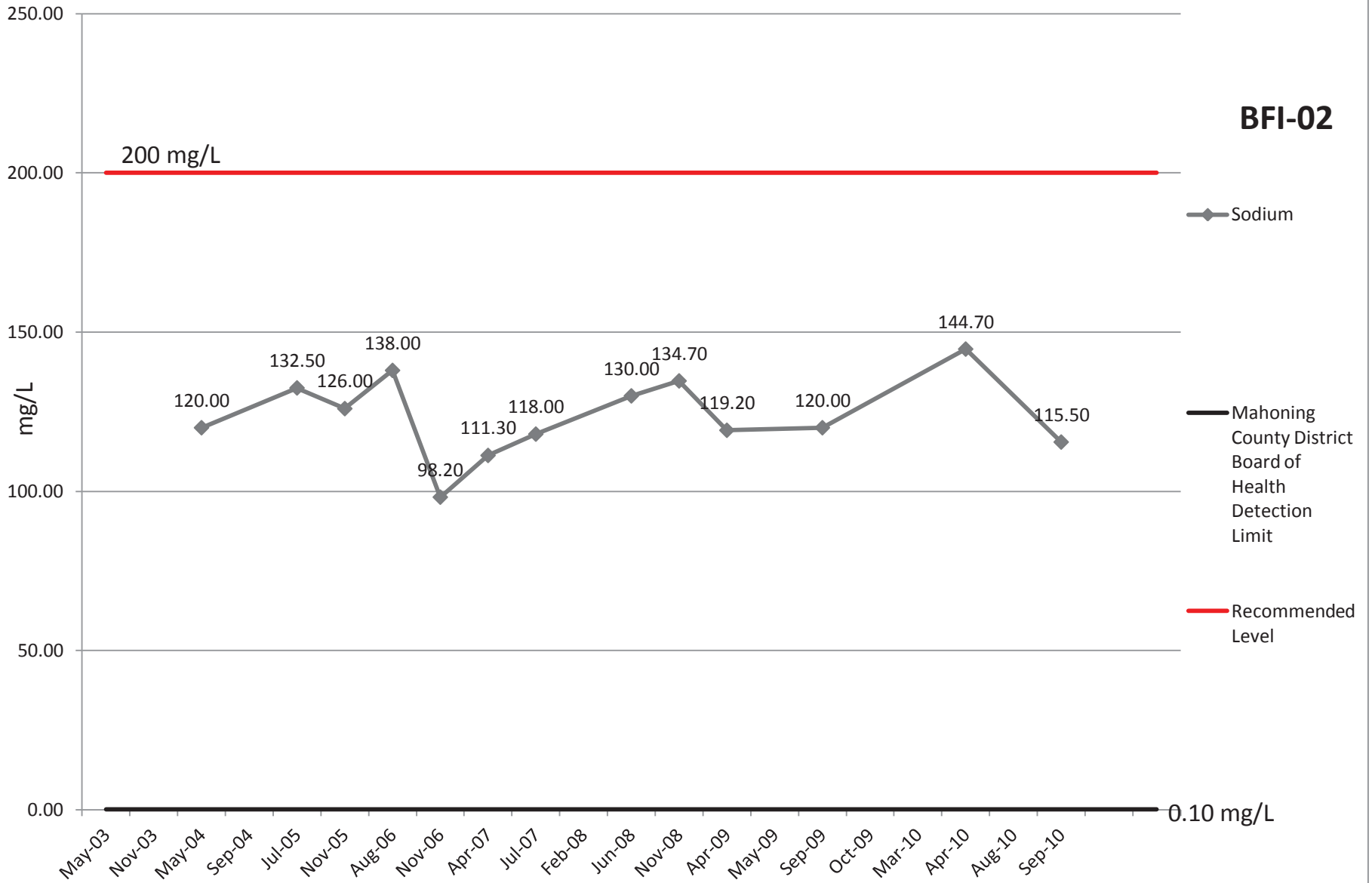


# Potassium



# Sodium

**BFI-02**



# Nitrate EPA

**BFI-02**

10 mg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

mg/L

◆ Nitrate EPA

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

0.05

0.05

0.05

0.05

0.05

0.05

0.05

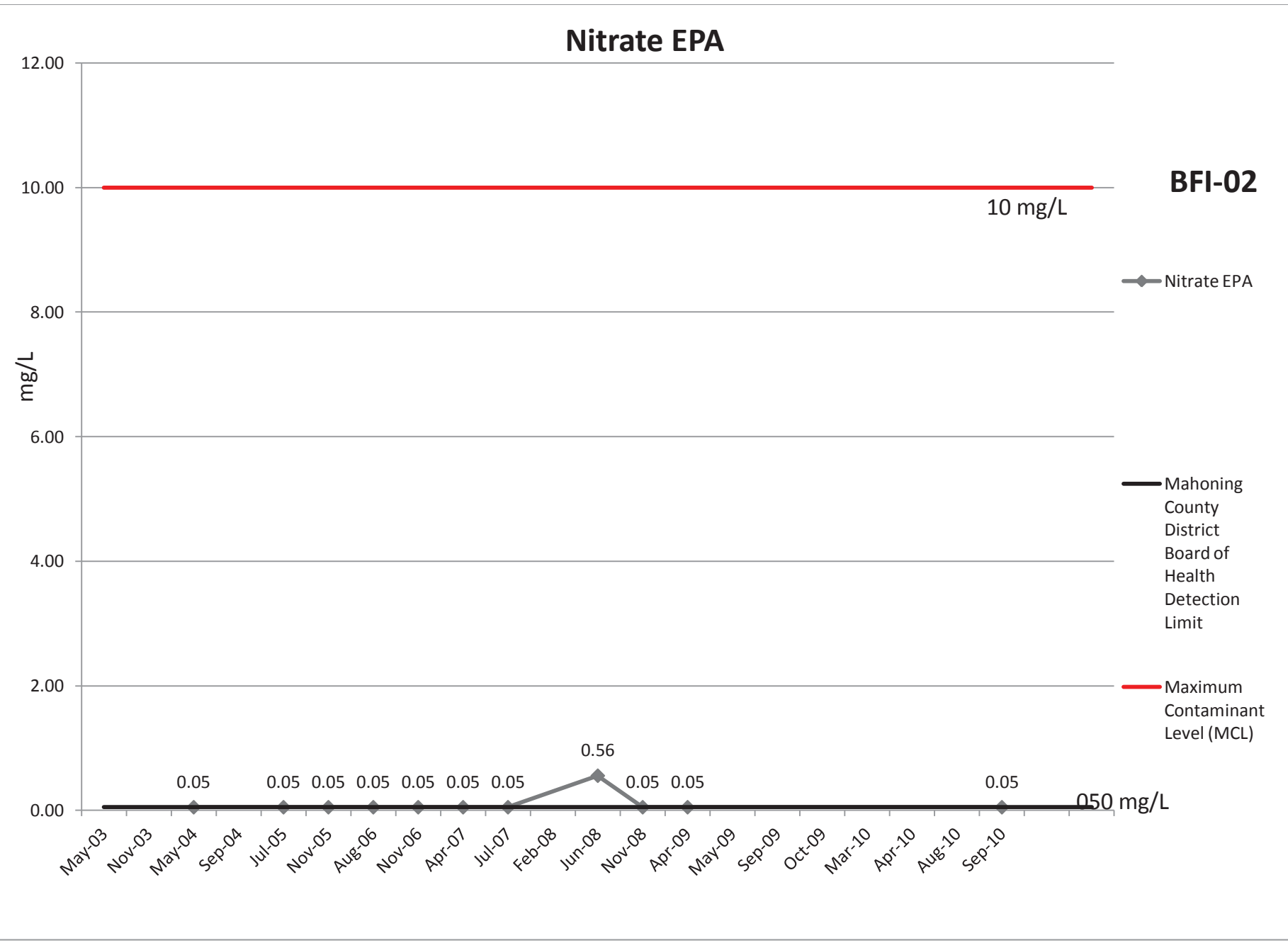
0.56

0.05

0.05

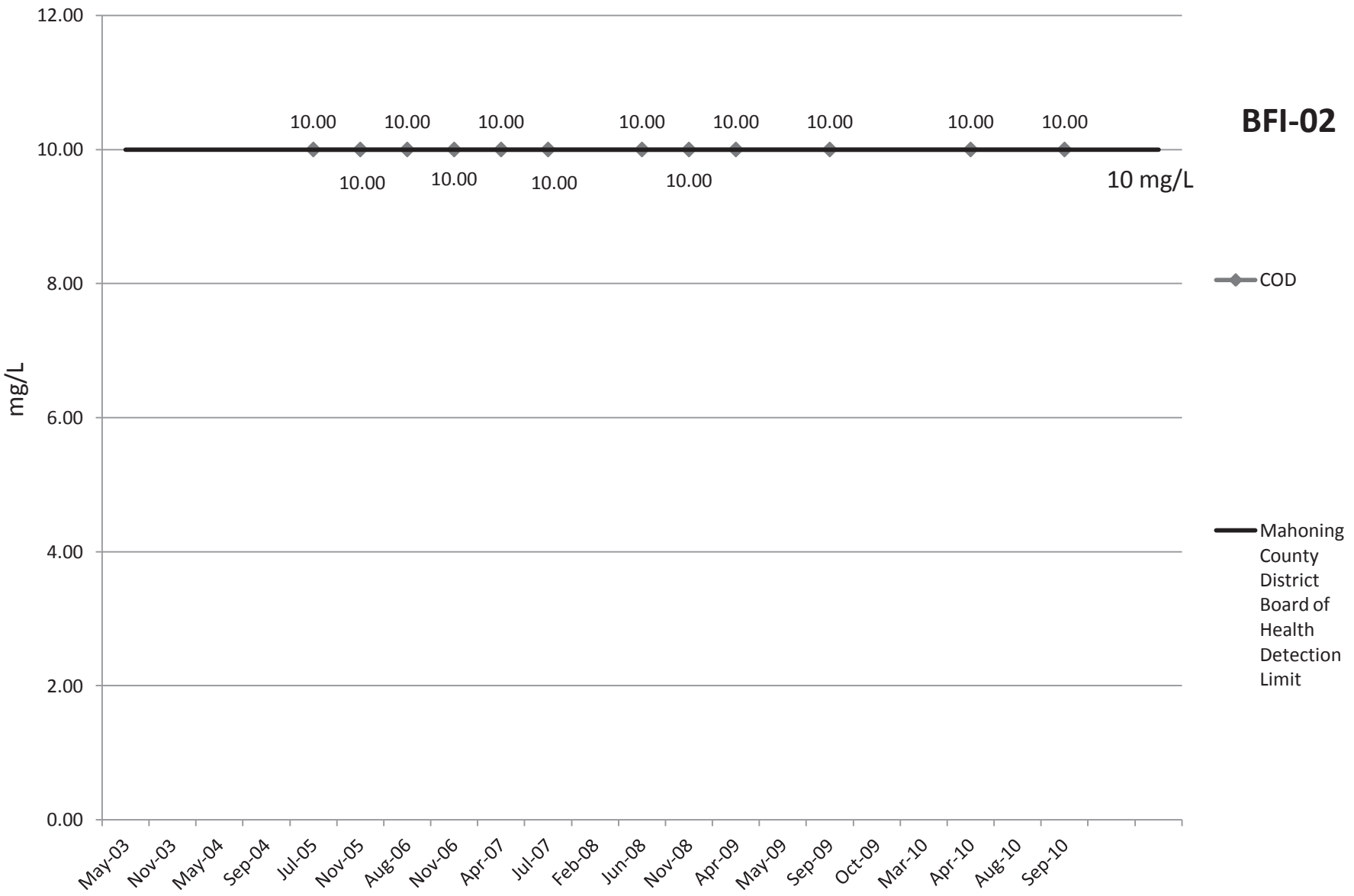
0.05

0.50 mg/L



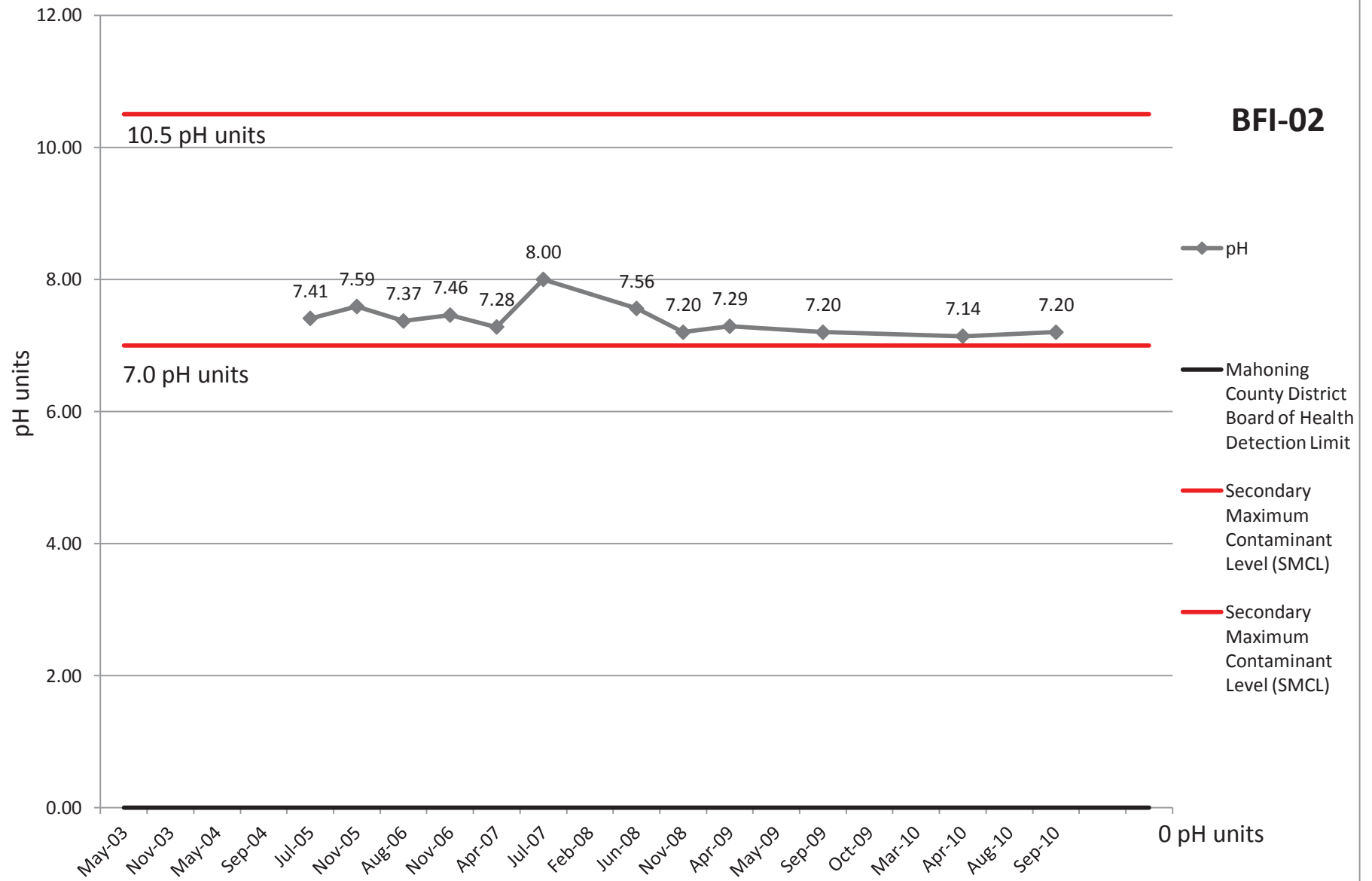
# COD

**BFI-02**

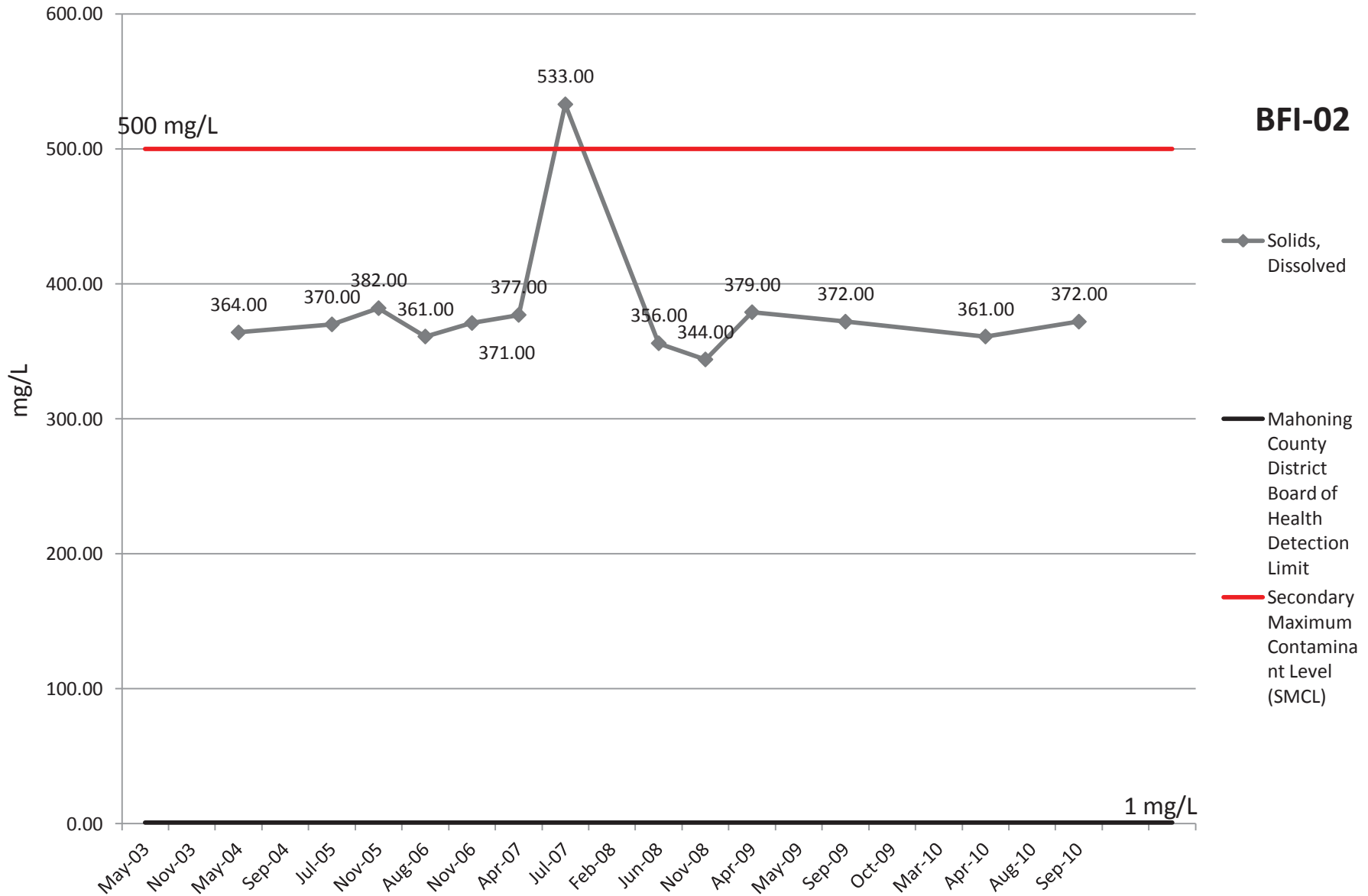


# pH

**BFI-02**

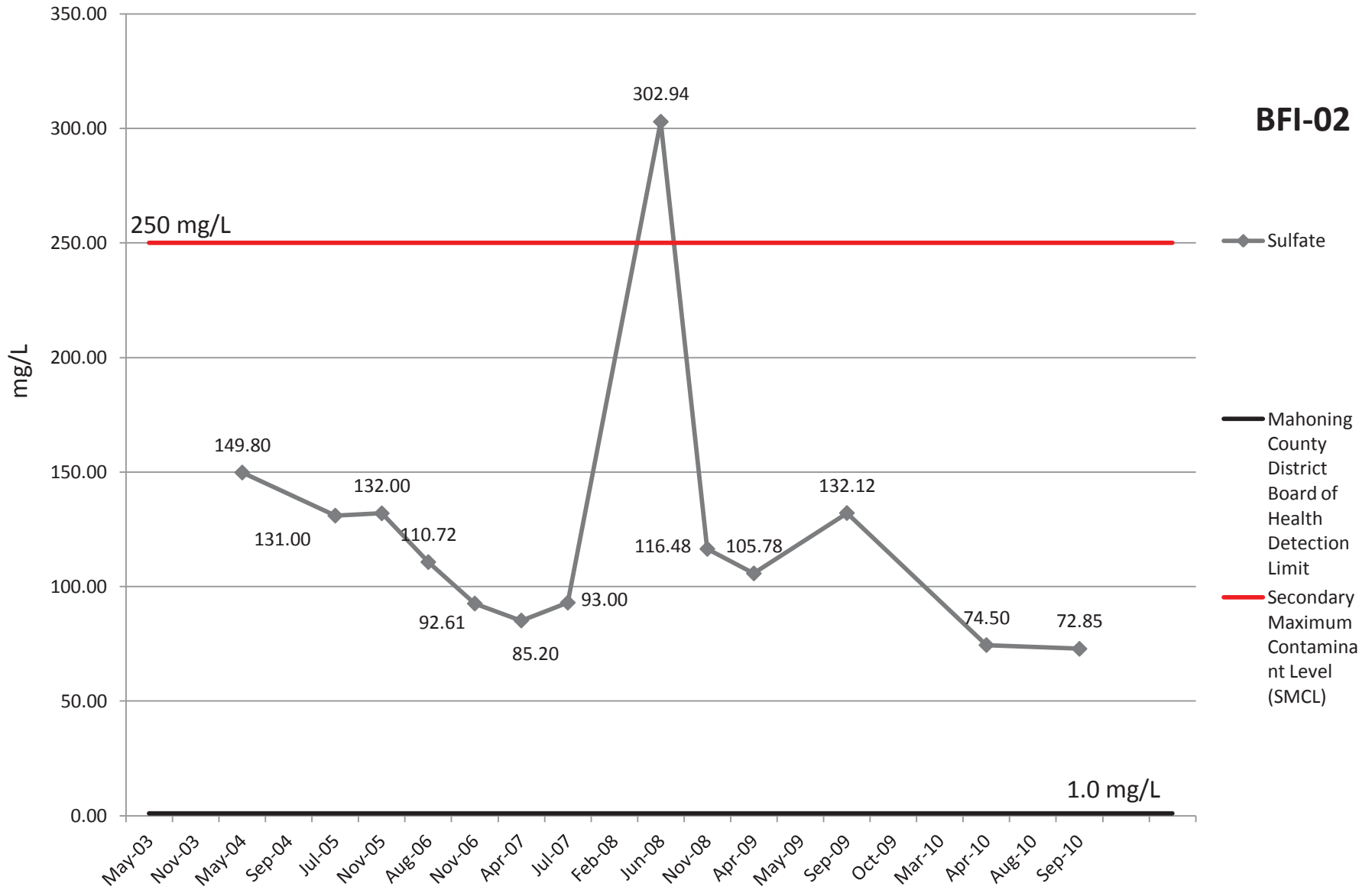


# Solids, Dissolved



# Sulfate

**BFI-02**





# Bacteria

positive (1)

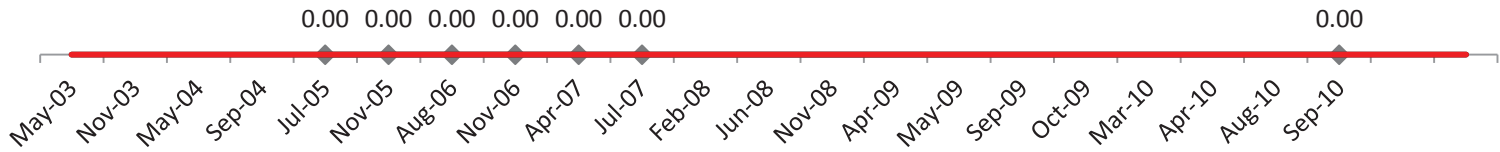
## BFI-02

Positive/Negative

◆ Bacteria

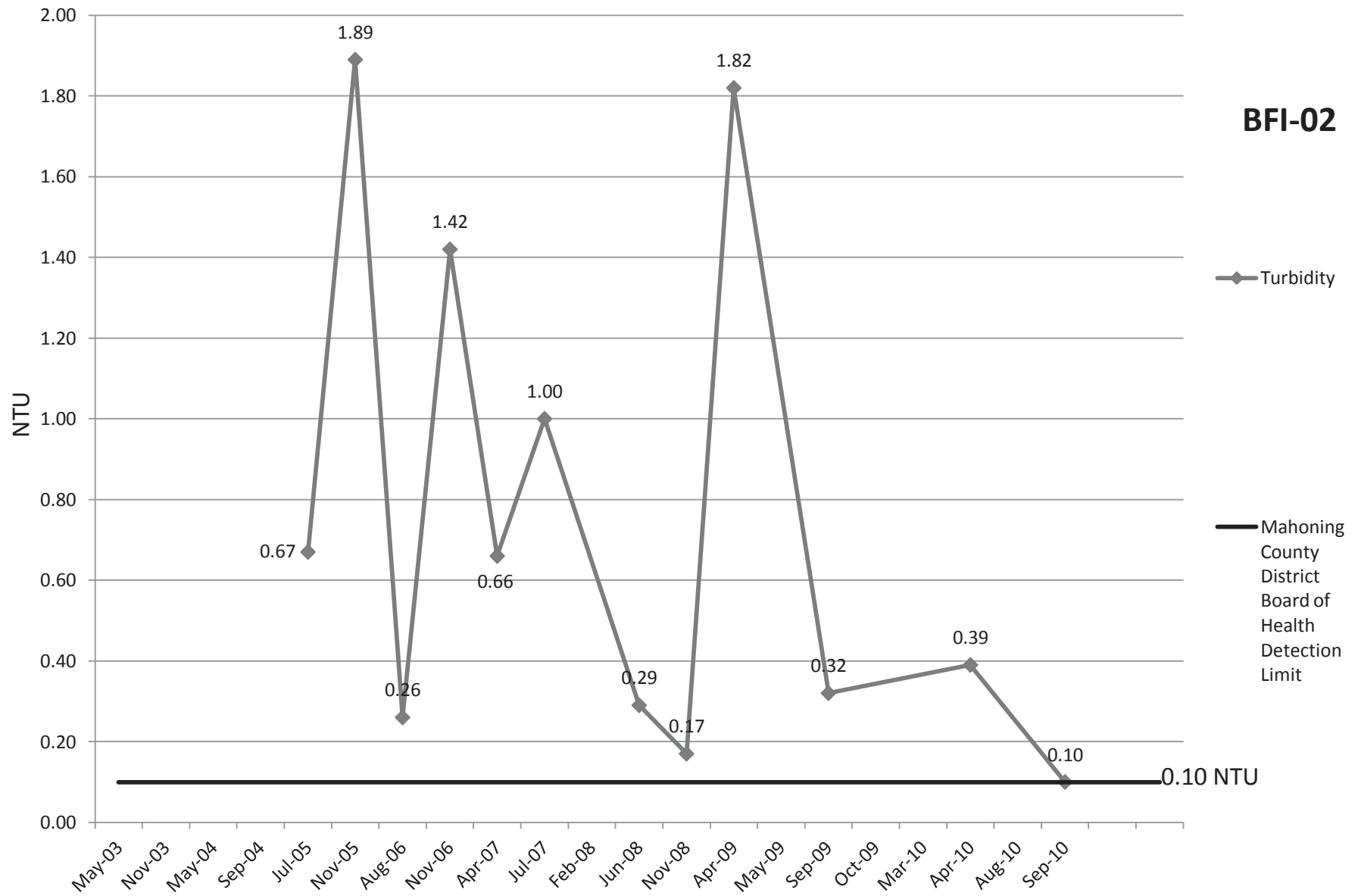
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)



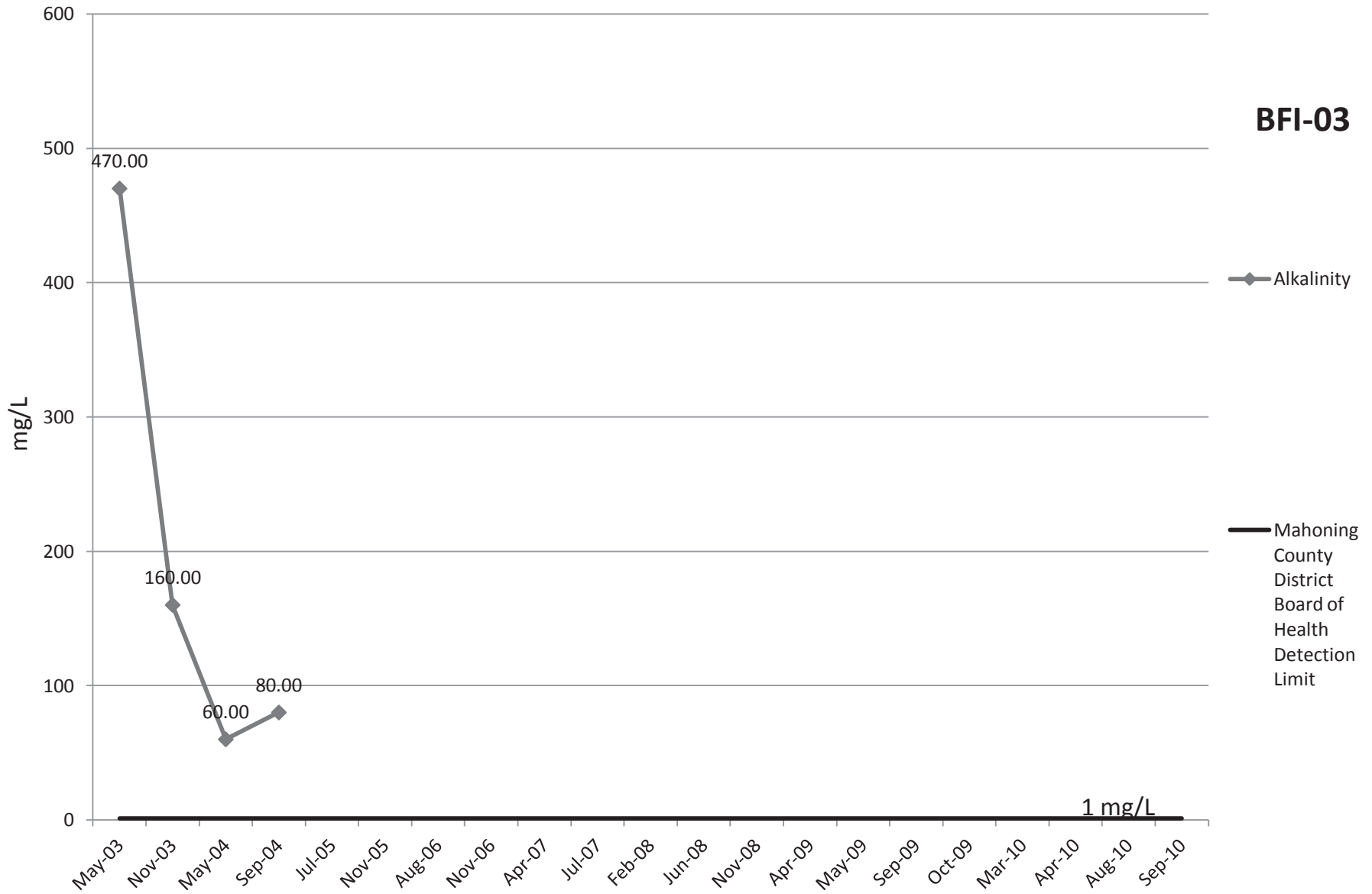
negative (0)

# Turbidity

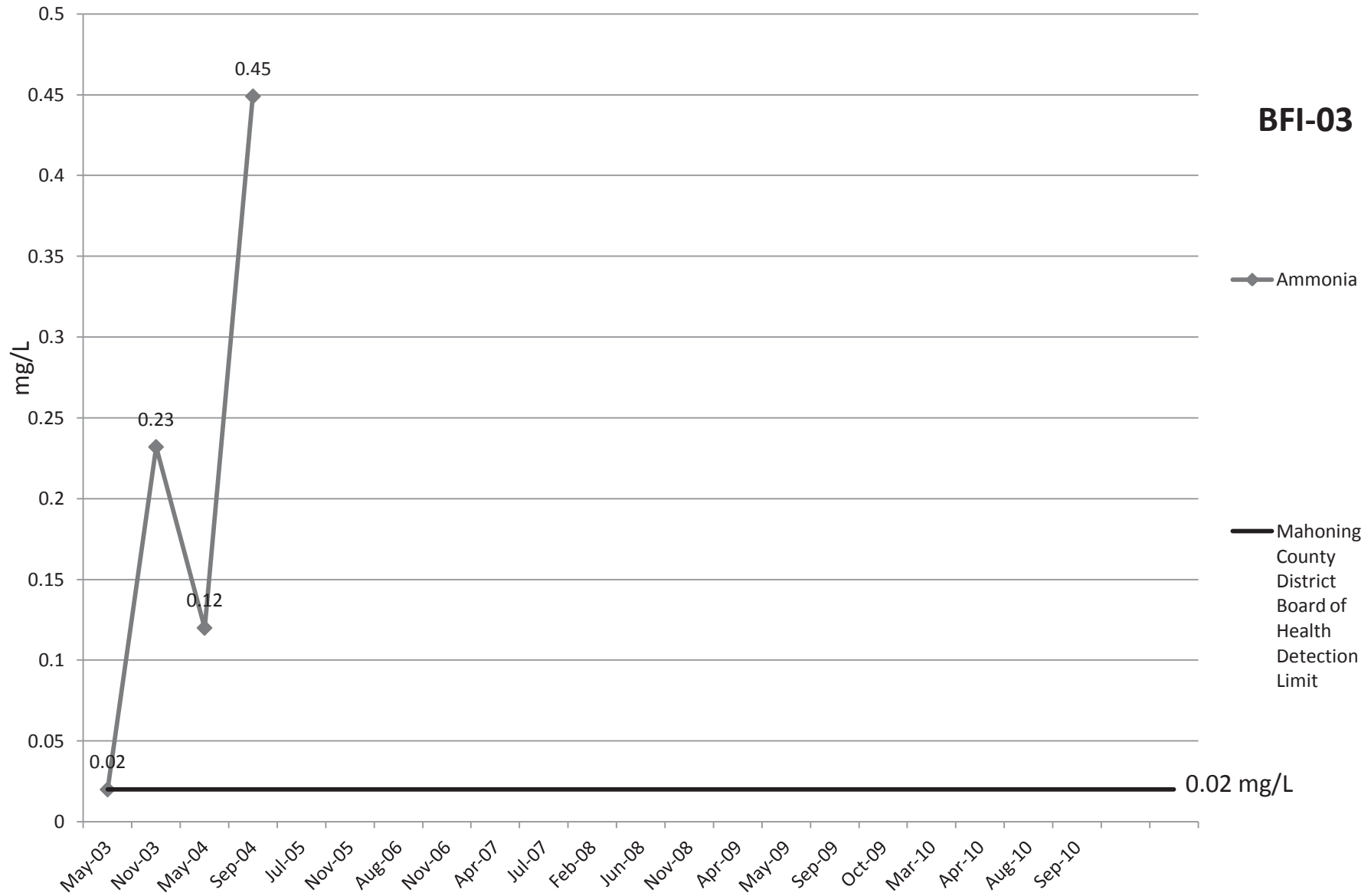


# Alkalinity

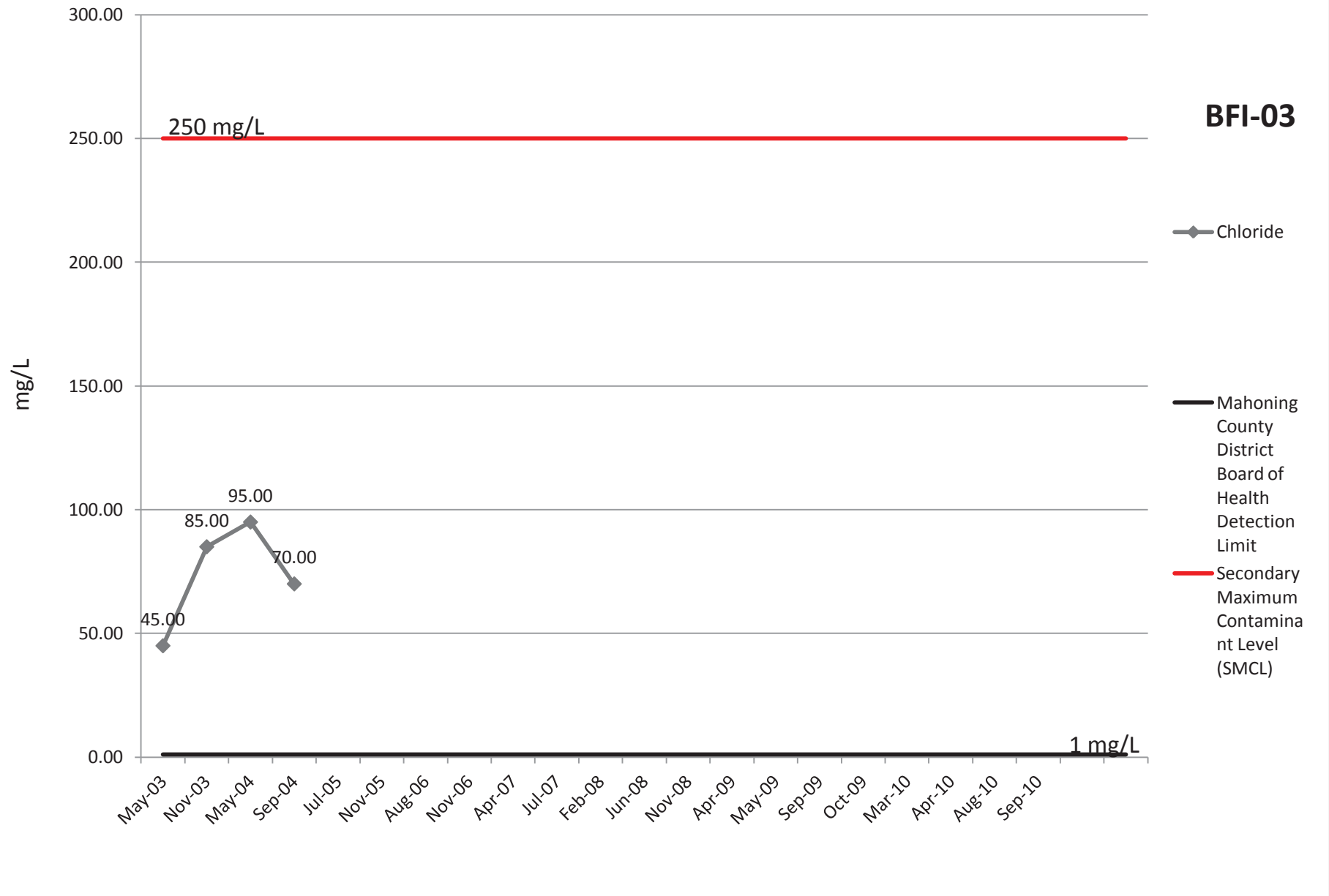
**BFI-03**



# Ammonia

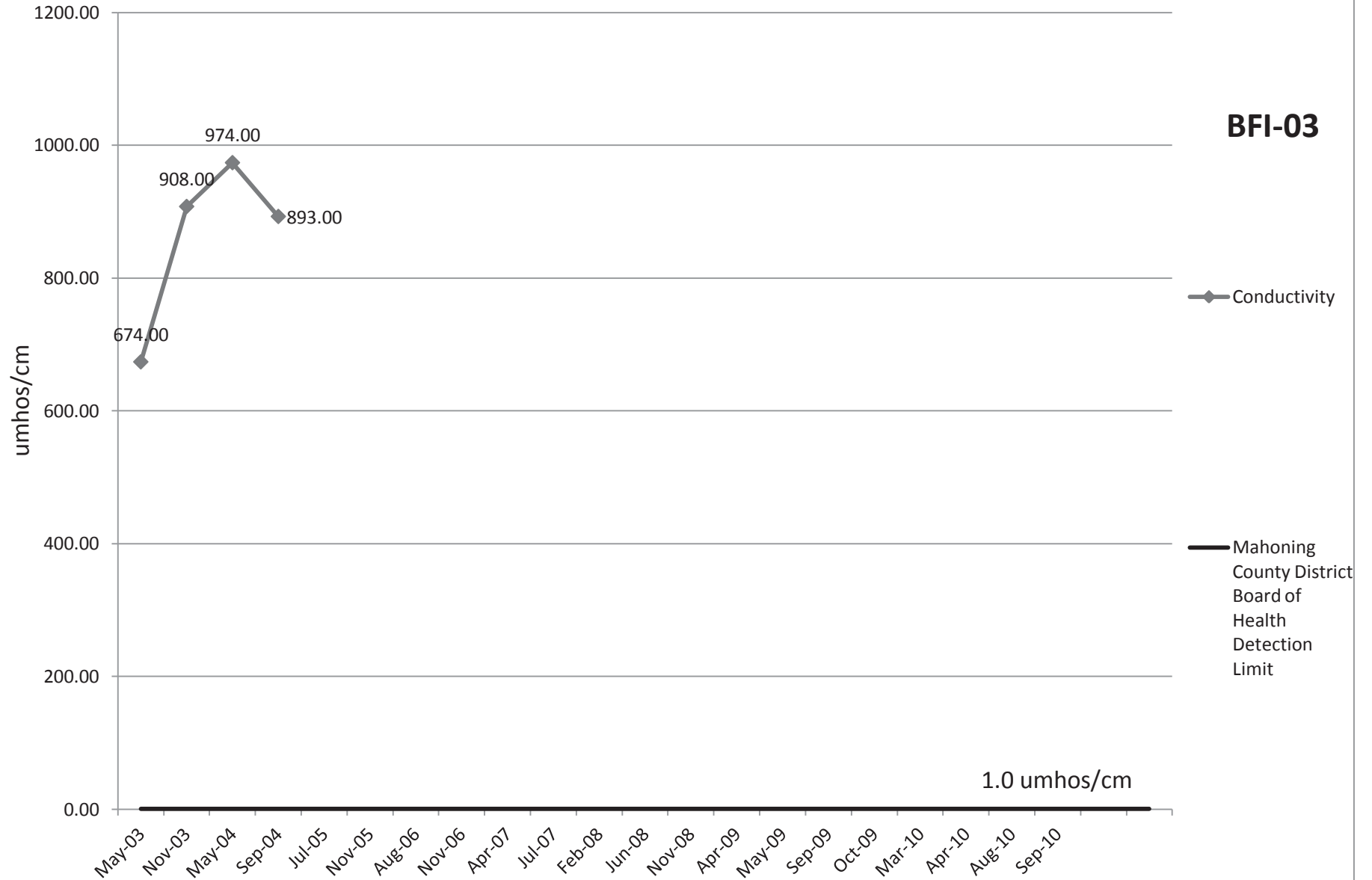


# Chloride

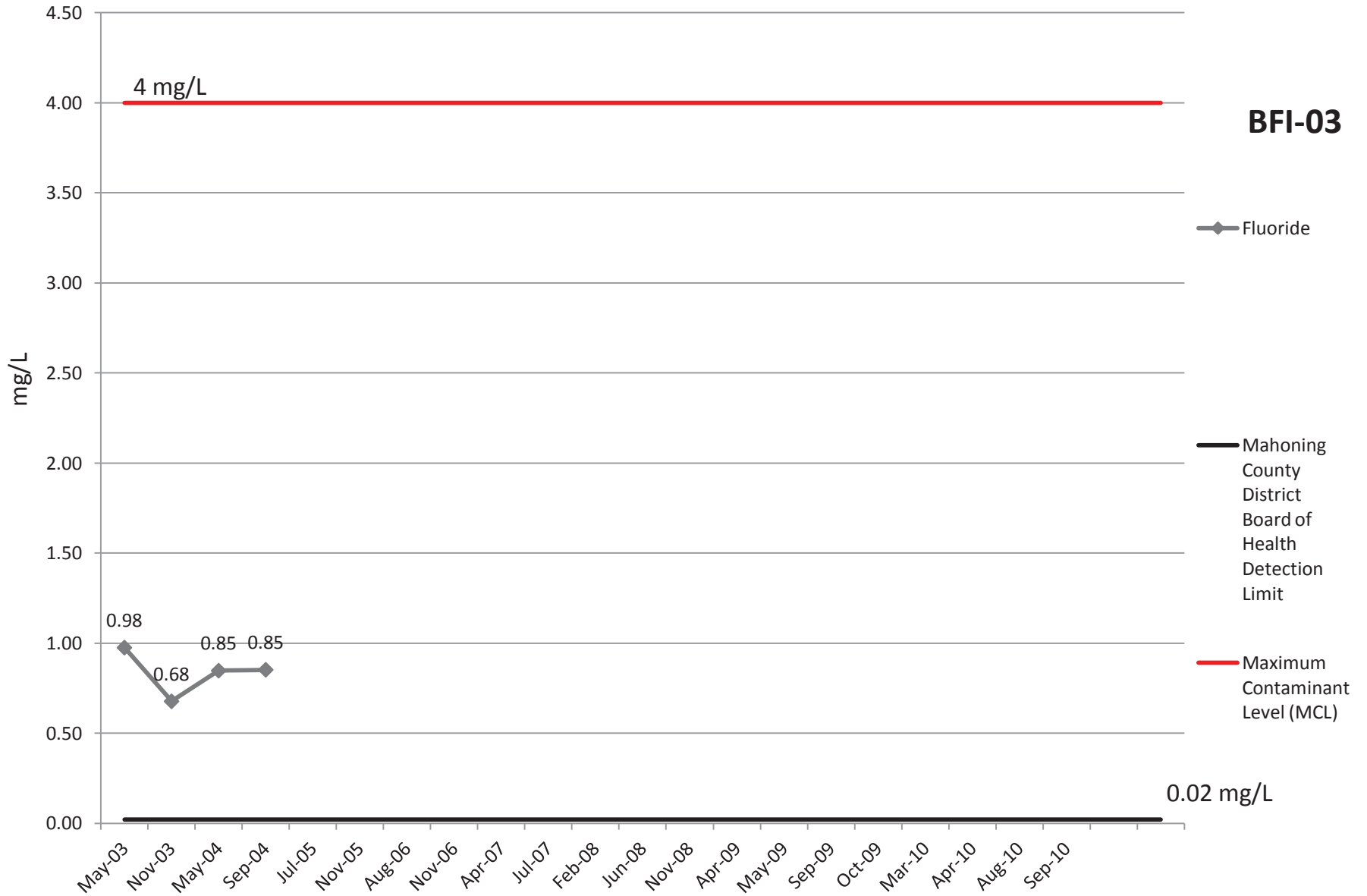


# Conductivity

**BFI-03**

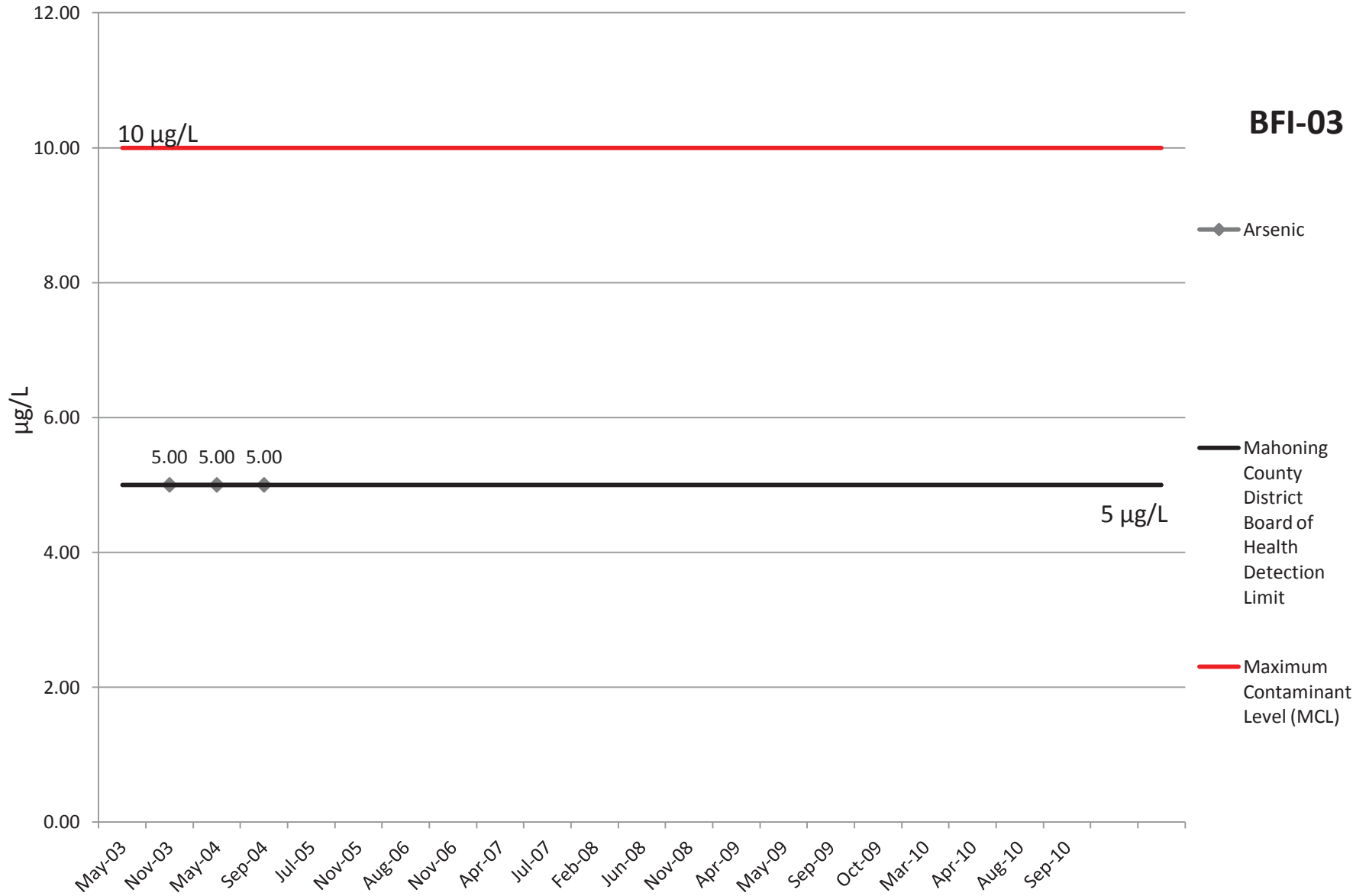


# Fluoride



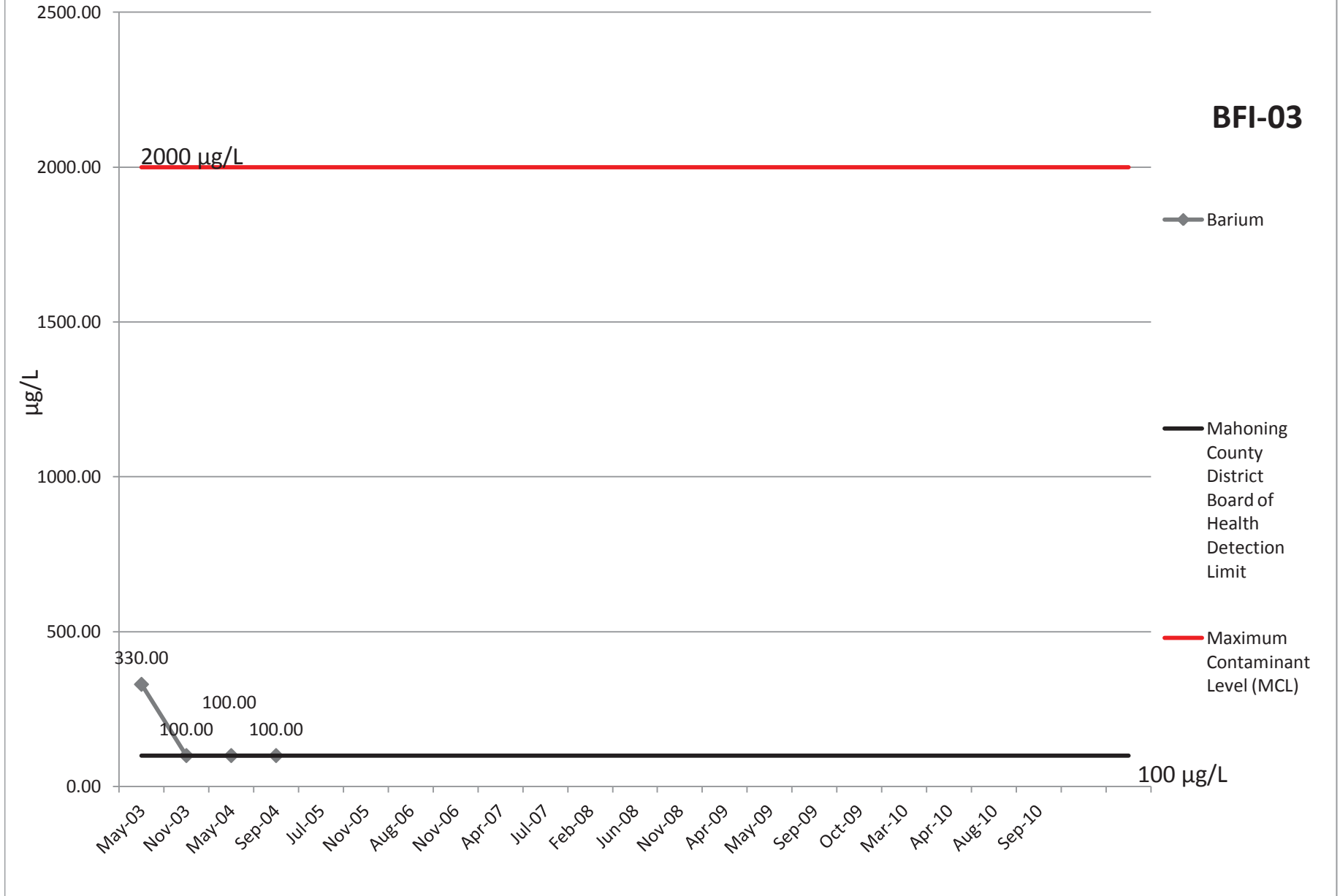
# Arsenic

**BFI-03**

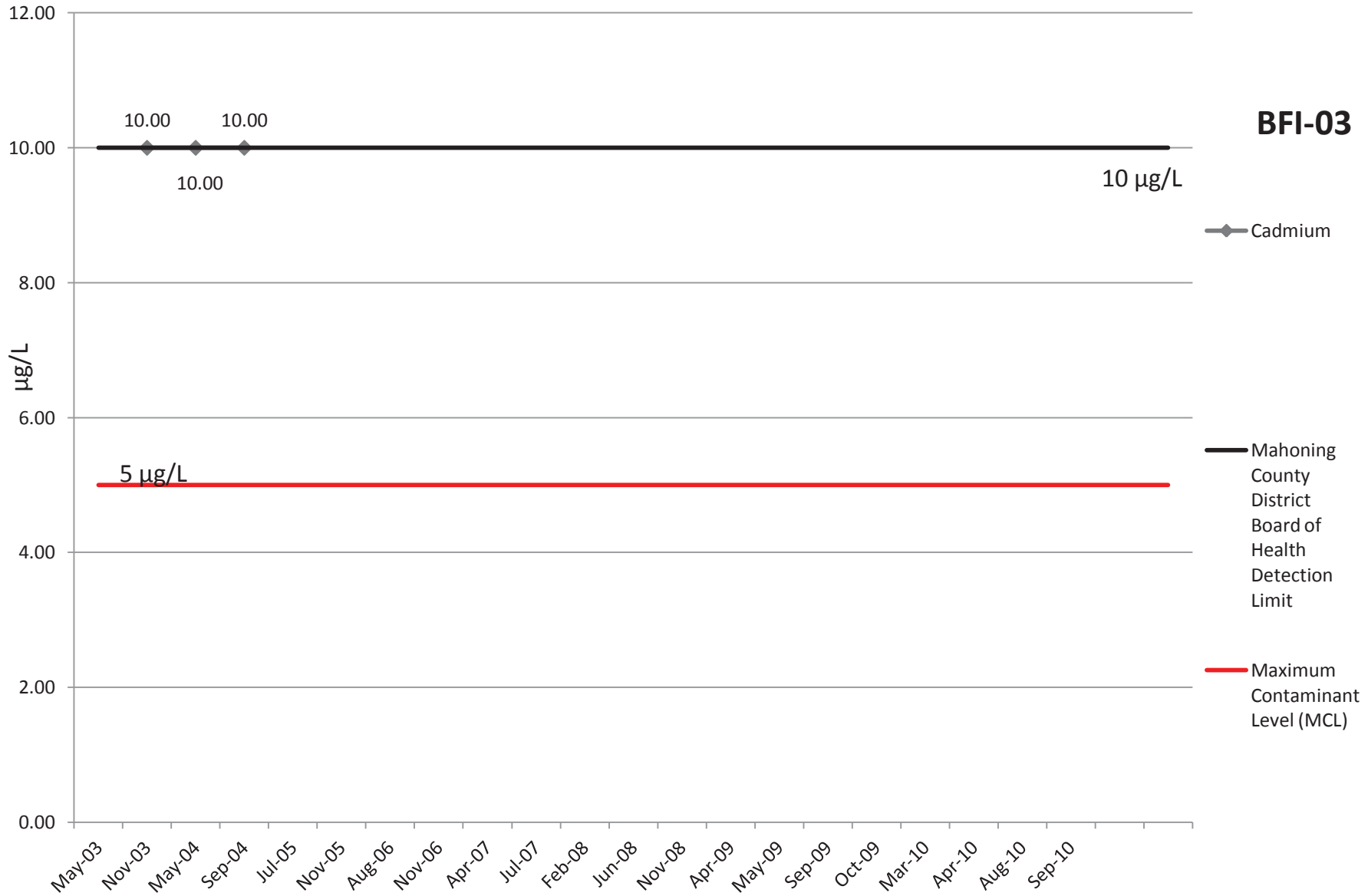




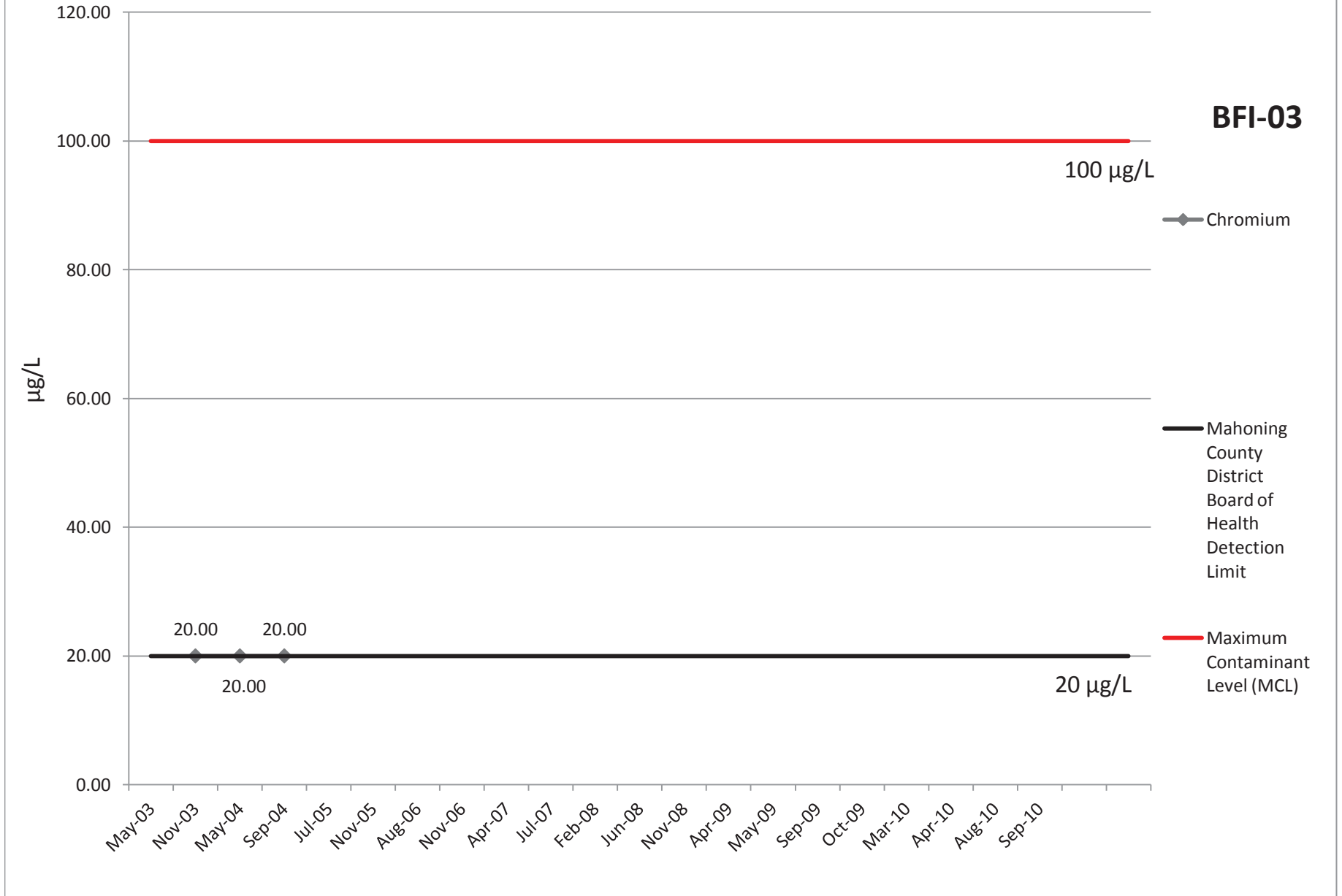
# Barium



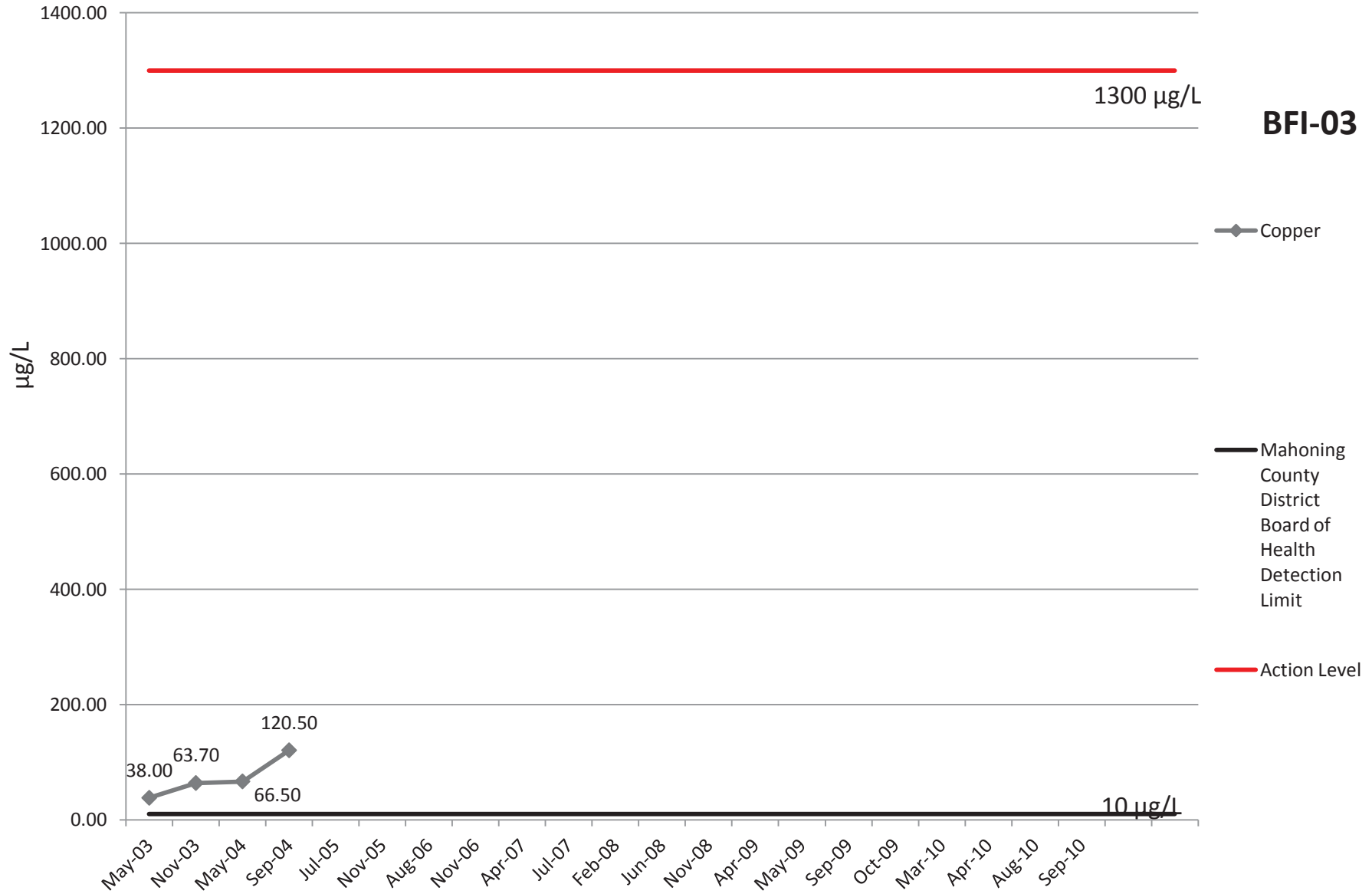
# Cadmium



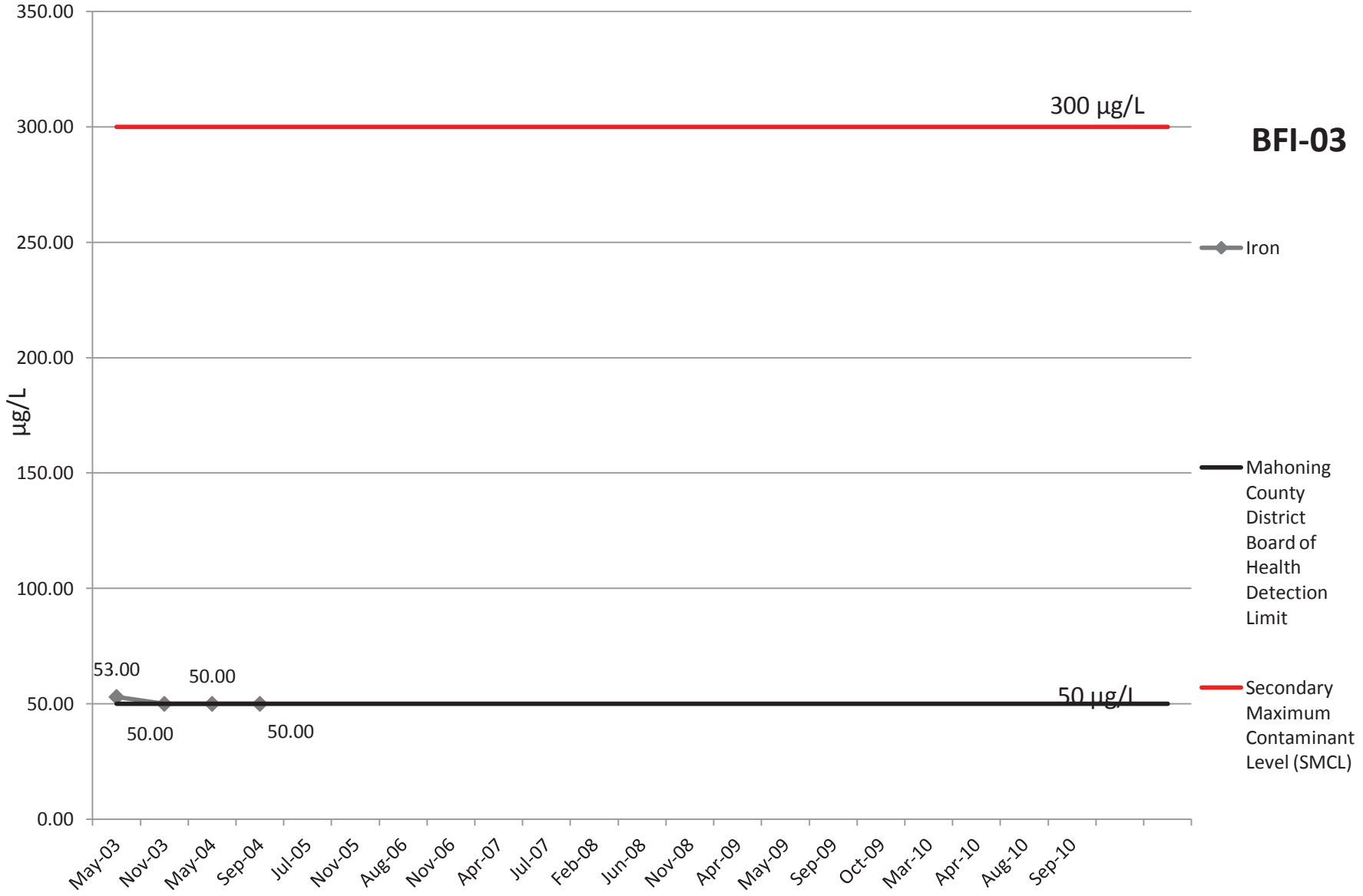
# Chromium



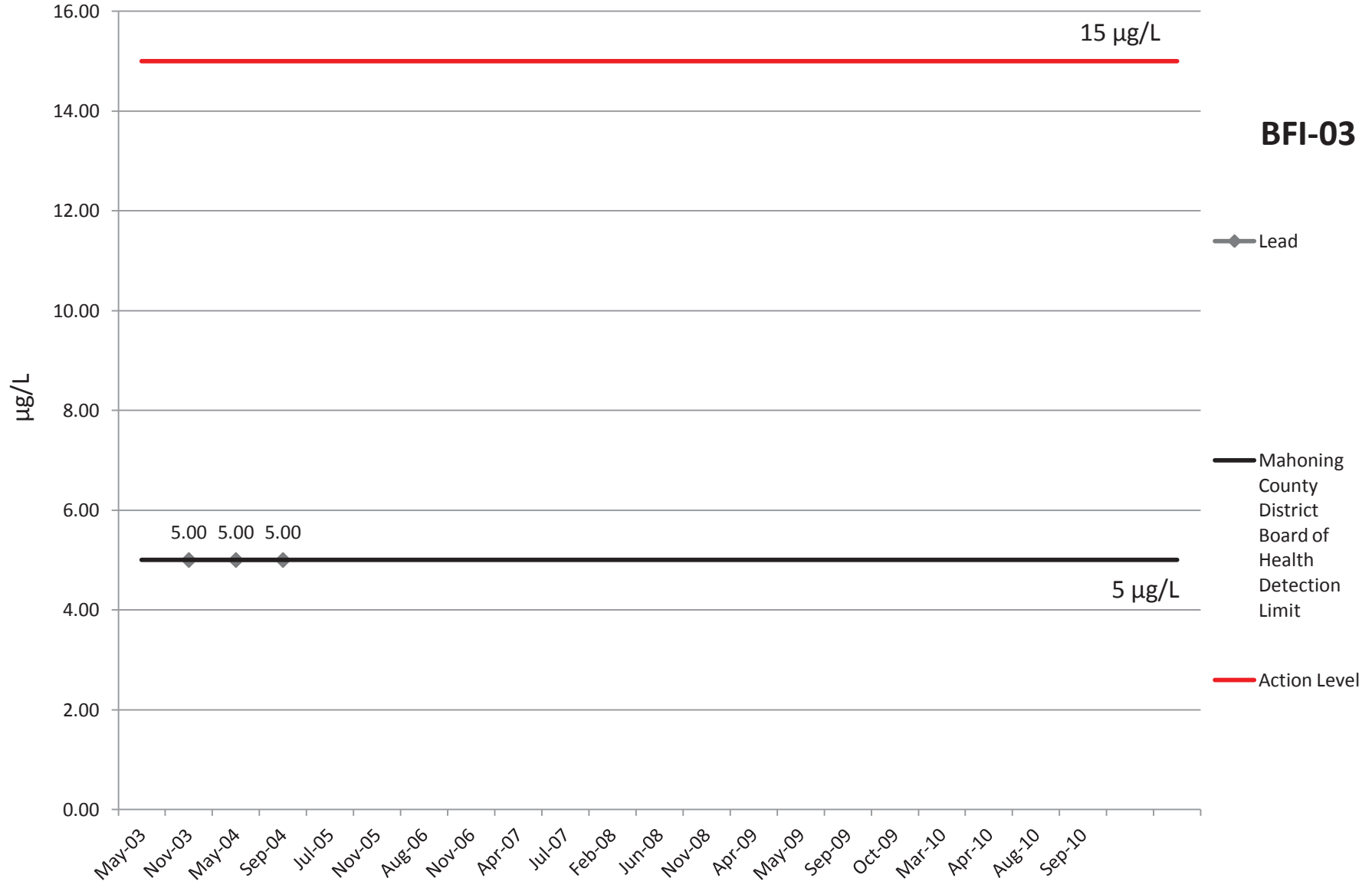
# Copper



# Iron



# Lead



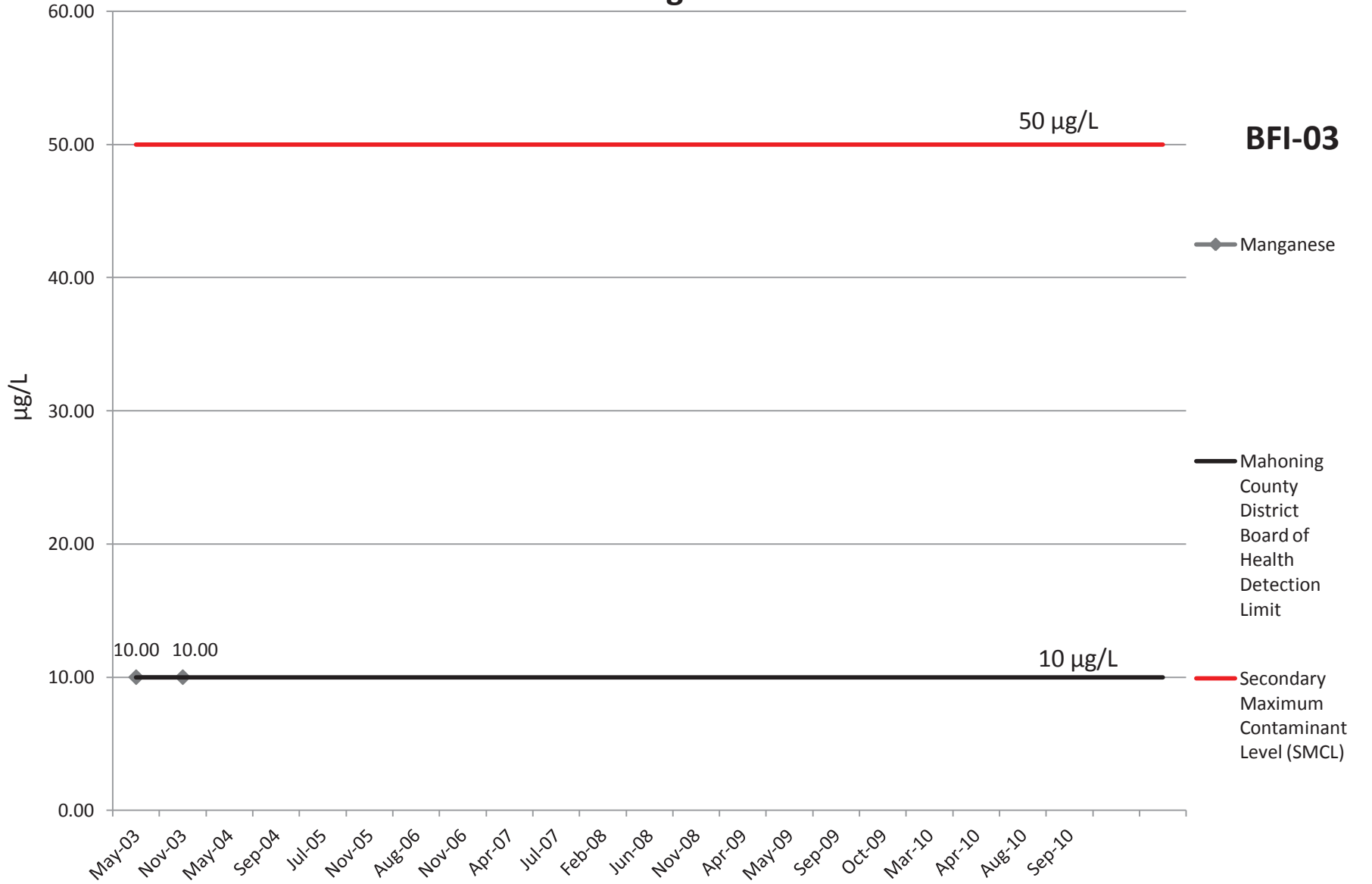
**BFI-03**

◆ Lead

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Action Level

# Manganese



**BFI-03**

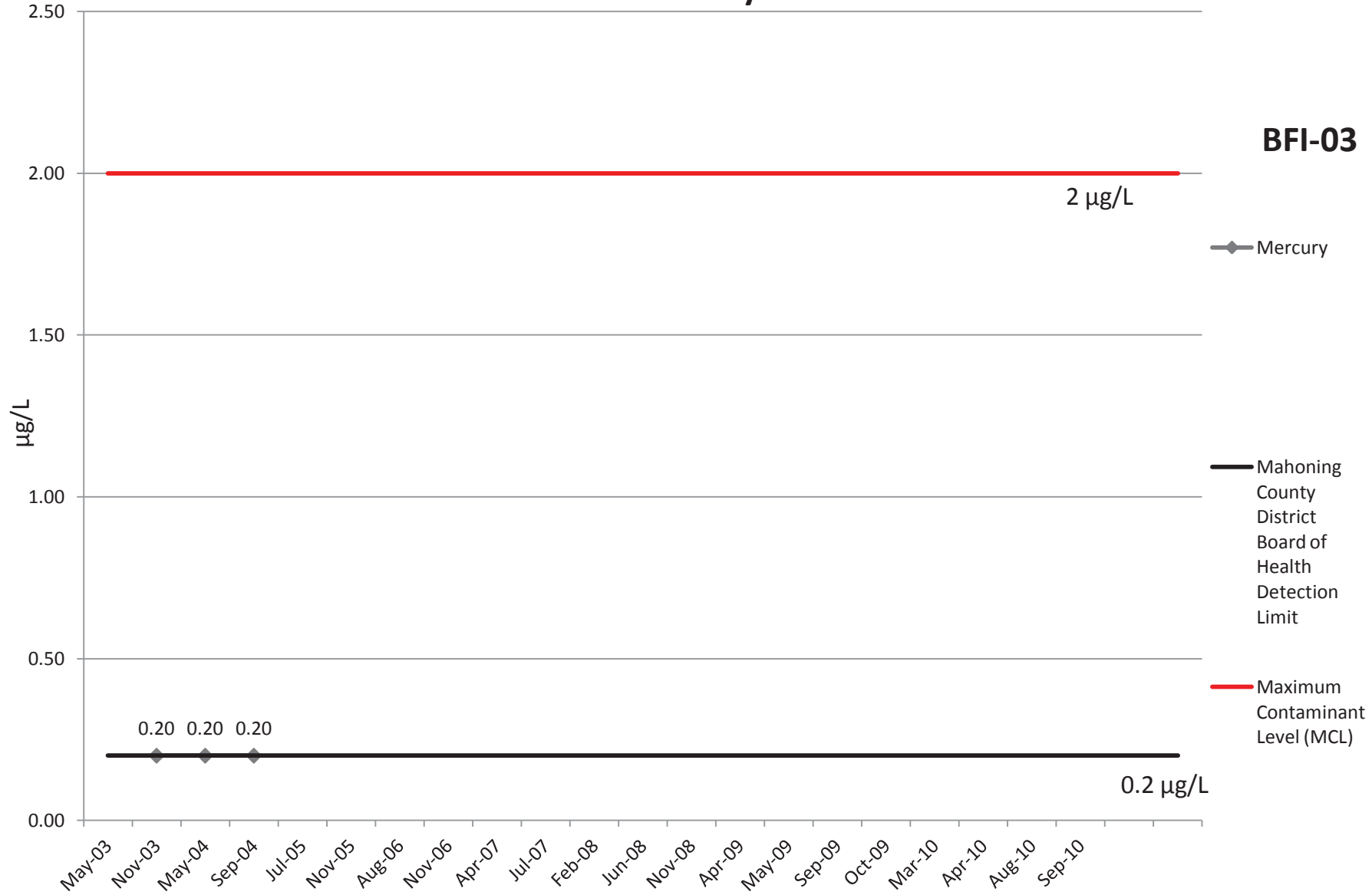
◆ Manganese

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Secondary  
Maximum  
Contaminant  
Level (SMCL)

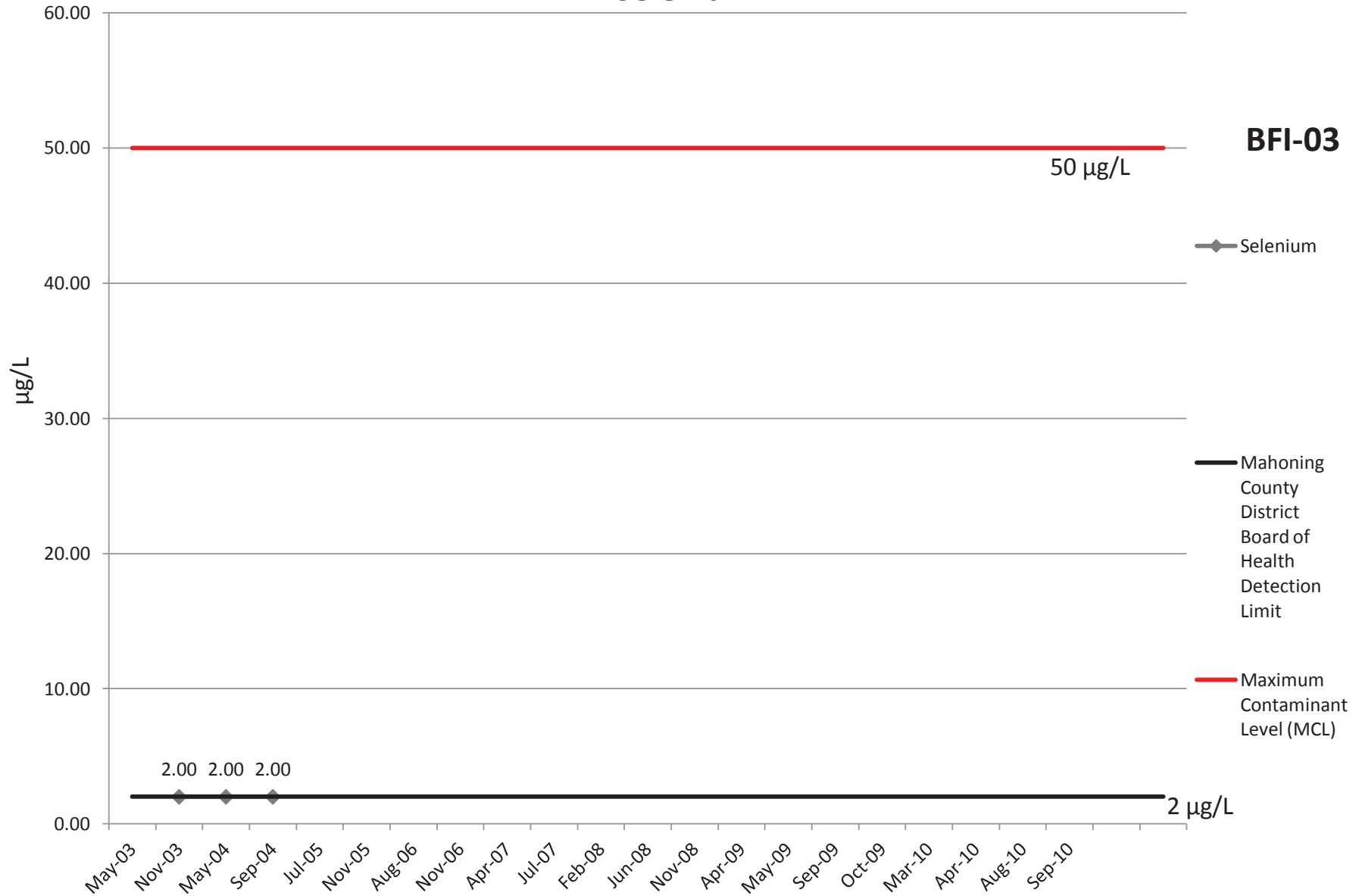
# Mercury

**BFI-03**

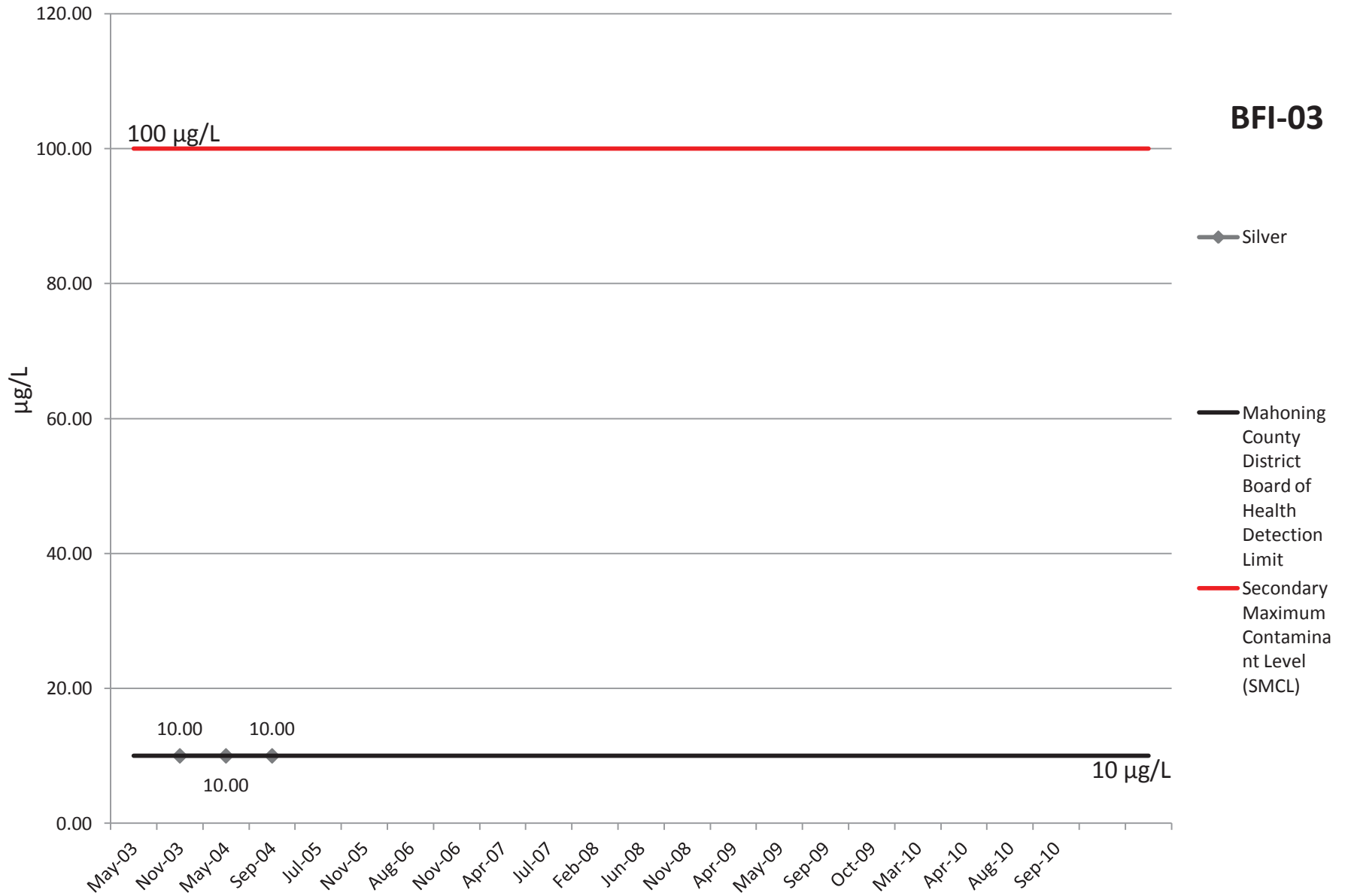




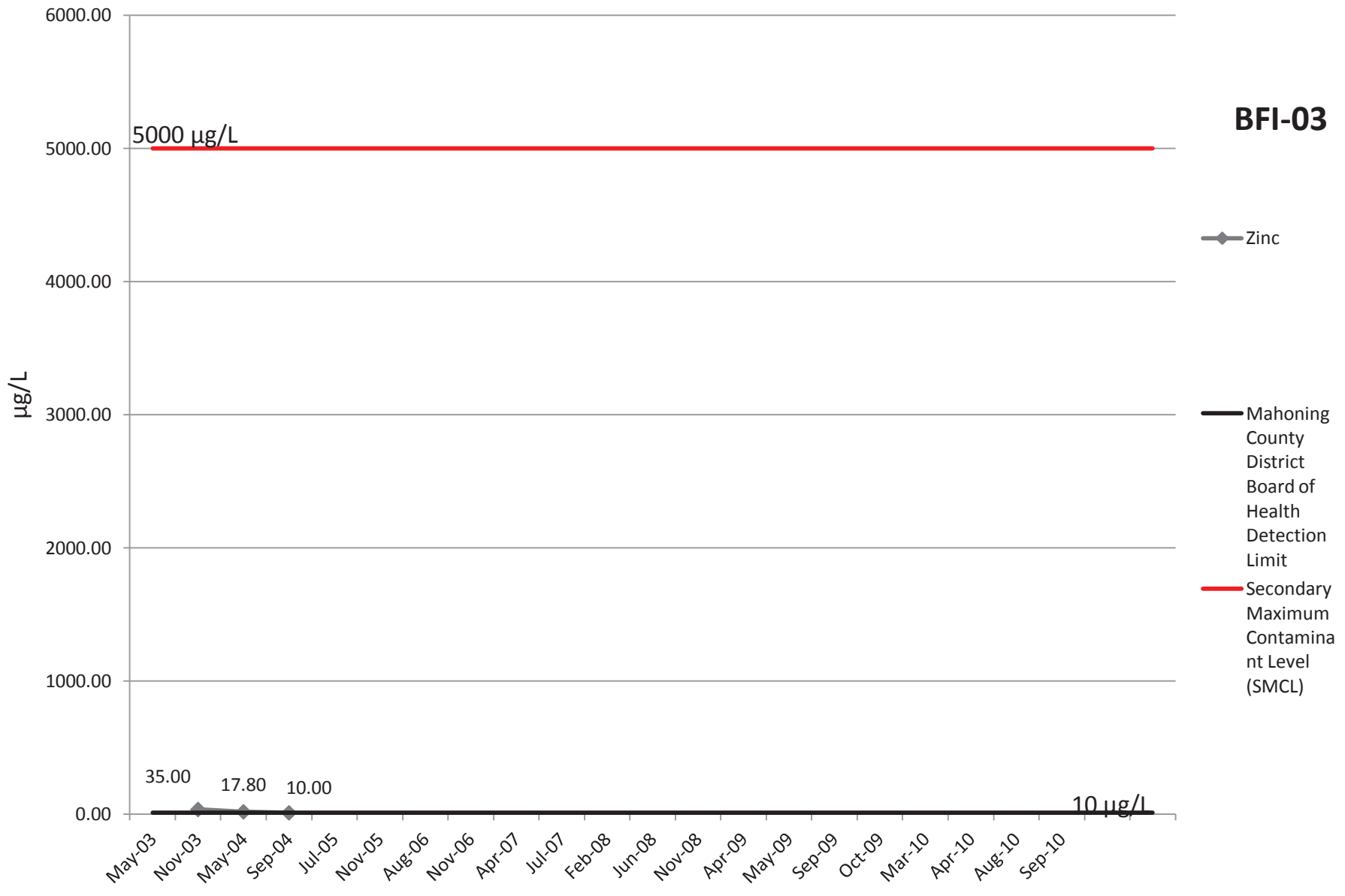
# Selenium



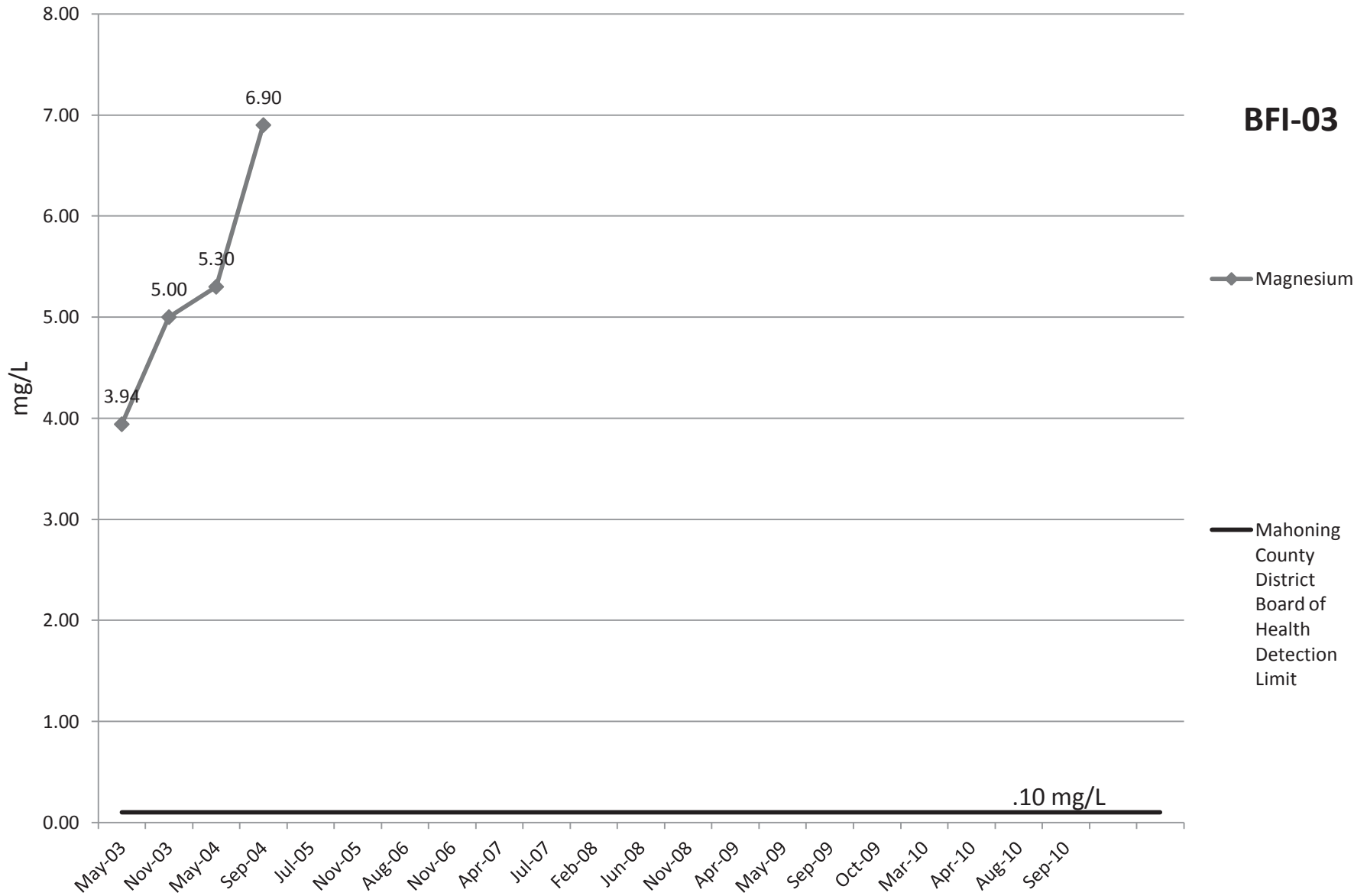
# Silver



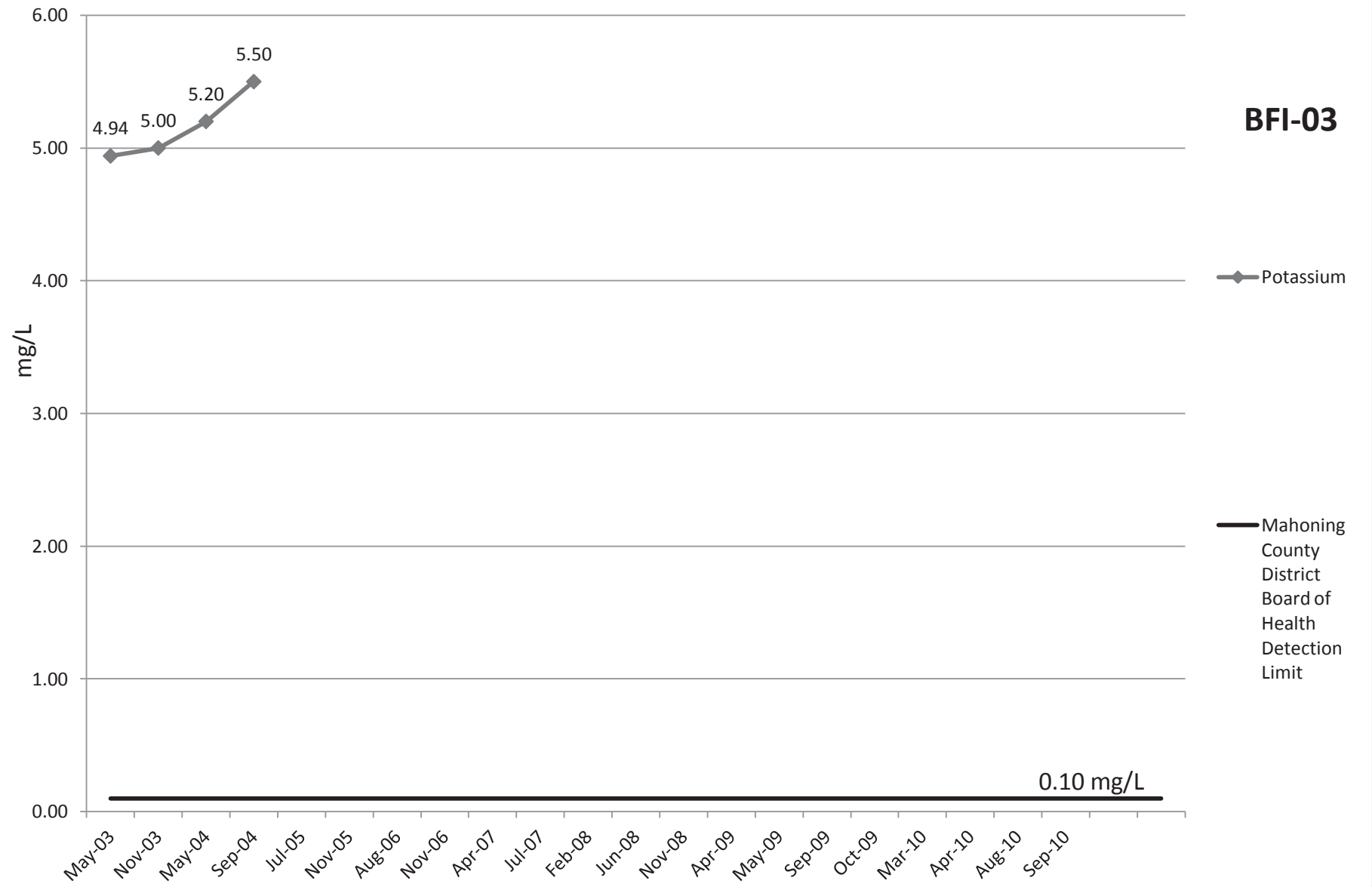
# Zinc



# Magnesium



# Potassium



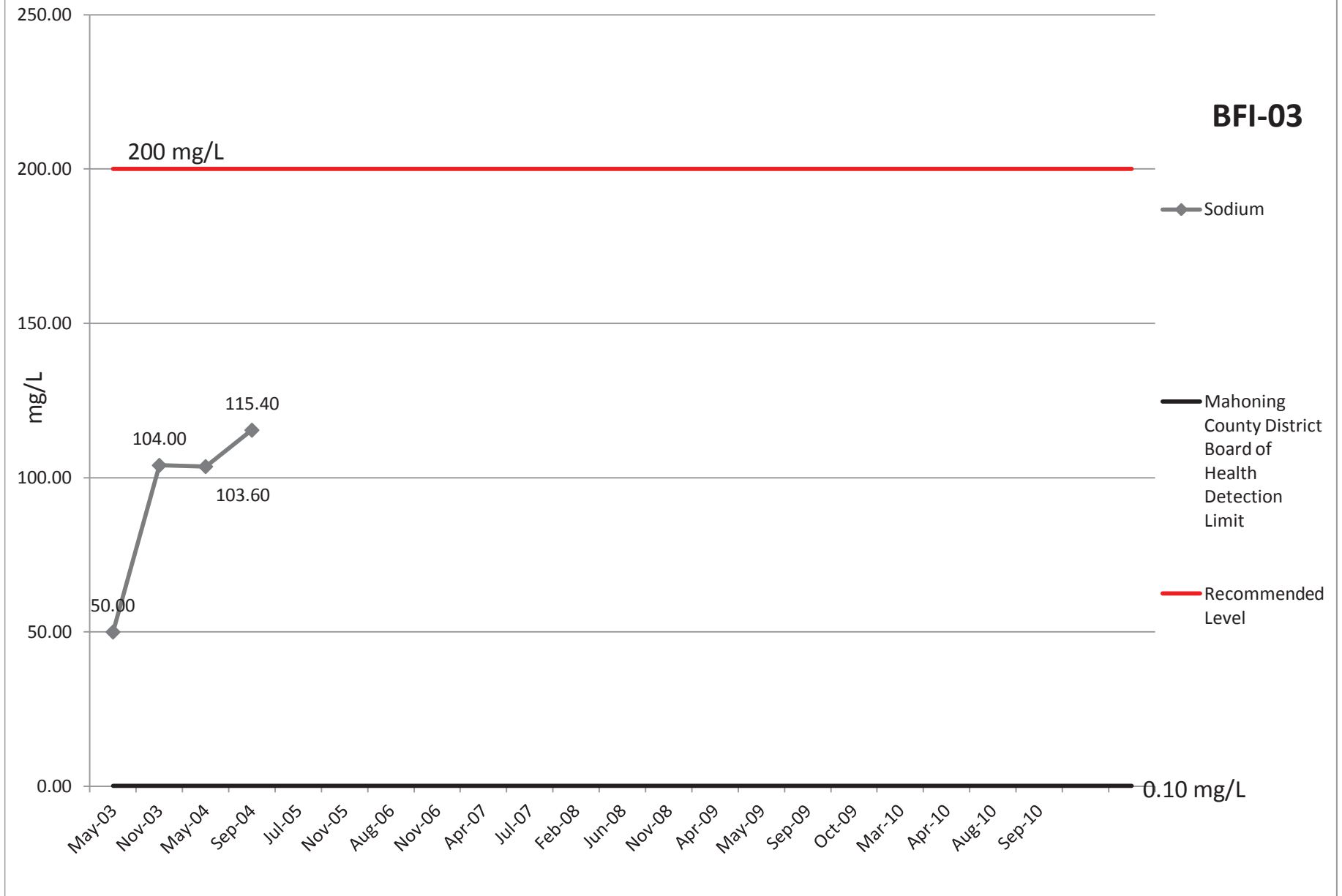
**BFI-03**

◆ Potassium

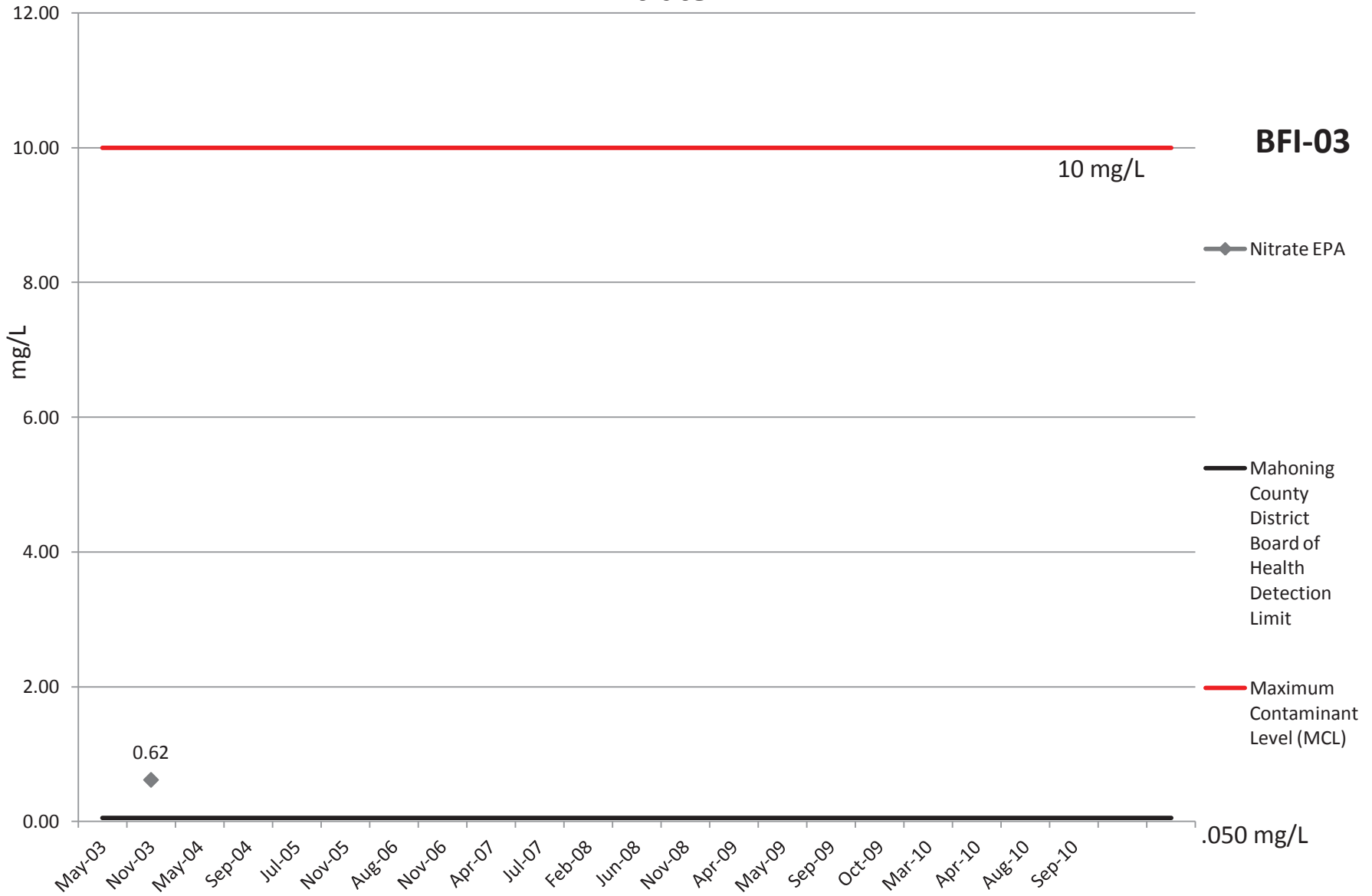
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

0.10 mg/L

# Sodium



# Nitrate EPA



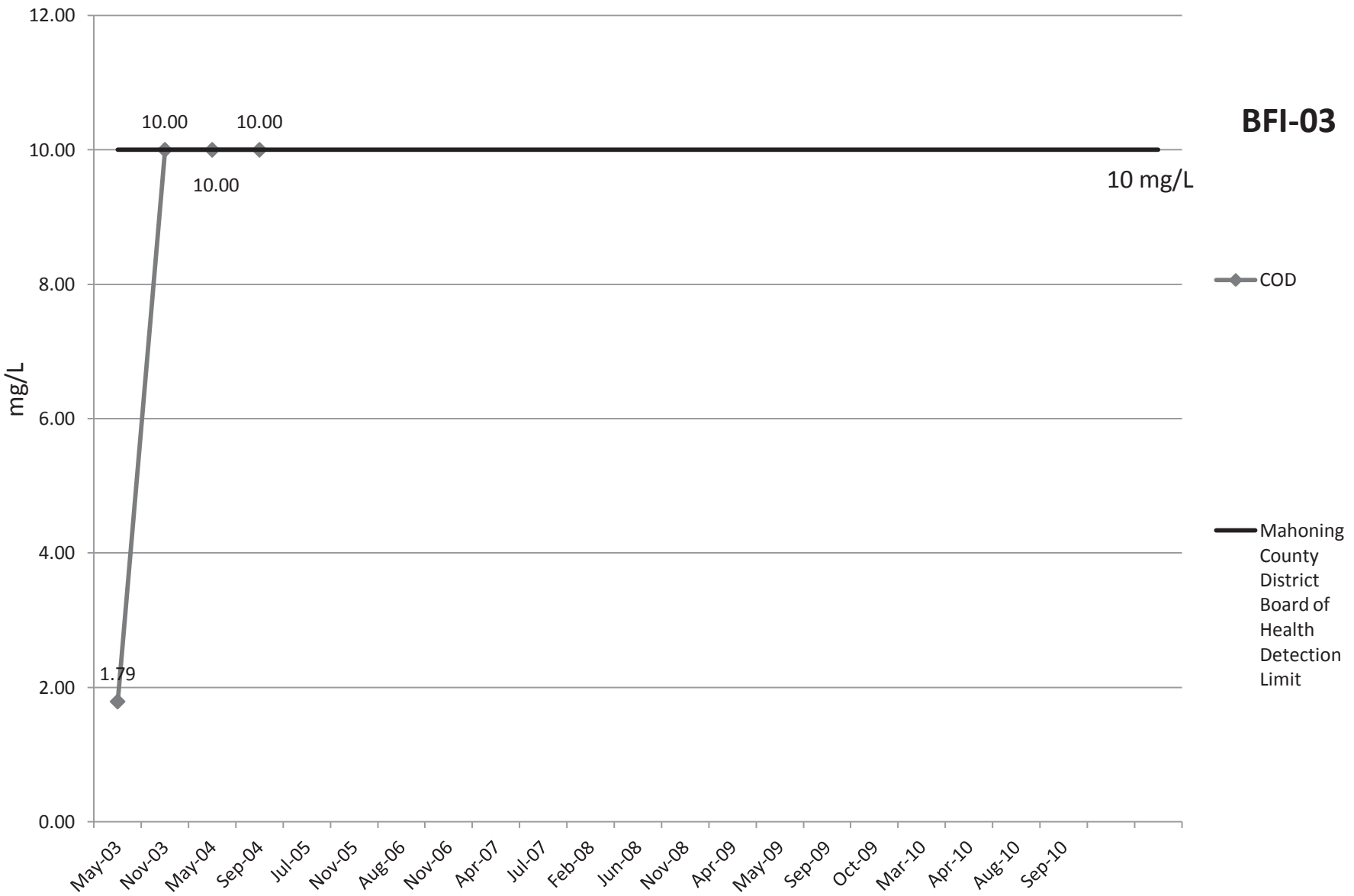
**BFI-03**

◆ Nitrate EPA

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

# COD



**BFI-03**

10 mg/L

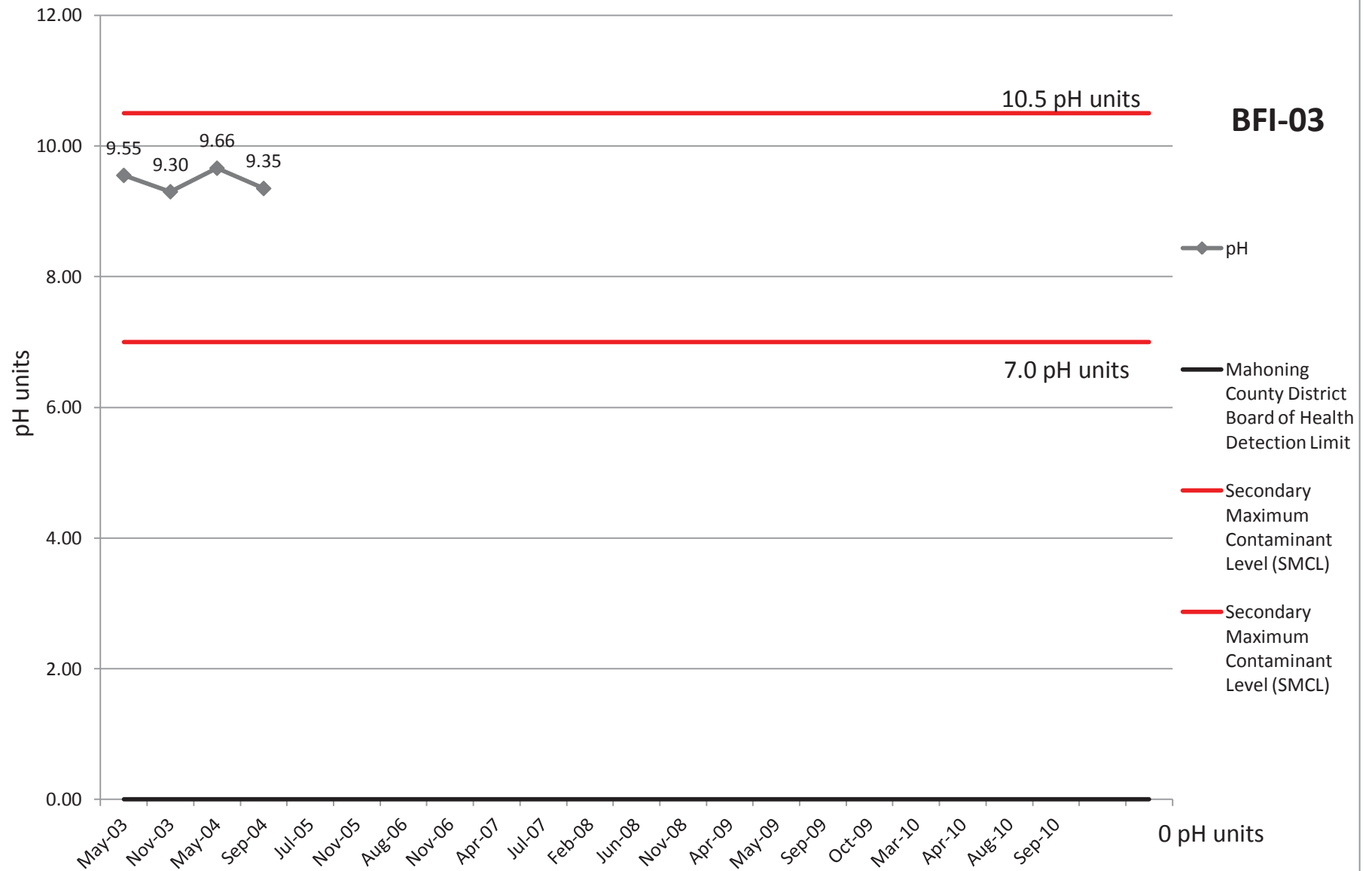
◆ COD

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

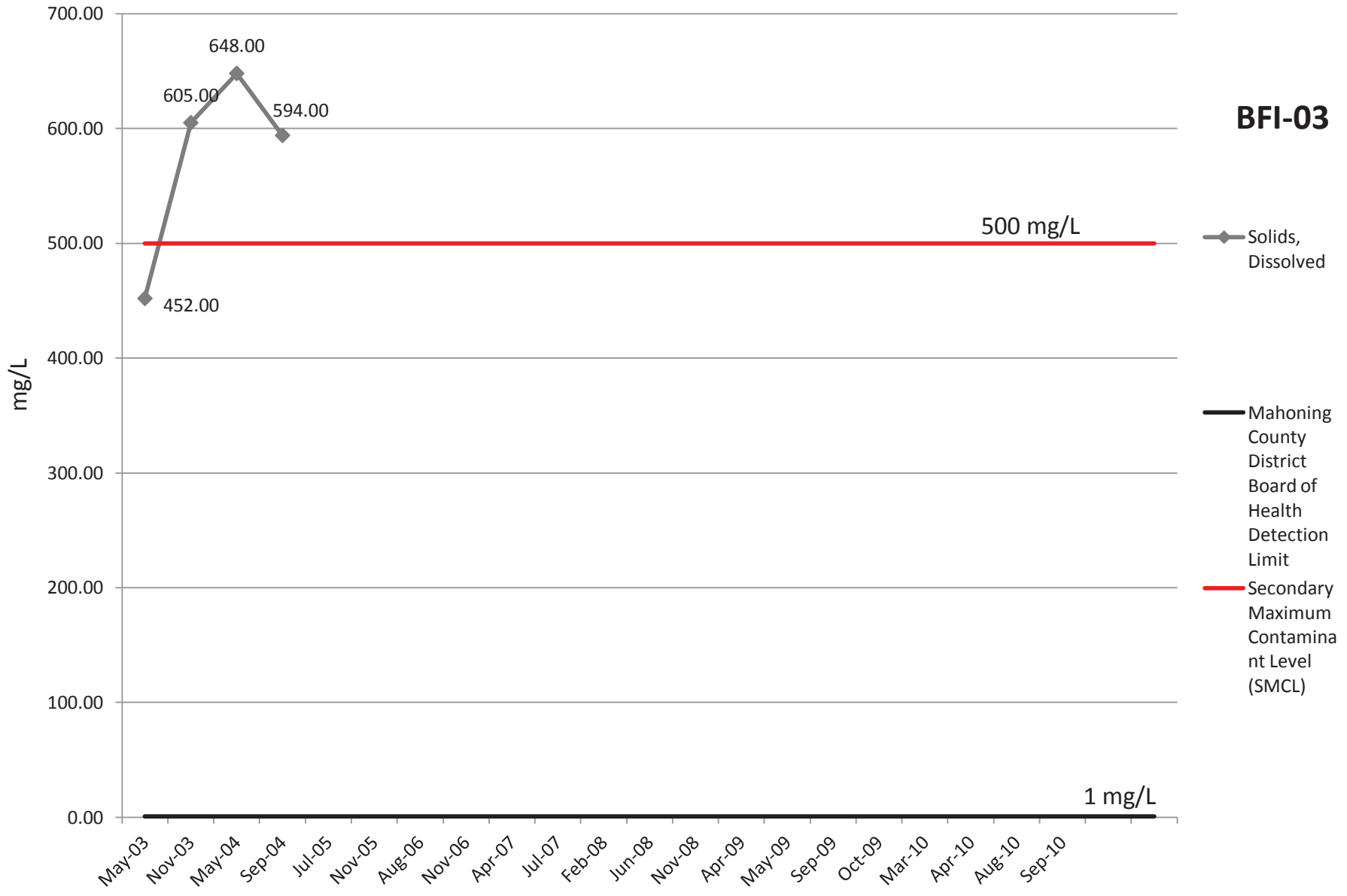


# pH

**BFI-03**

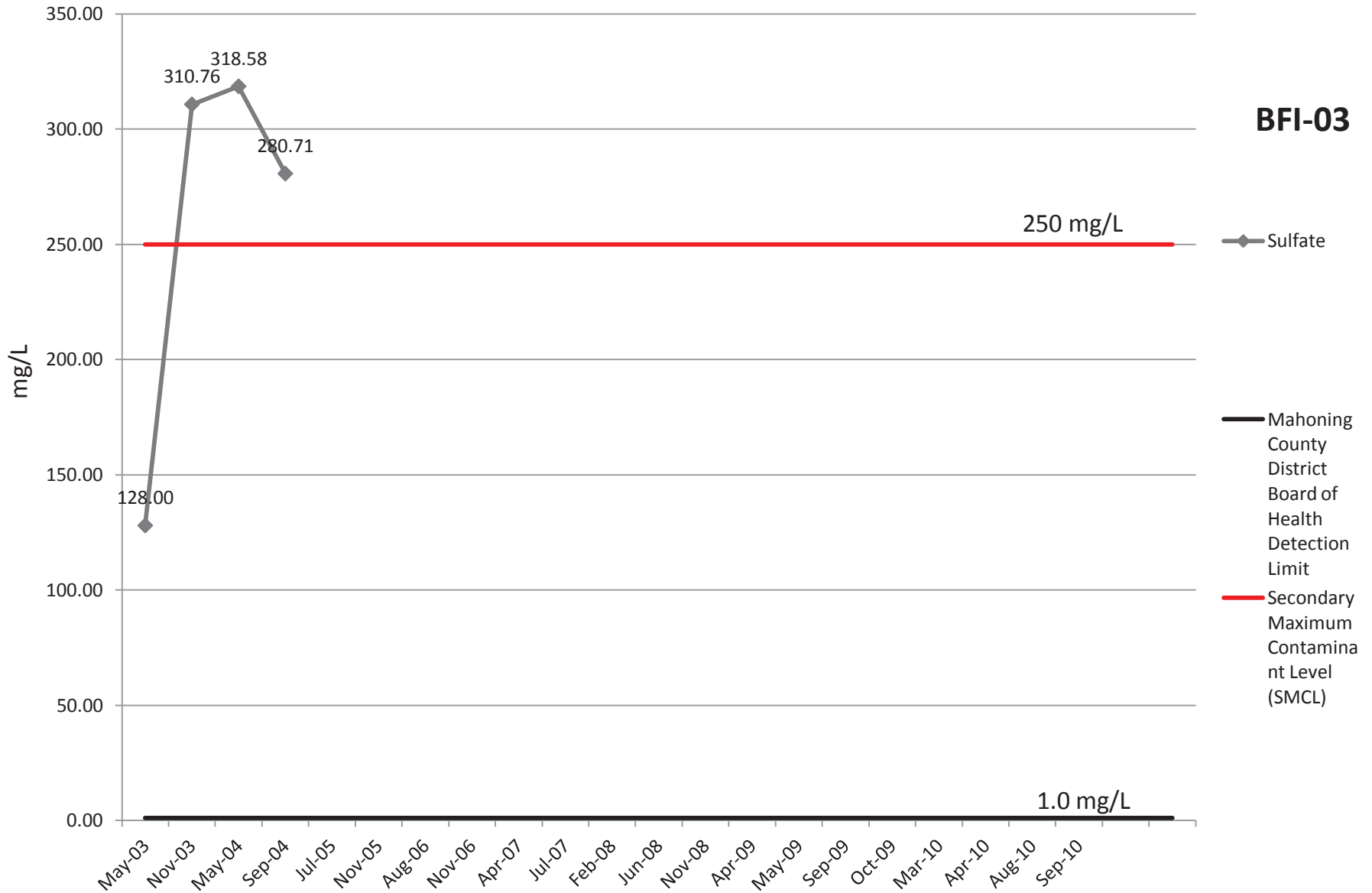


# Solids, Dissolved

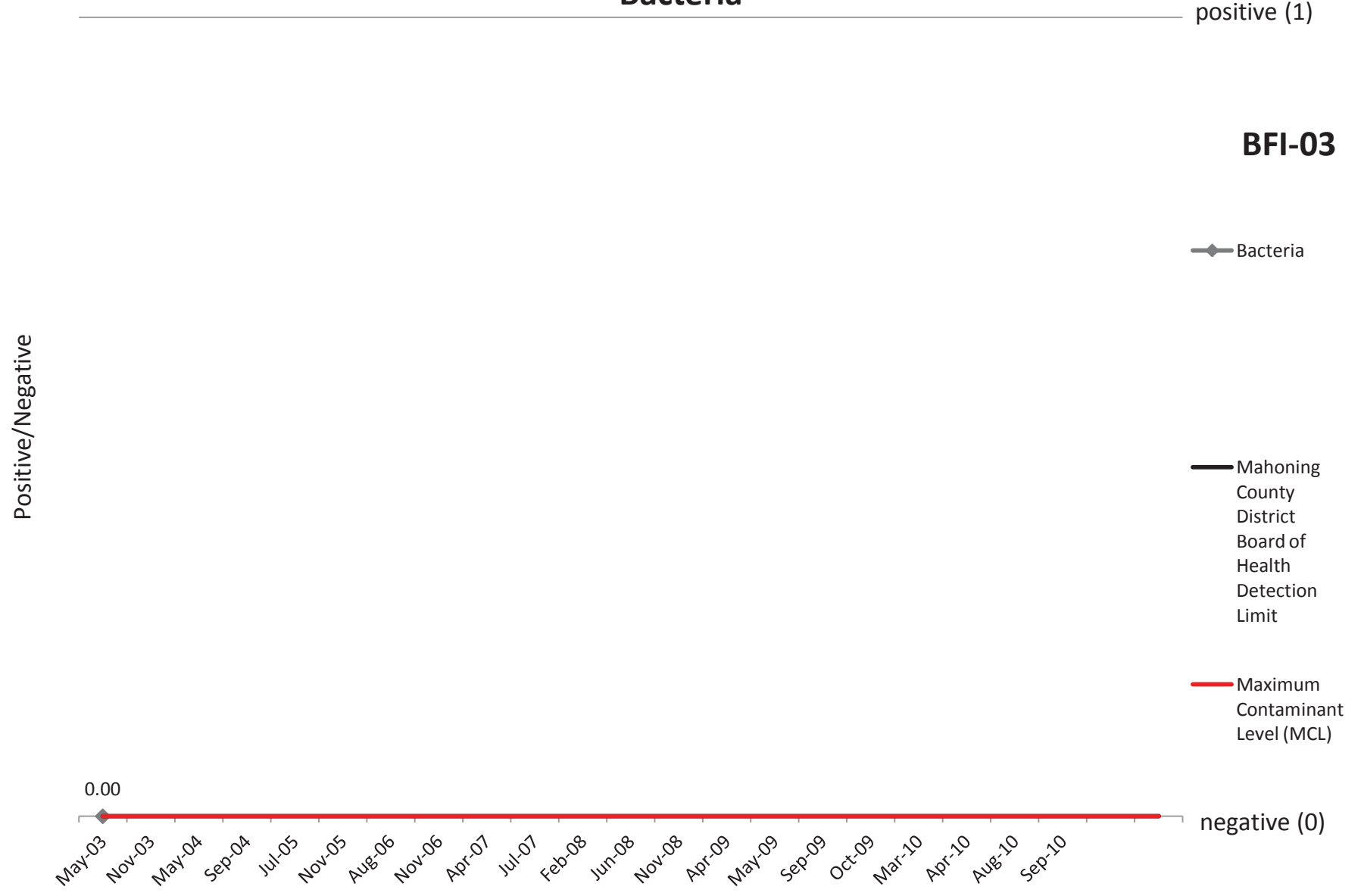


# Sulfate

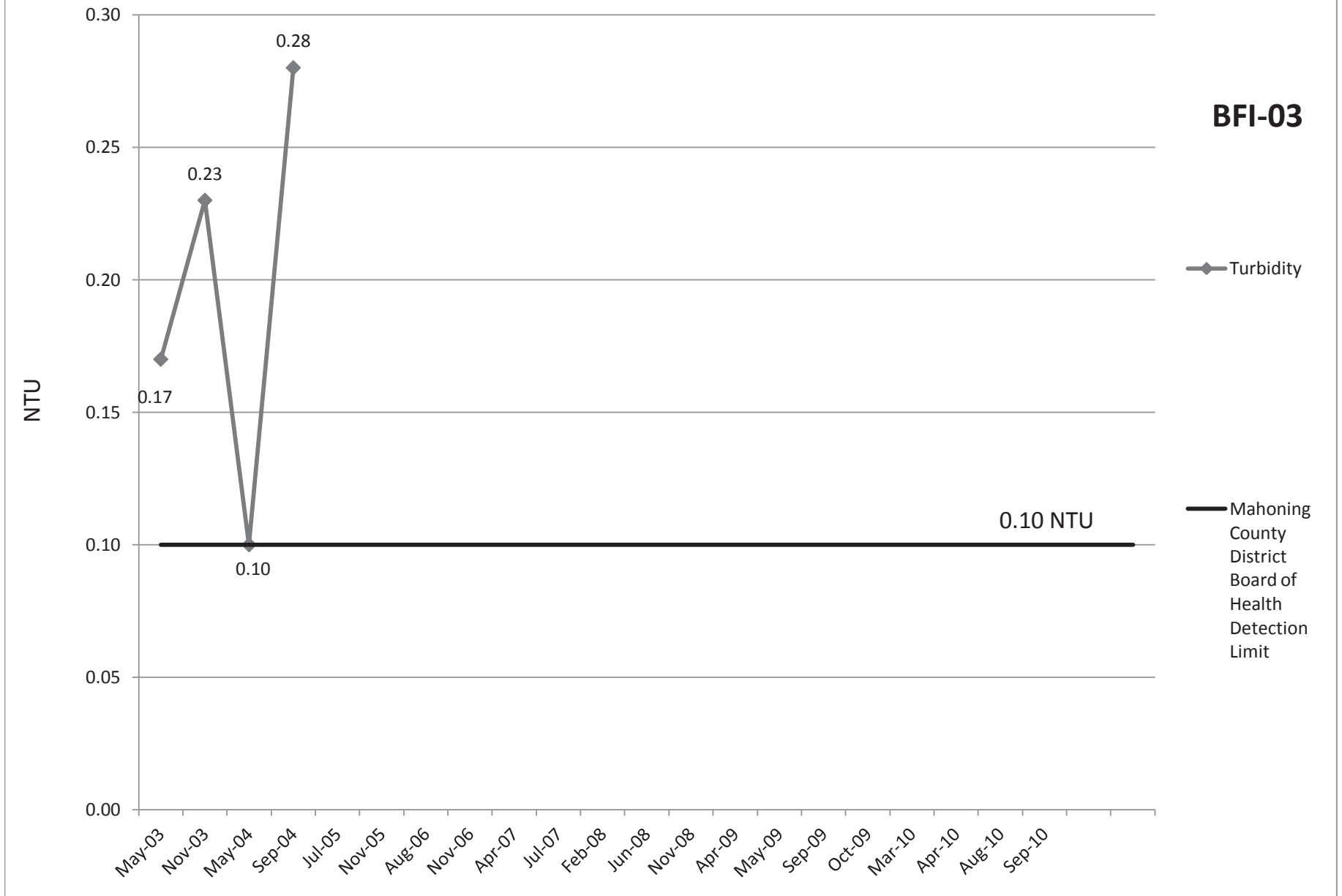
**BFI-03**



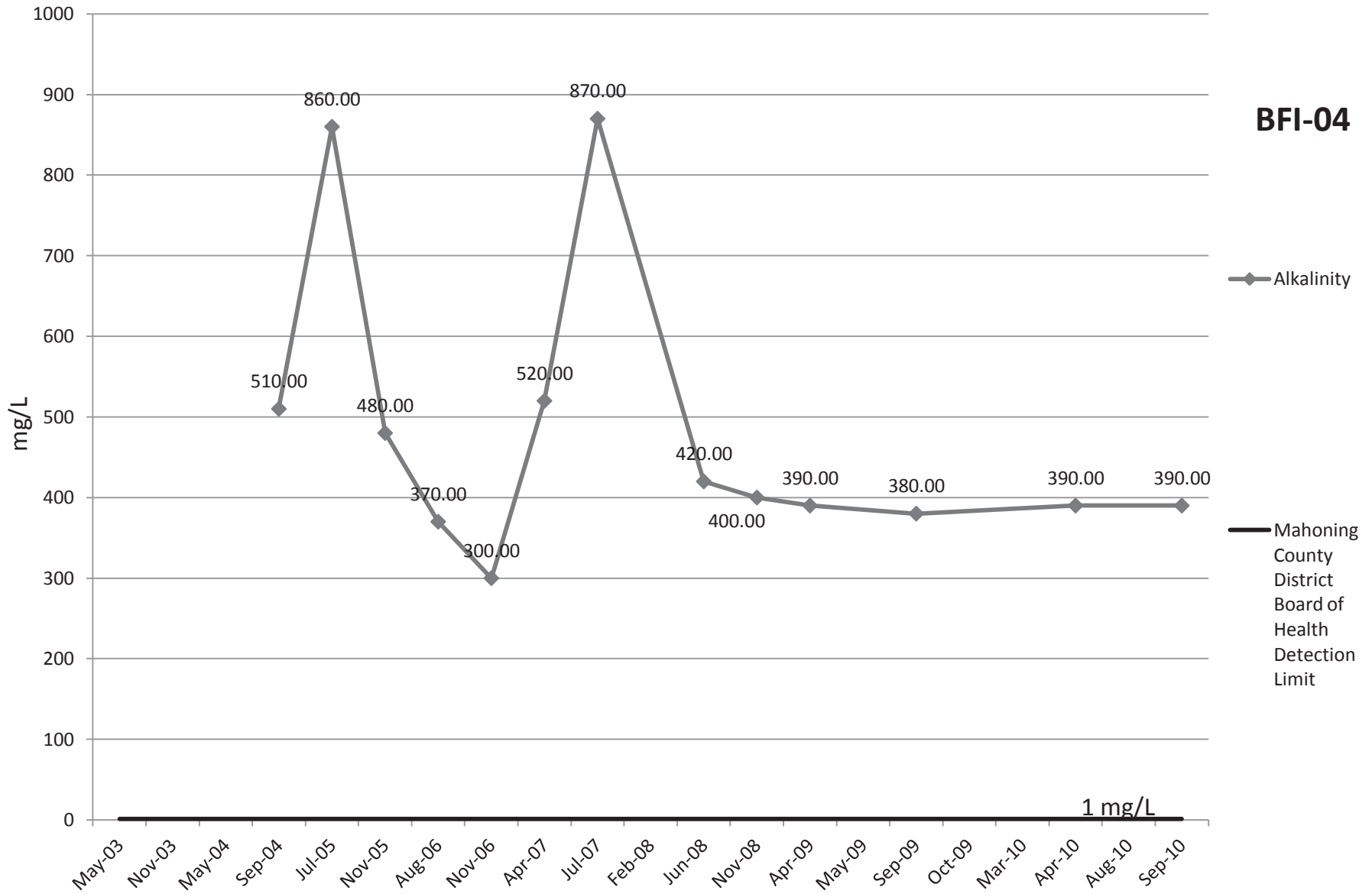
# Bacteria



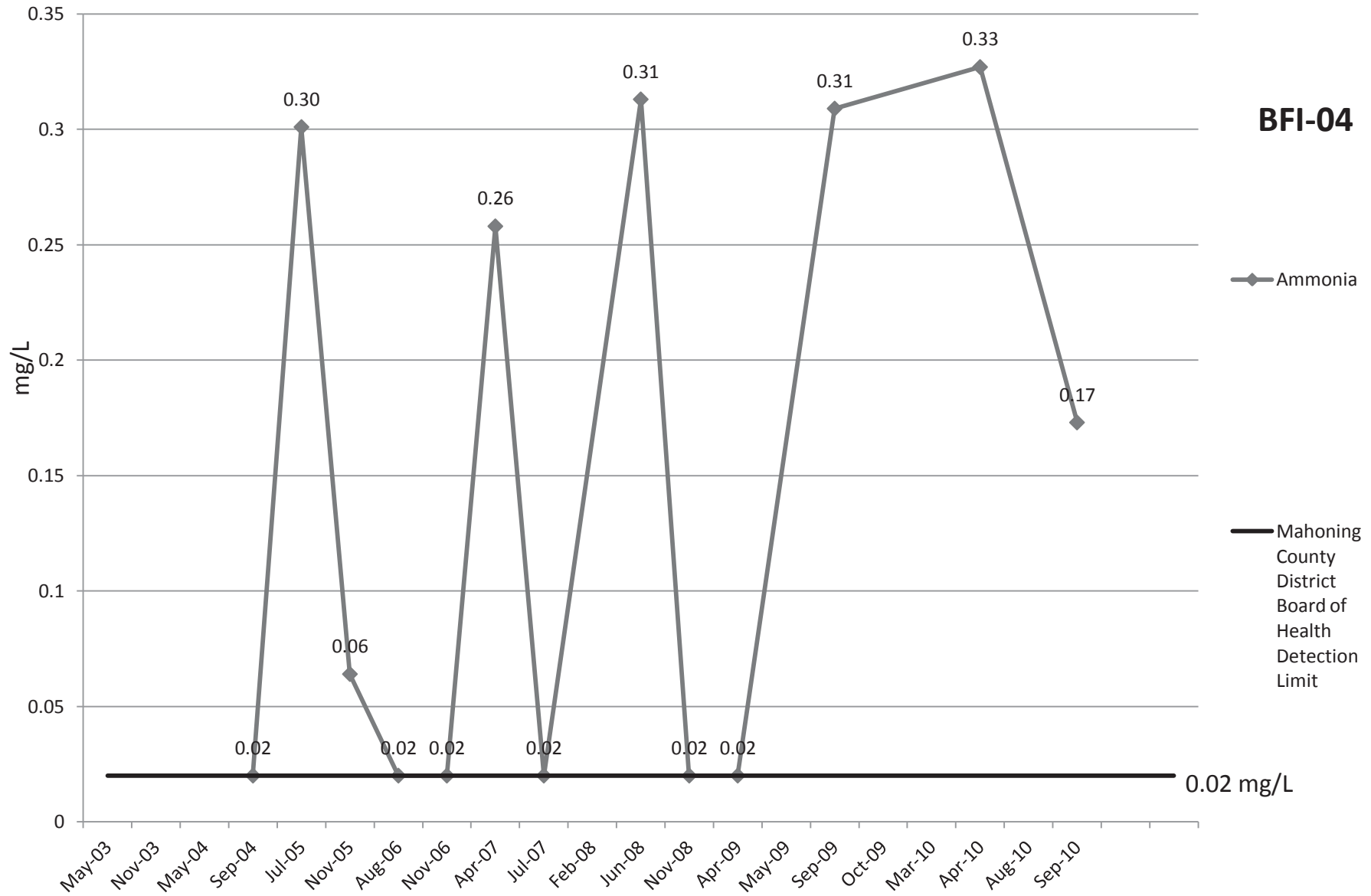
# Turbidity



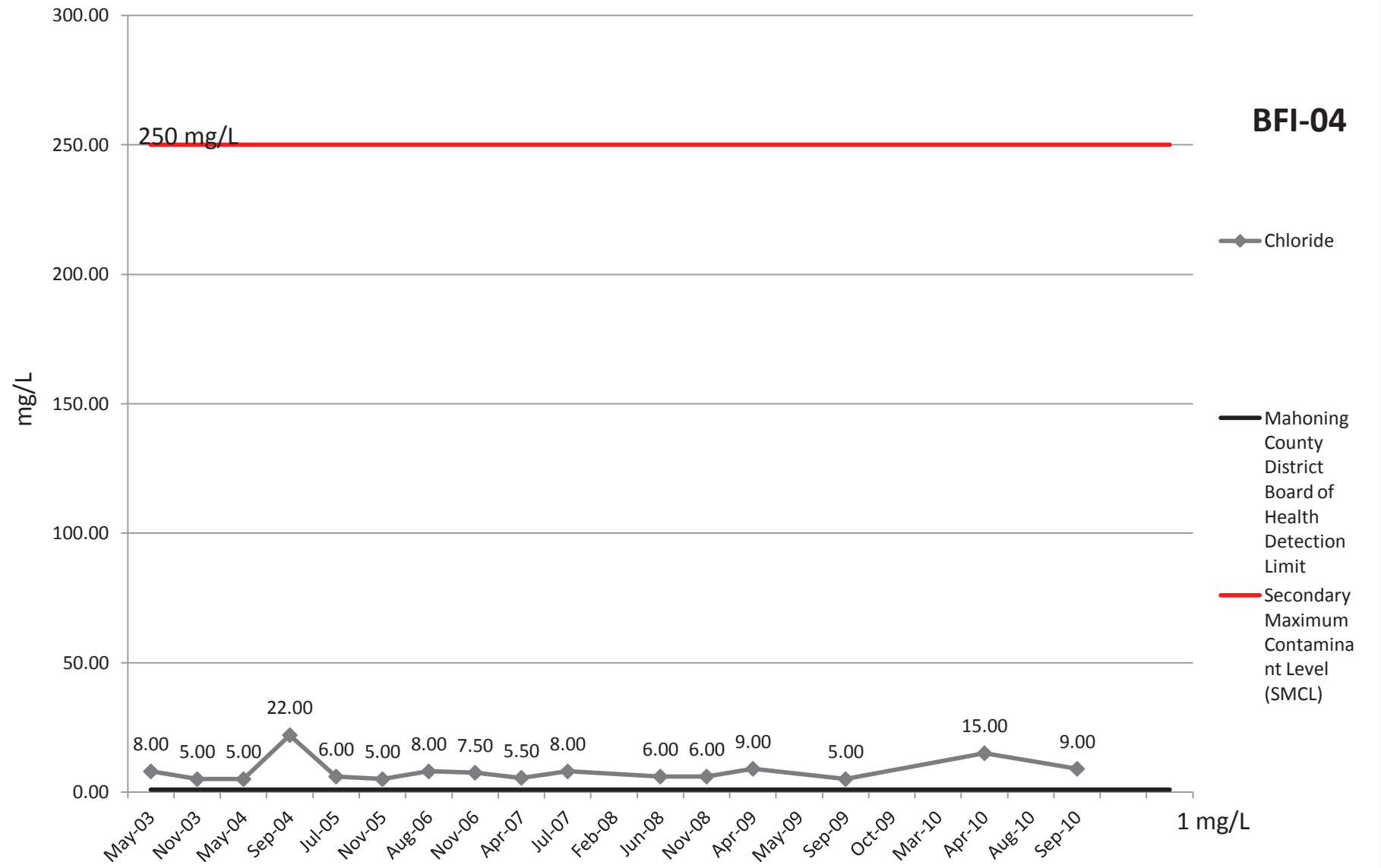
# Alkalinity



# Ammonia



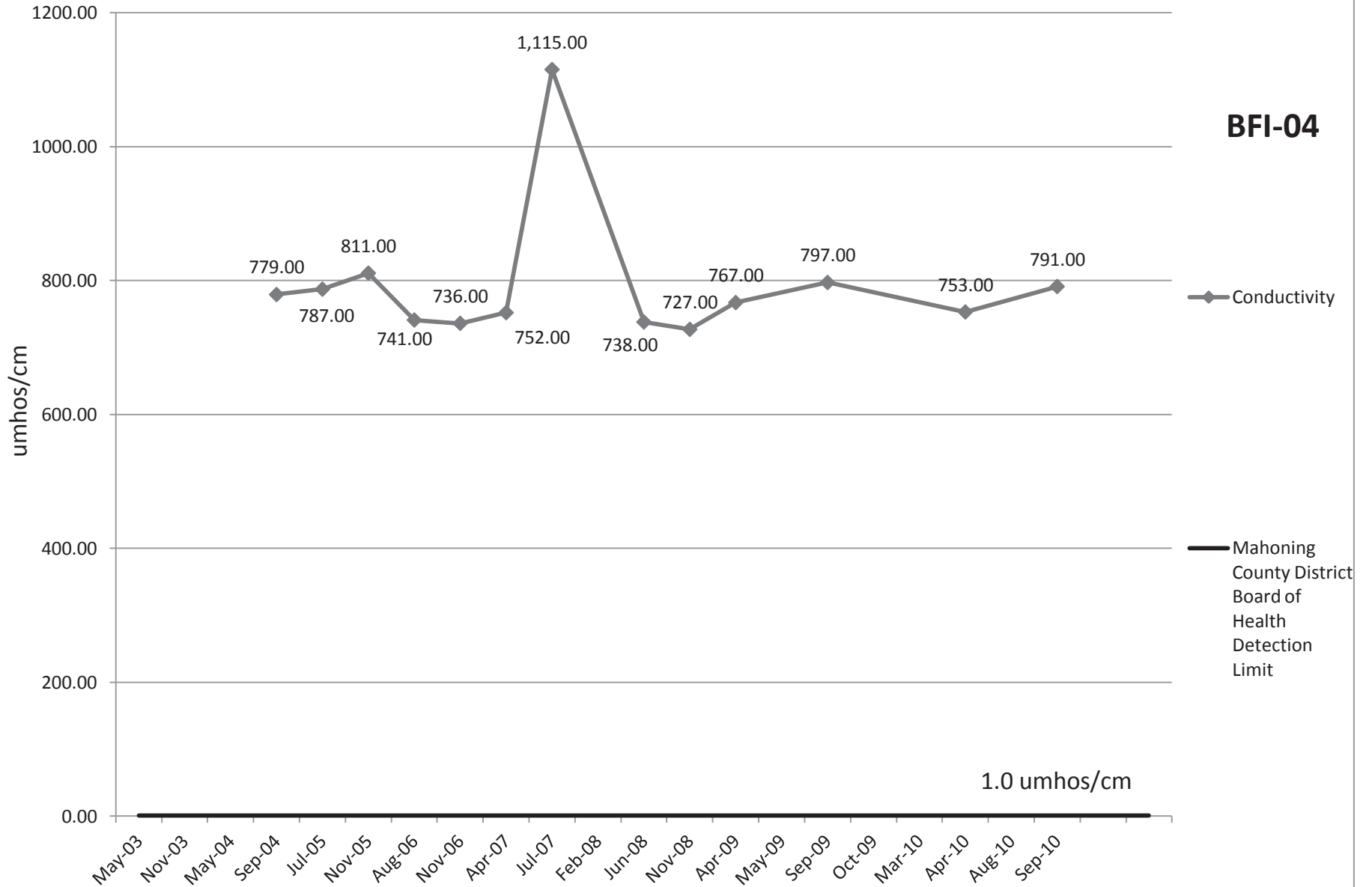
# Chloride



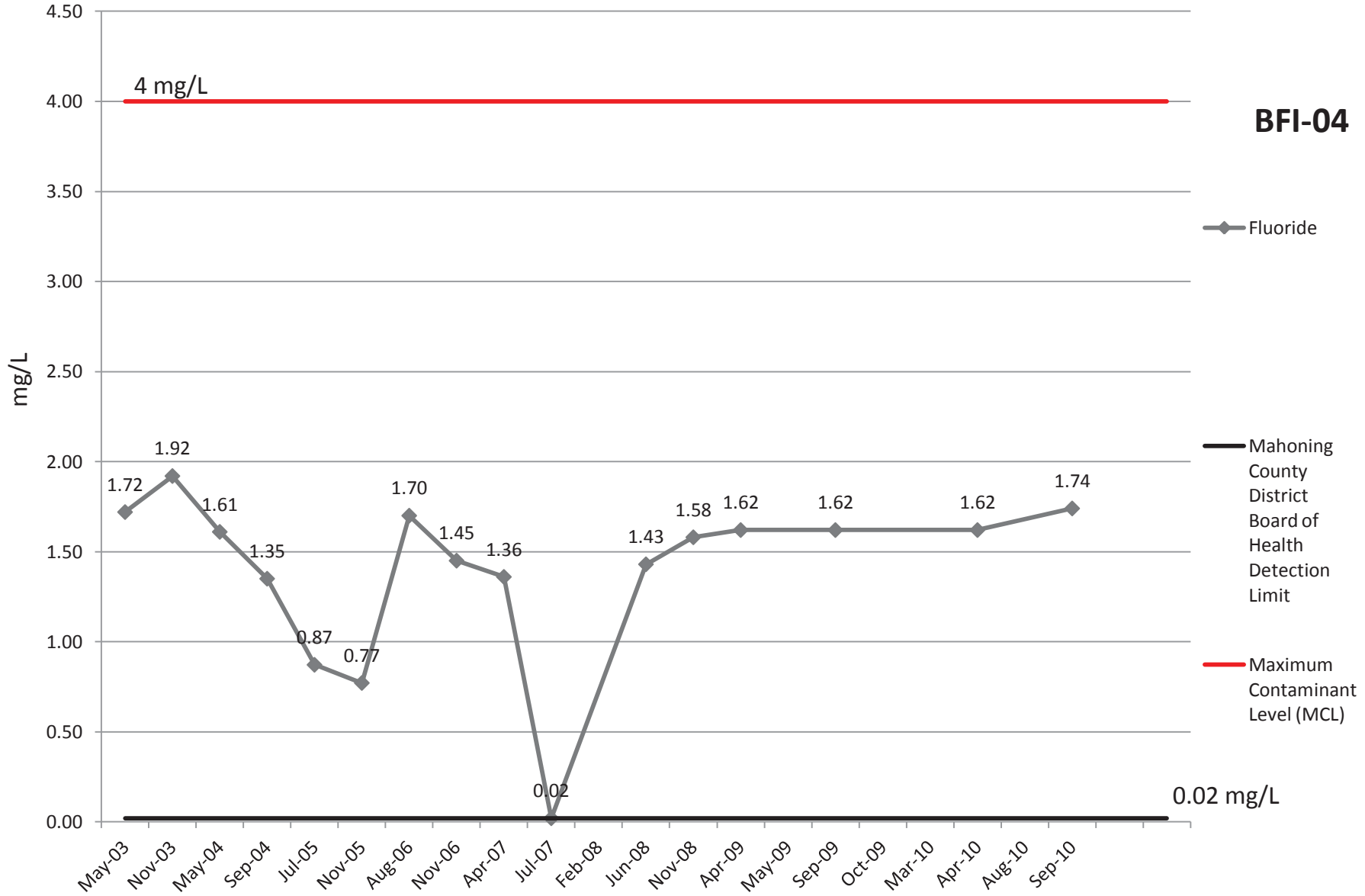


# Conductivity

**BFI-04**

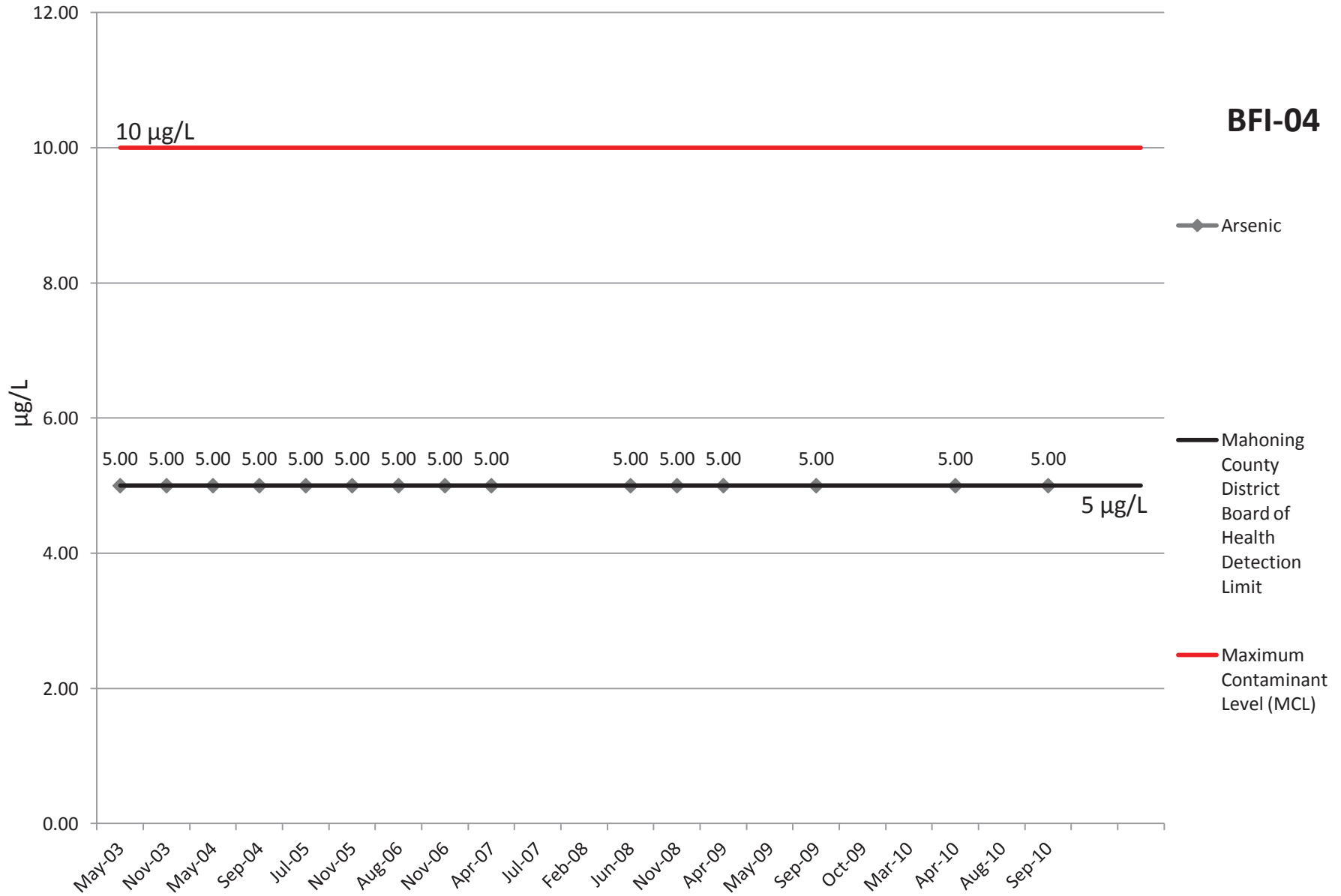


# Fluoride



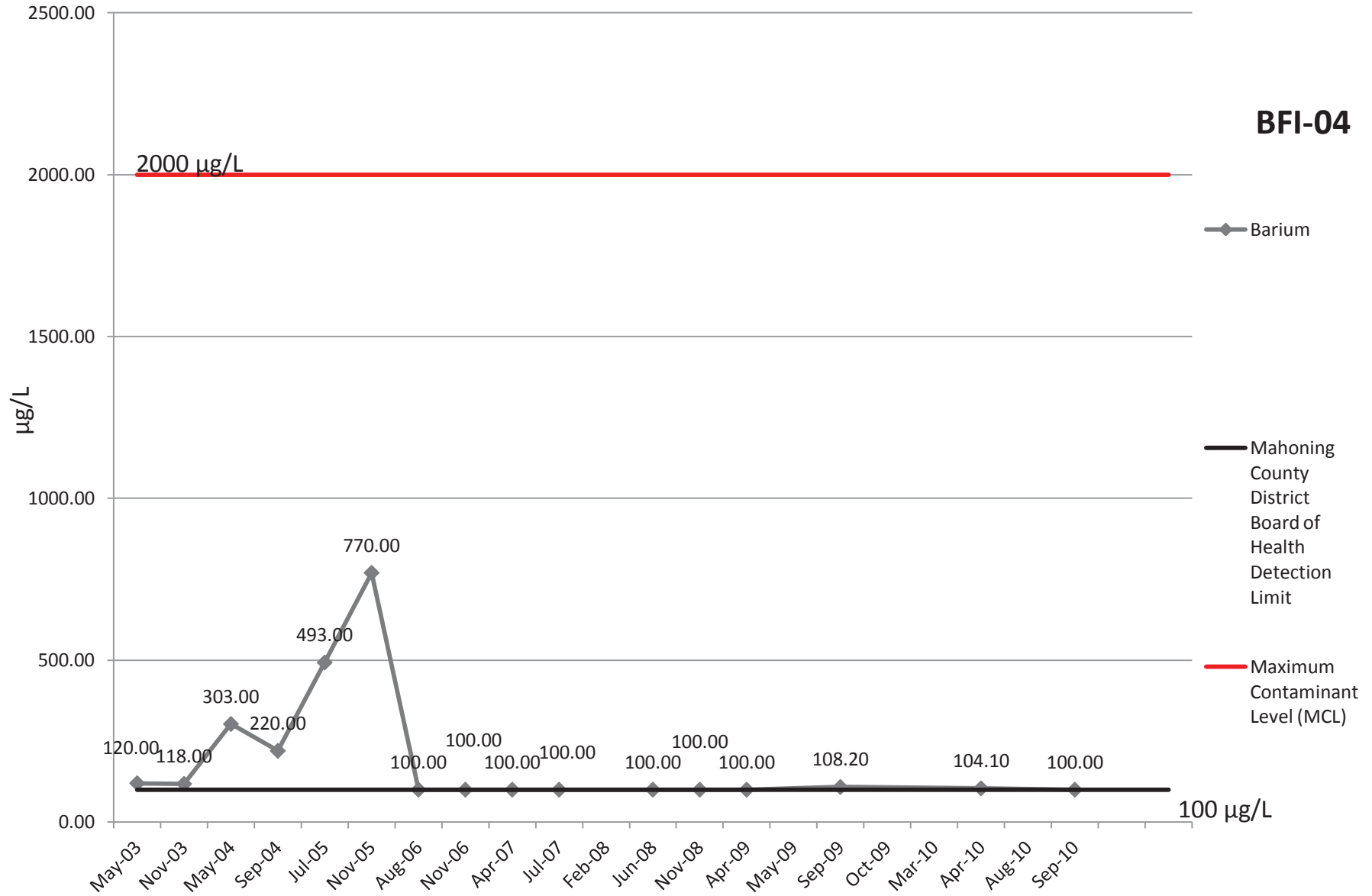
# Arsenic

**BFI-04**



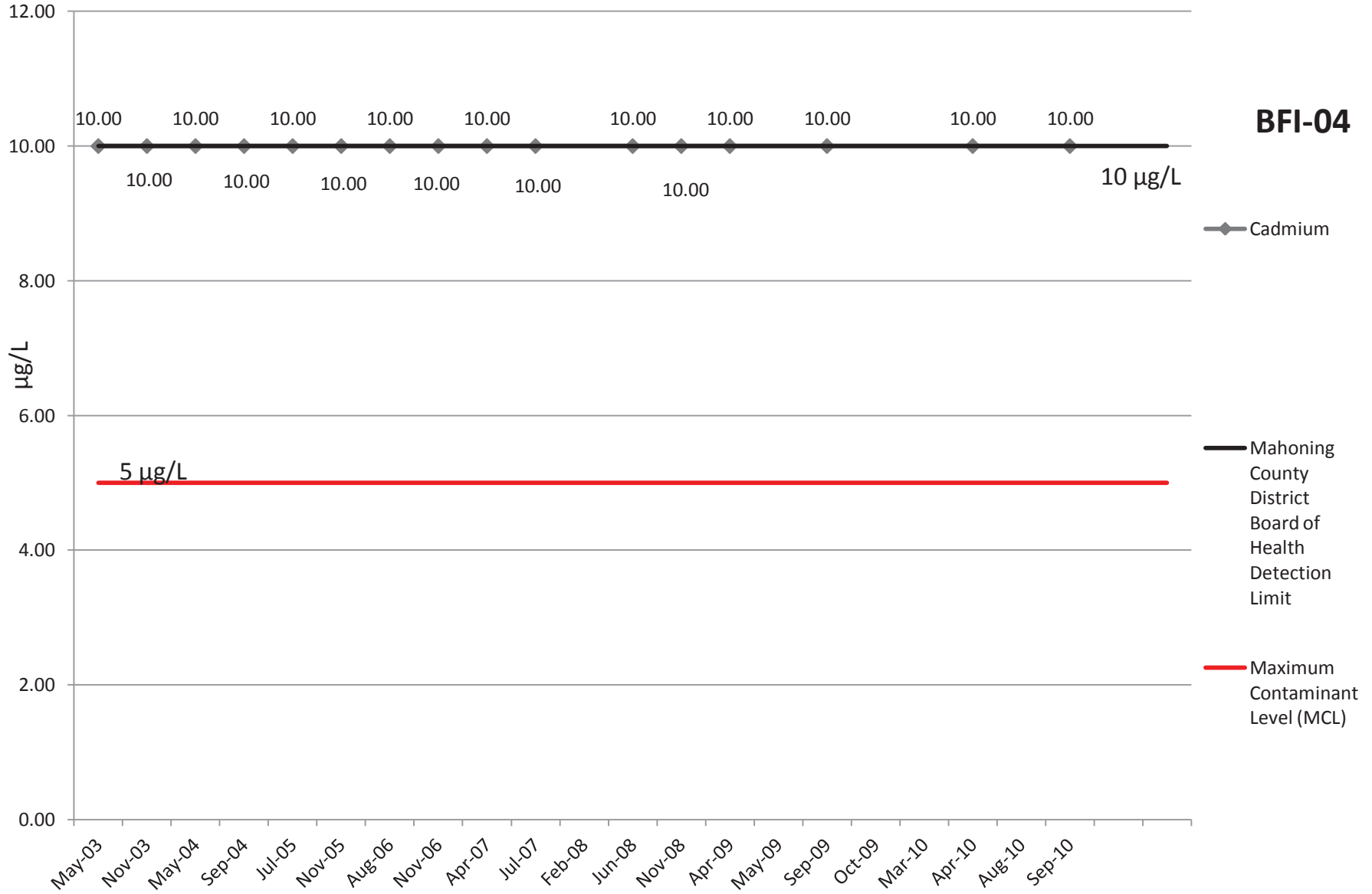
# Barium

**BFI-04**

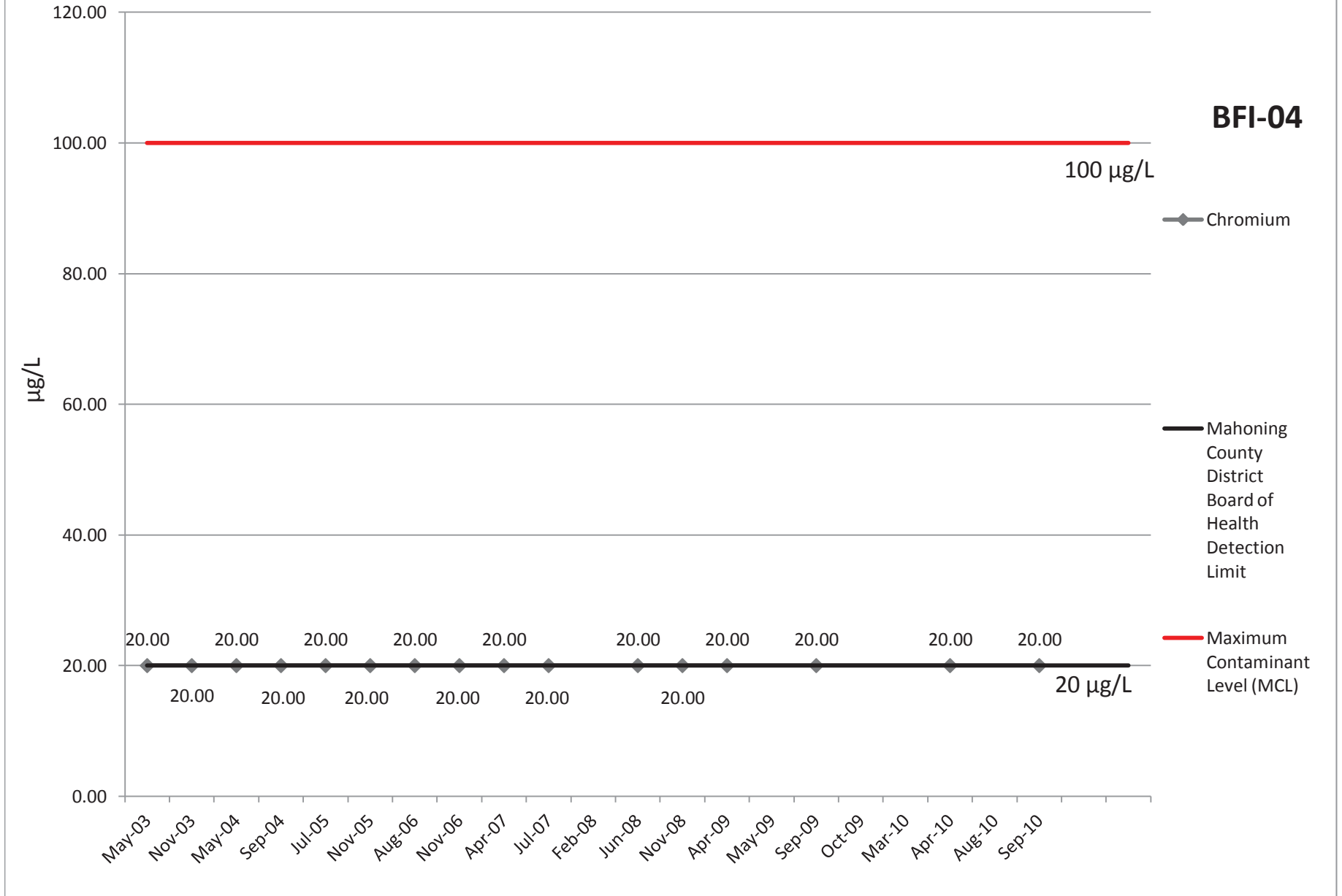


# Cadmium

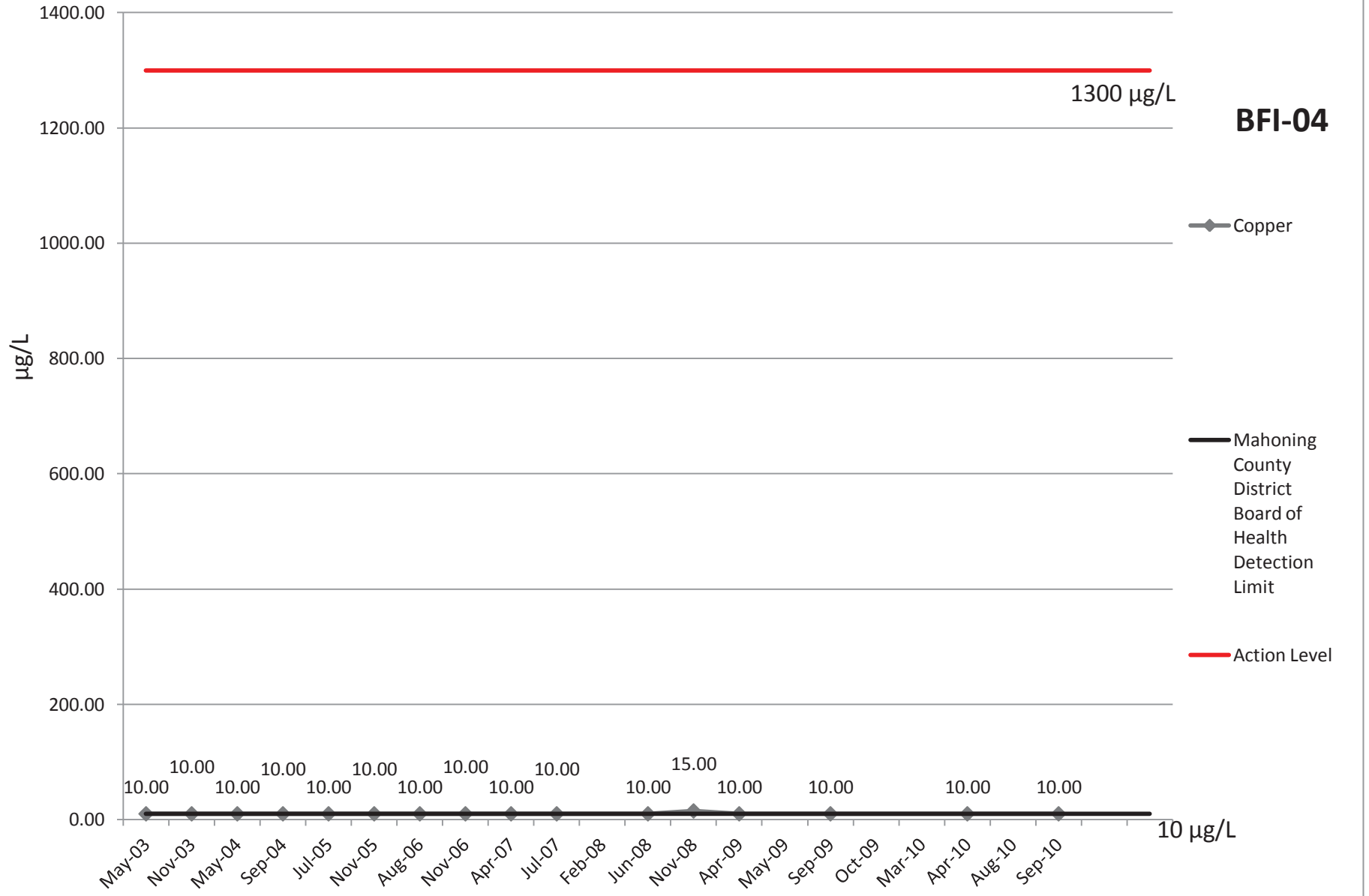
**BFI-04**



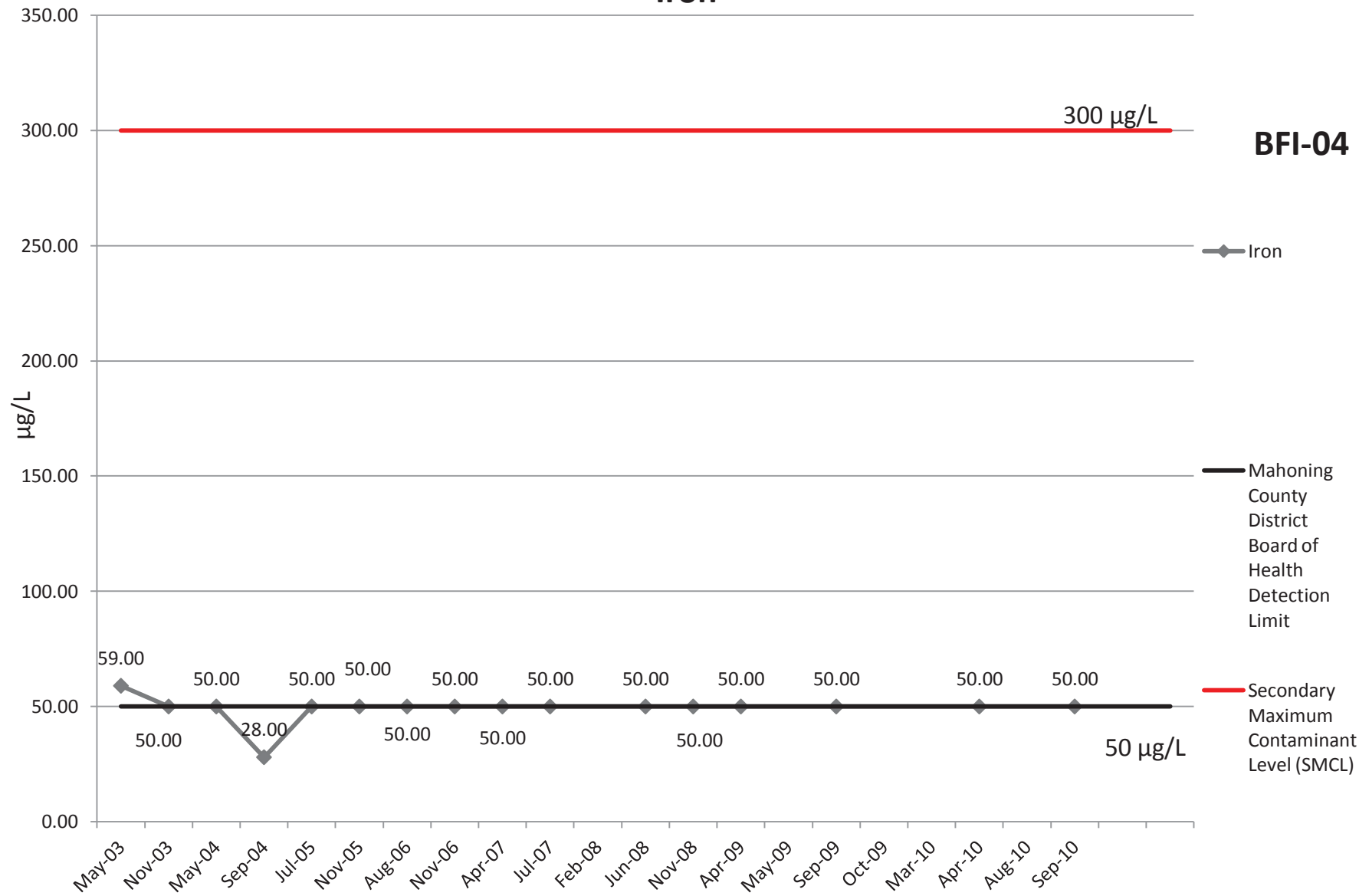
# Chromium



# Copper



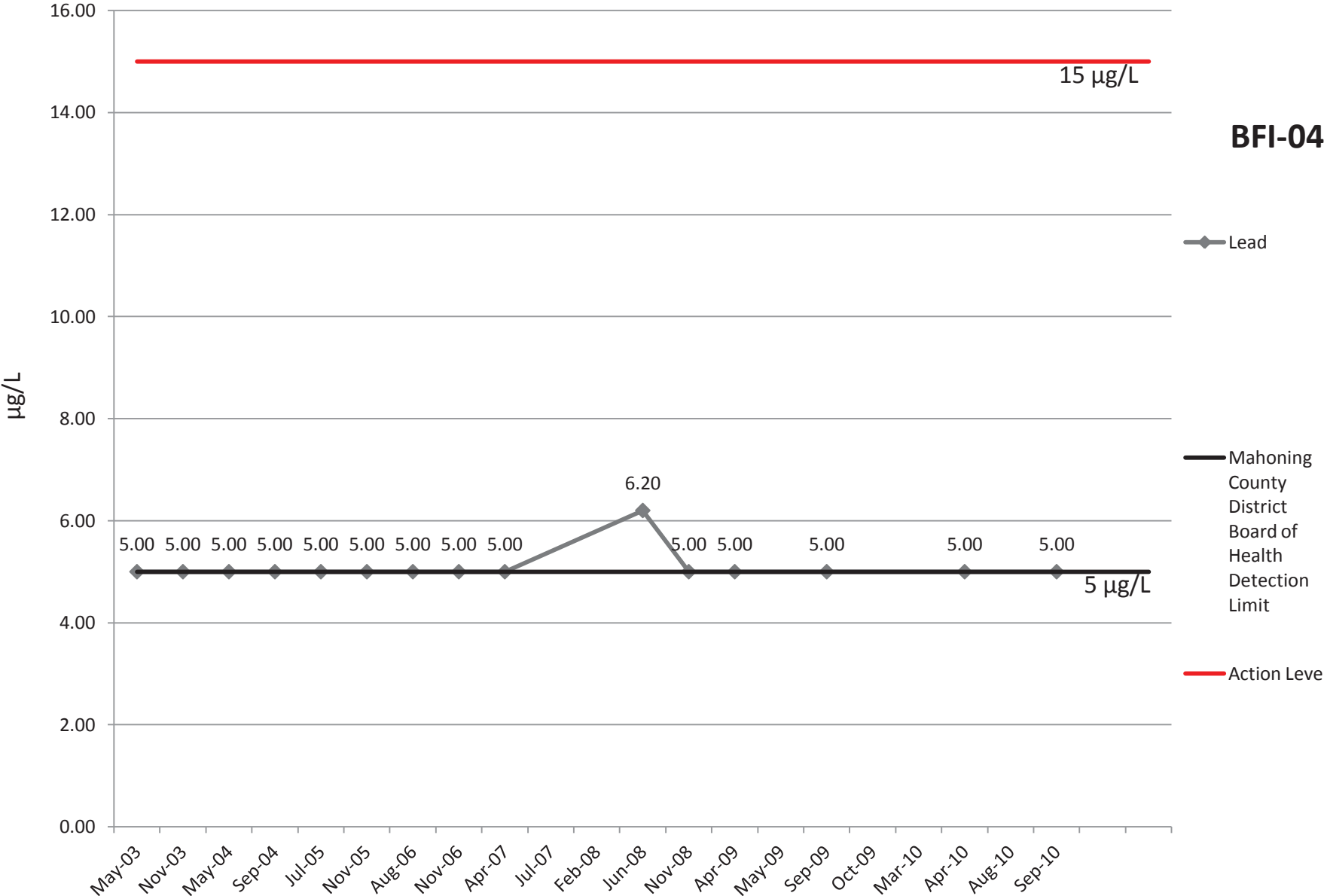
# Iron



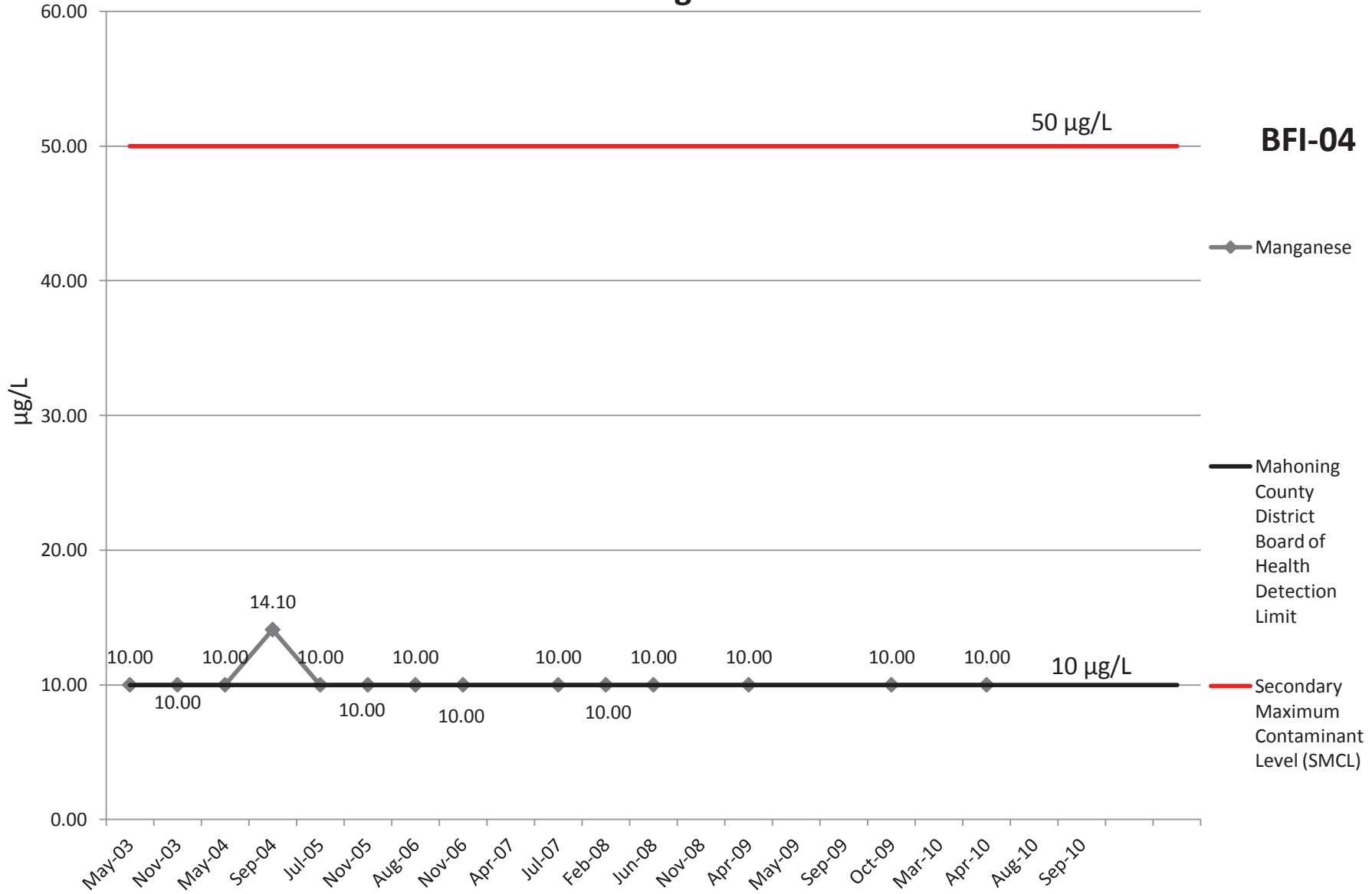


# Lead

**BFI-04**



# Manganese

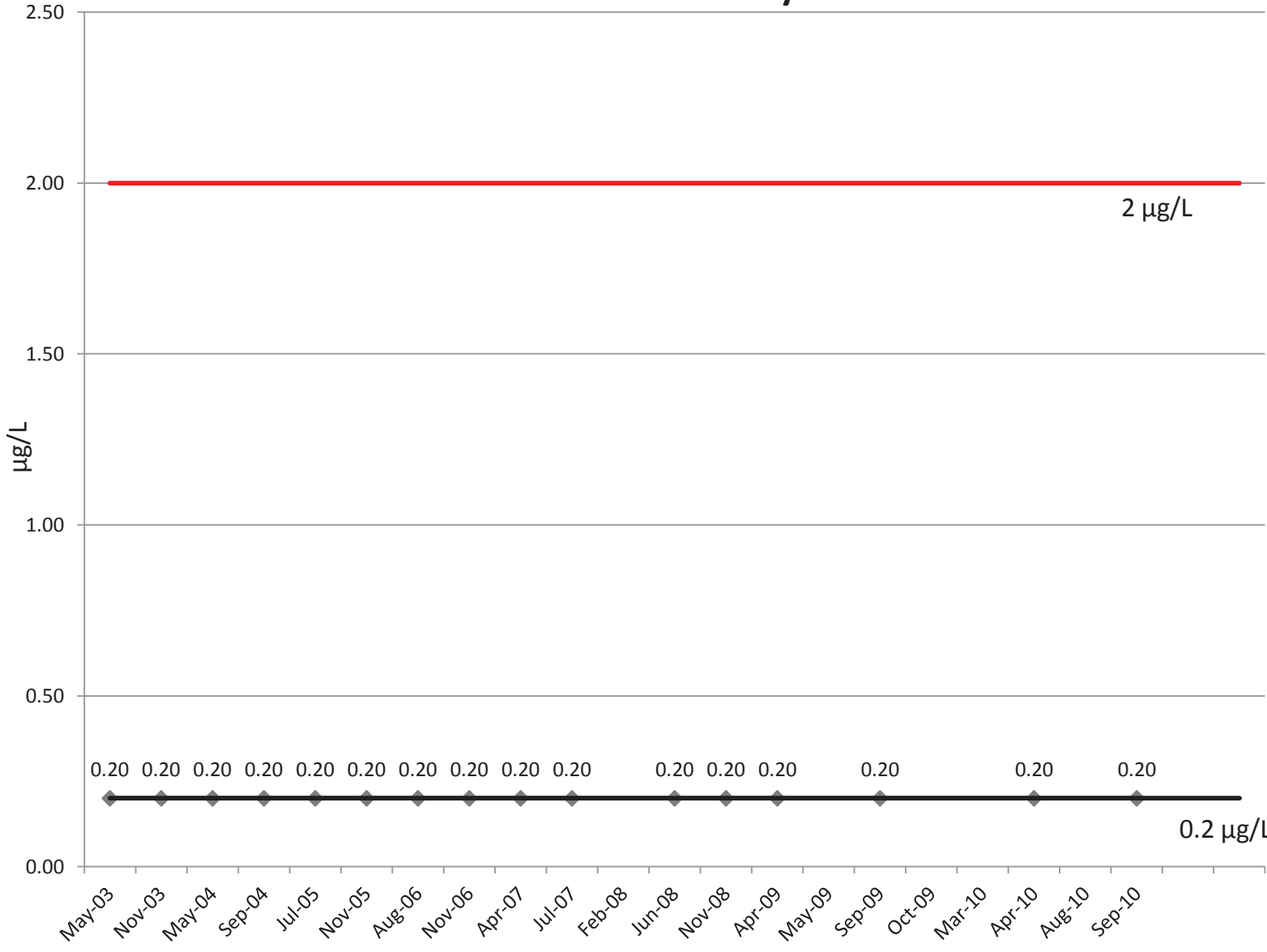


# Mercury

**BFI-04**

2 µg/L

0.2 µg/L

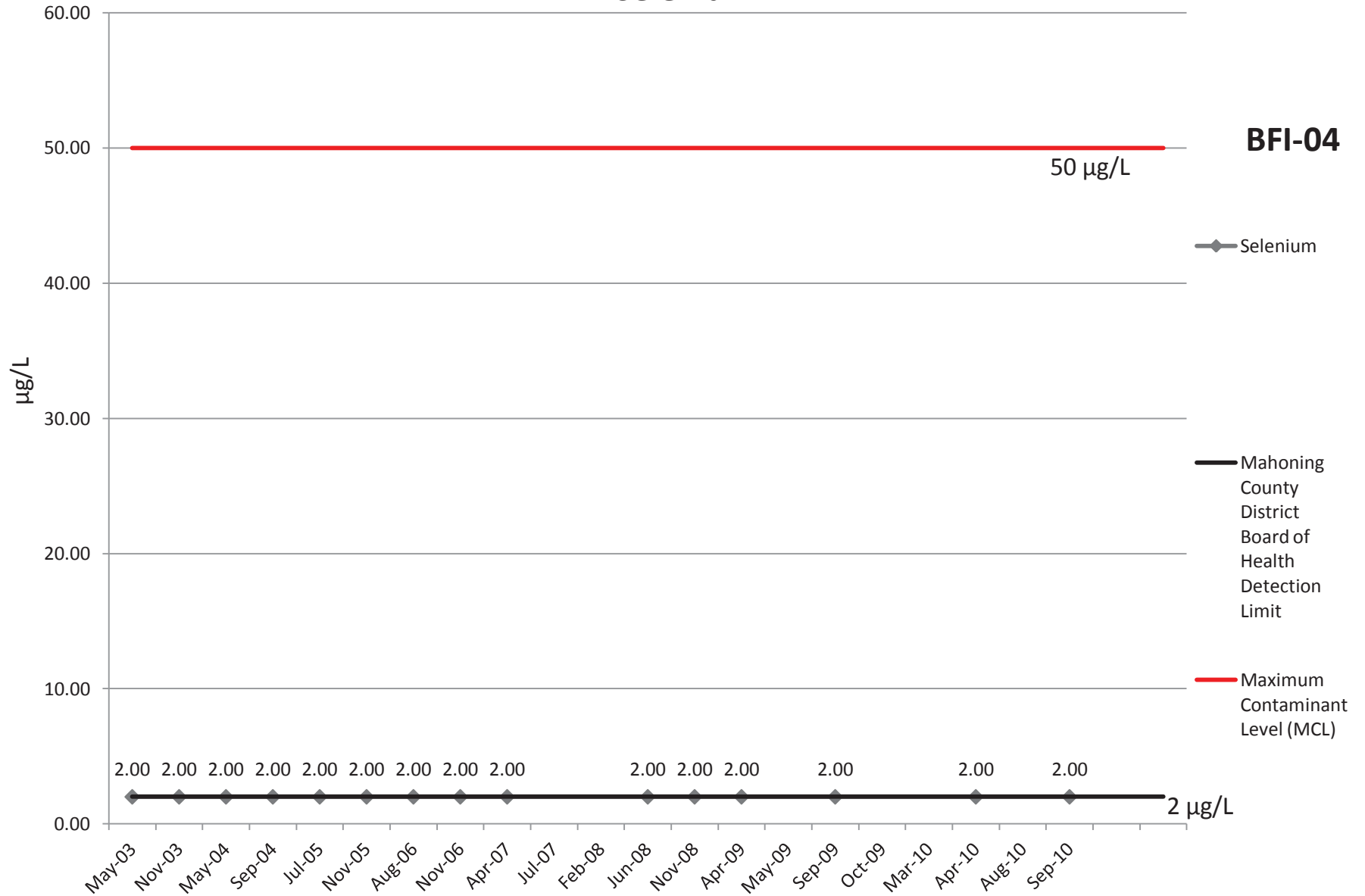


◆ Mercury

— Mahoning County District Board of Health Detection Limit

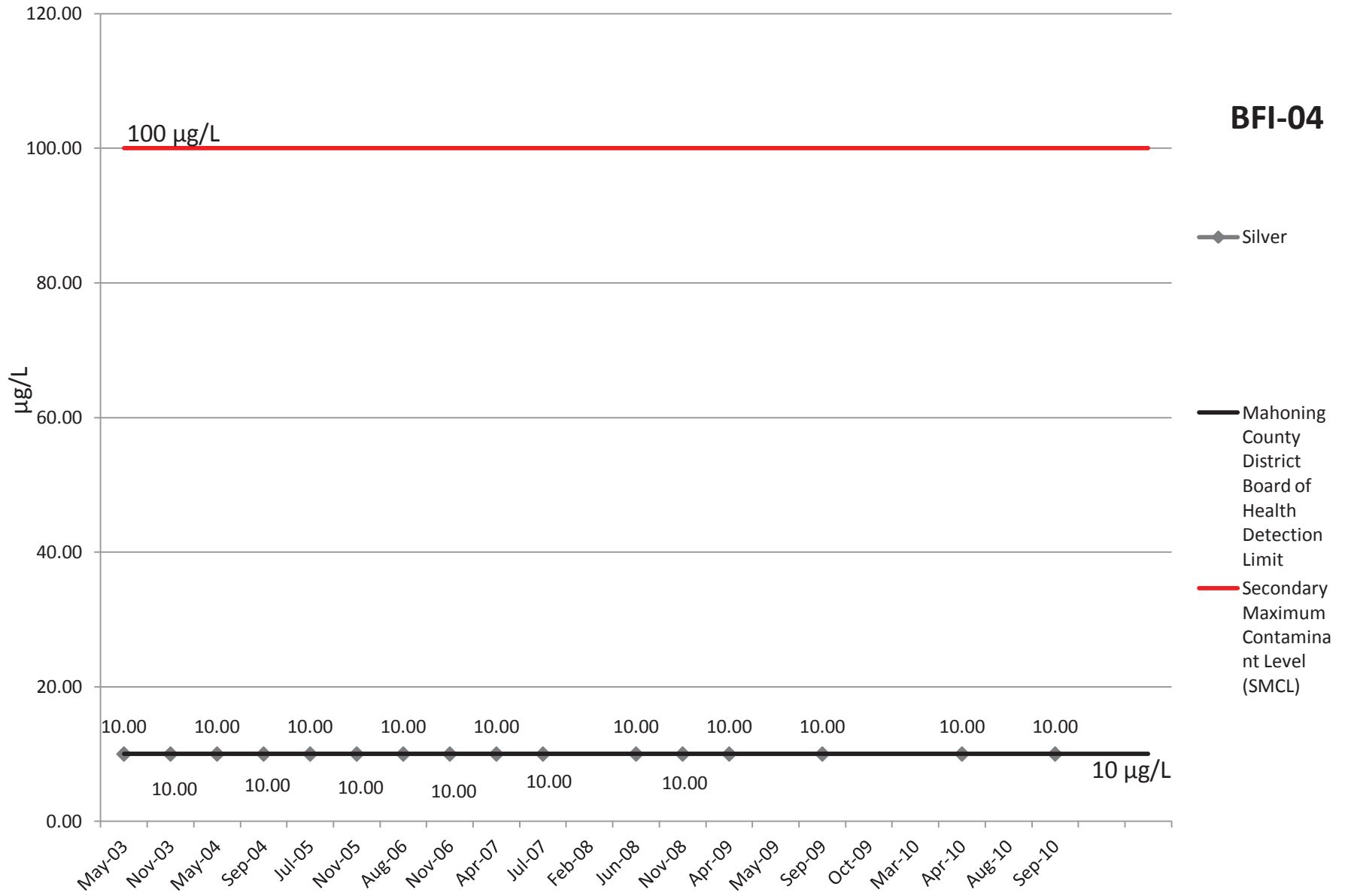
— Maximum Contaminant Level (MCL)

# Selenium

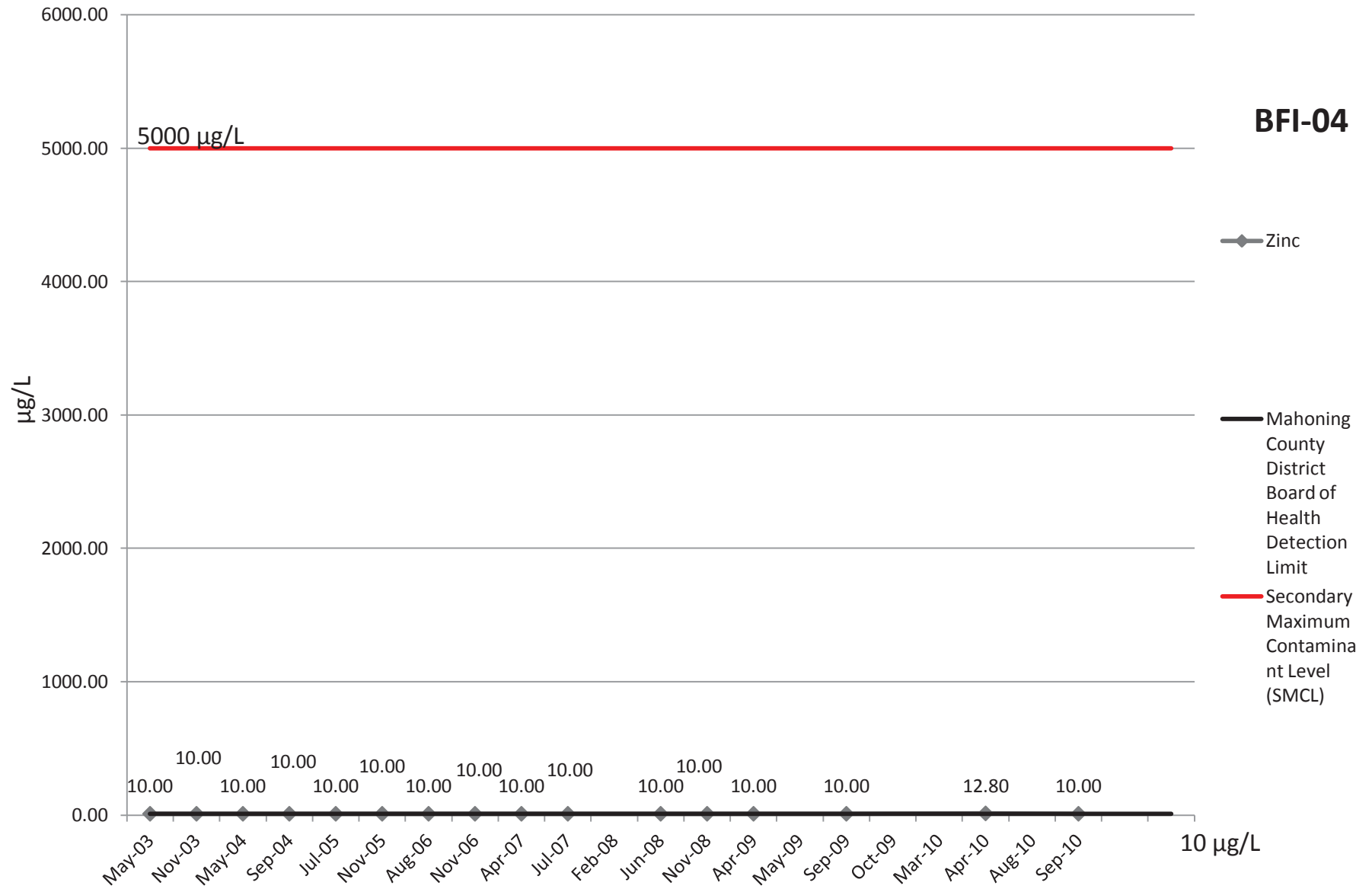


# Silver

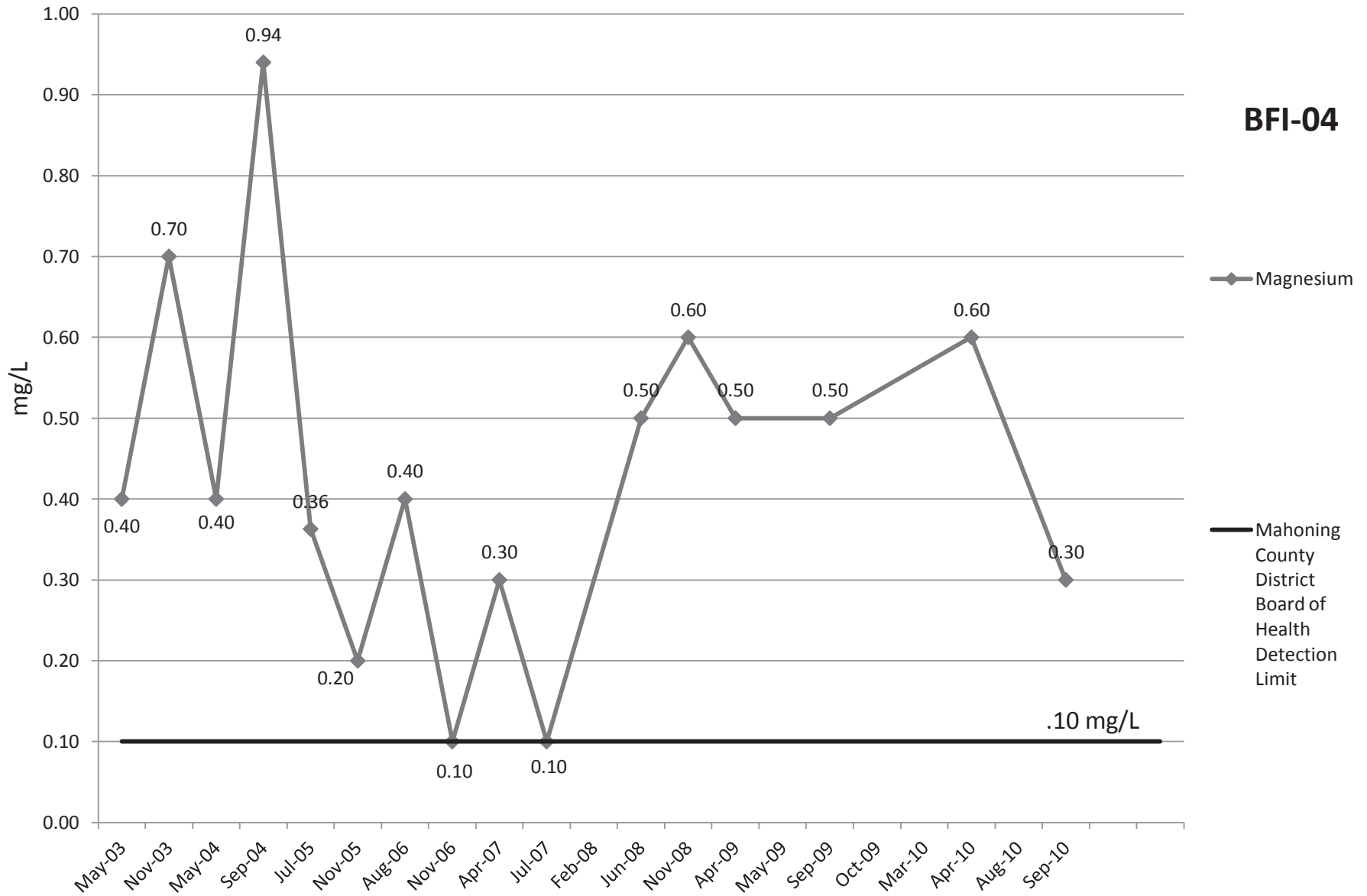
**BFI-04**



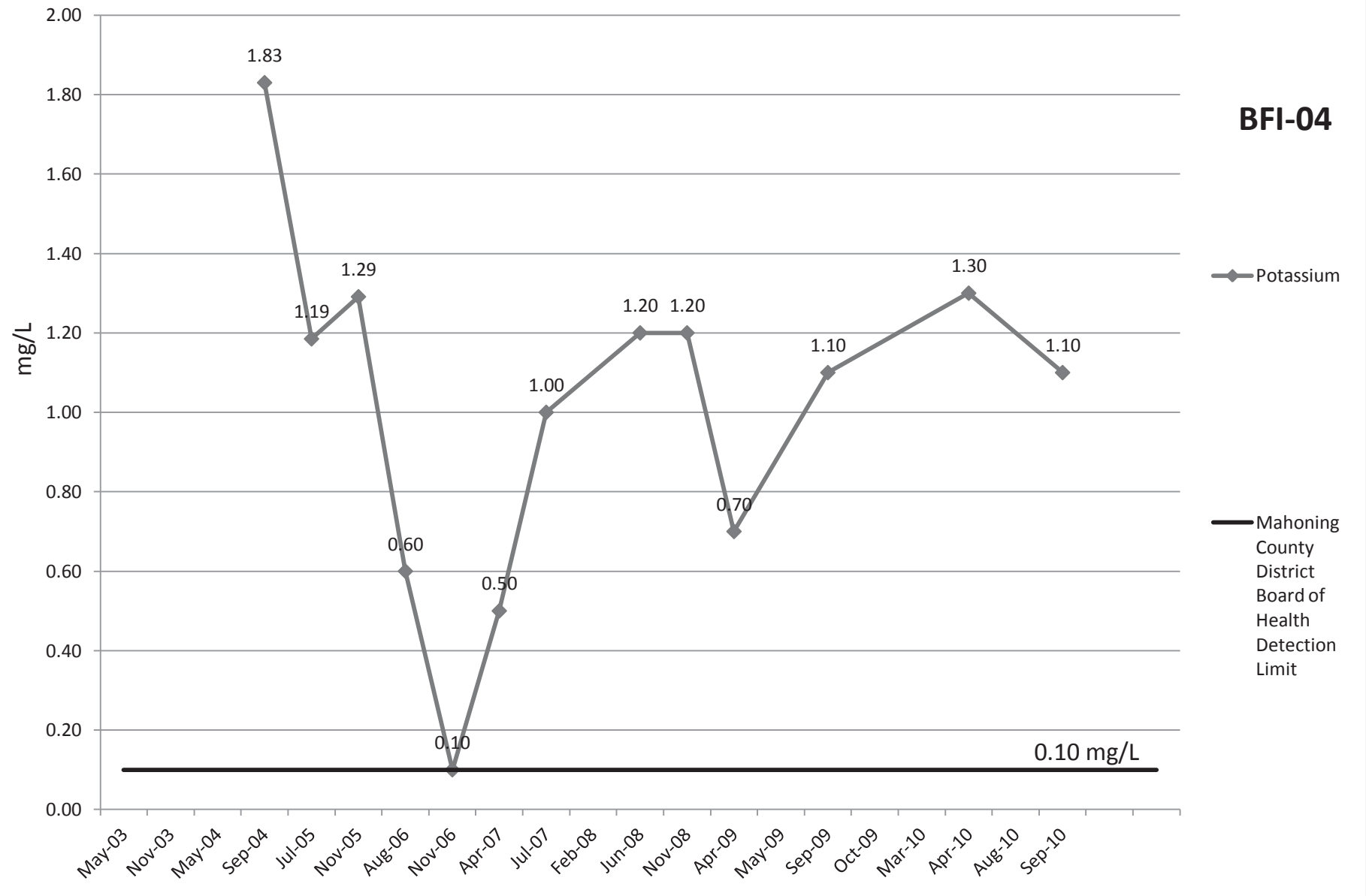
# Zinc



# Magnesium

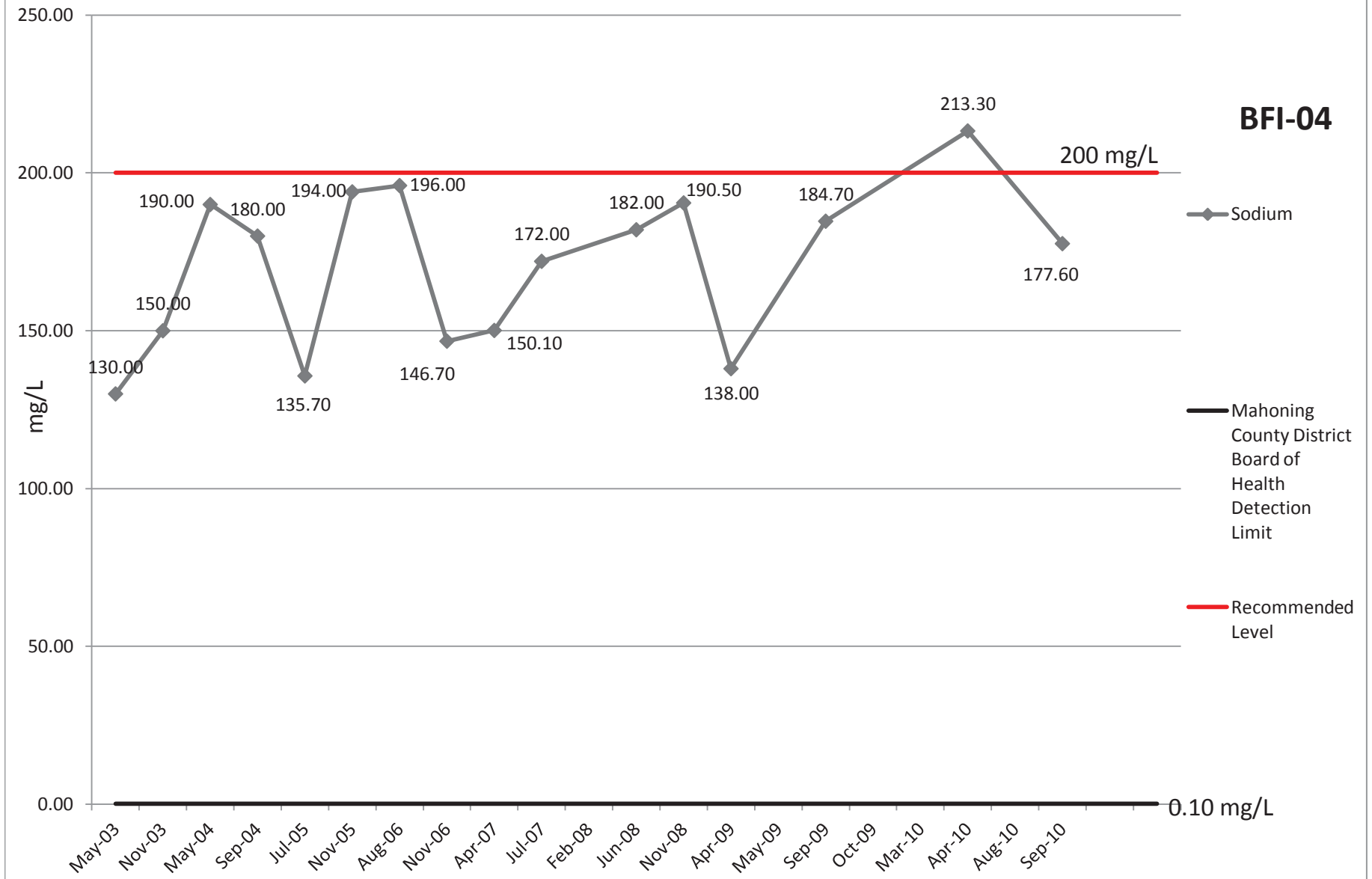


# Potassium

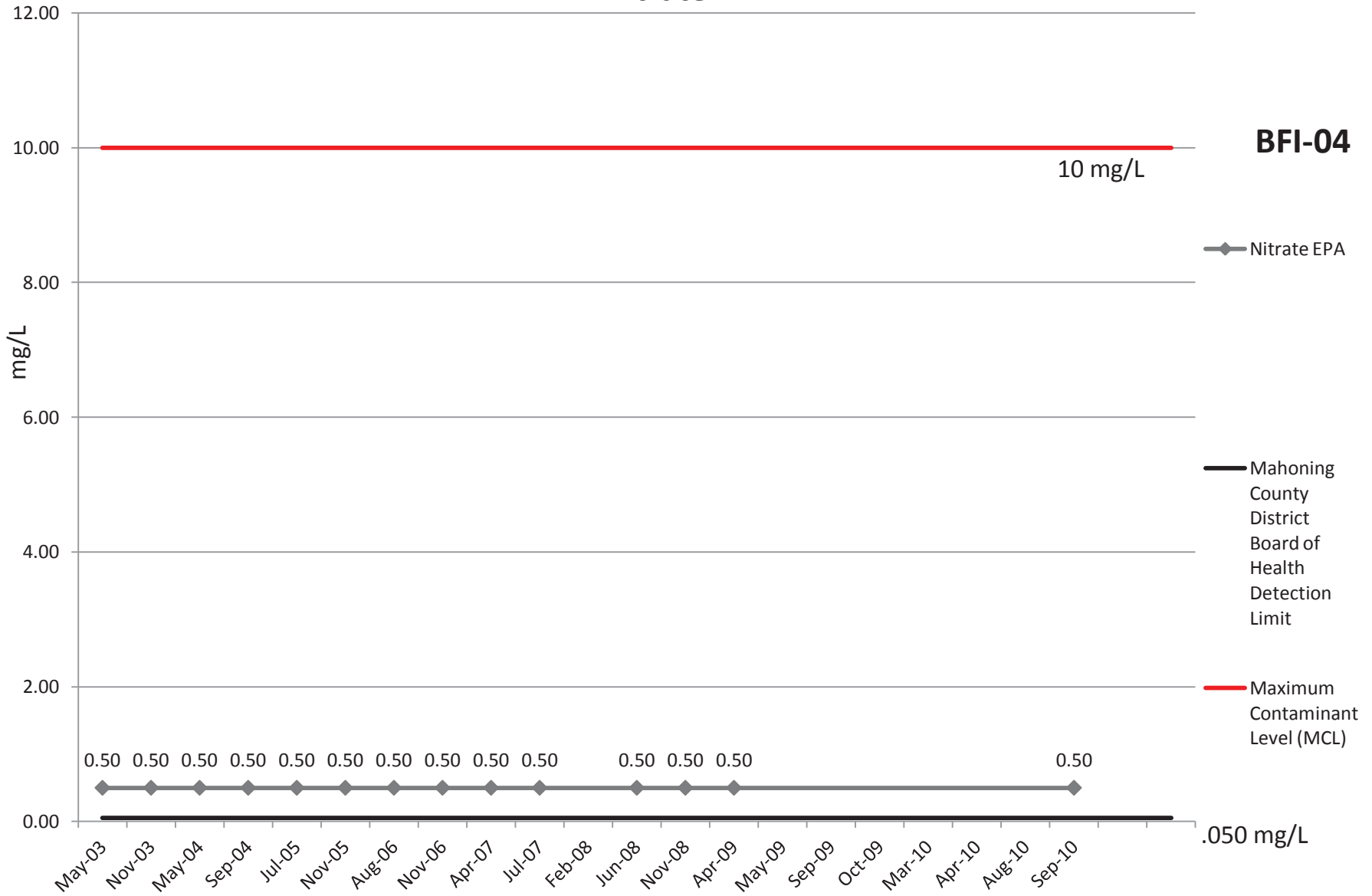




# Sodium

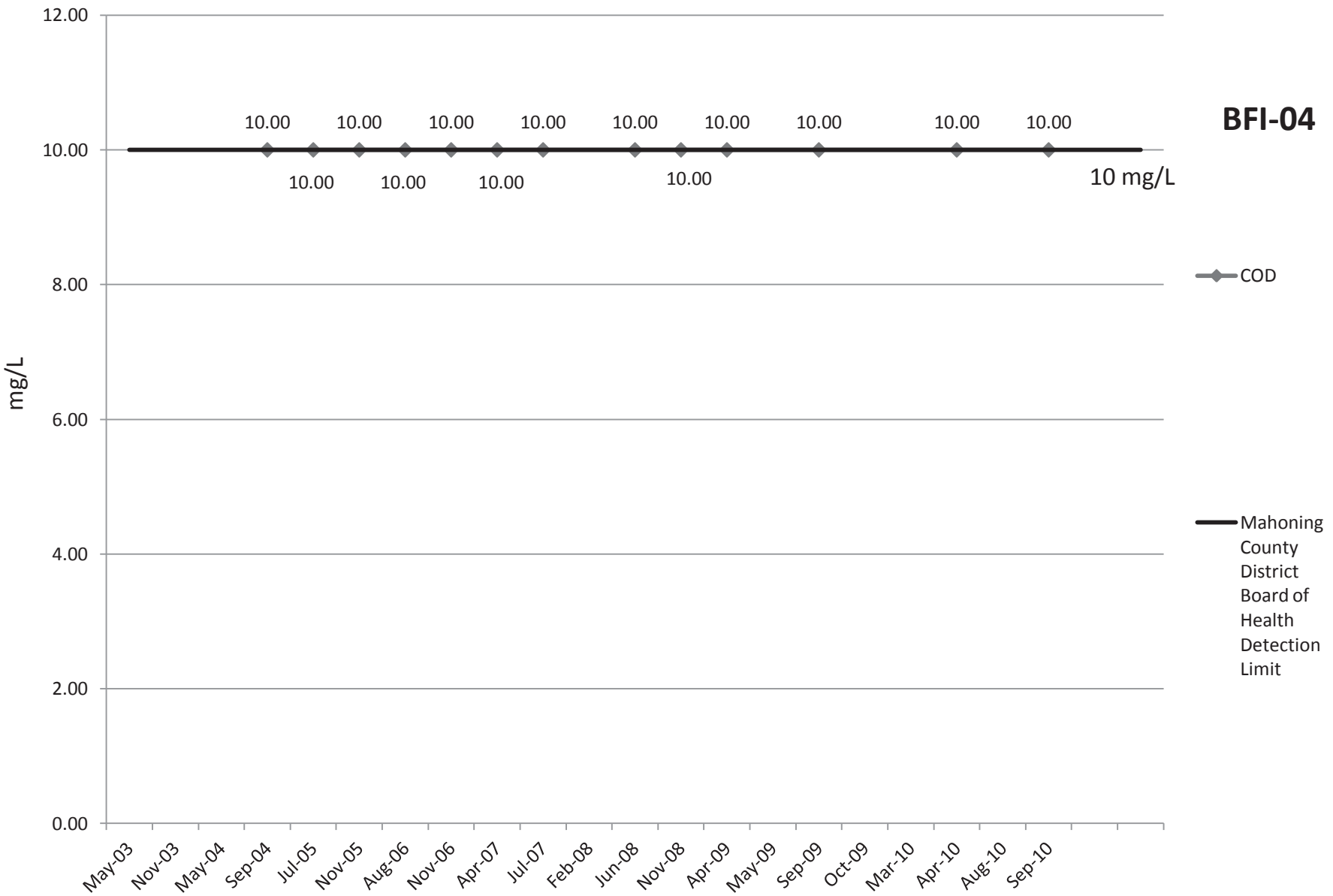


# Nitrate EPA



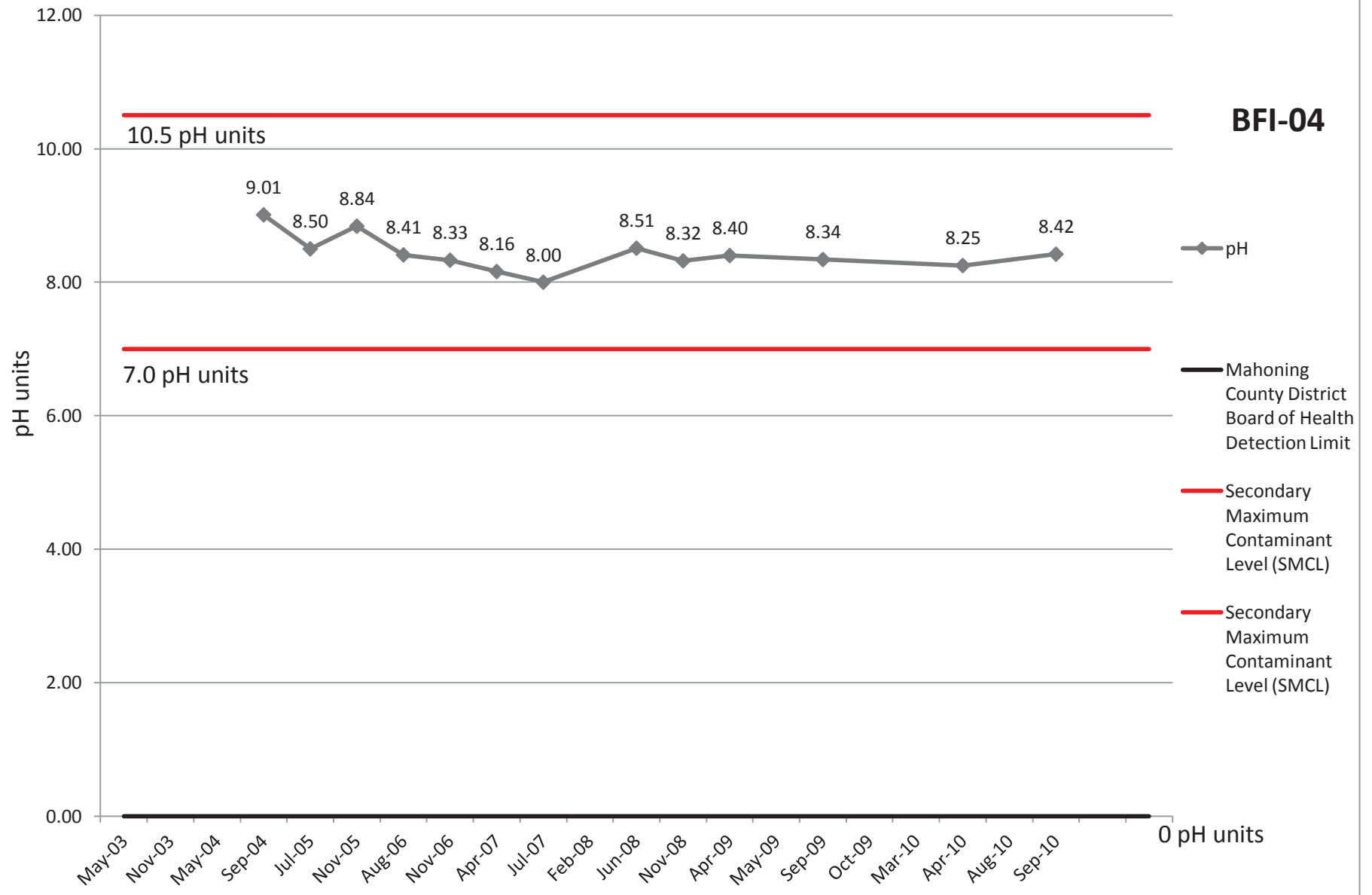
# COD

**BFI-04**



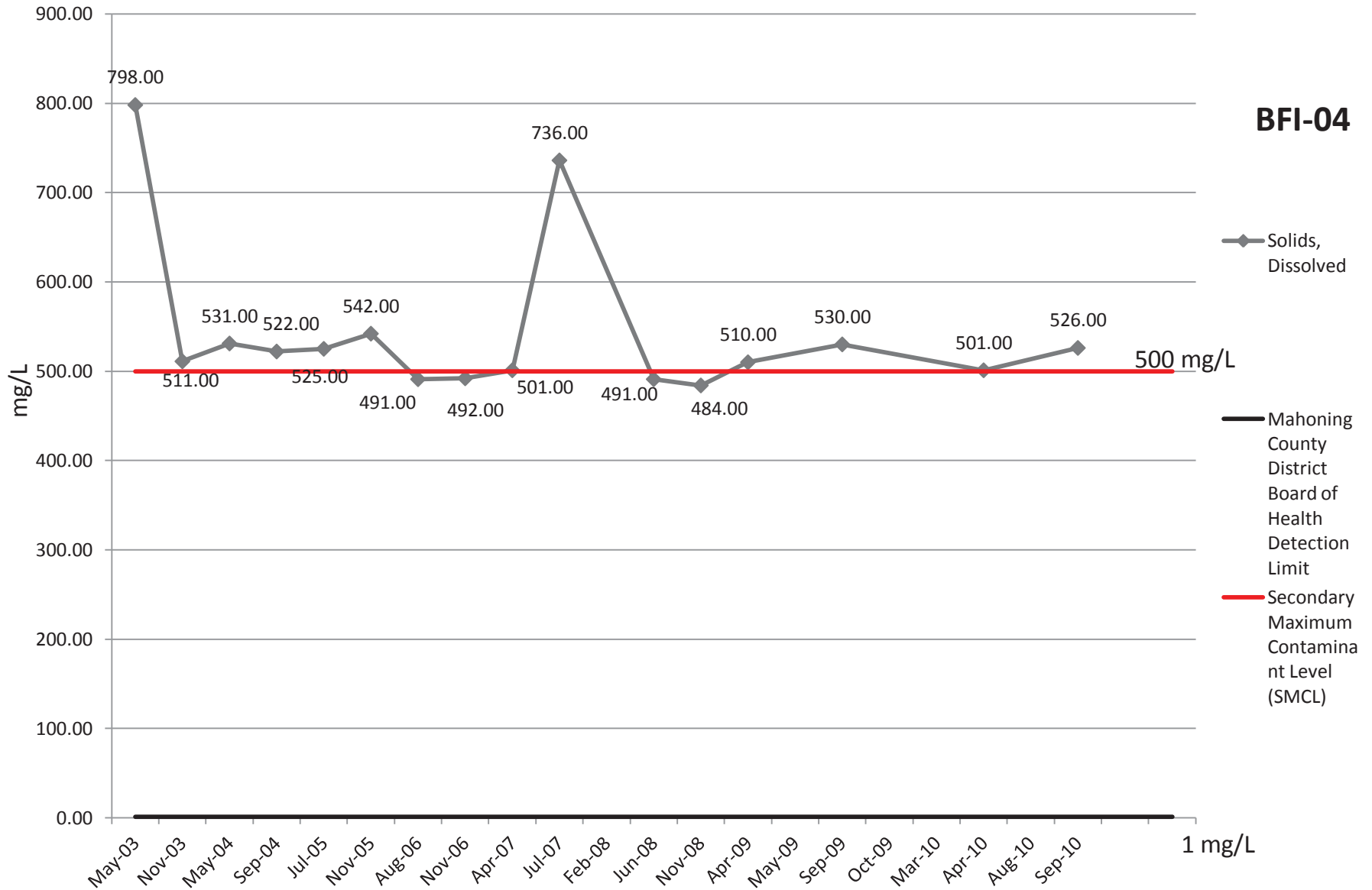
# pH

**BFI-04**



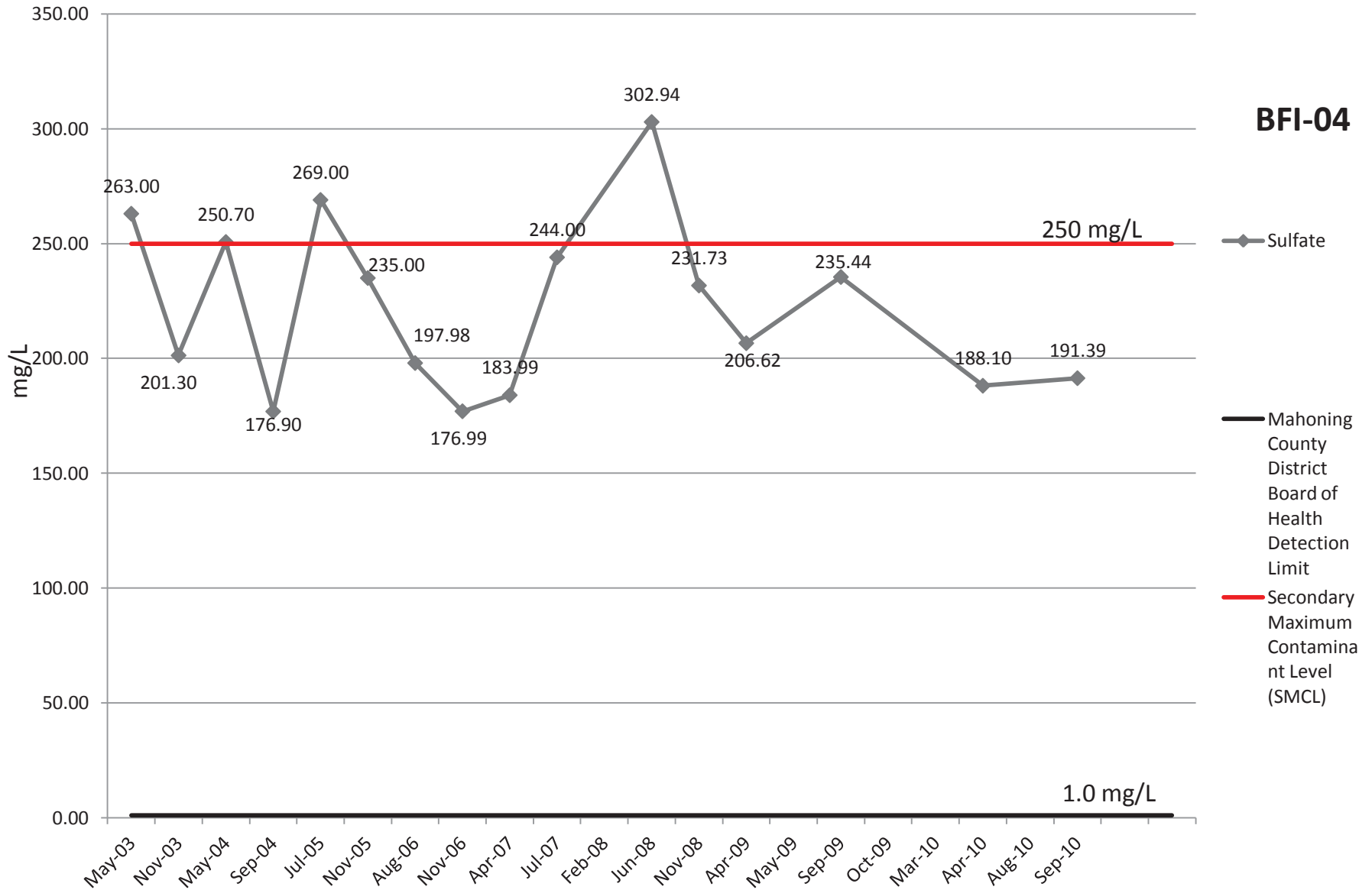
# Solids, Dissolved

**BFI-04**



# Sulfate

**BFI-04**

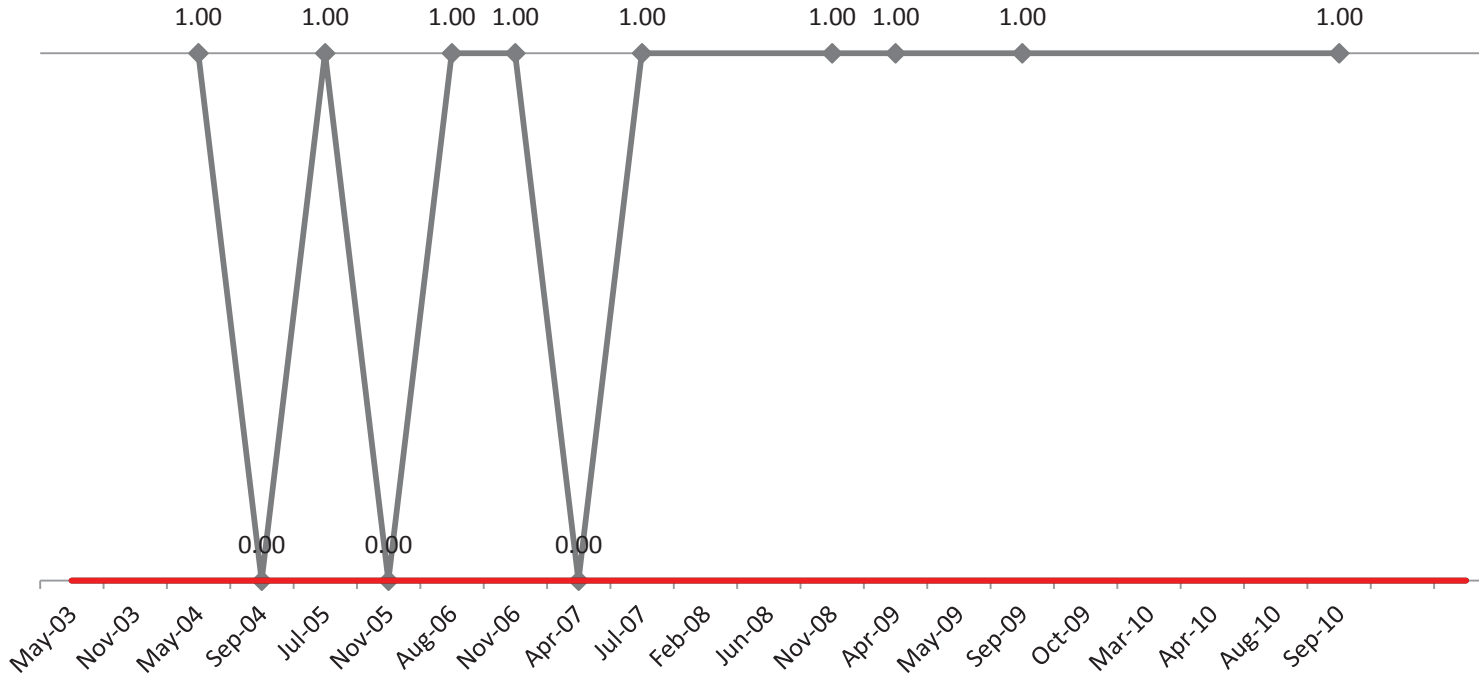


# Bacteria

**BFI-04**

Positive/Negative

◆ Bacteria



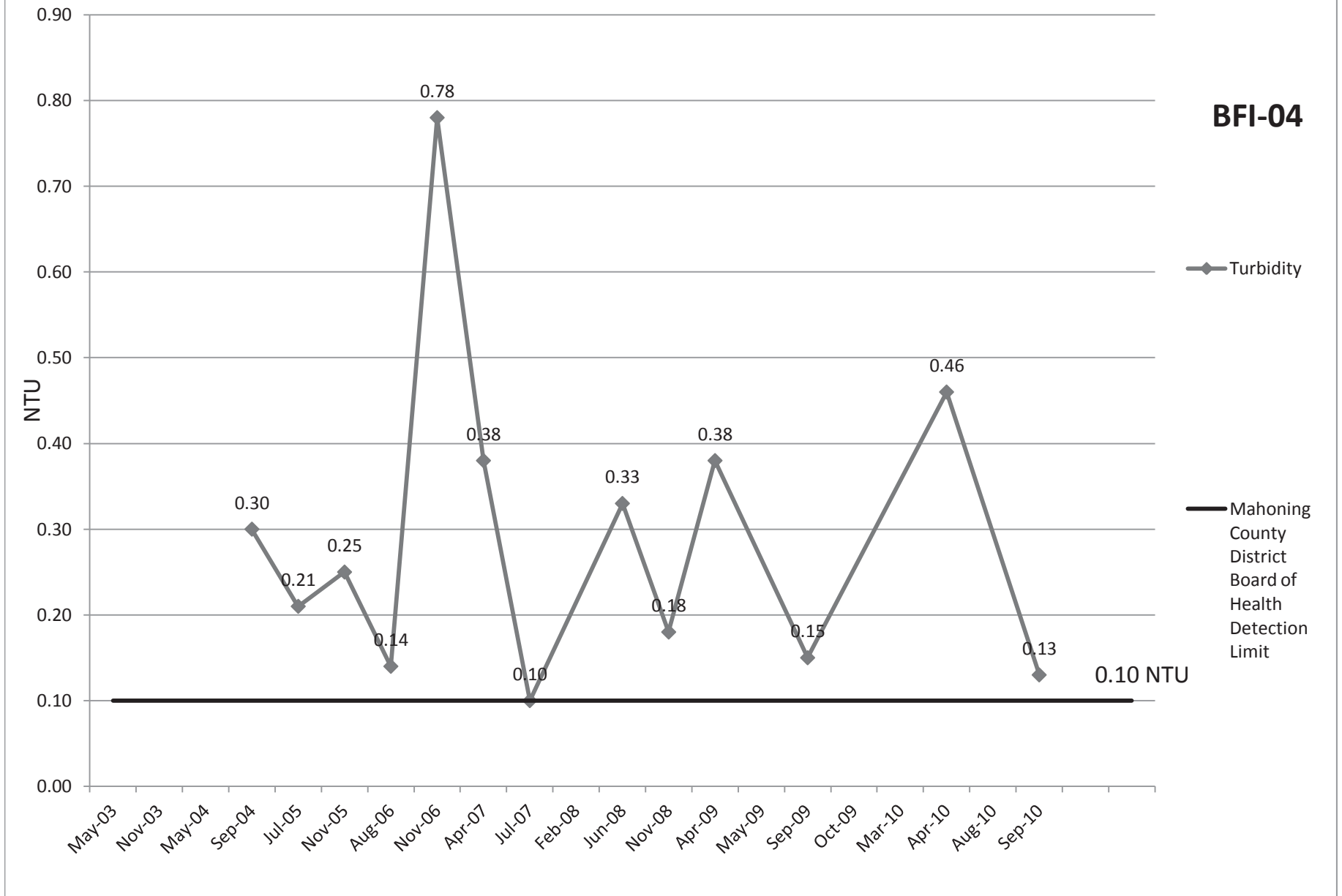
positive (1)

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

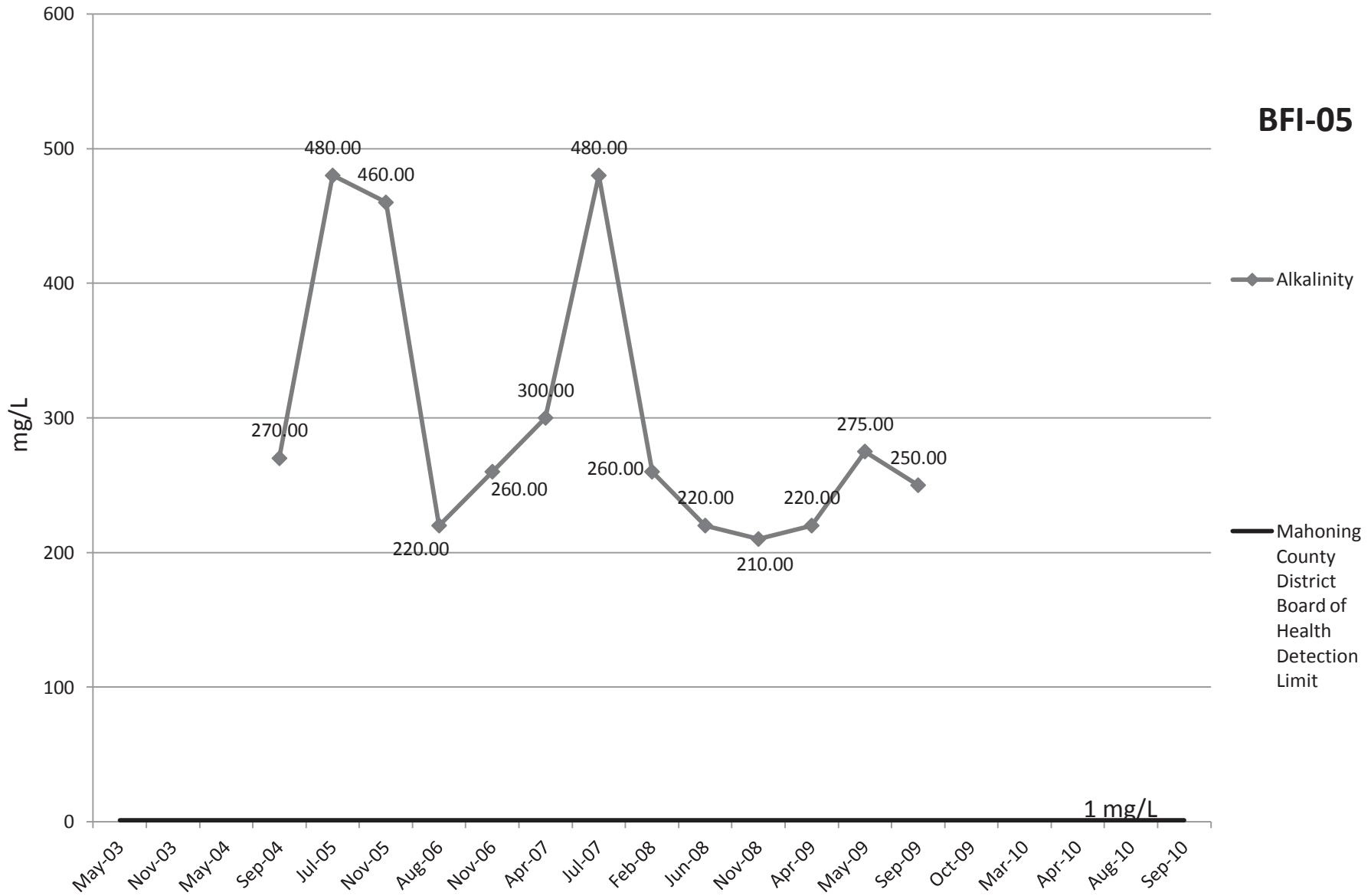
negative (0)

# Turbidity

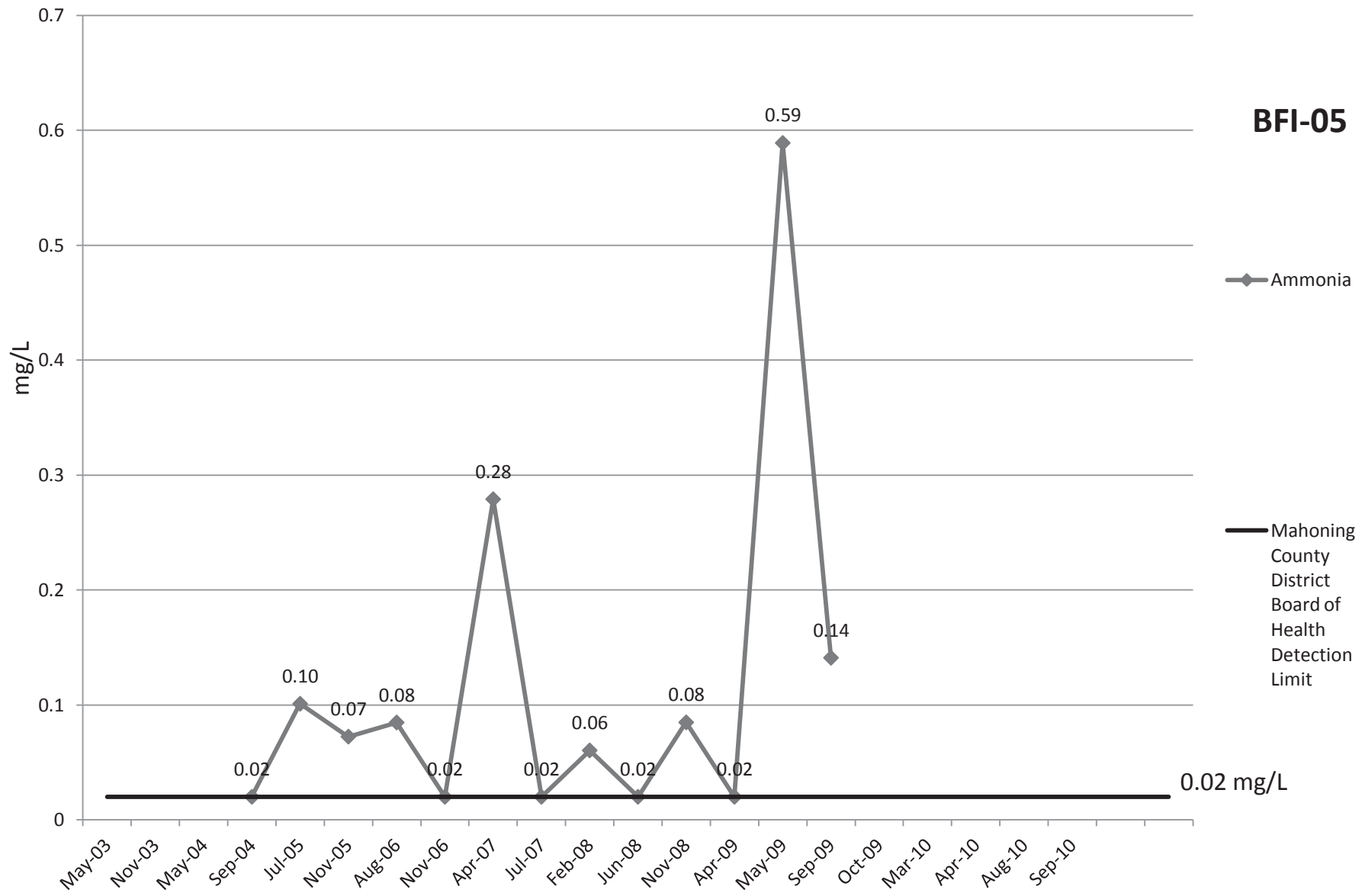




# Alkalinity



# Ammonia



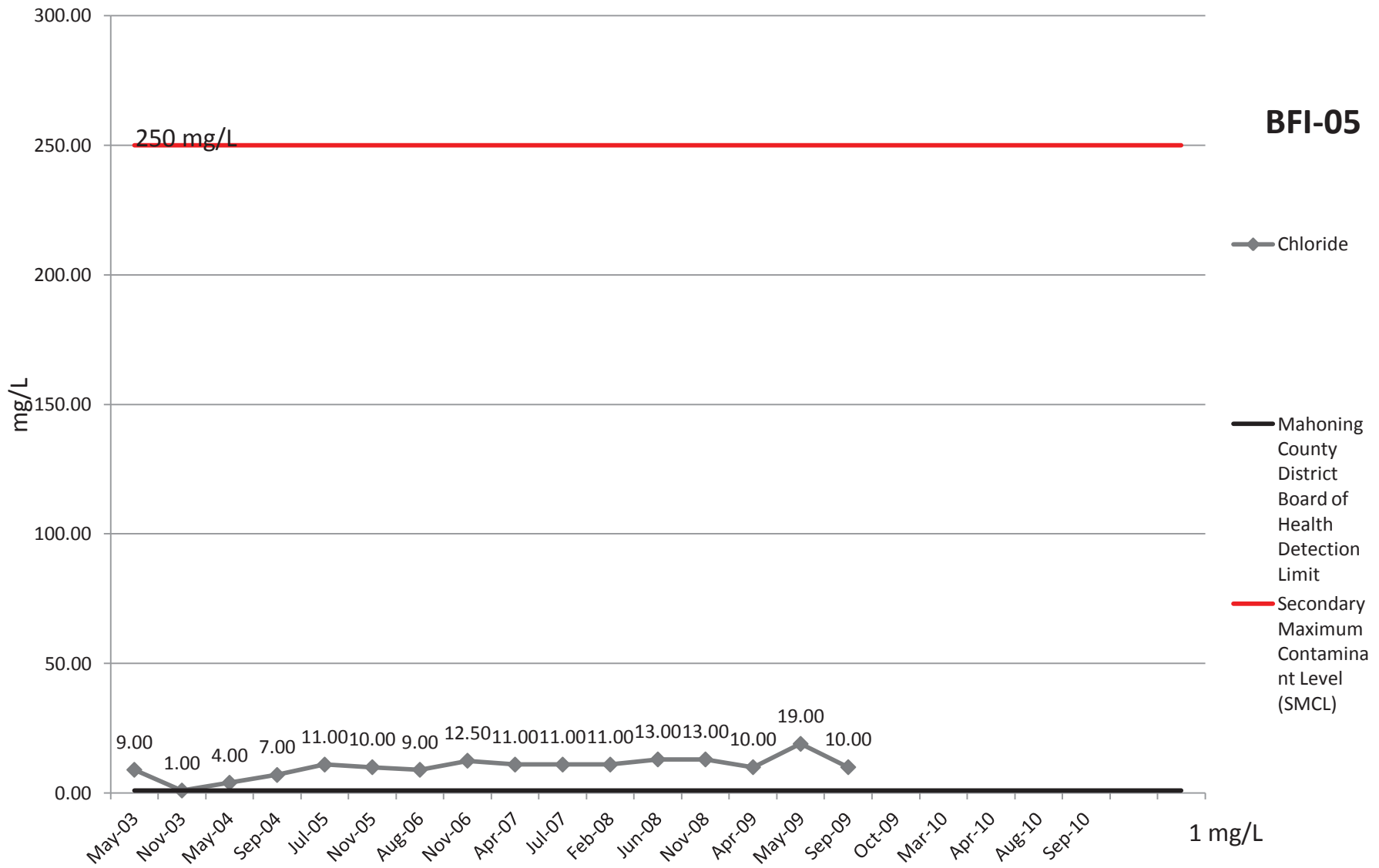
**BFI-05**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

0.02 mg/L

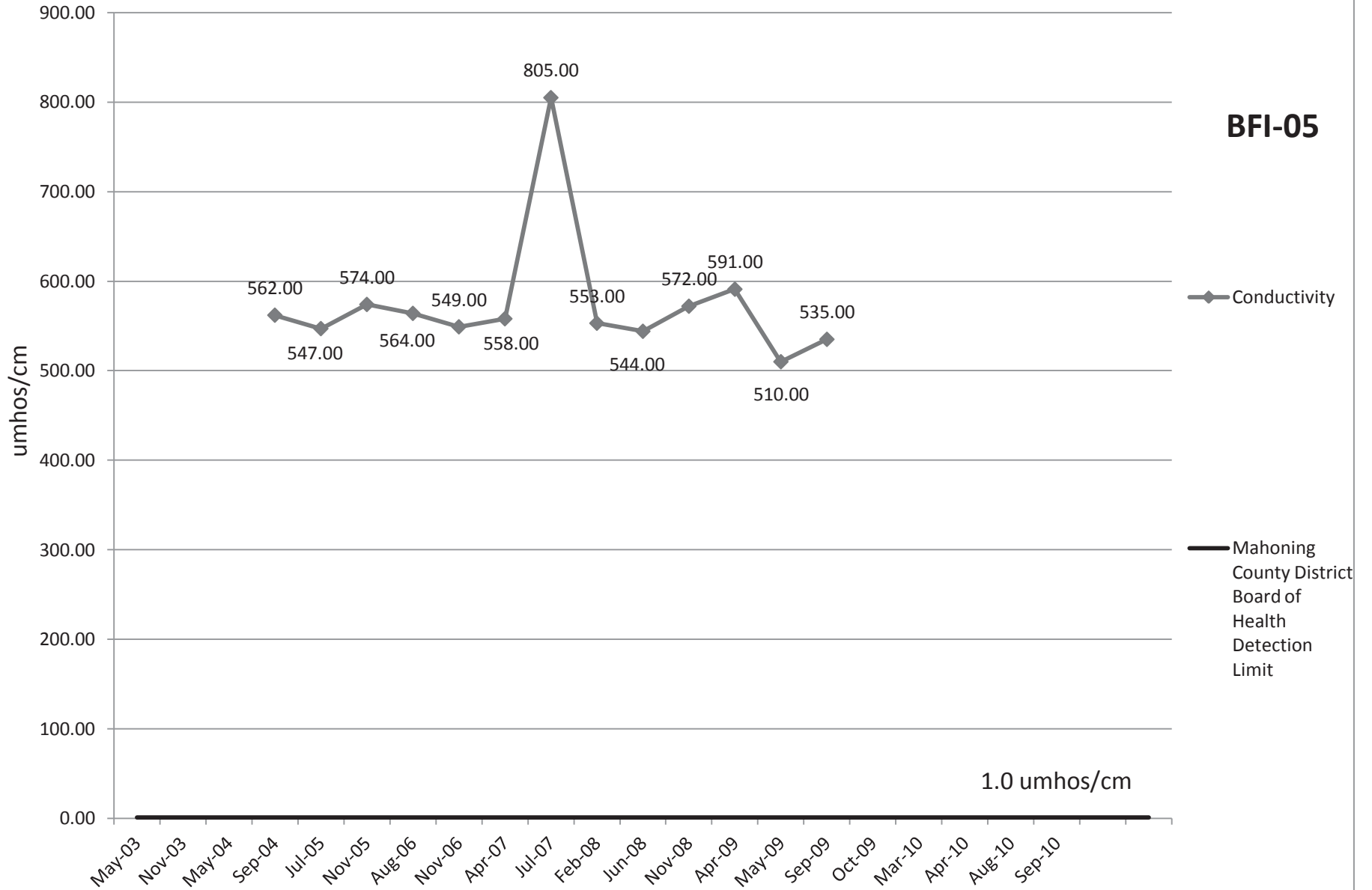
# Chloride



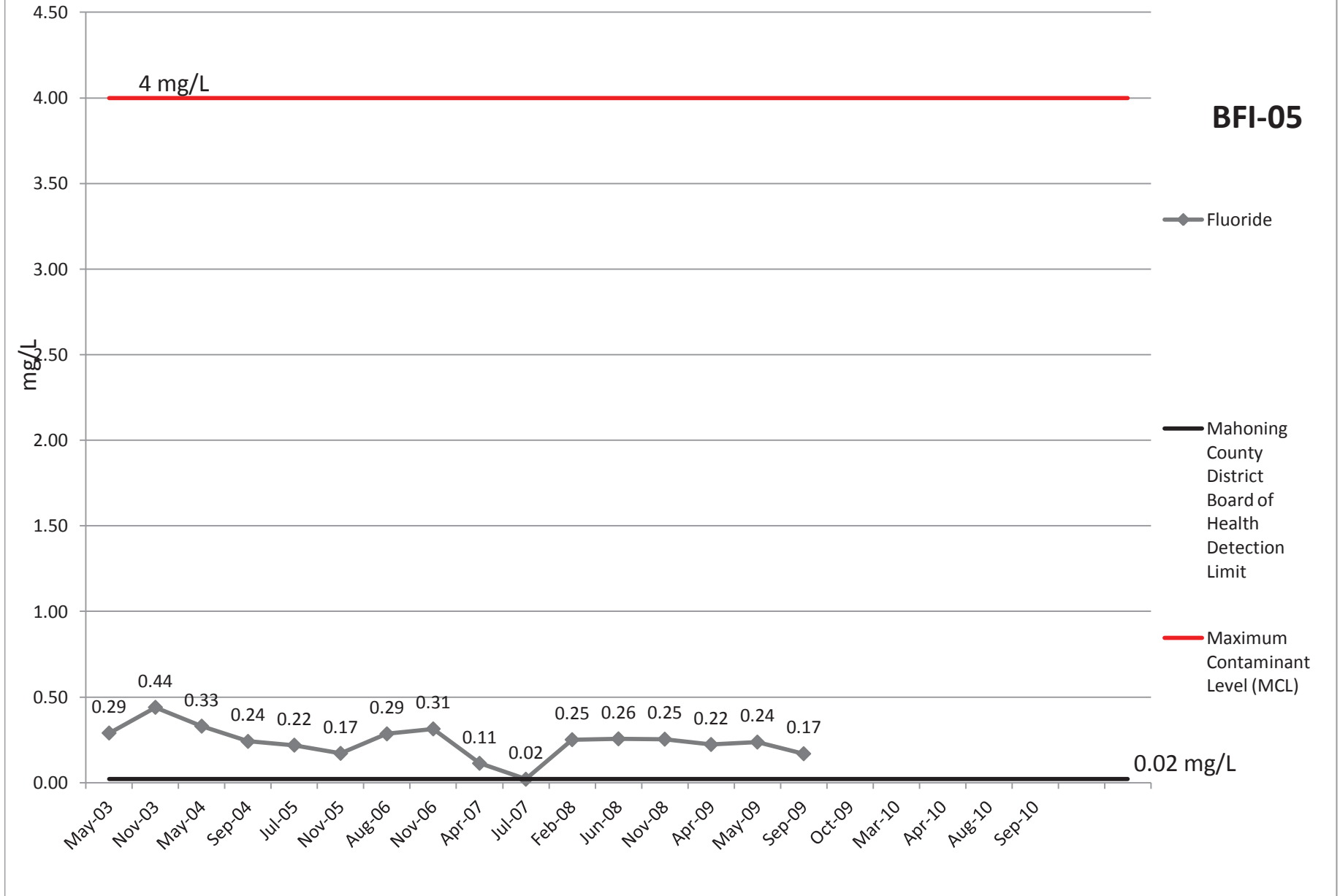
1 mg/L

# Conductivity

**BFI-05**

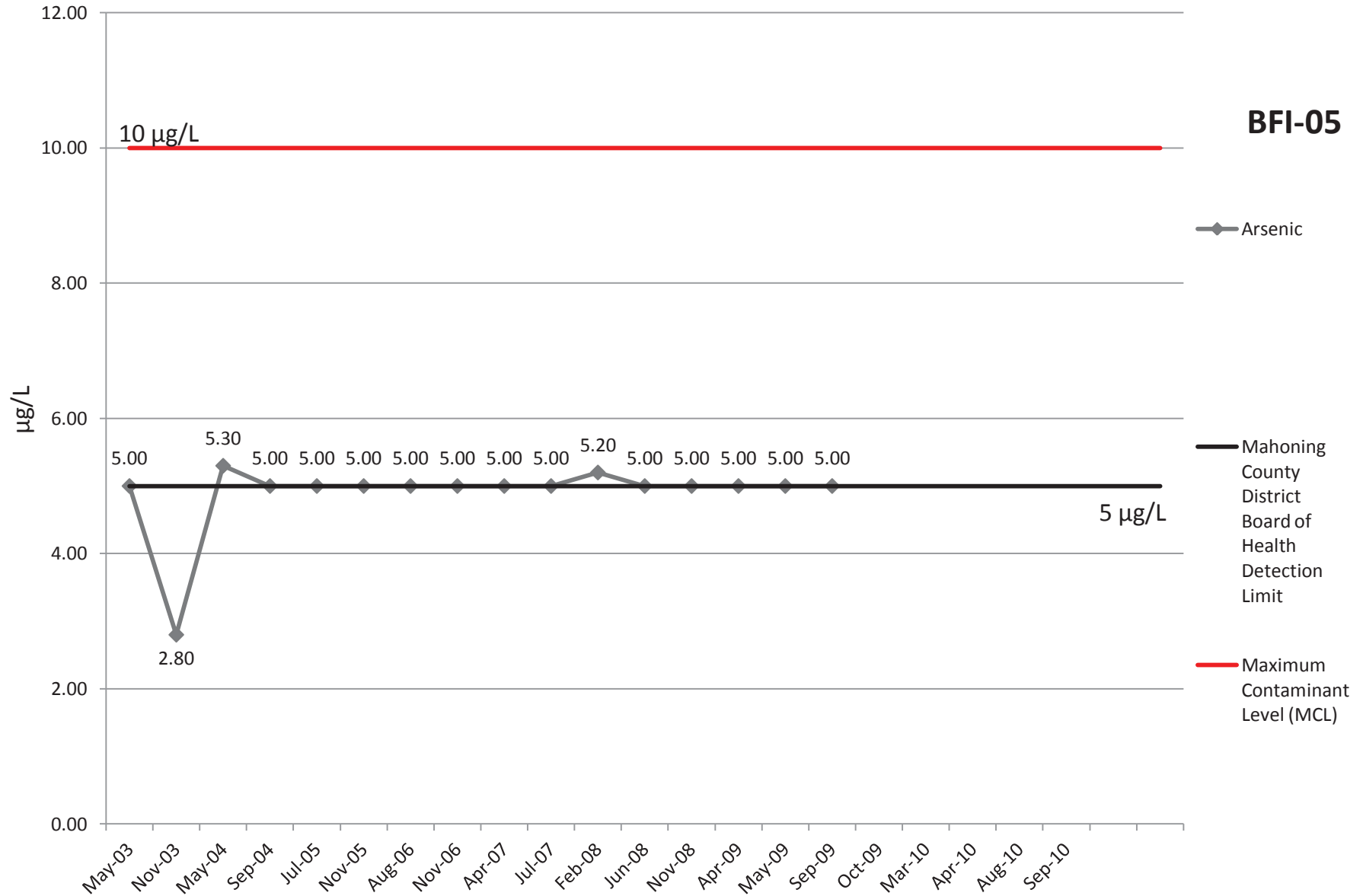


# Fluoride



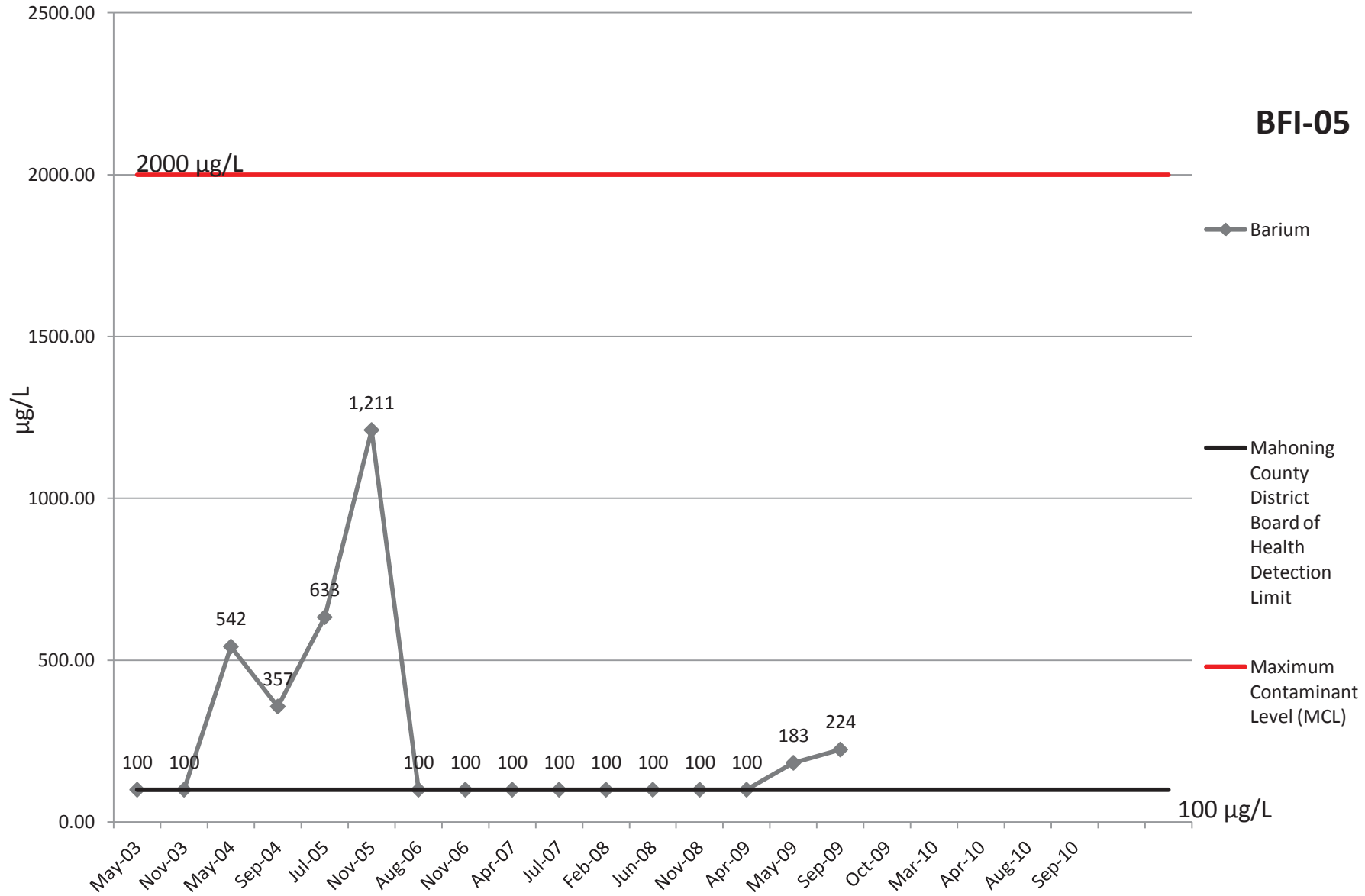
# Arsenic

**BFI-05**



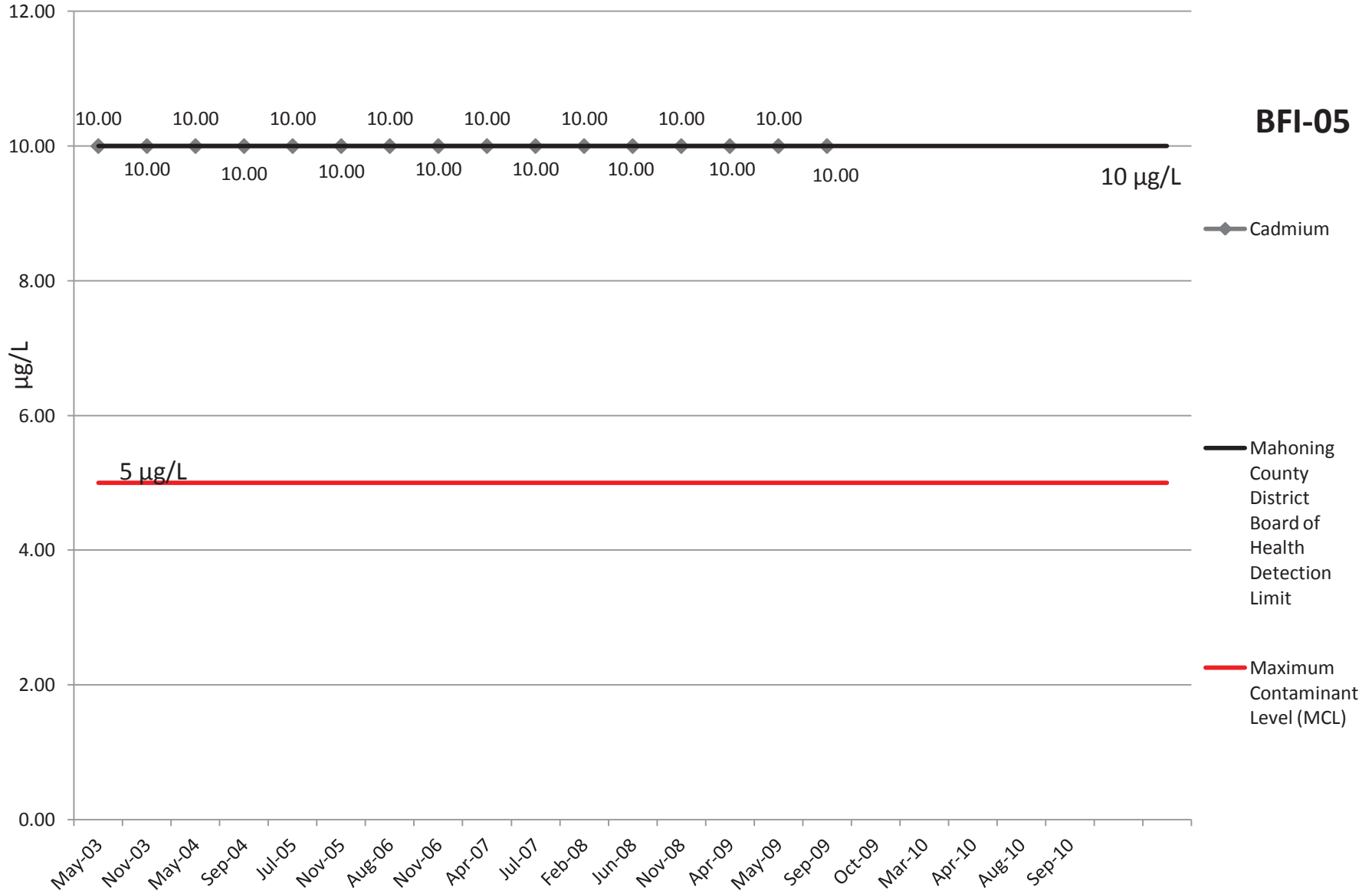
# Barium

**BFI-05**



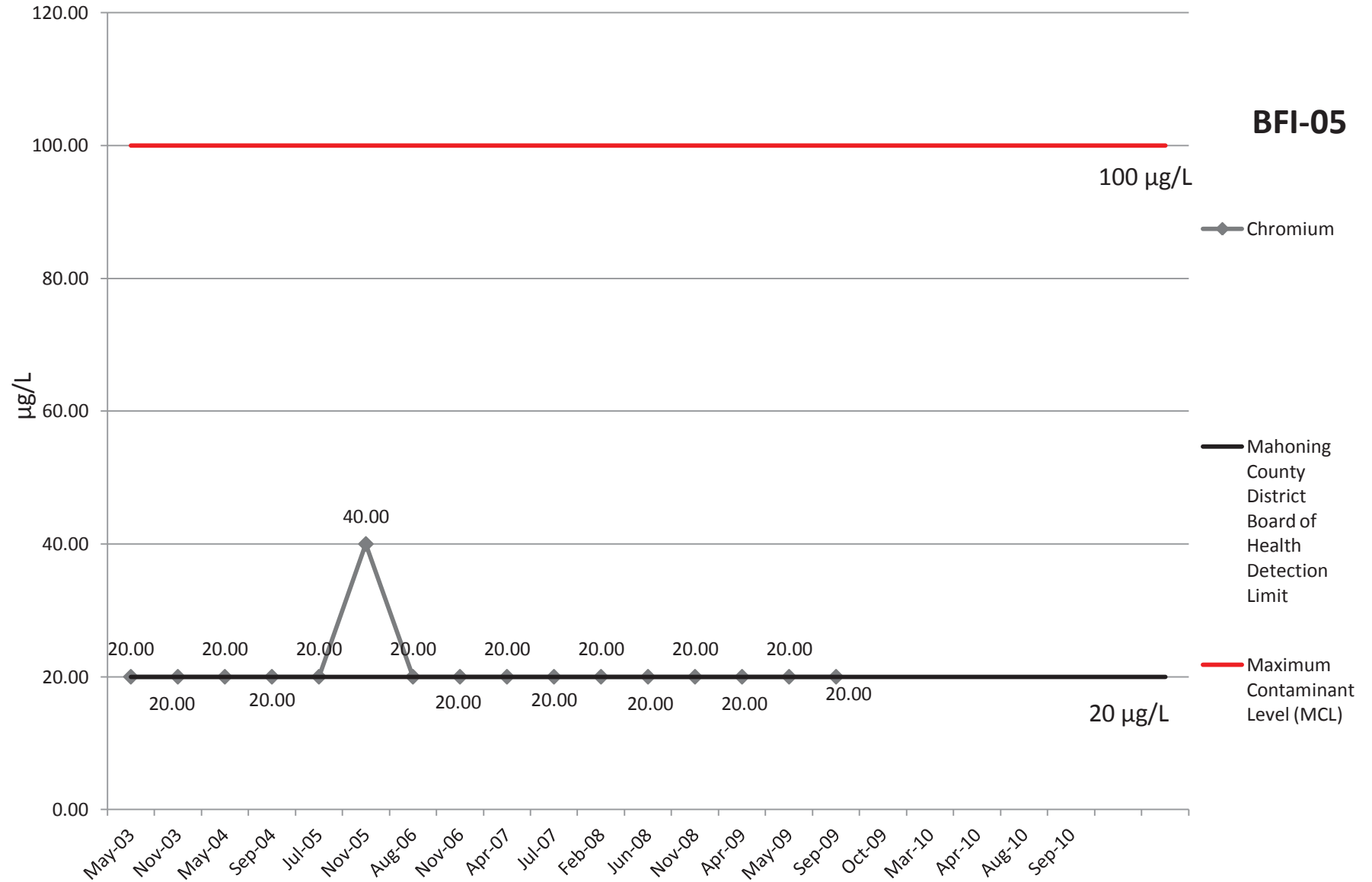
# Cadmium

**BFI-05**

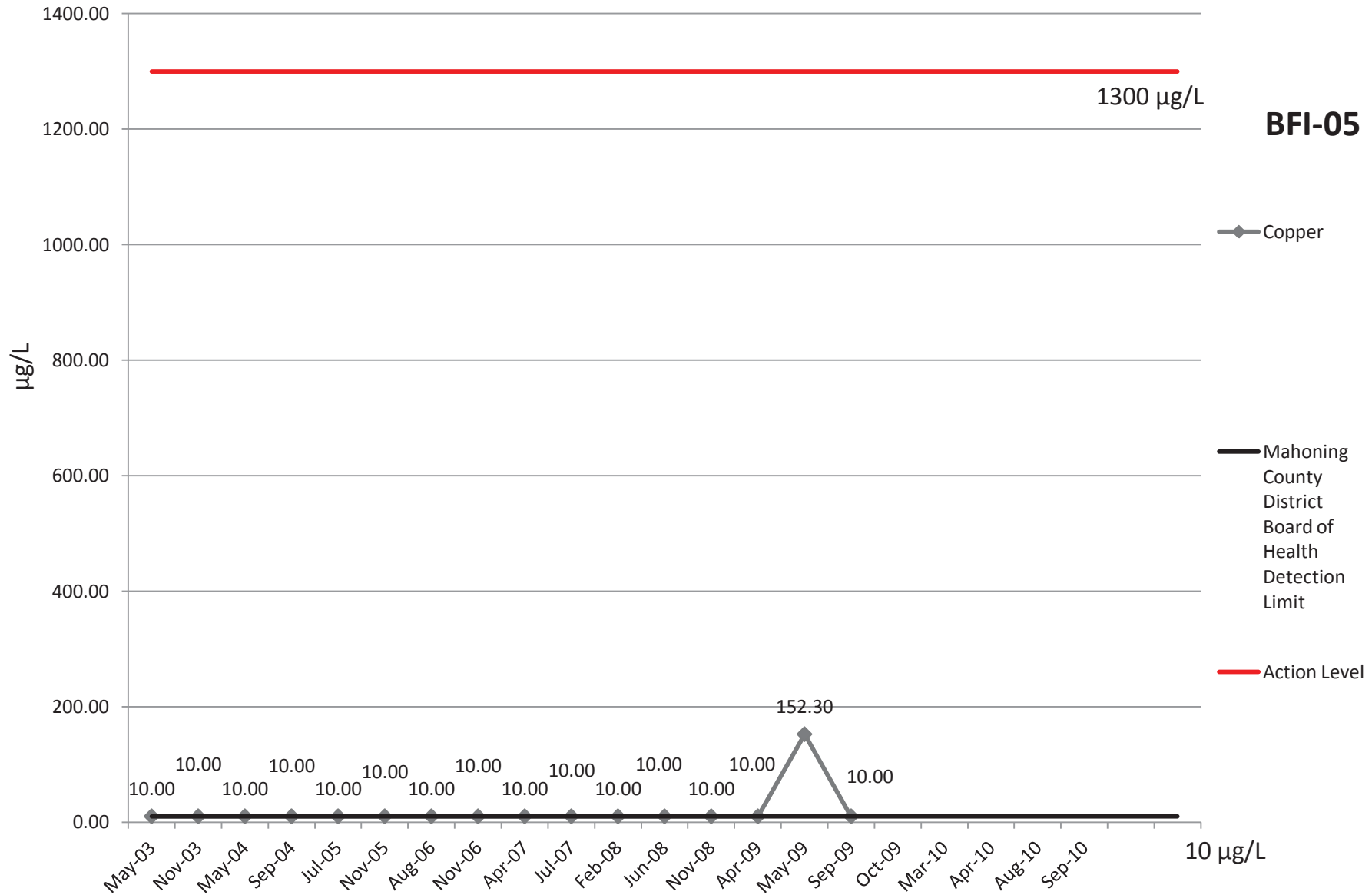




# Chromium

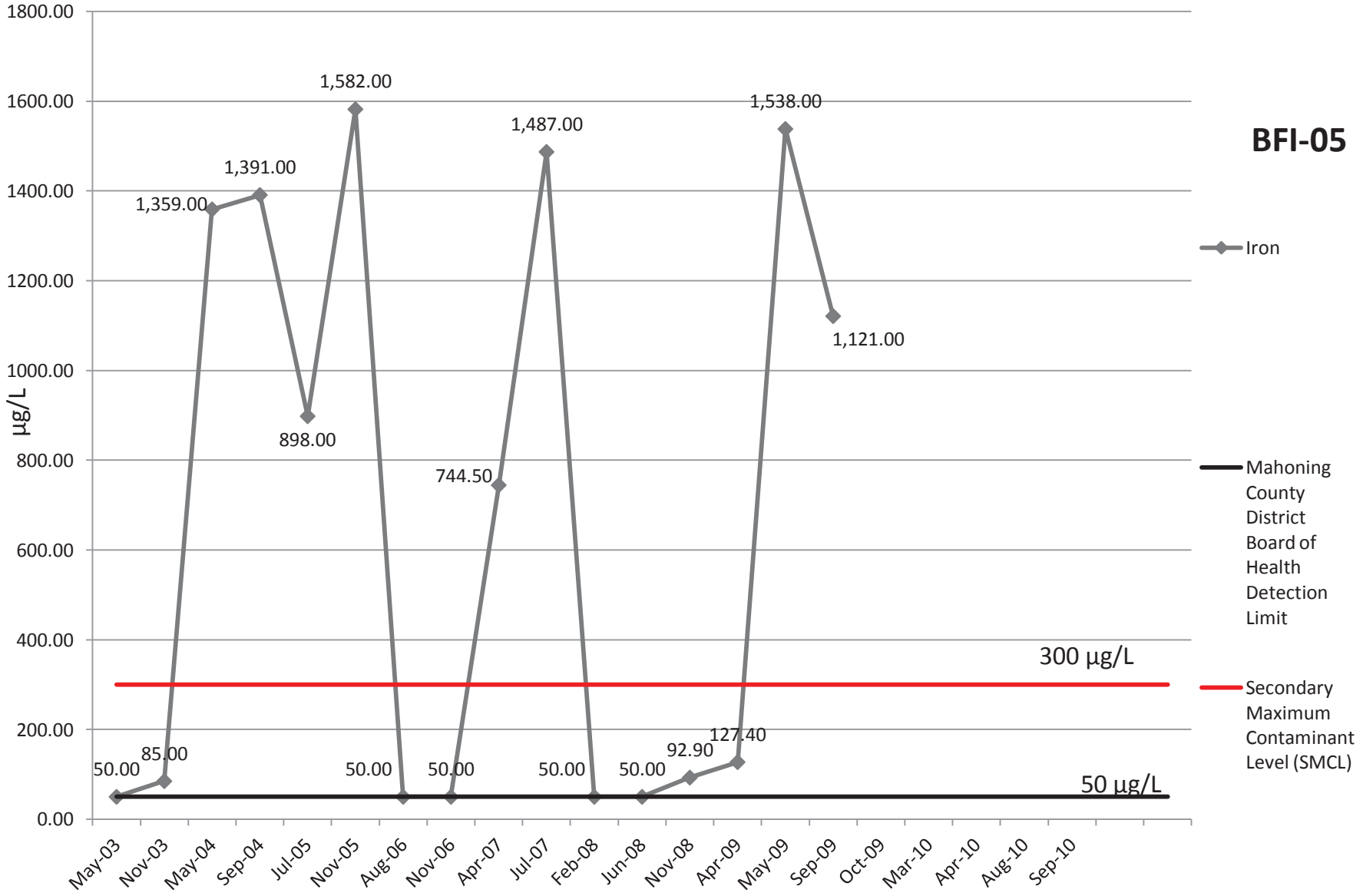


# Copper



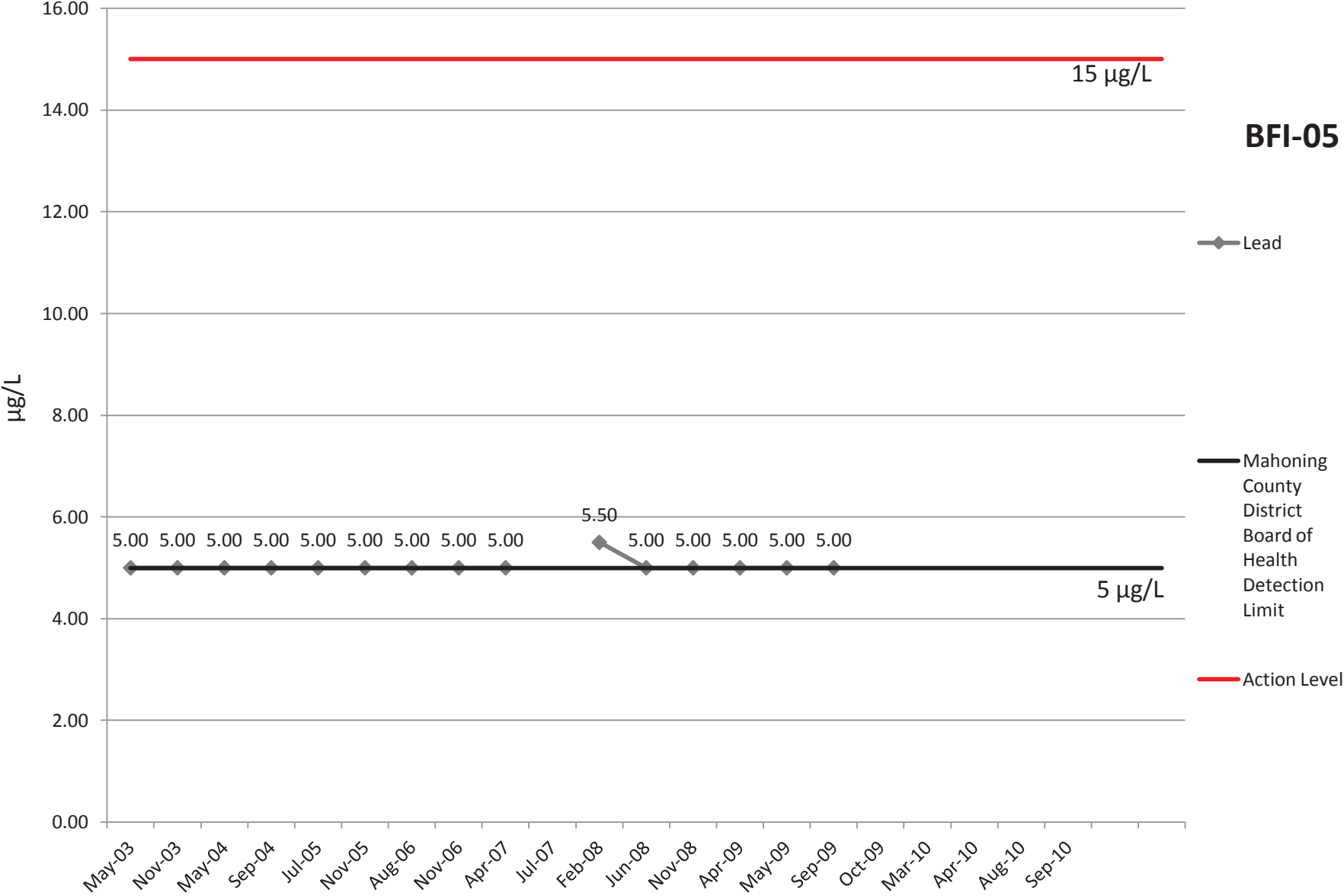
# Iron

**BFI-05**

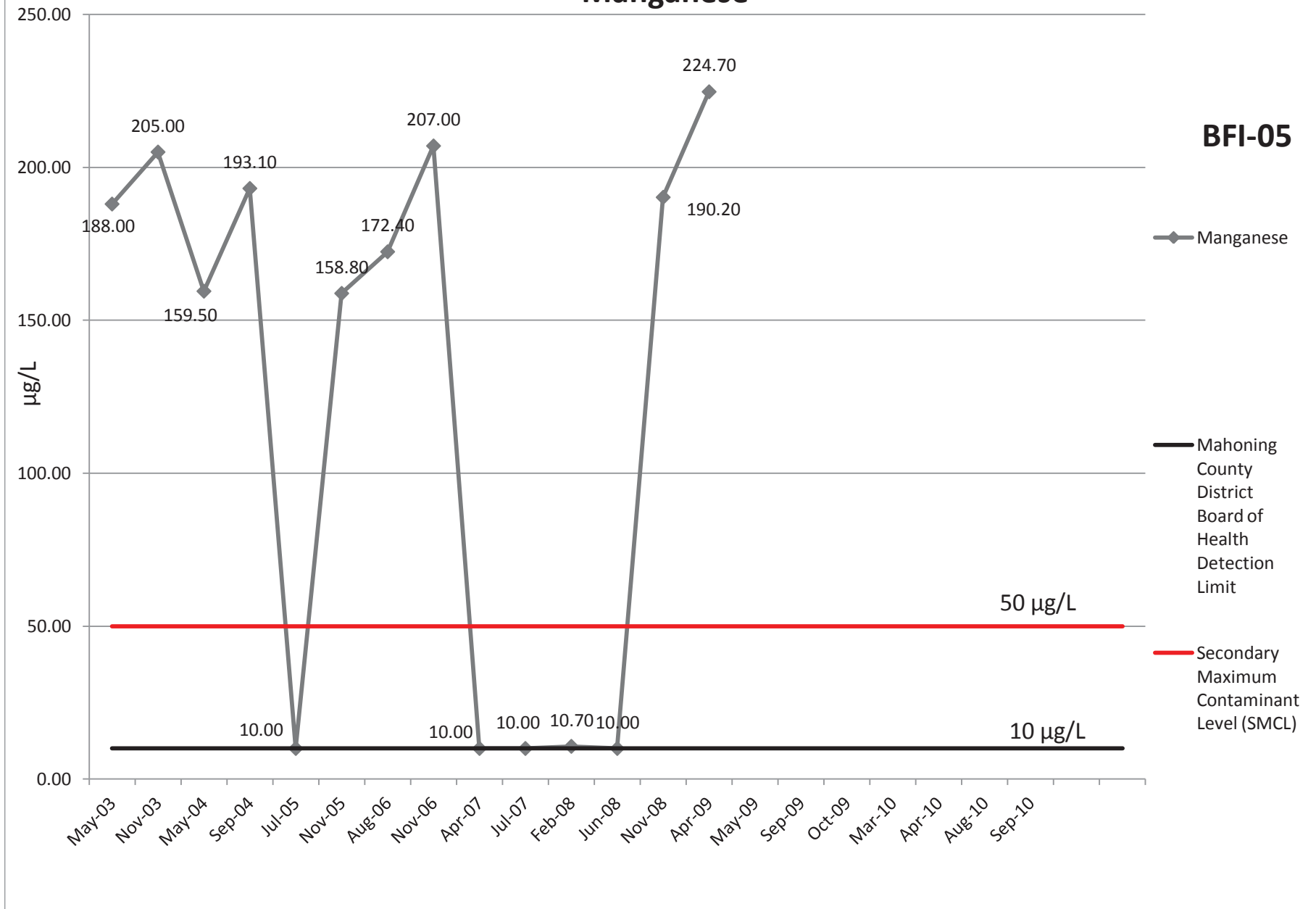


# Lead

**BFI-05**



# Manganese



# Mercury

**BFI-05**

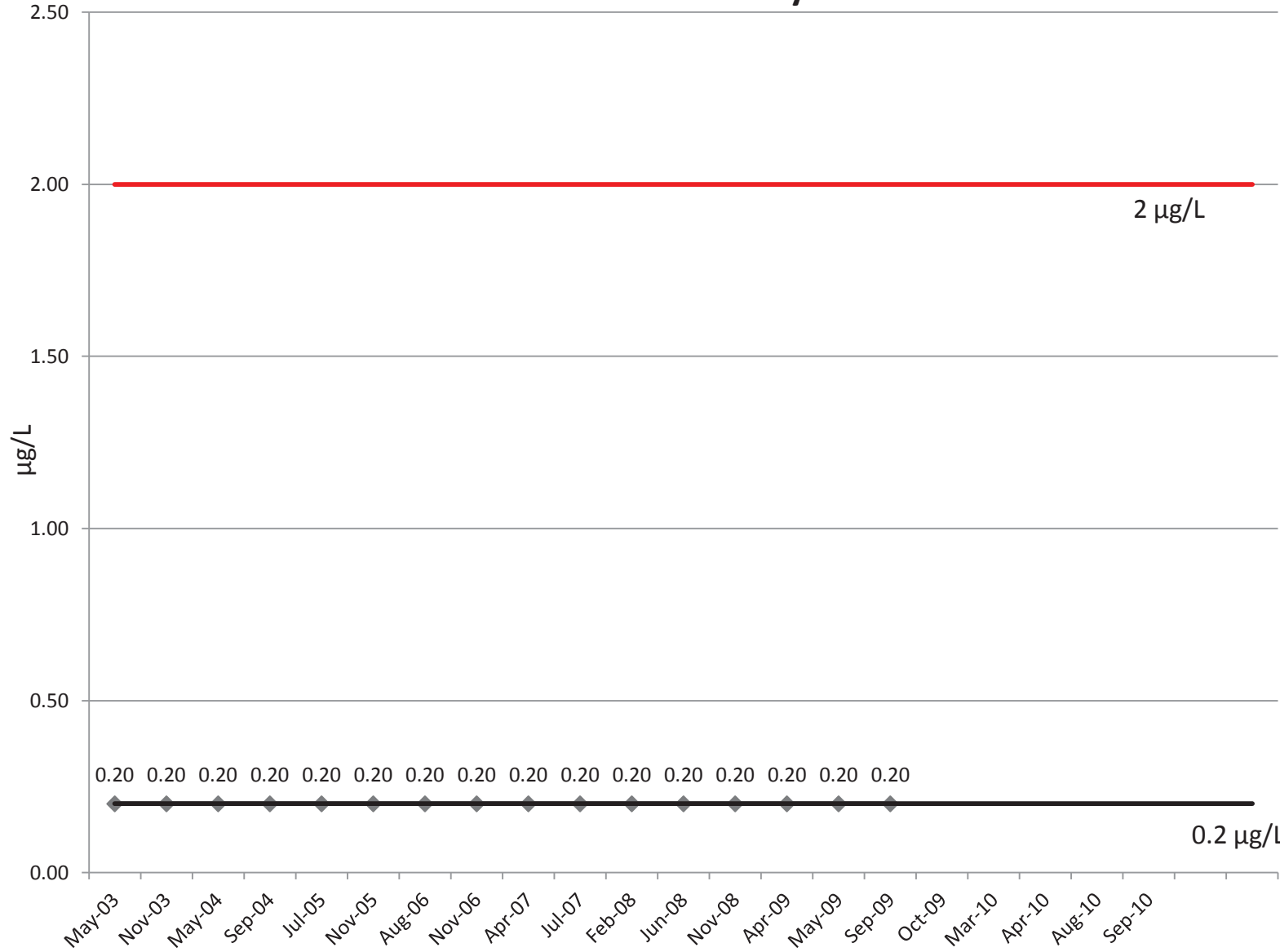
2 µg/L

Mercury

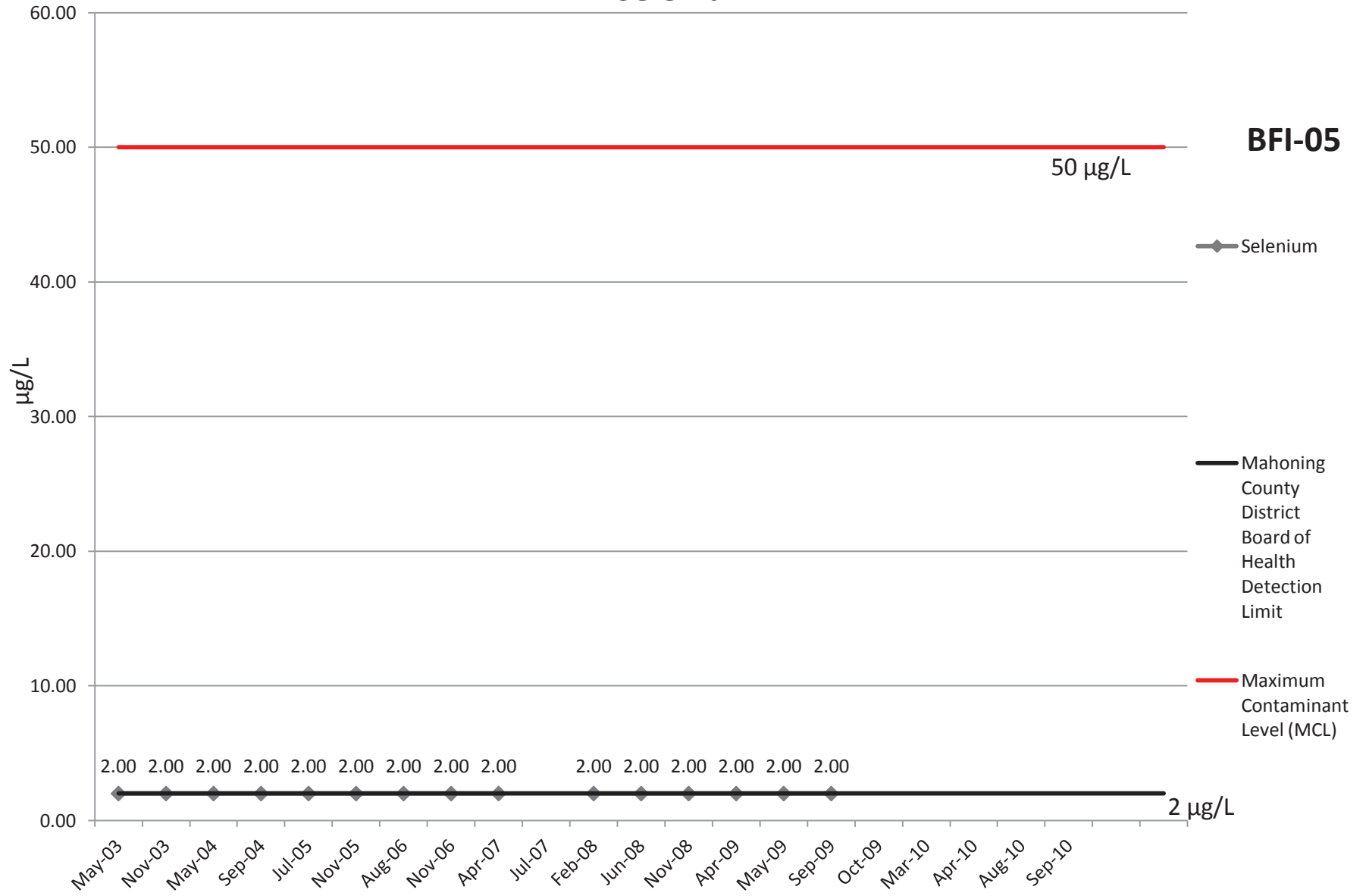
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

0.2 µg/L

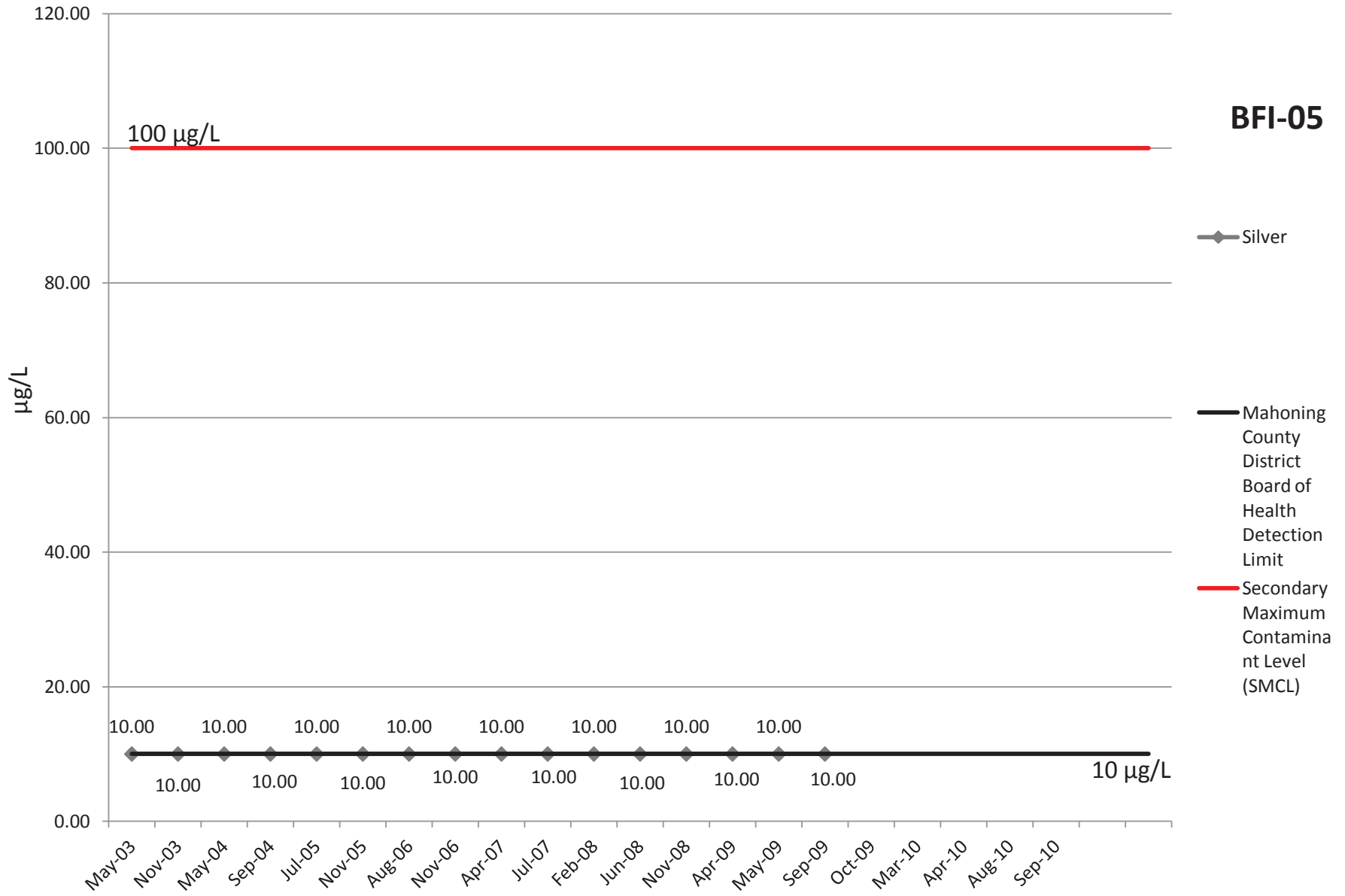


# Selenium



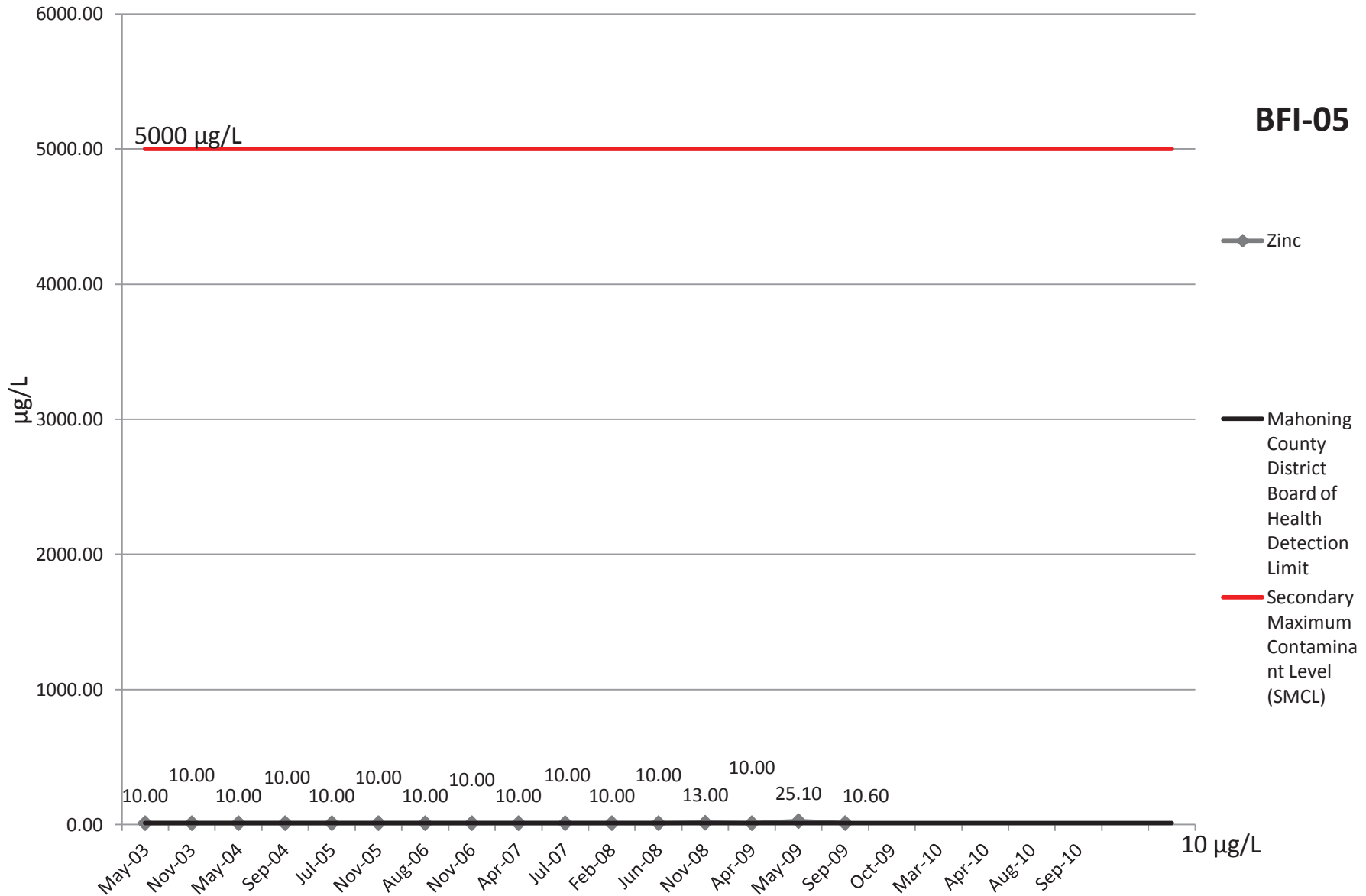
# Silver

**BFI-05**

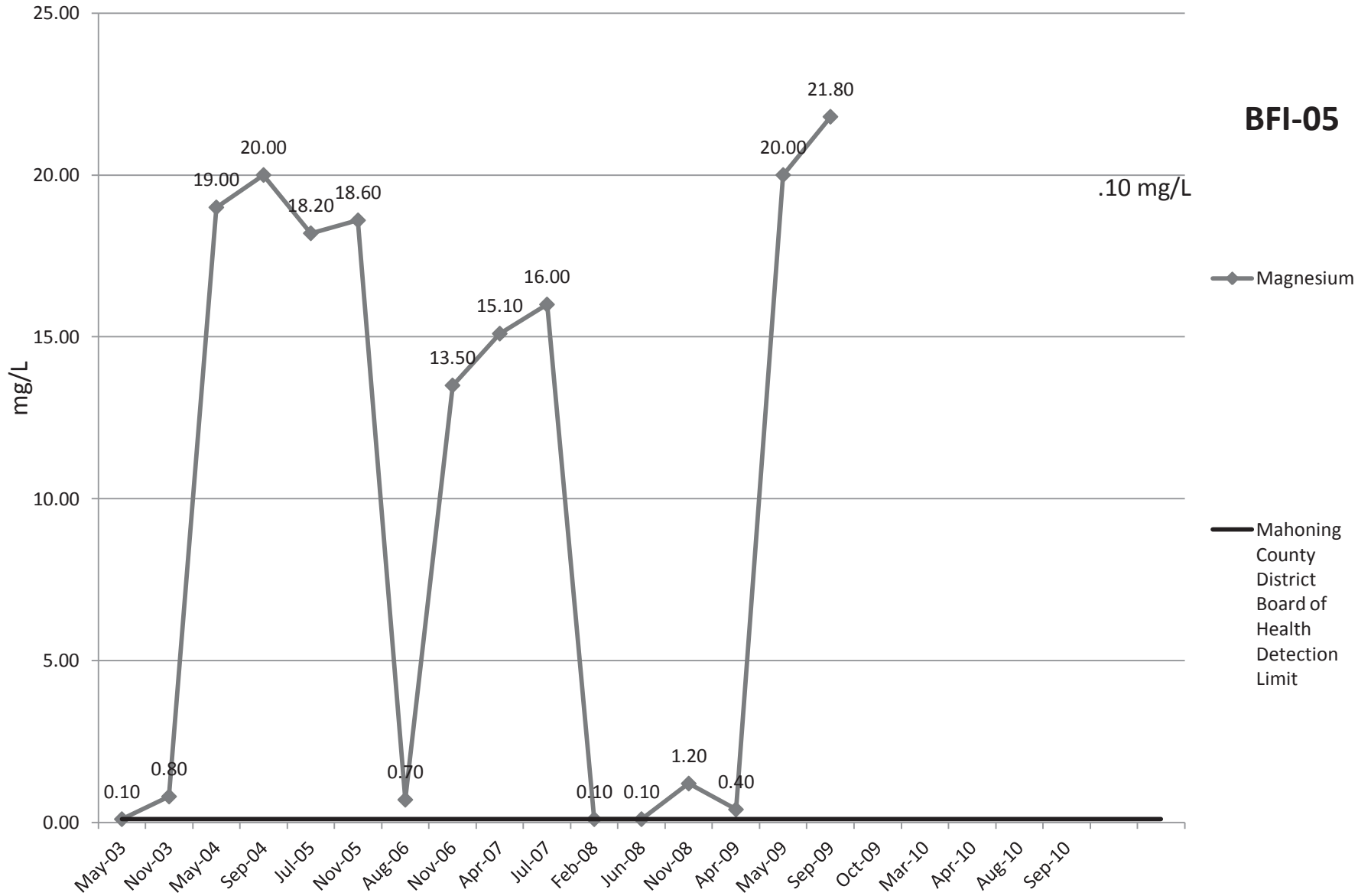




# Zinc

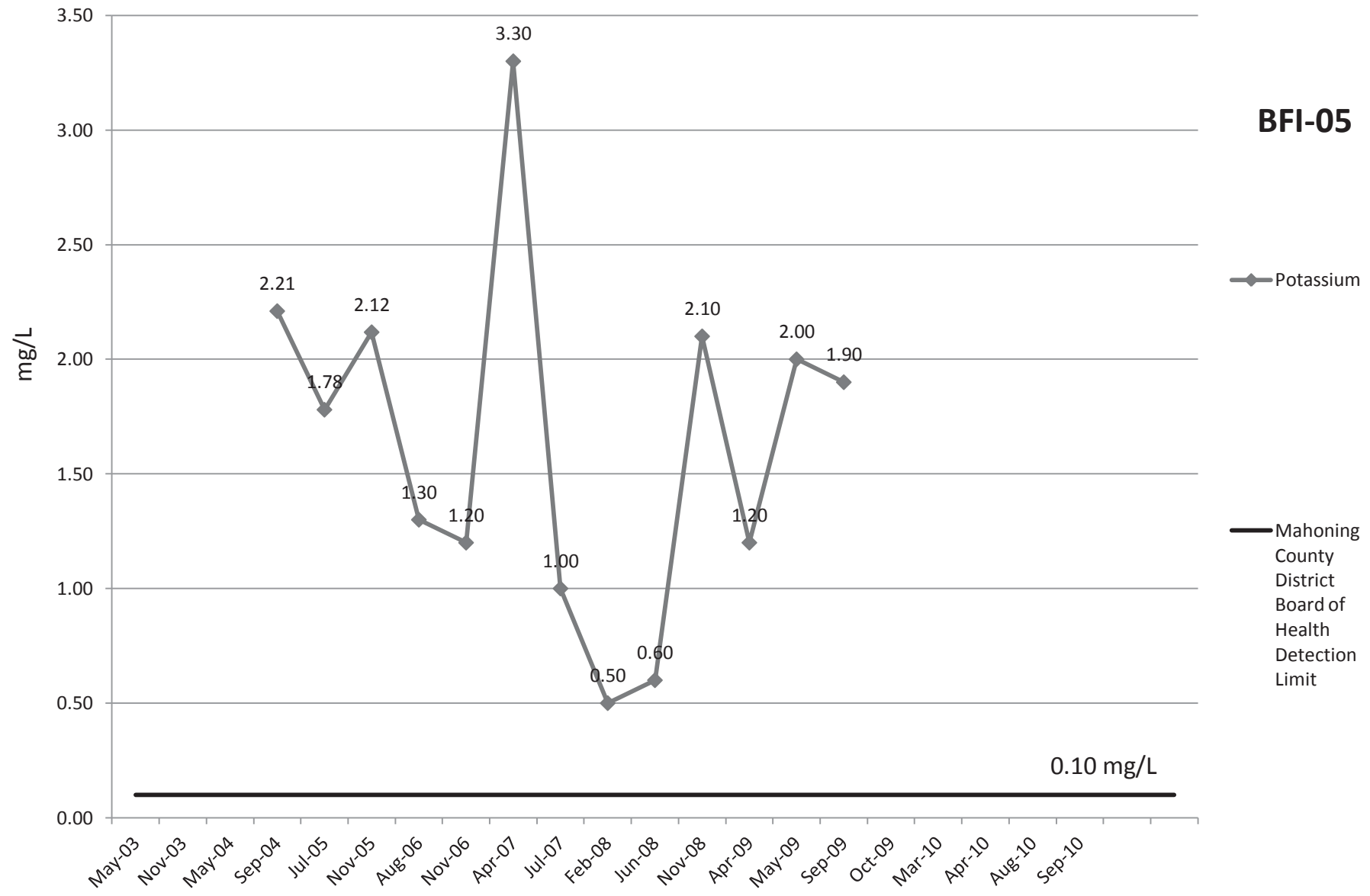


# Magnesium



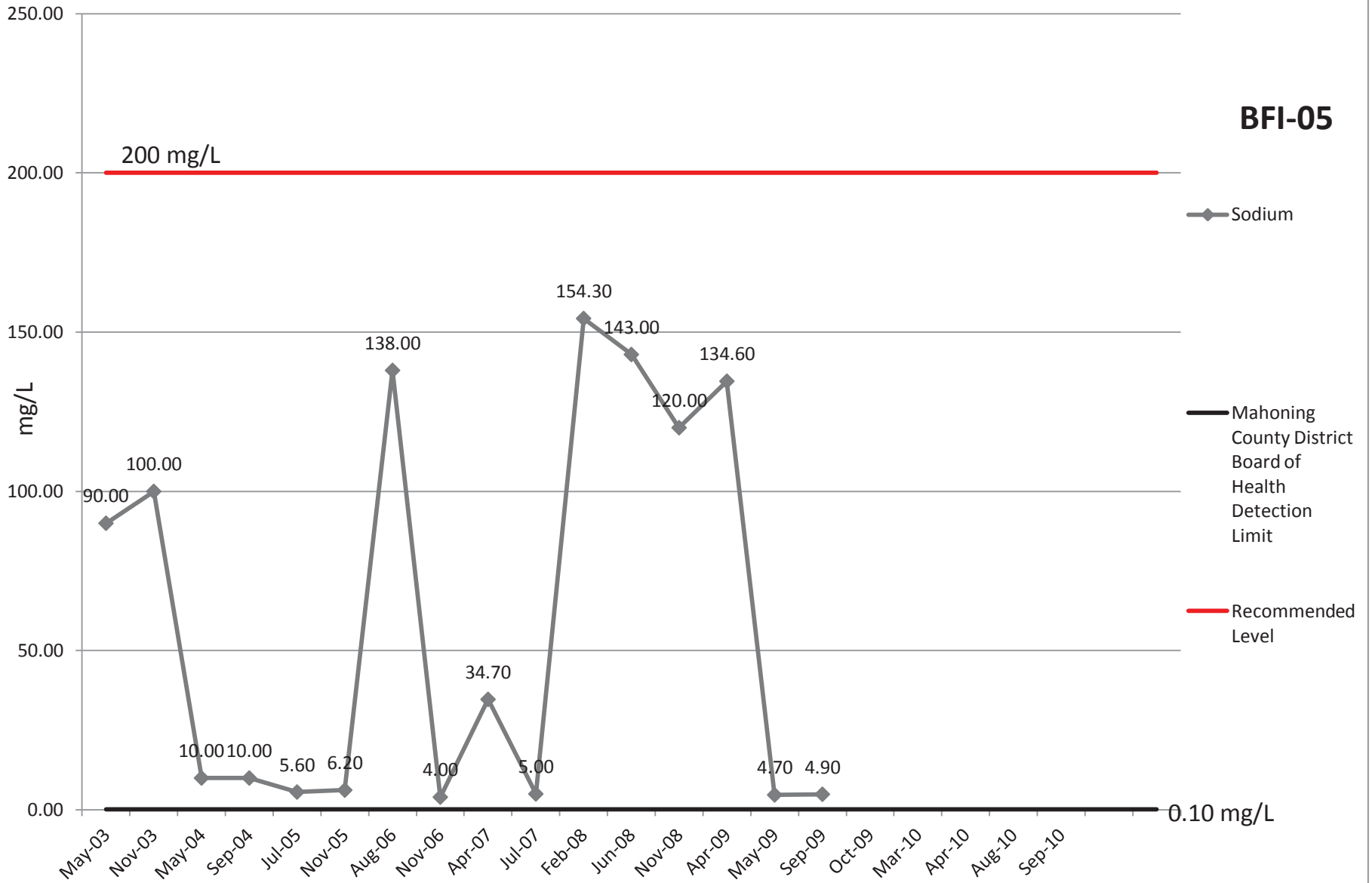
# Potassium

**BFI-05**

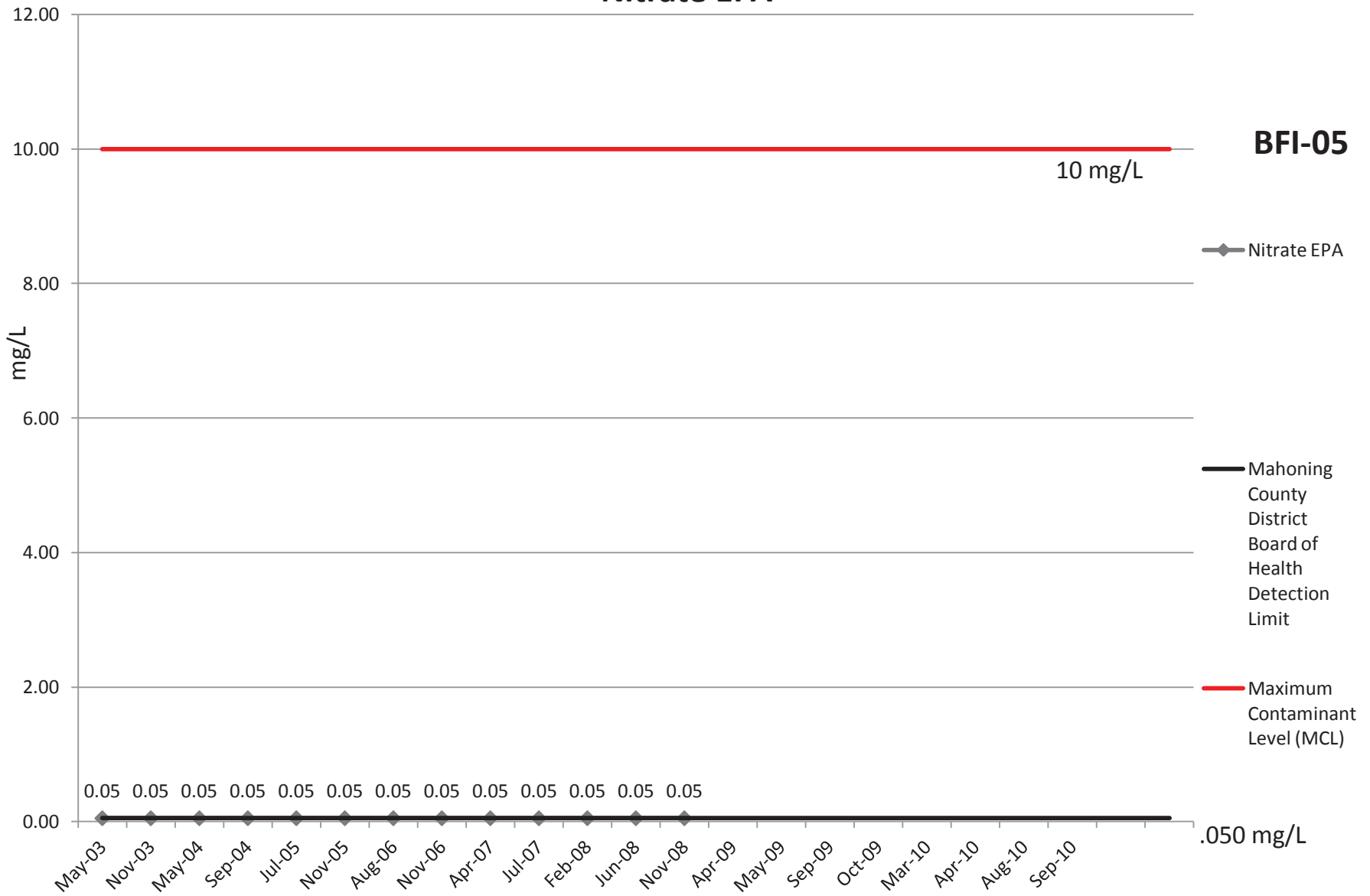


# Sodium

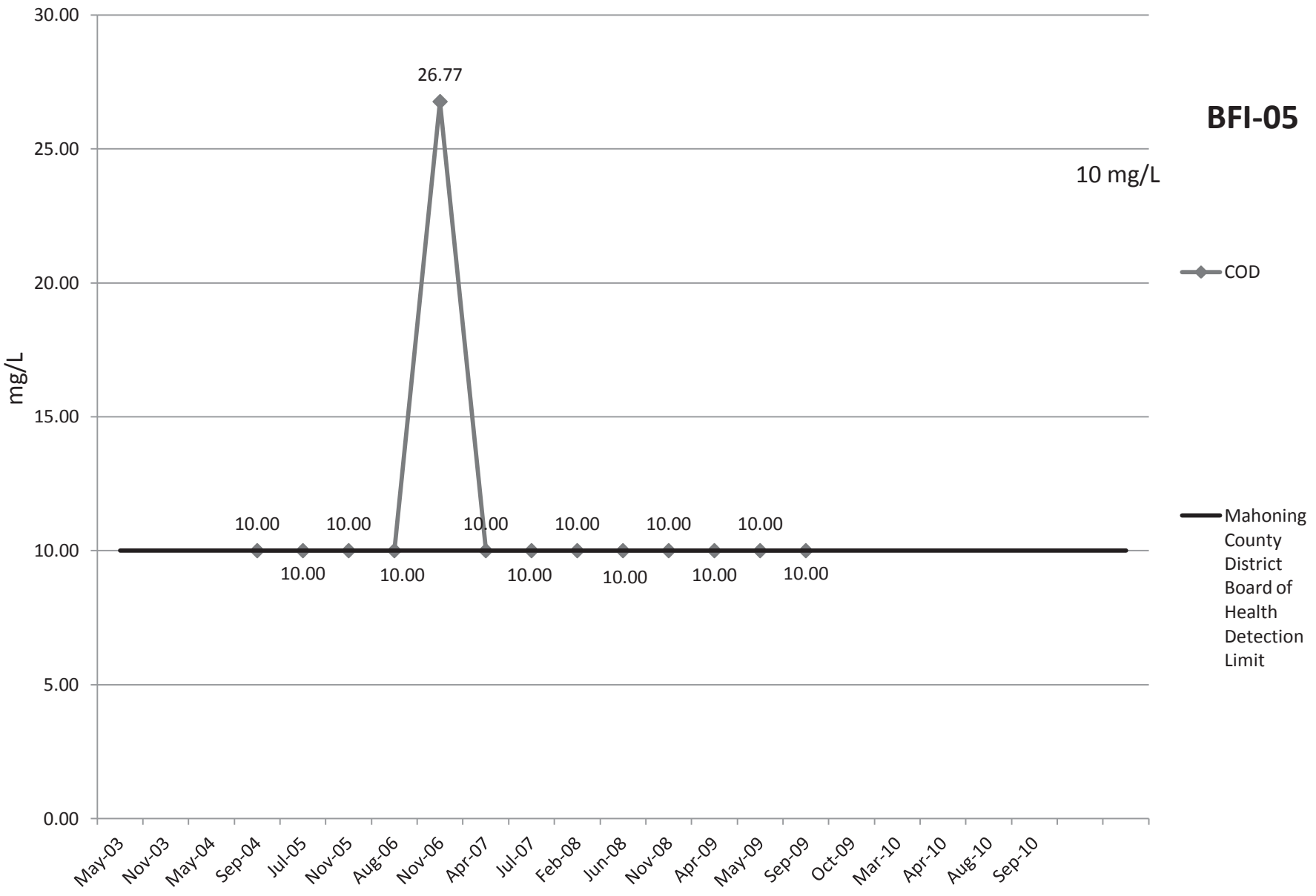
**BFI-05**



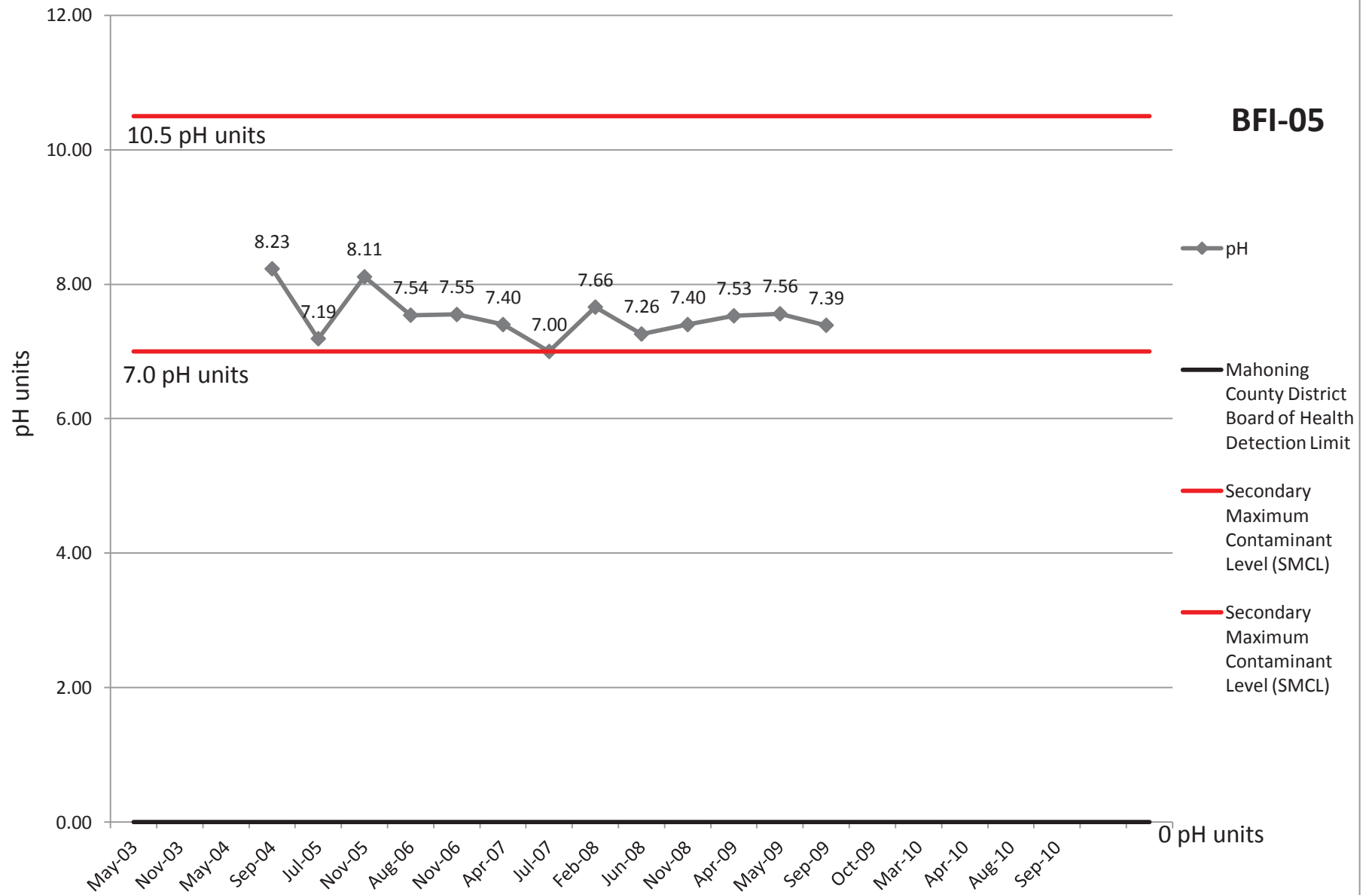
# Nitrate EPA



# COD

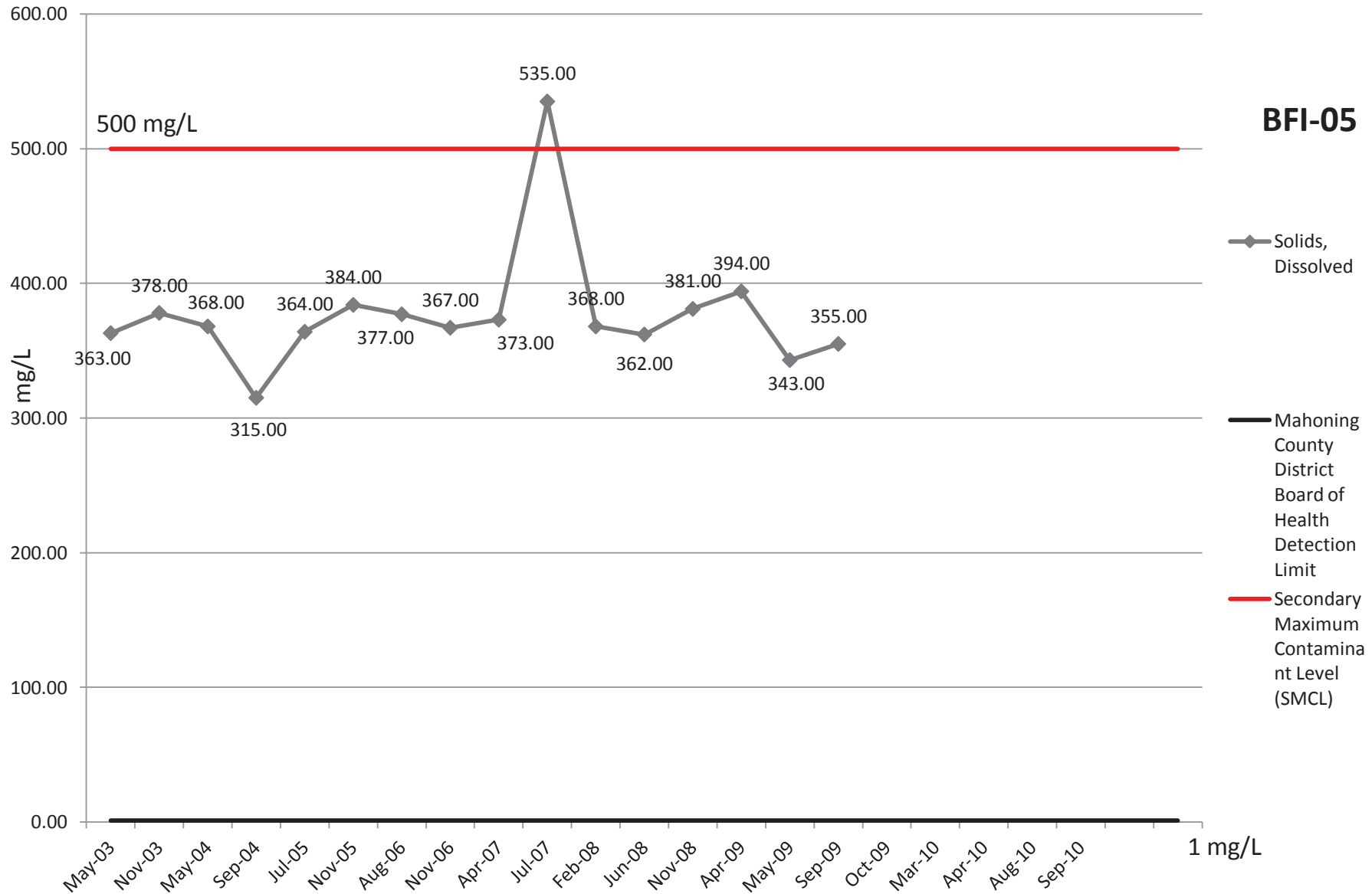


# pH



# Solids, Dissolved

**BFI-05**



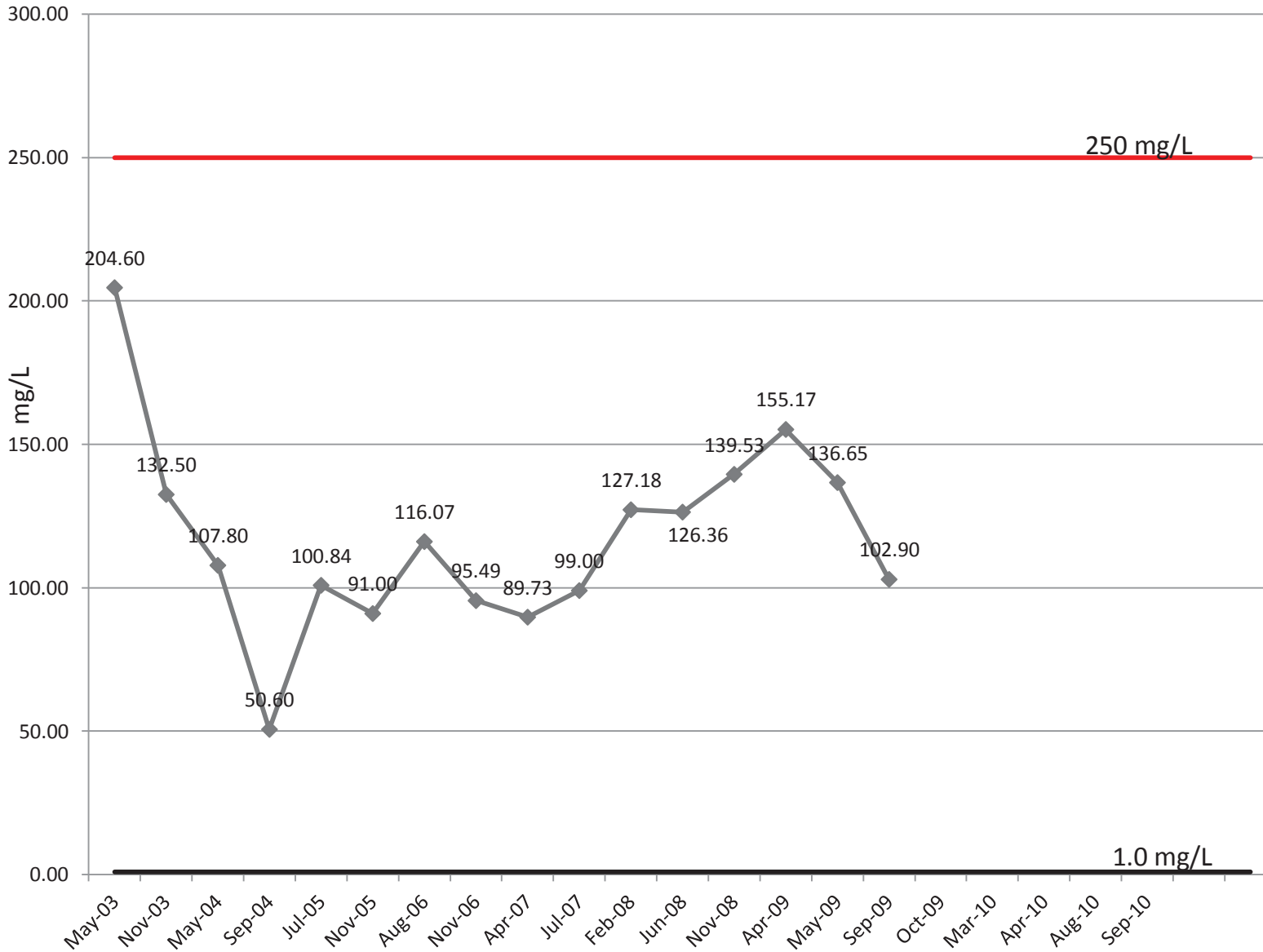


# Sulfate

**BFI-05**

250 mg/L

1.0 mg/L



◆ Sulfate

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

# Bacteria

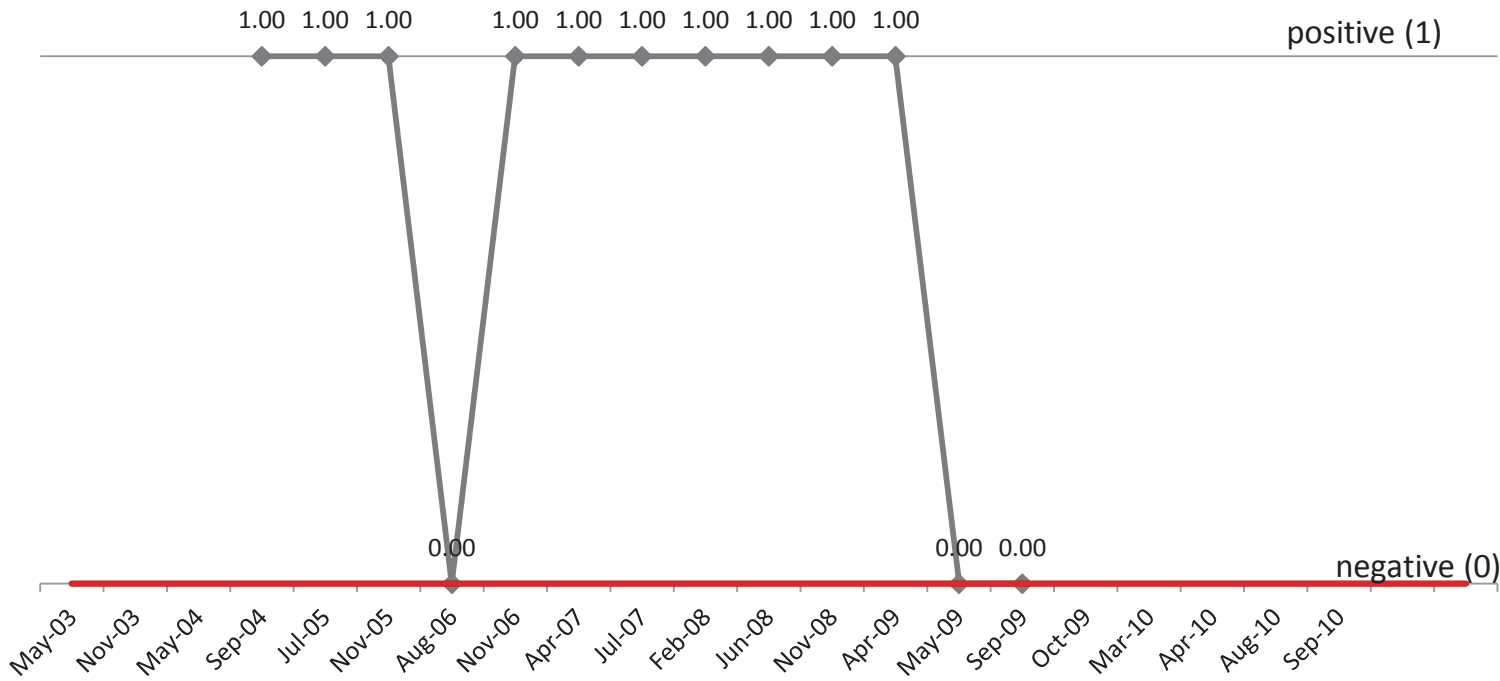
## BFI-05

Positive/Negative

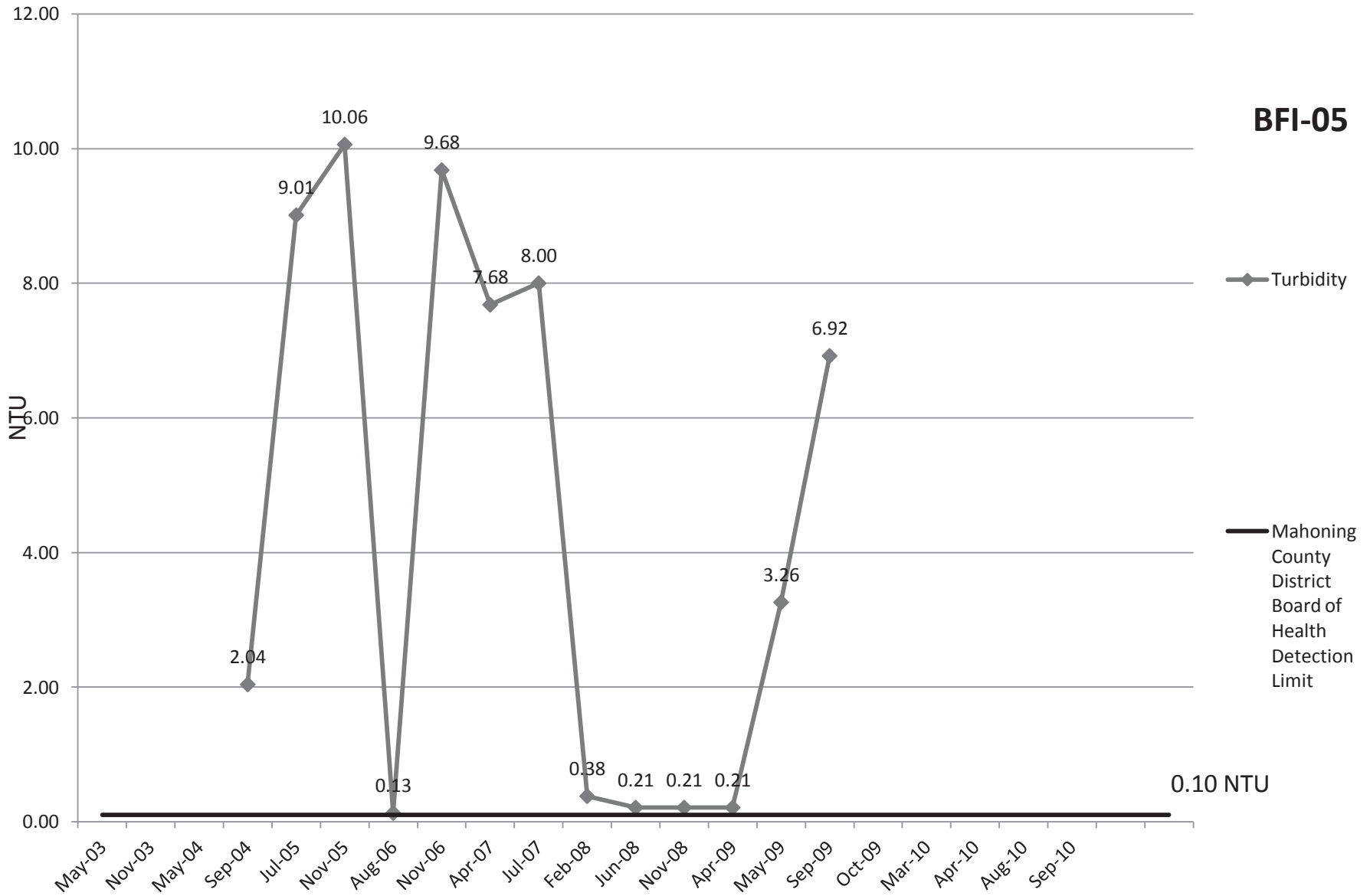
◆ Bacteria

— Mahoning County District Board of Health Detection Limit

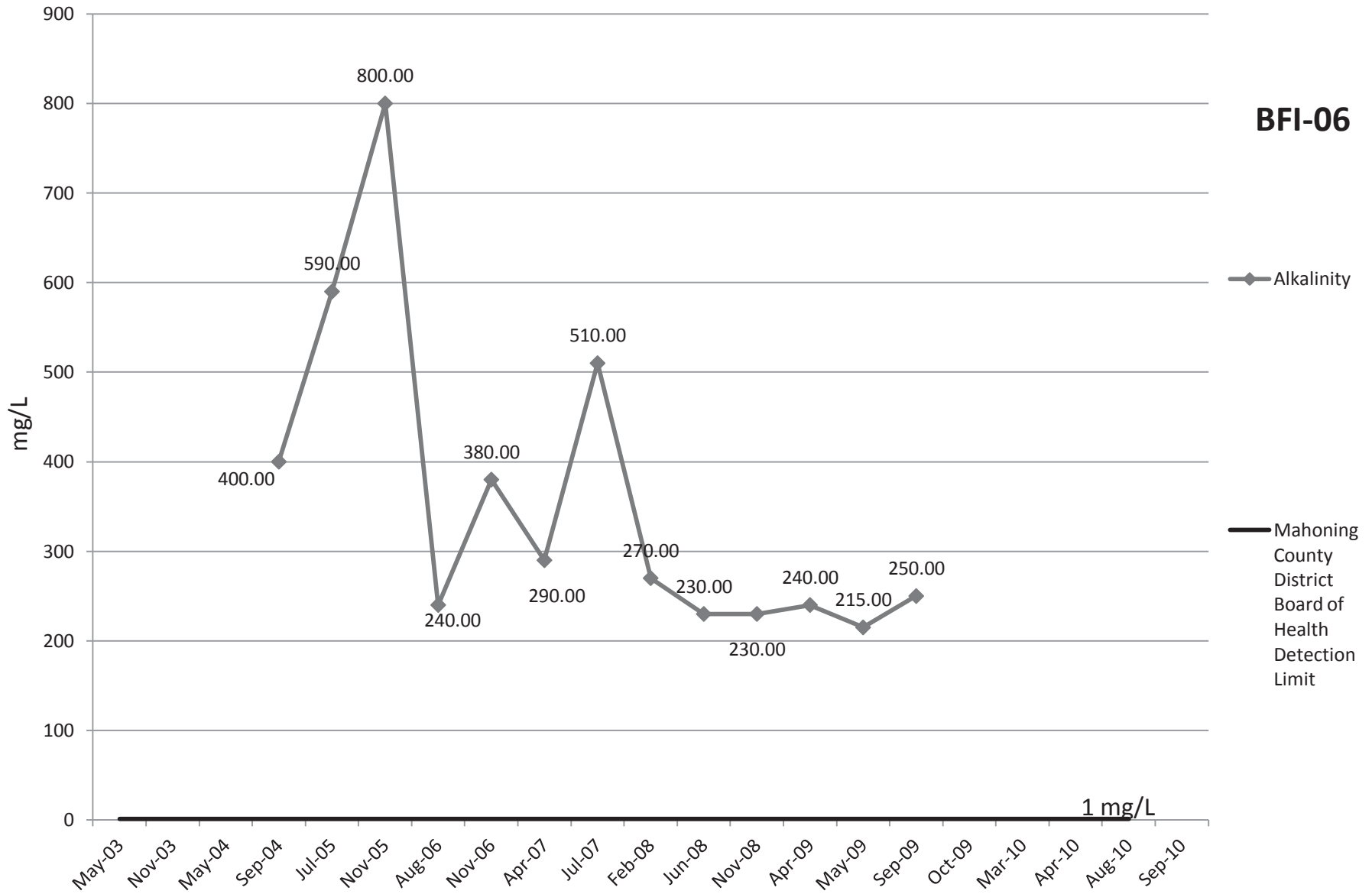
— Maximum Contaminant Level (MCL)



# Turbidity

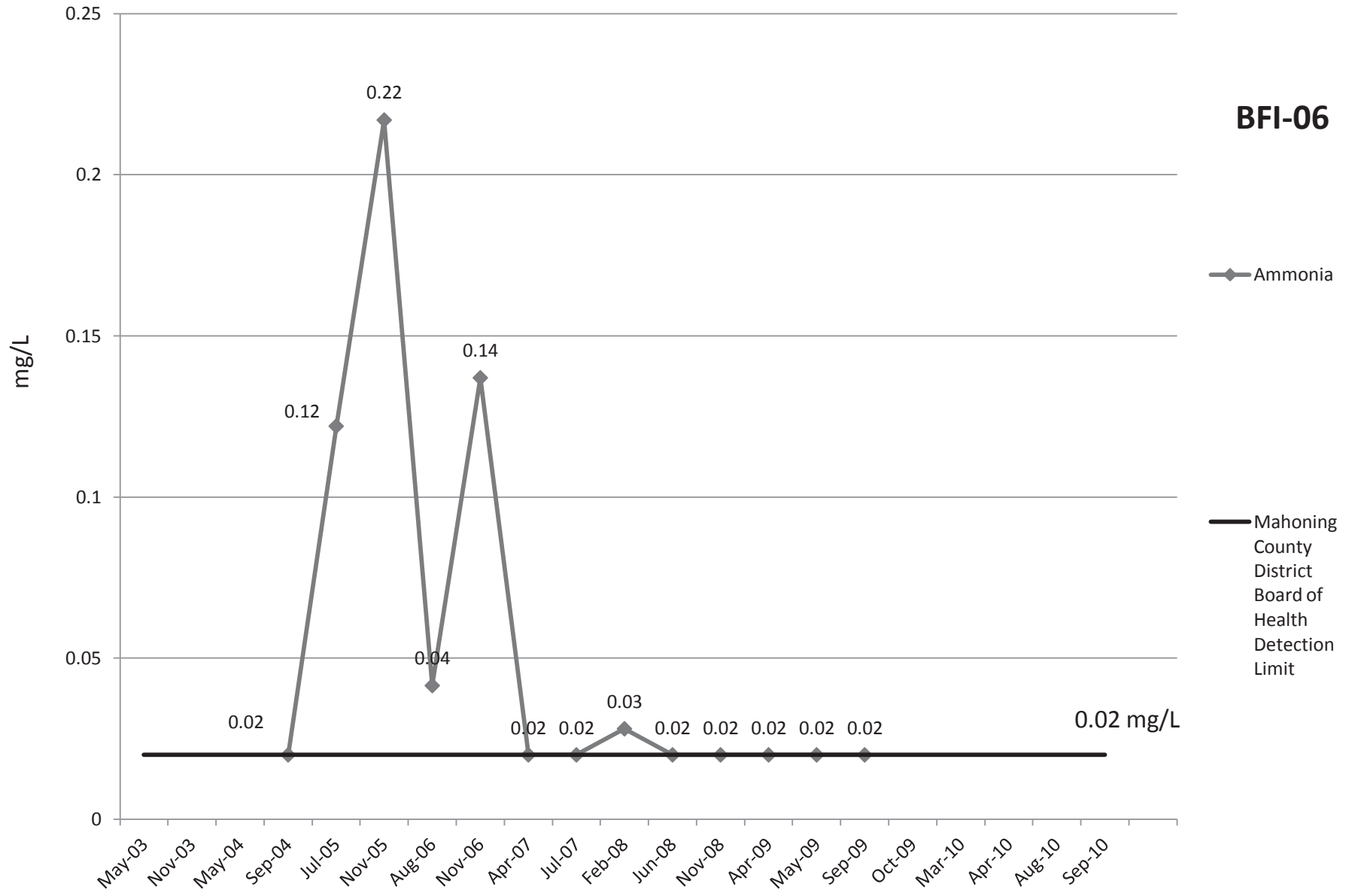


# Alkalinity



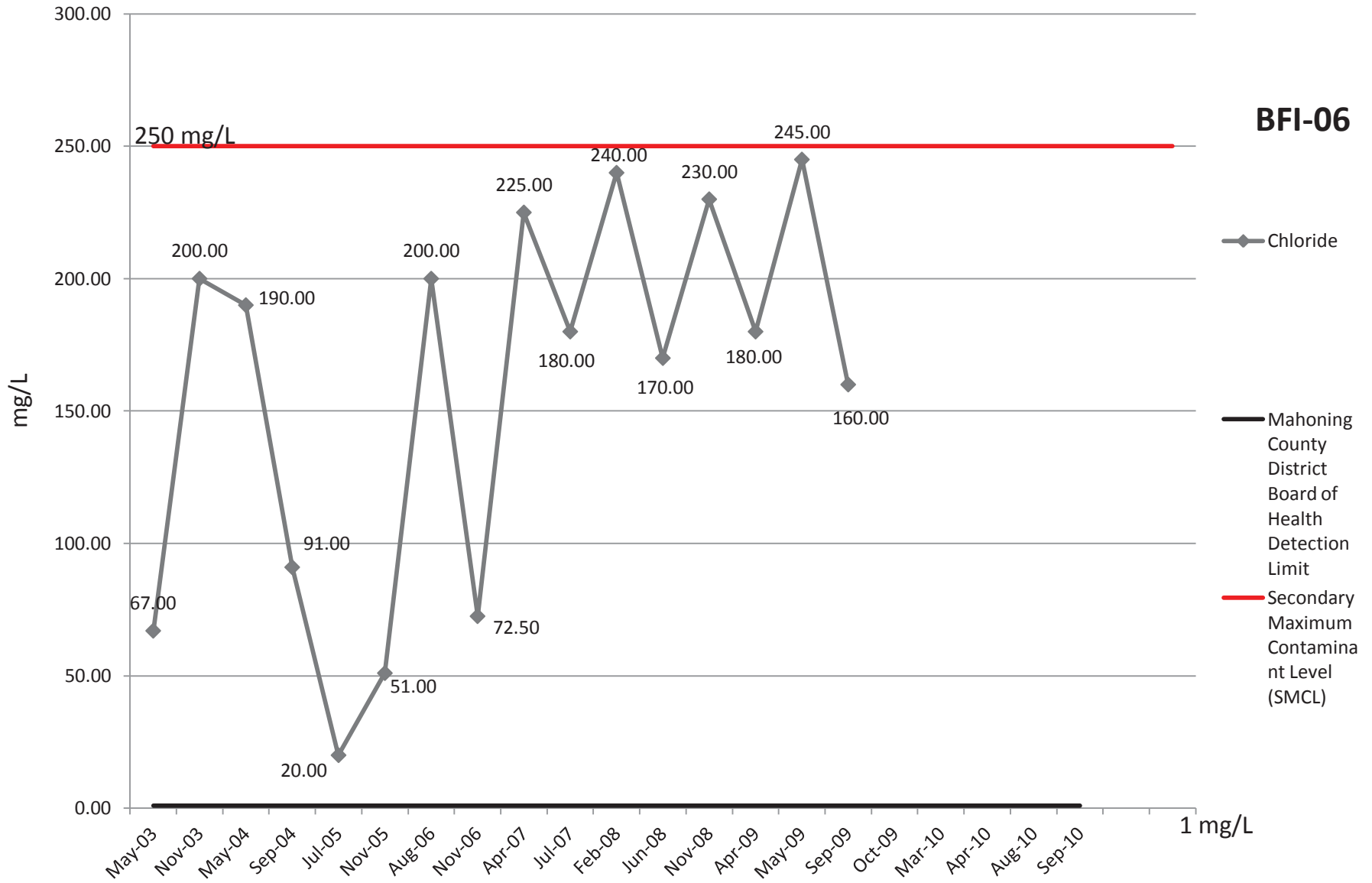
# Ammonia

**BFI-06**



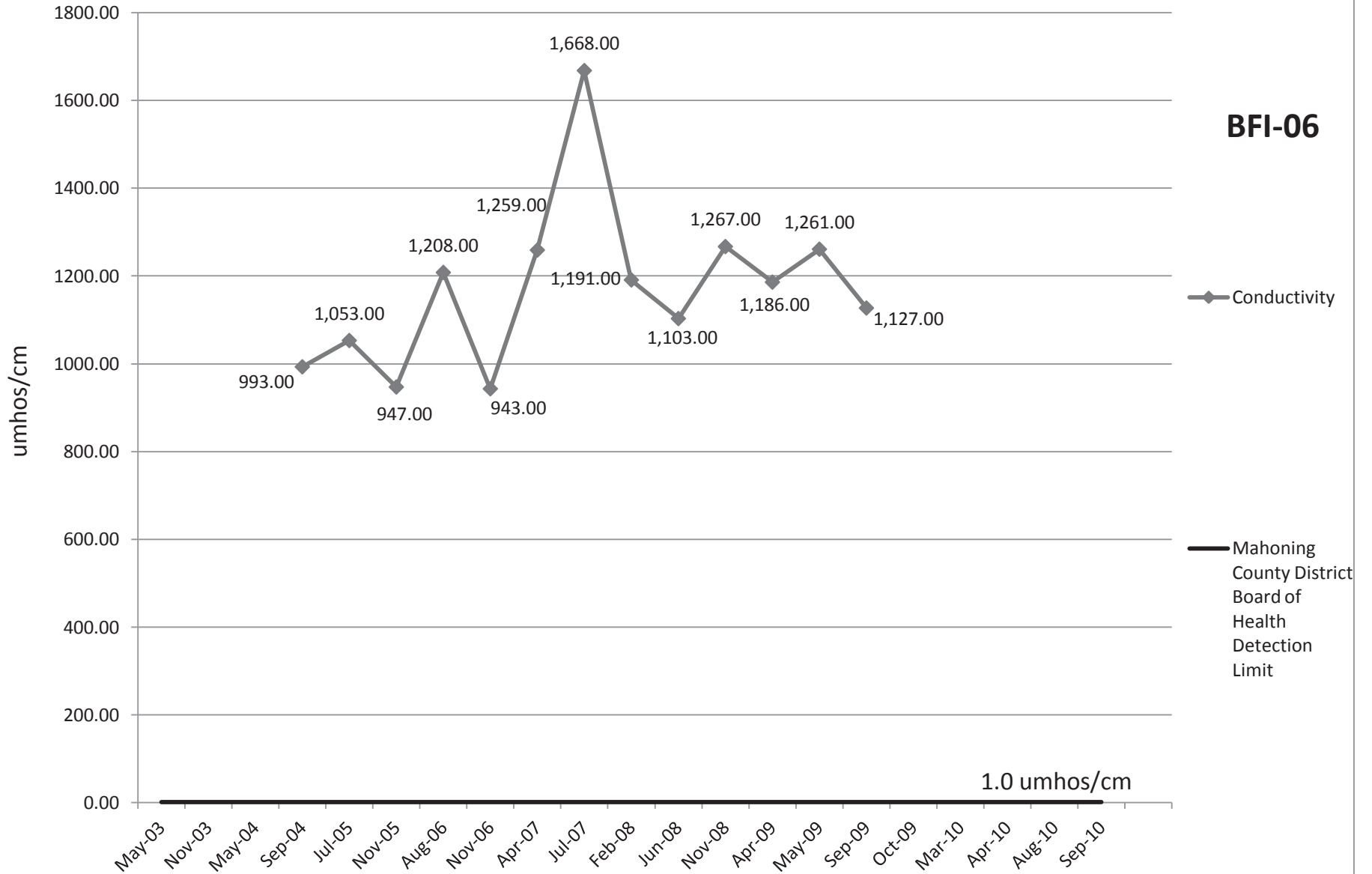
# Chloride

**BFI-06**

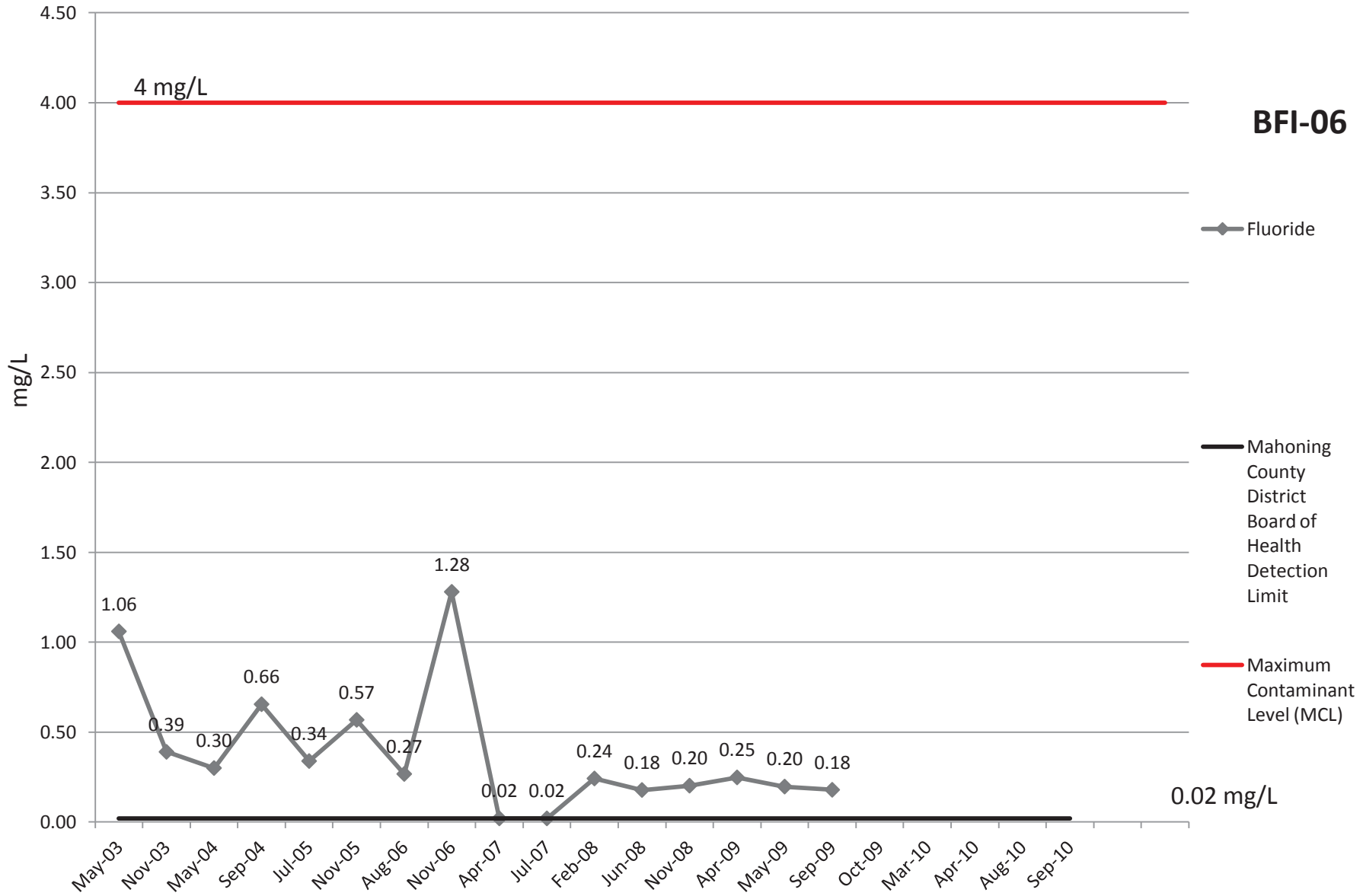


# Conductivity

**BFI-06**



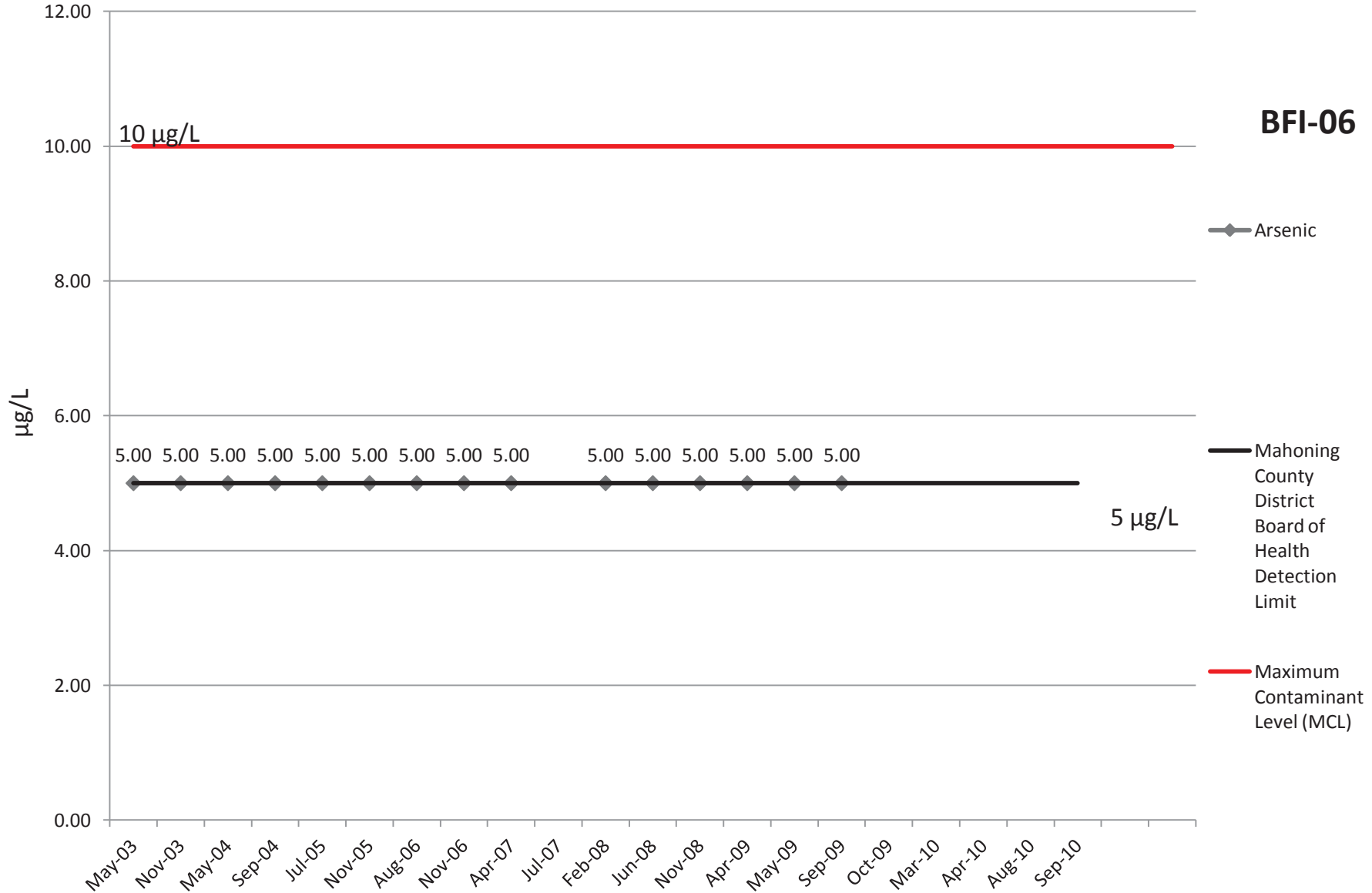
# Fluoride





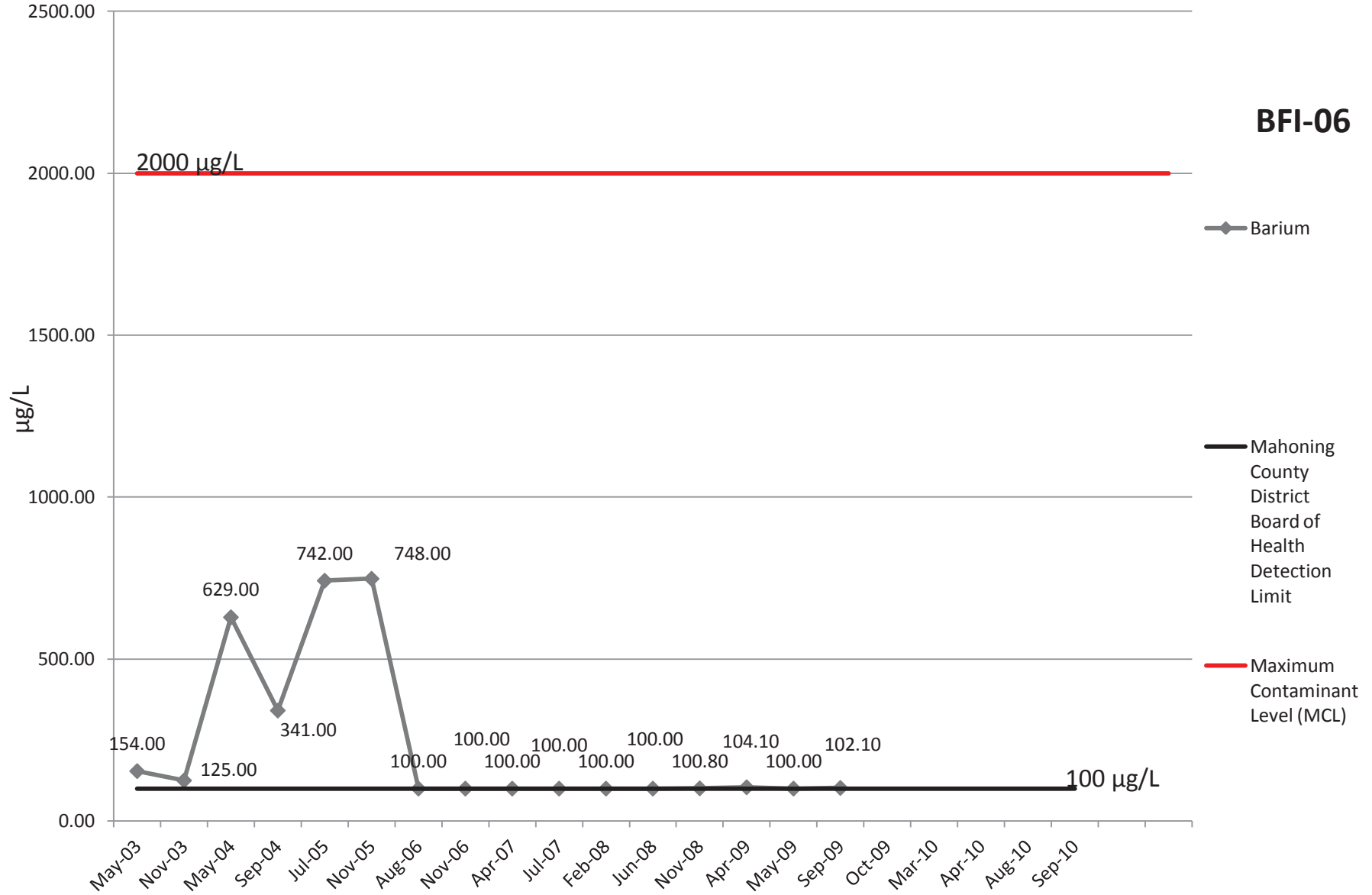
# Arsenic

**BFI-06**



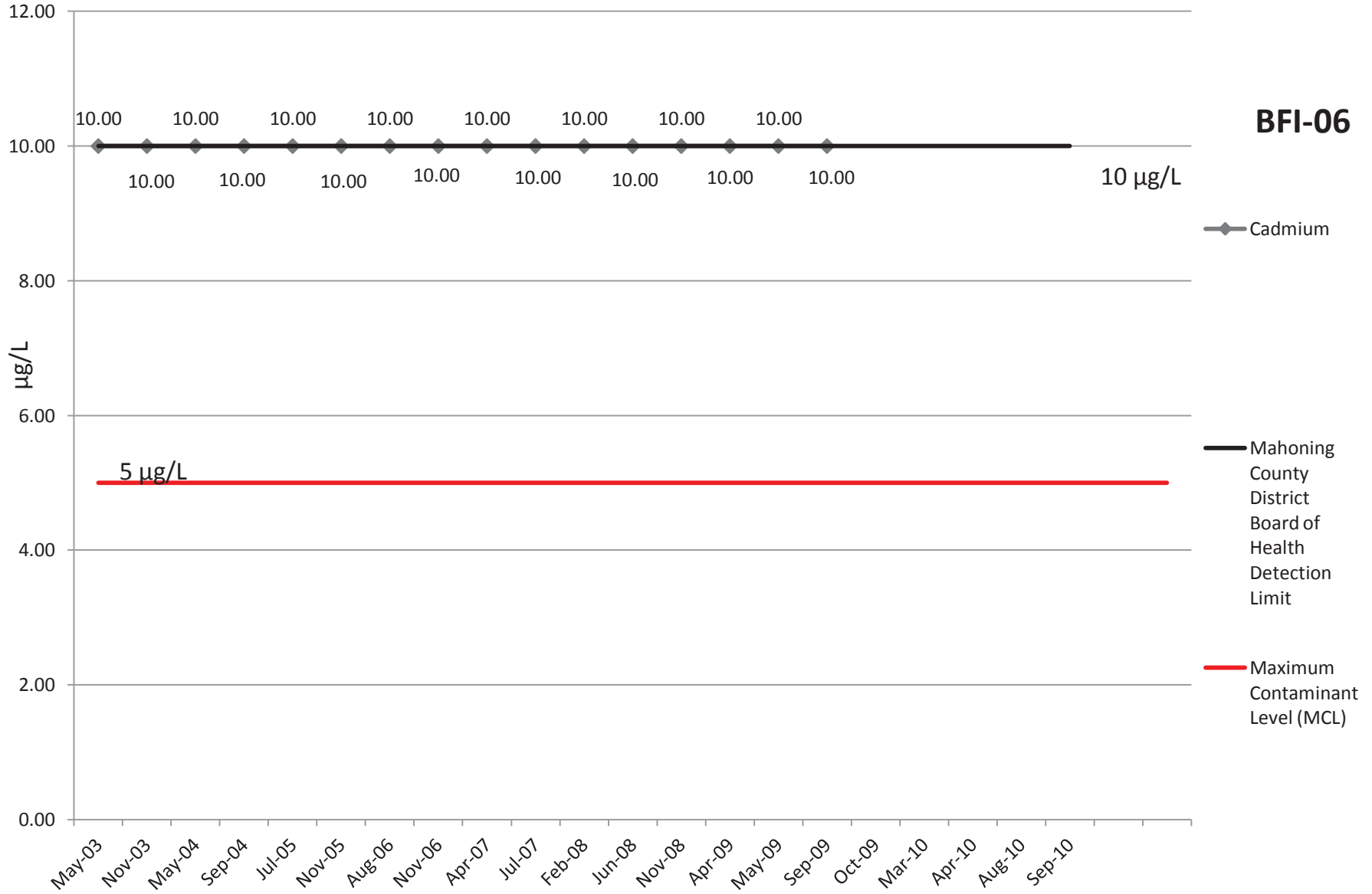
# Barium

**BFI-06**

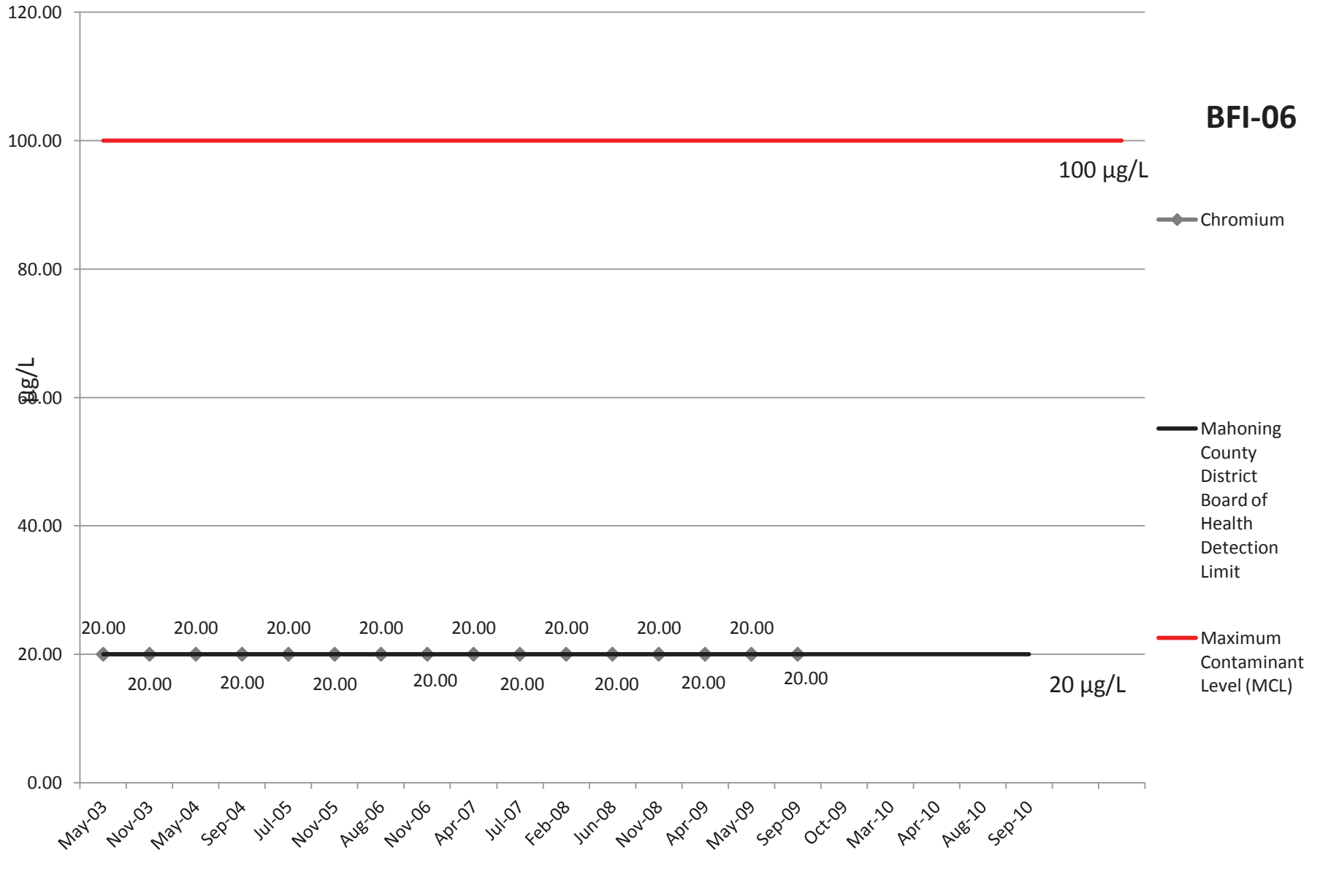


# Cadmium

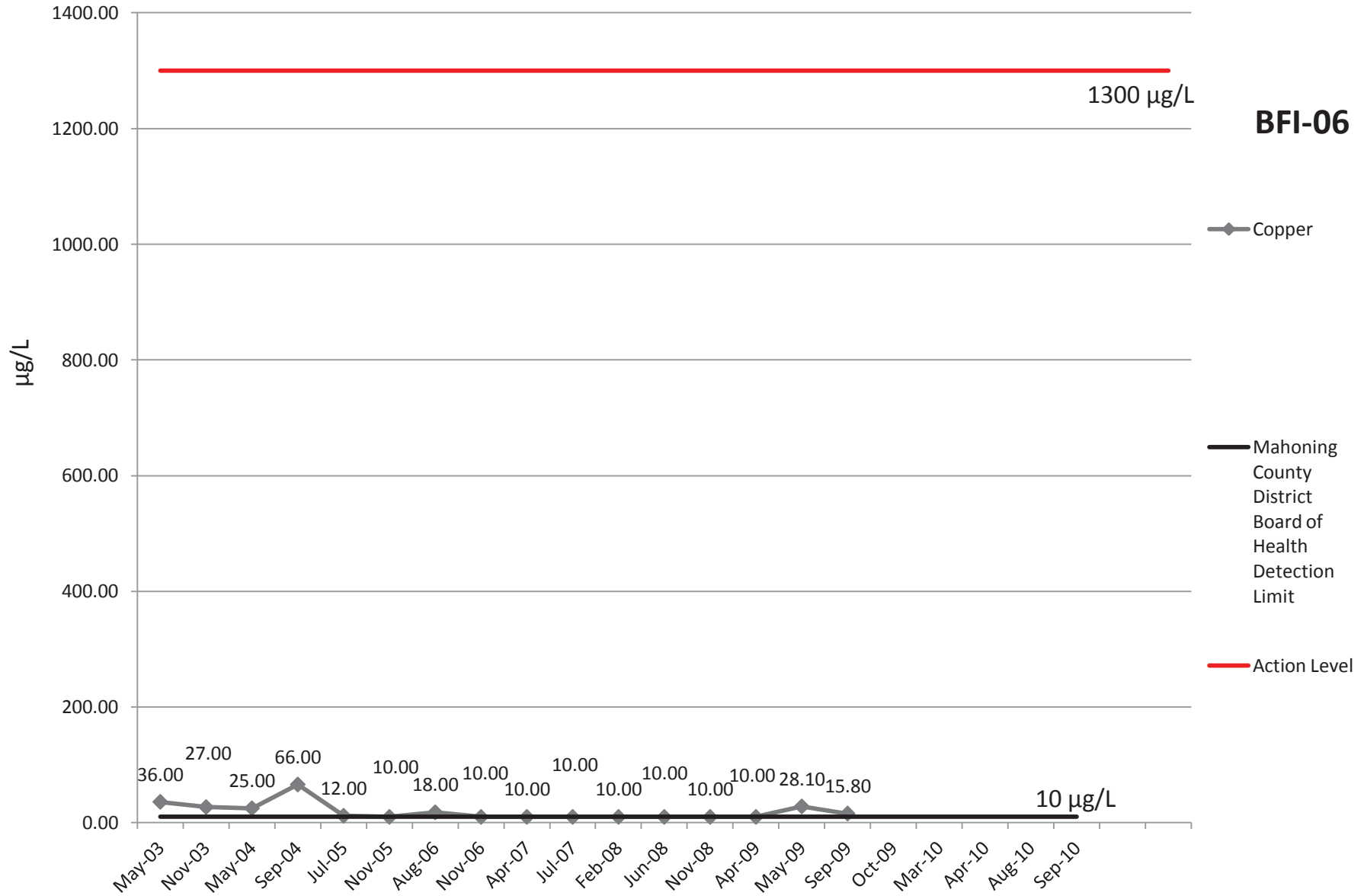
**BFI-06**



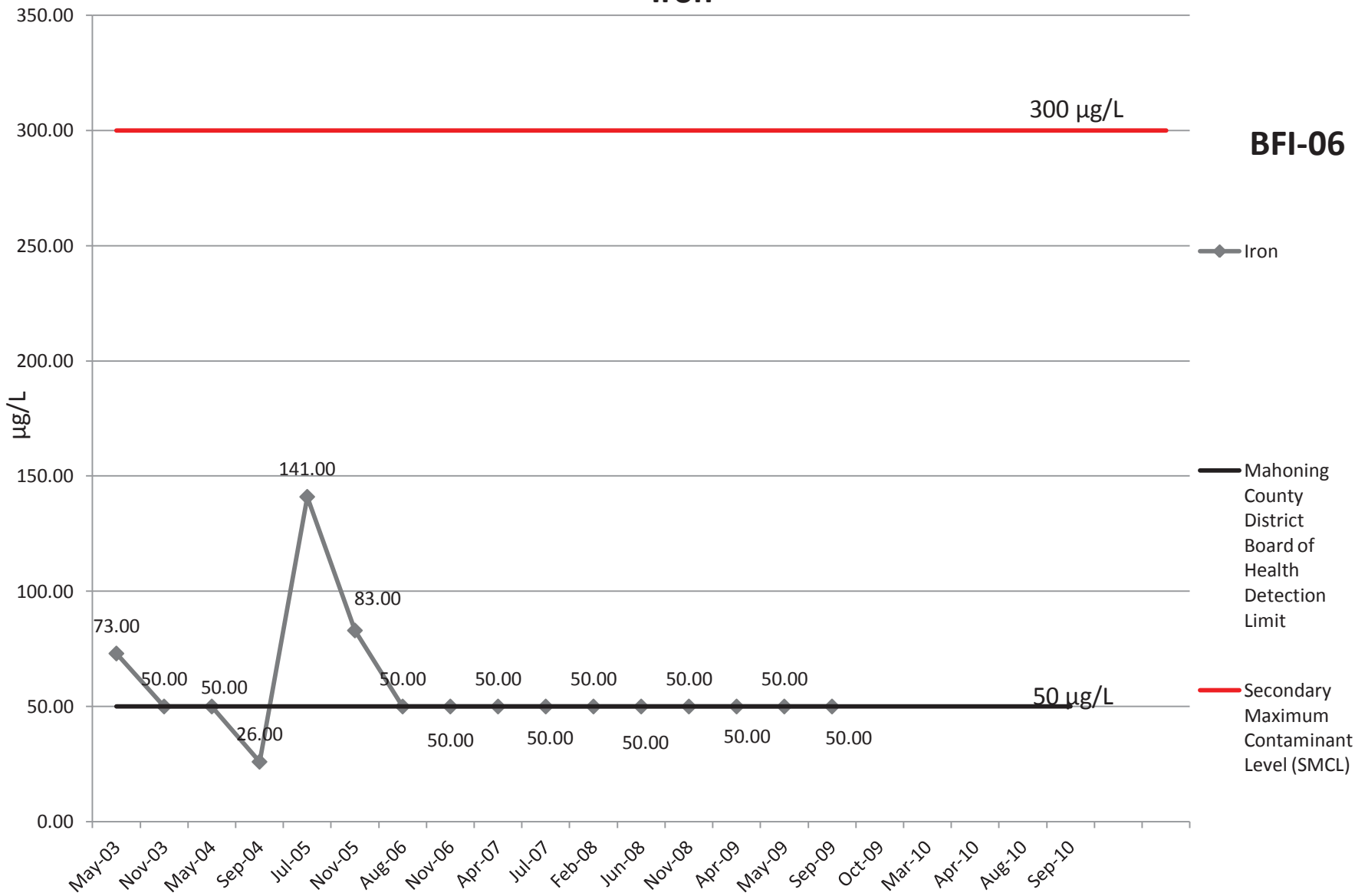
# Chromium



# Copper

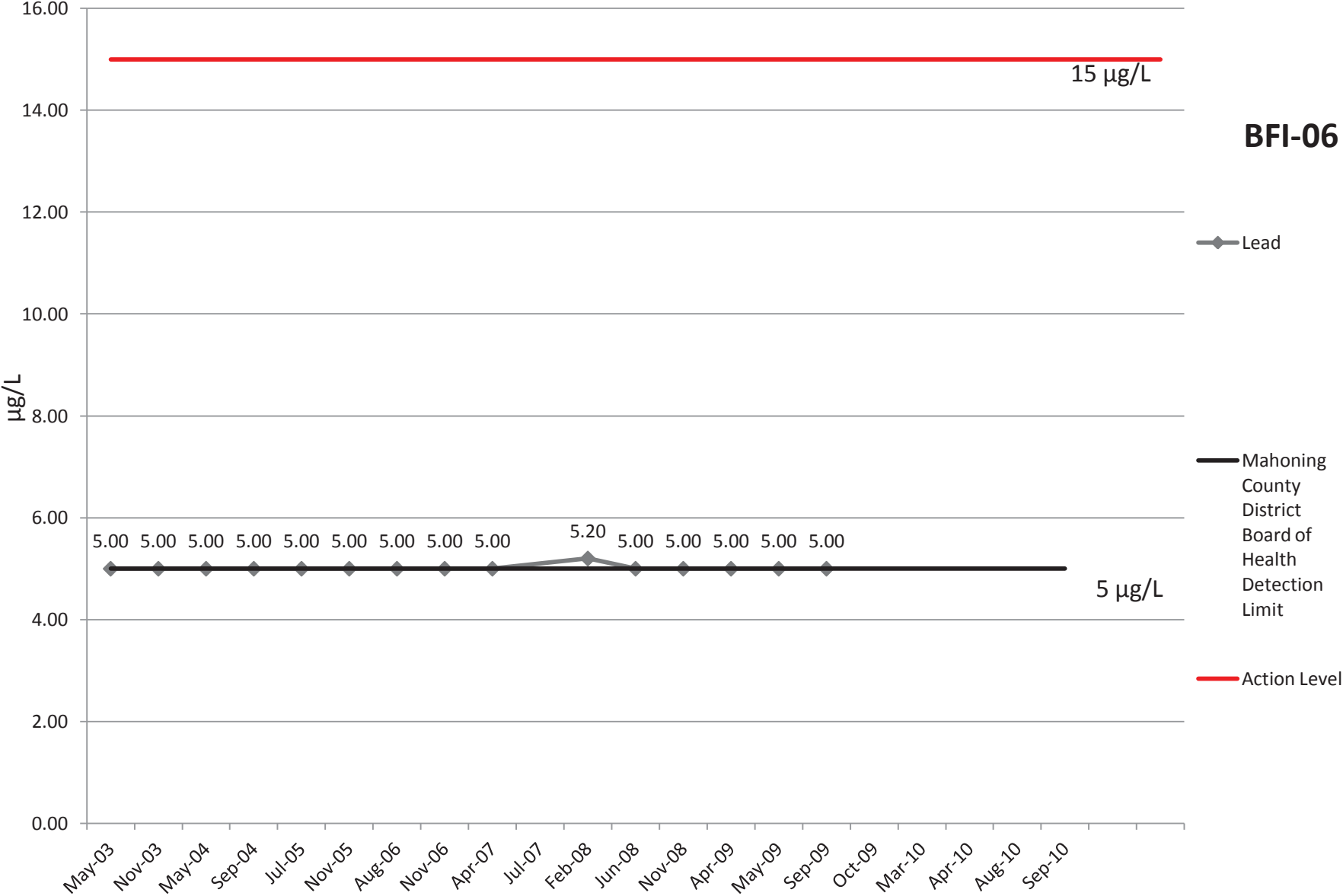


# Iron

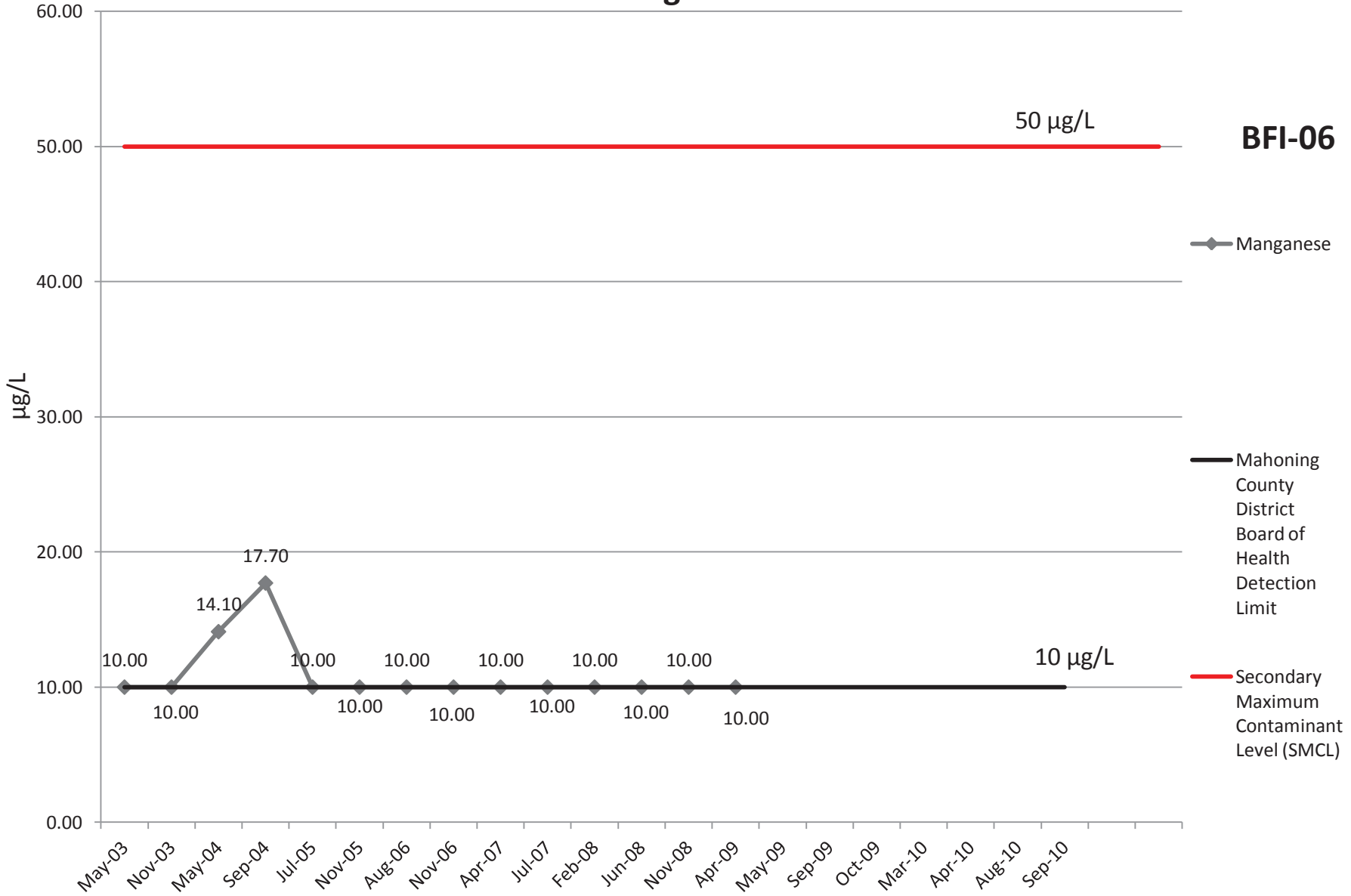


# Lead

**BFI-06**



# Manganese



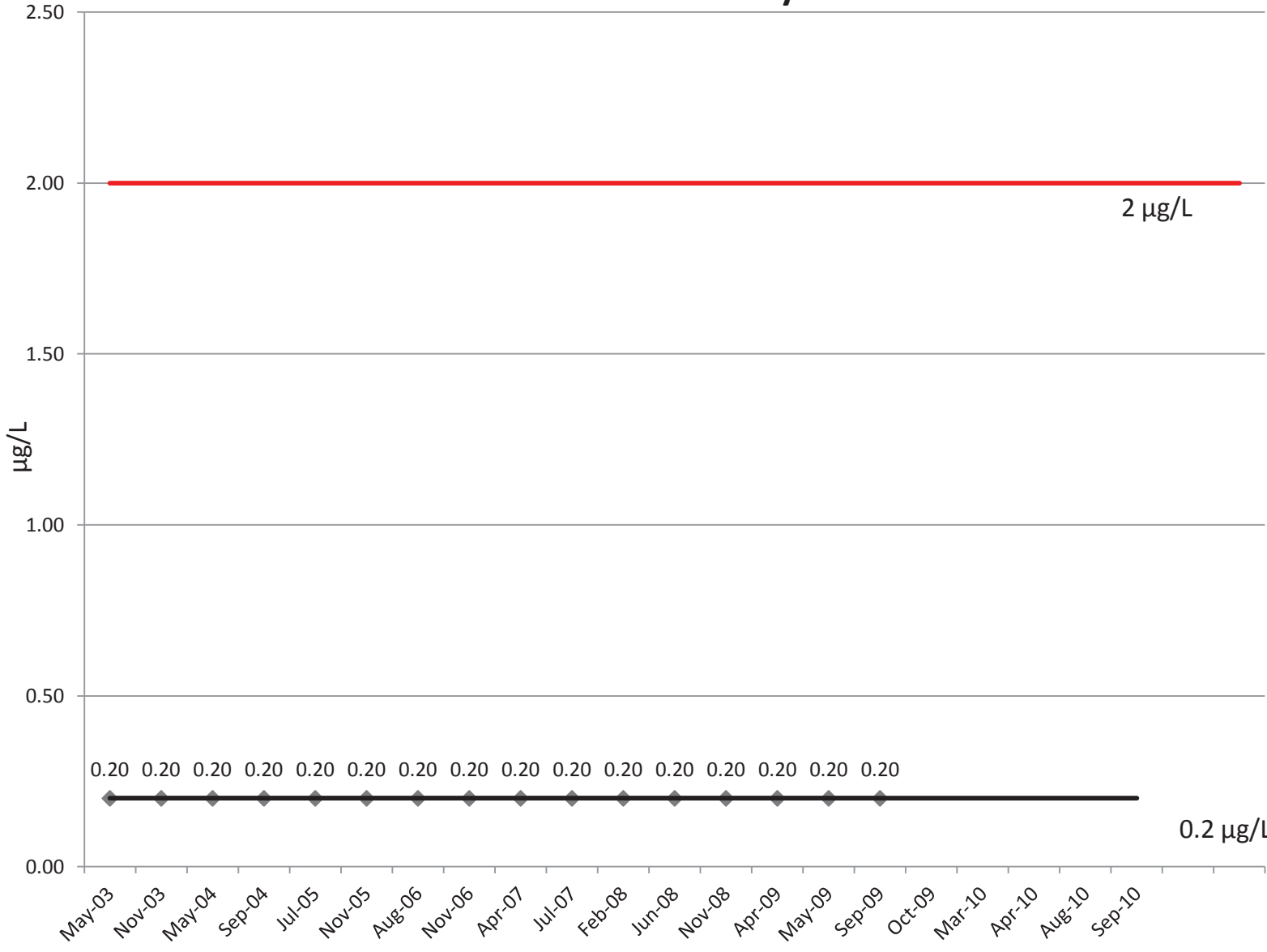


# Mercury

**BFI-06**

2 µg/L

0.2 µg/L

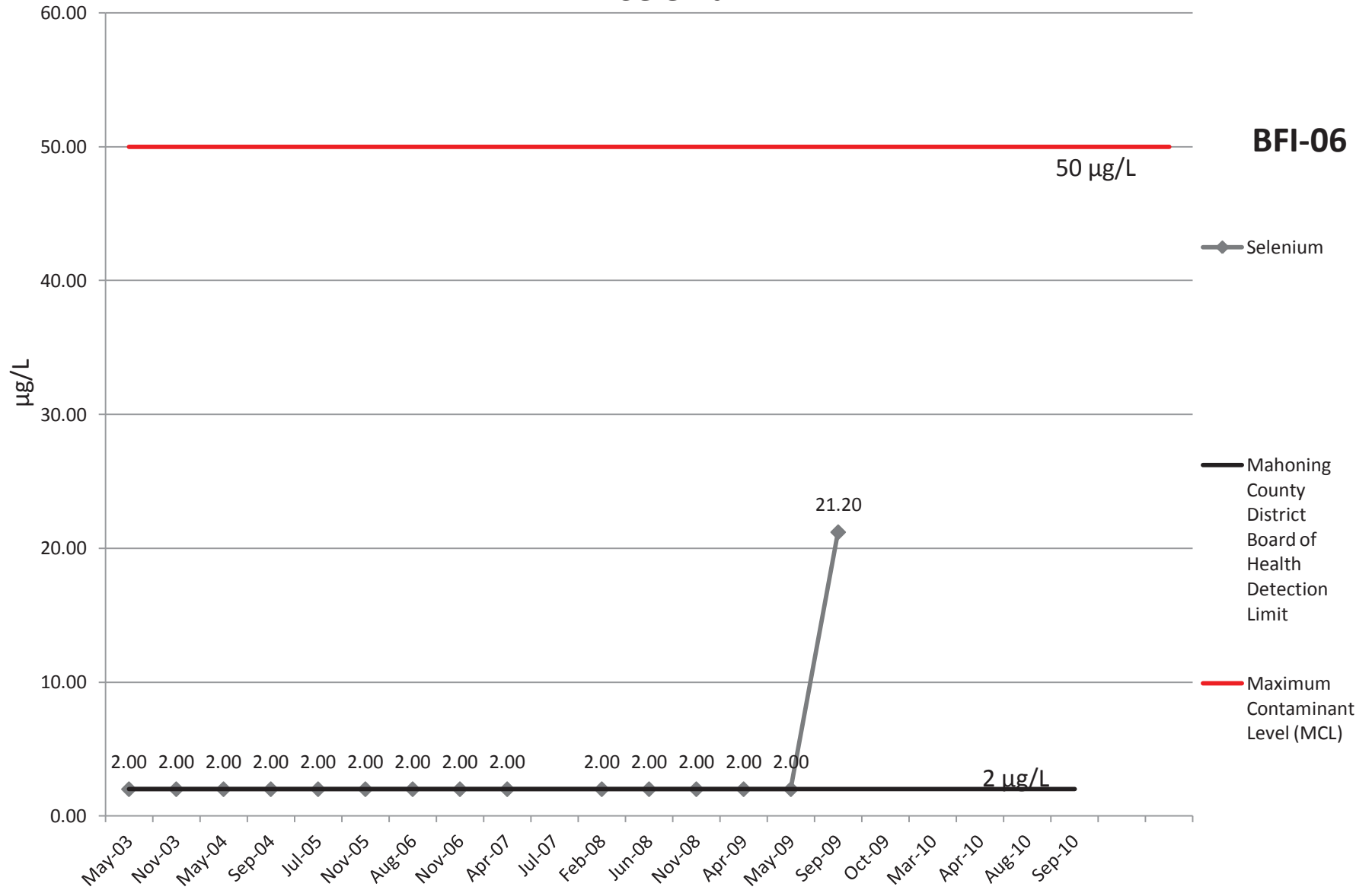


◆ Mercury

— Mahoning County District Board of Health Detection Limit

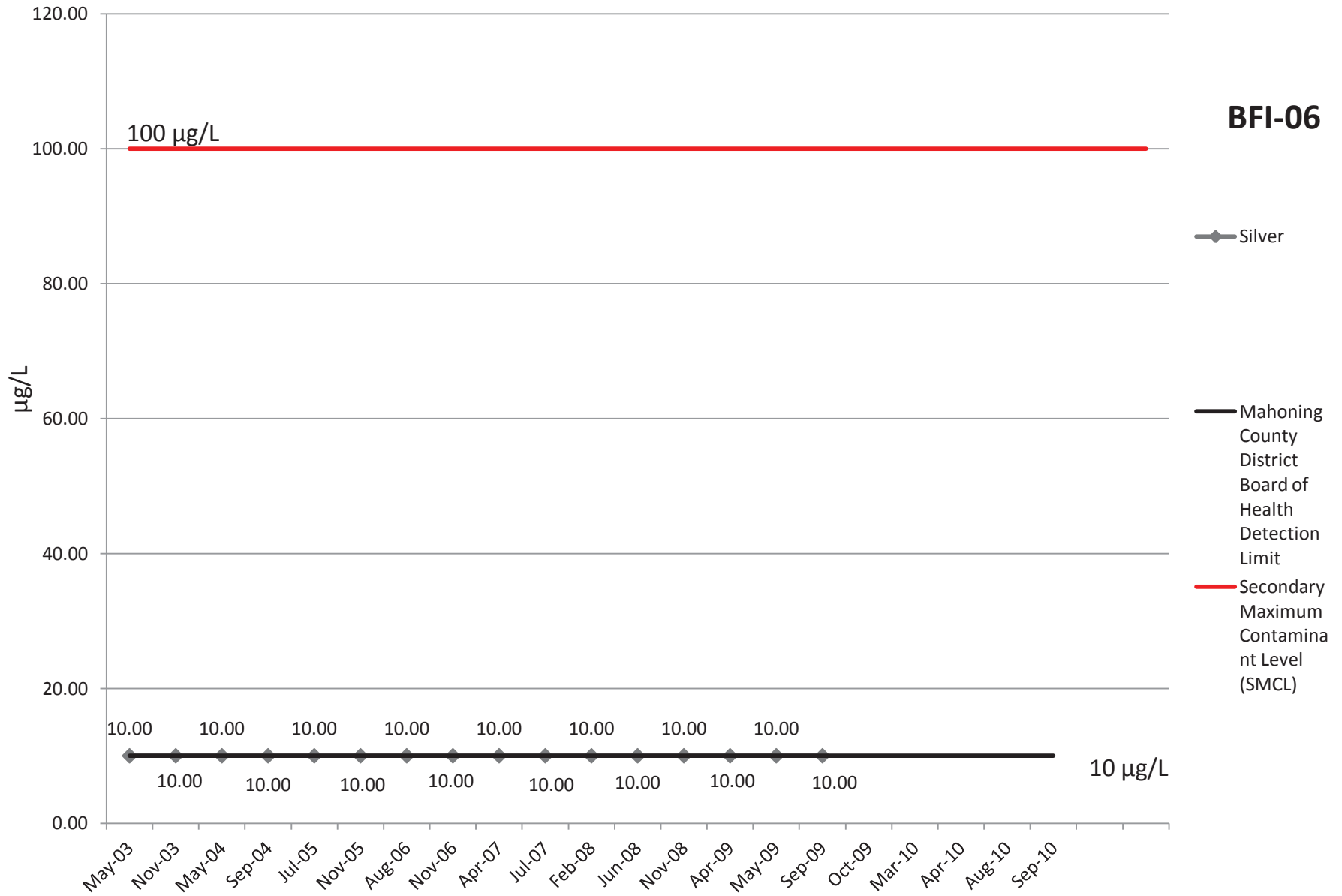
— Maximum Contaminant Level (MCL)

# Selenium



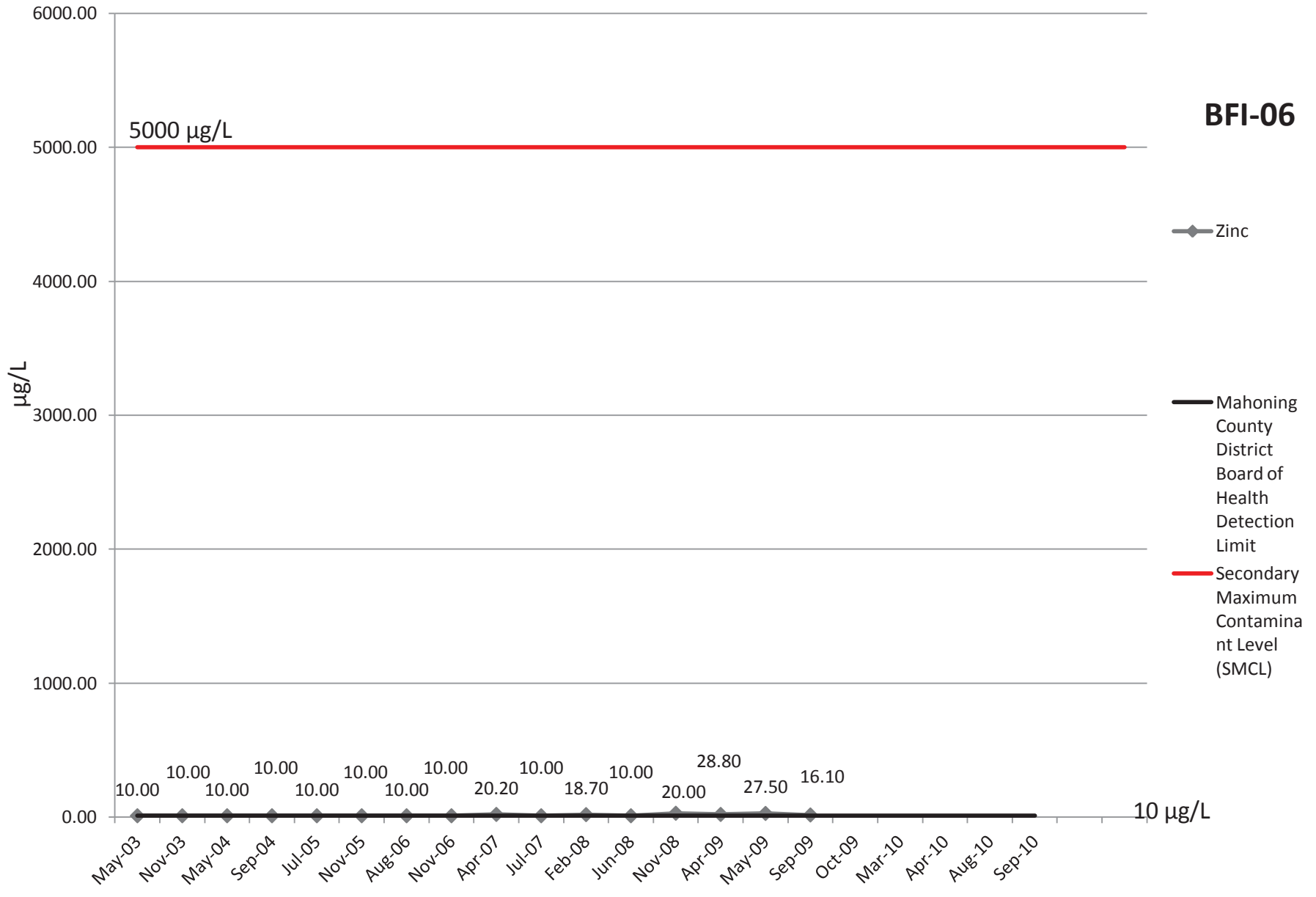
# Silver

**BFI-06**

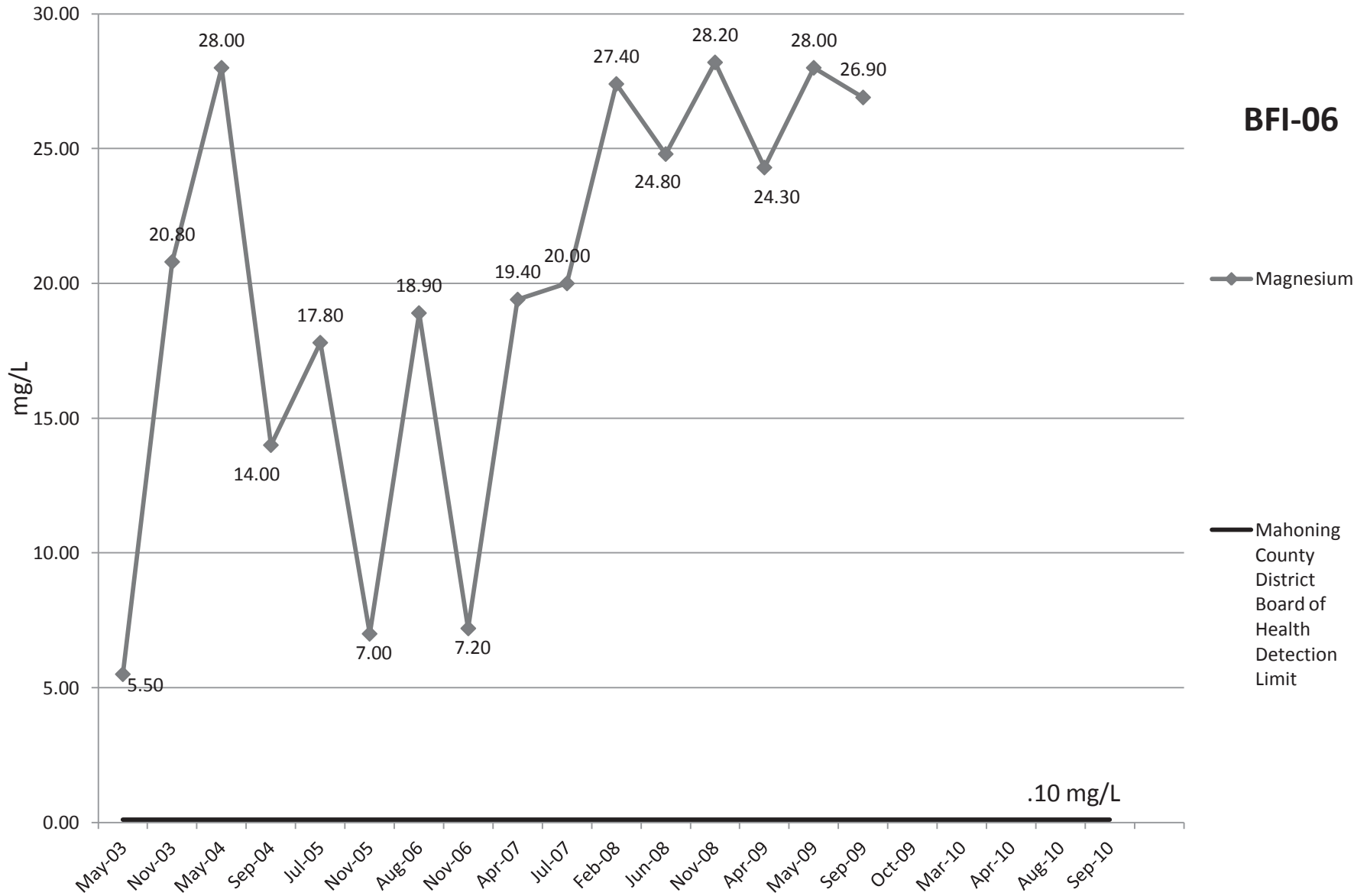


# Zinc

**BFI-06**



# Magnesium



**BFI-06**

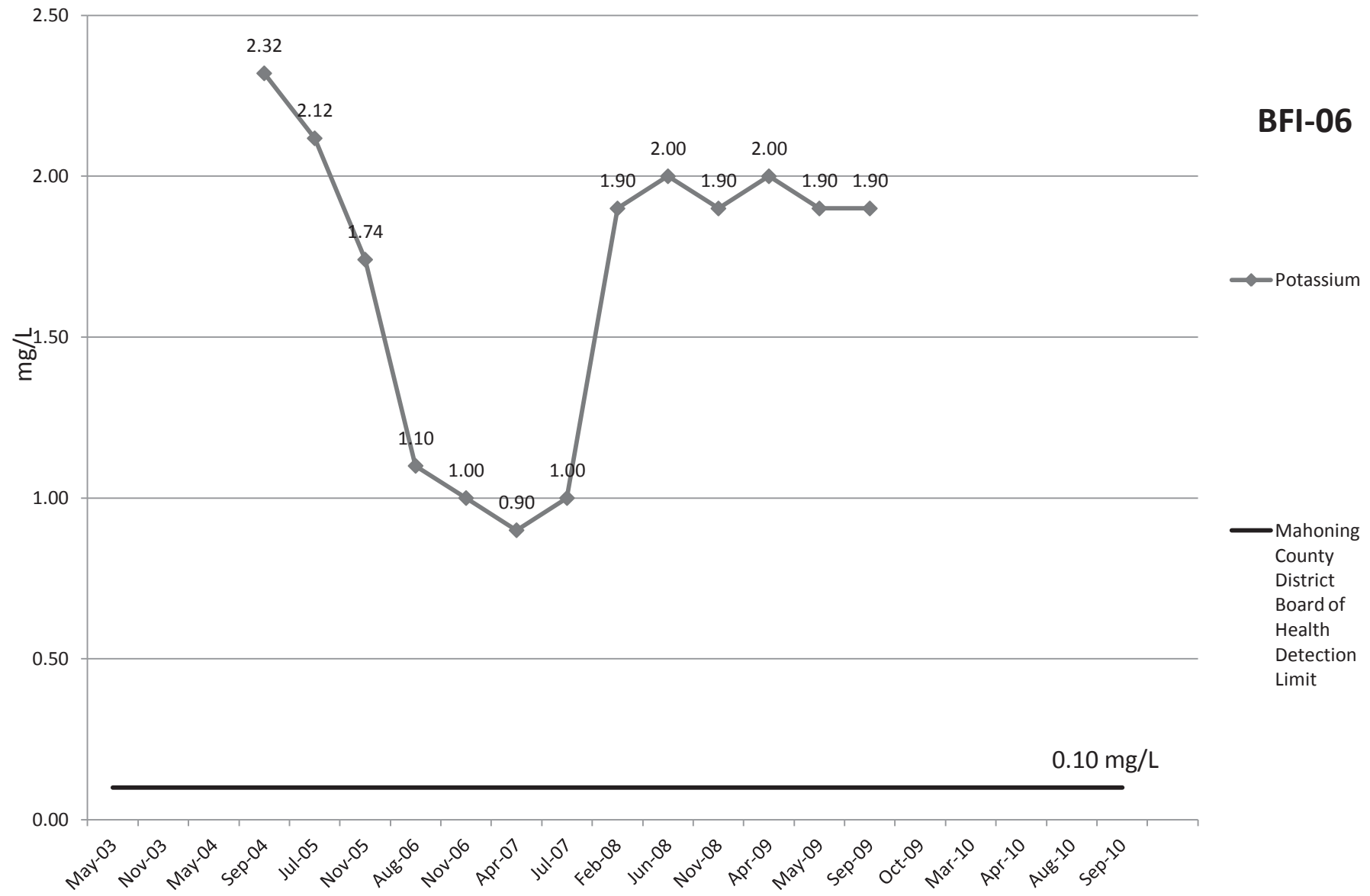
◆ Magnesium

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

.10 mg/L

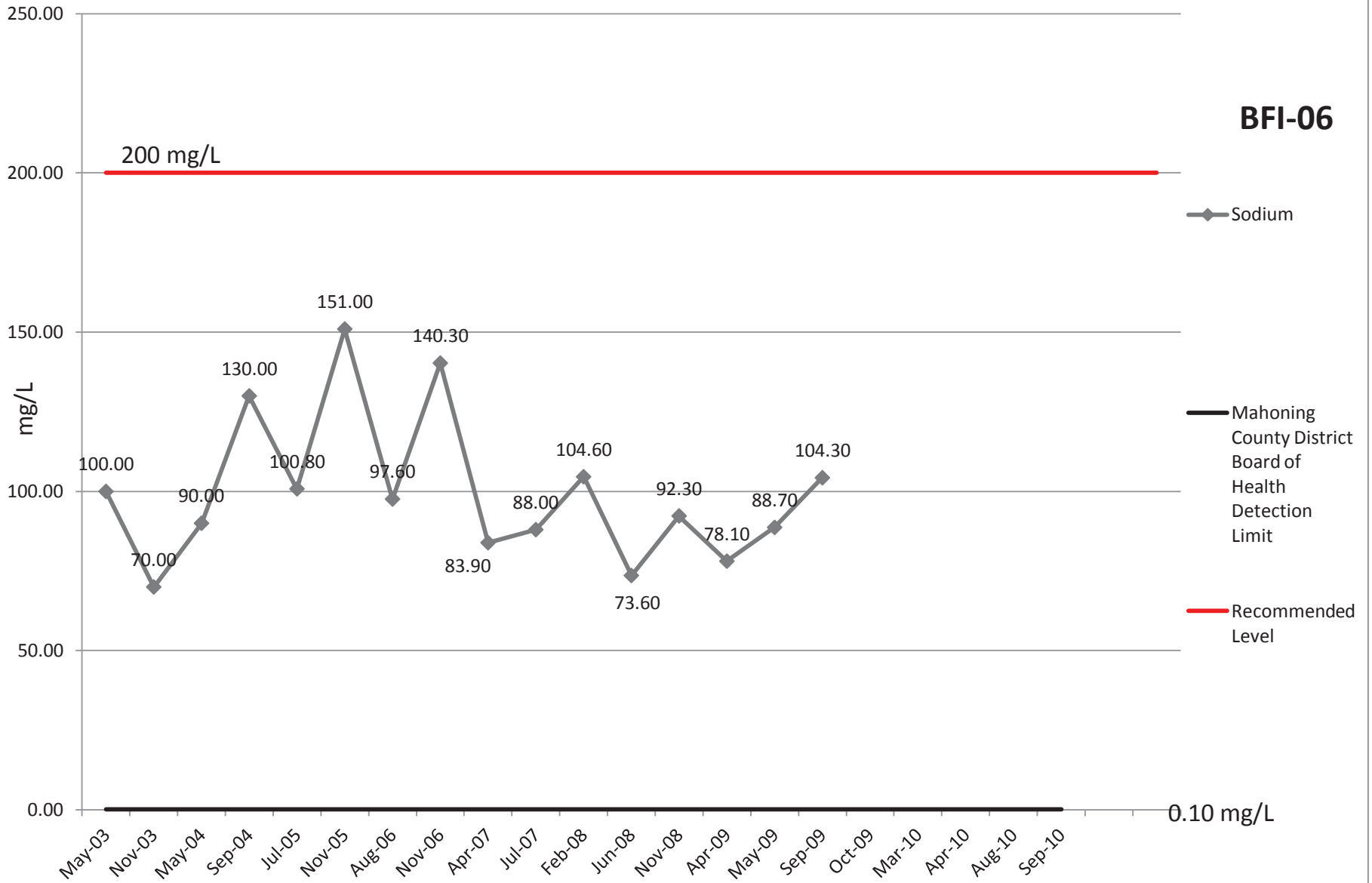
# Potassium

**BFI-06**



# Sodium

**BFI-06**



# Nitrate EPA

**BFI-06**

10 mg/L

mg/L

◆ Nitrate EPA

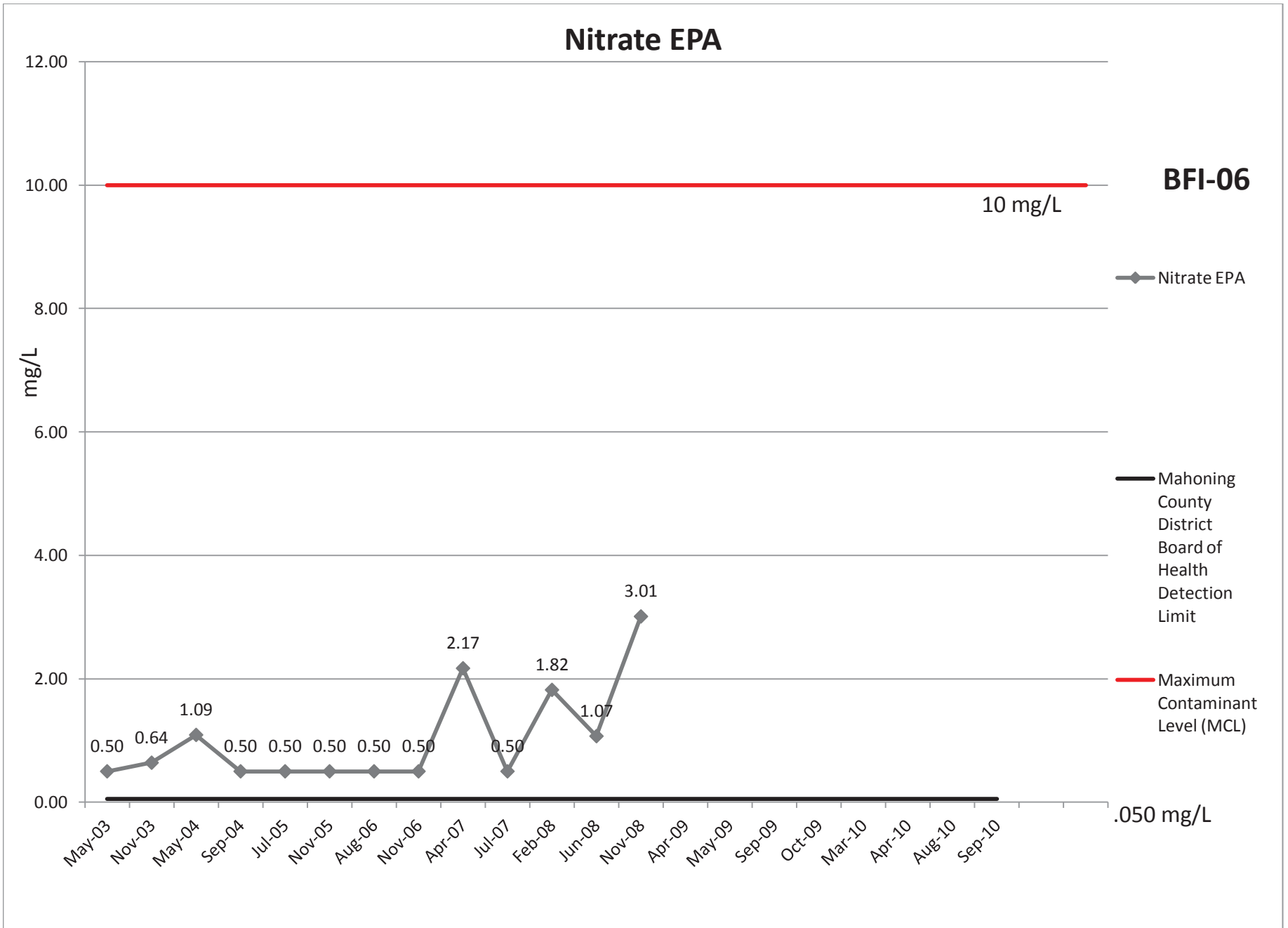
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

.050 mg/L

0.50 0.64 1.09 0.50 0.50 0.50 0.50 0.50 0.50 2.17 0.50 1.82 1.07 3.01

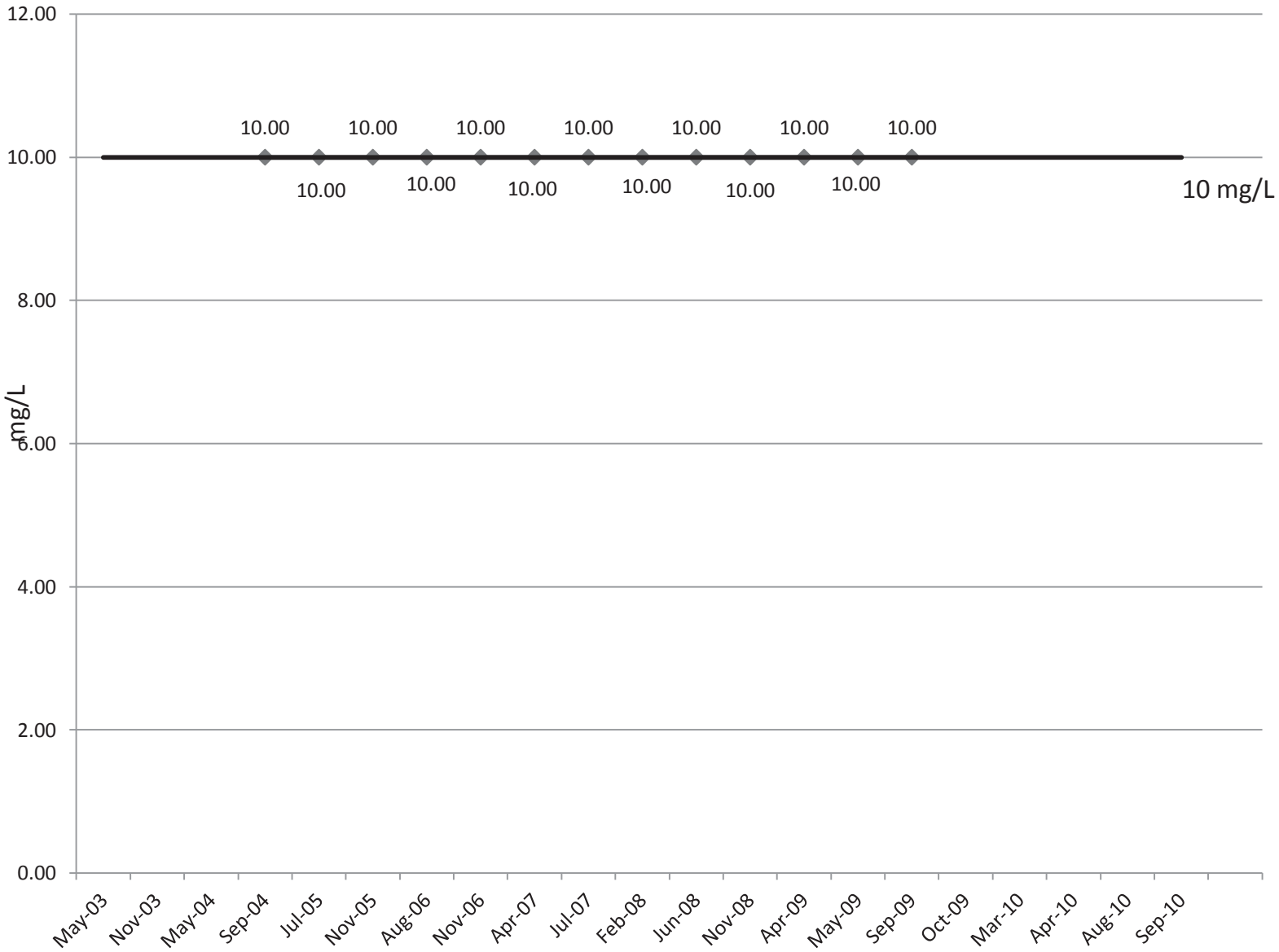
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10





# COD

**BFI-06**

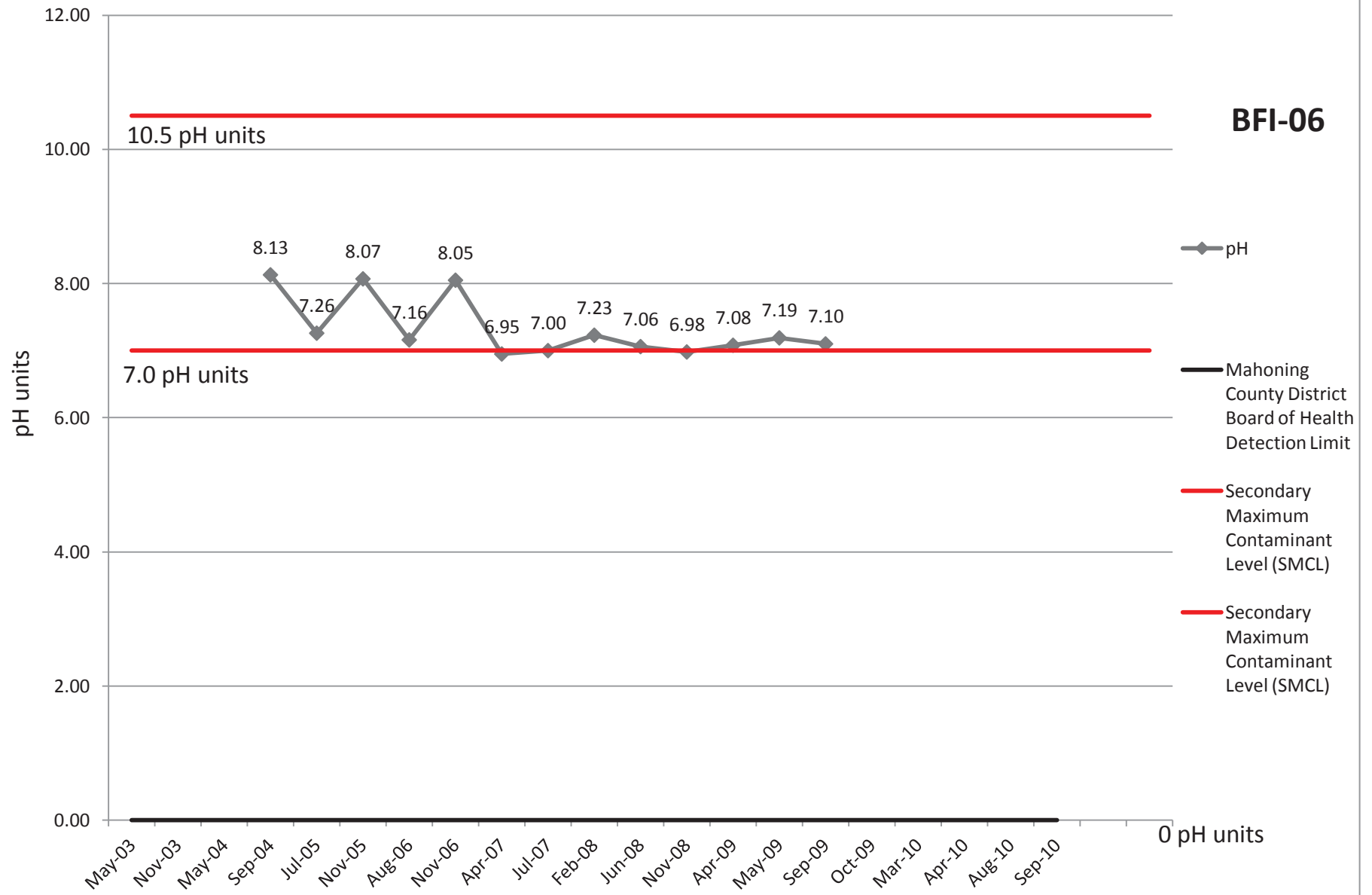


◆ COD

— Mahoning County District Board of Health Detection Limit

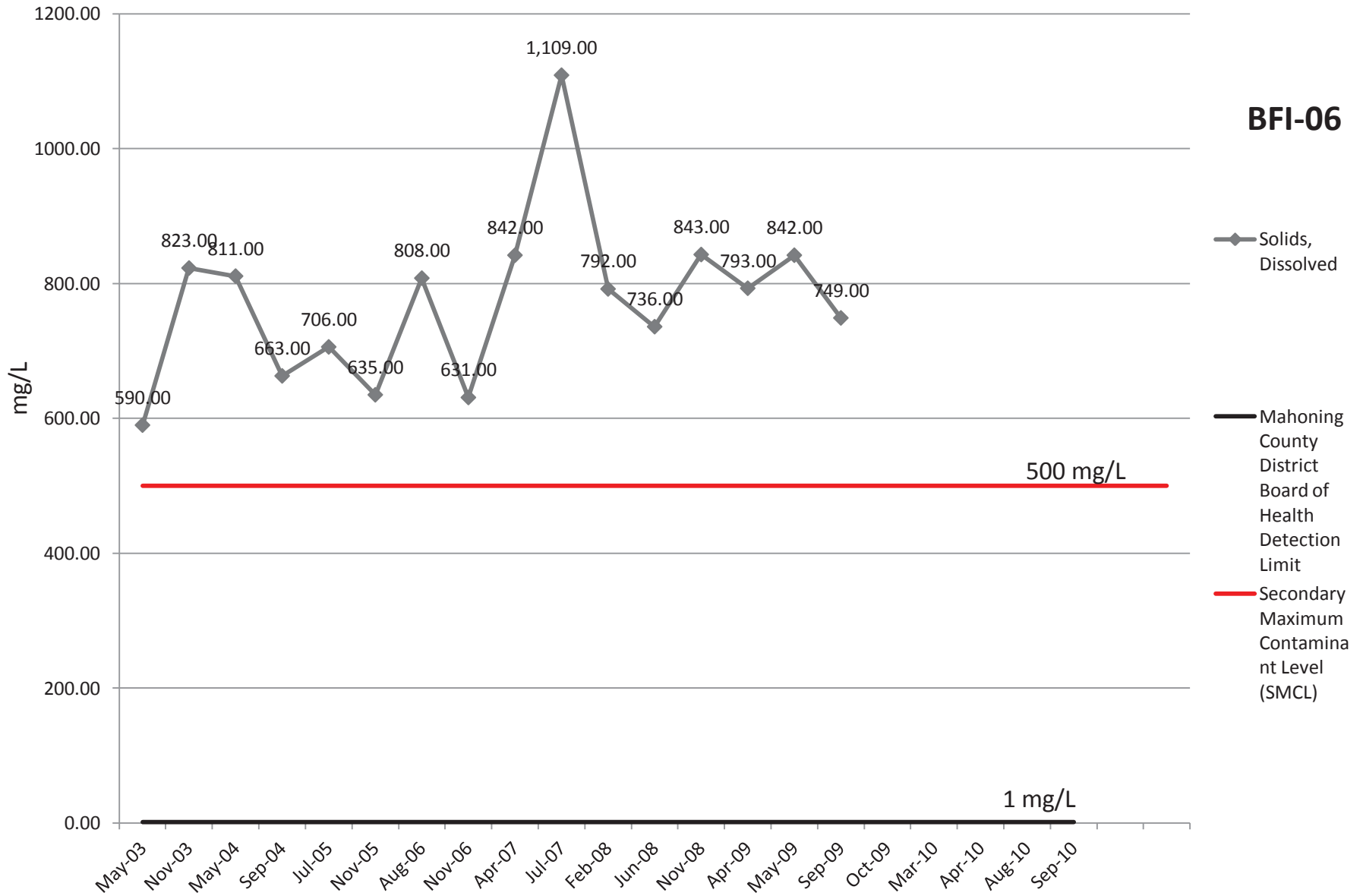
# pH

**BFI-06**



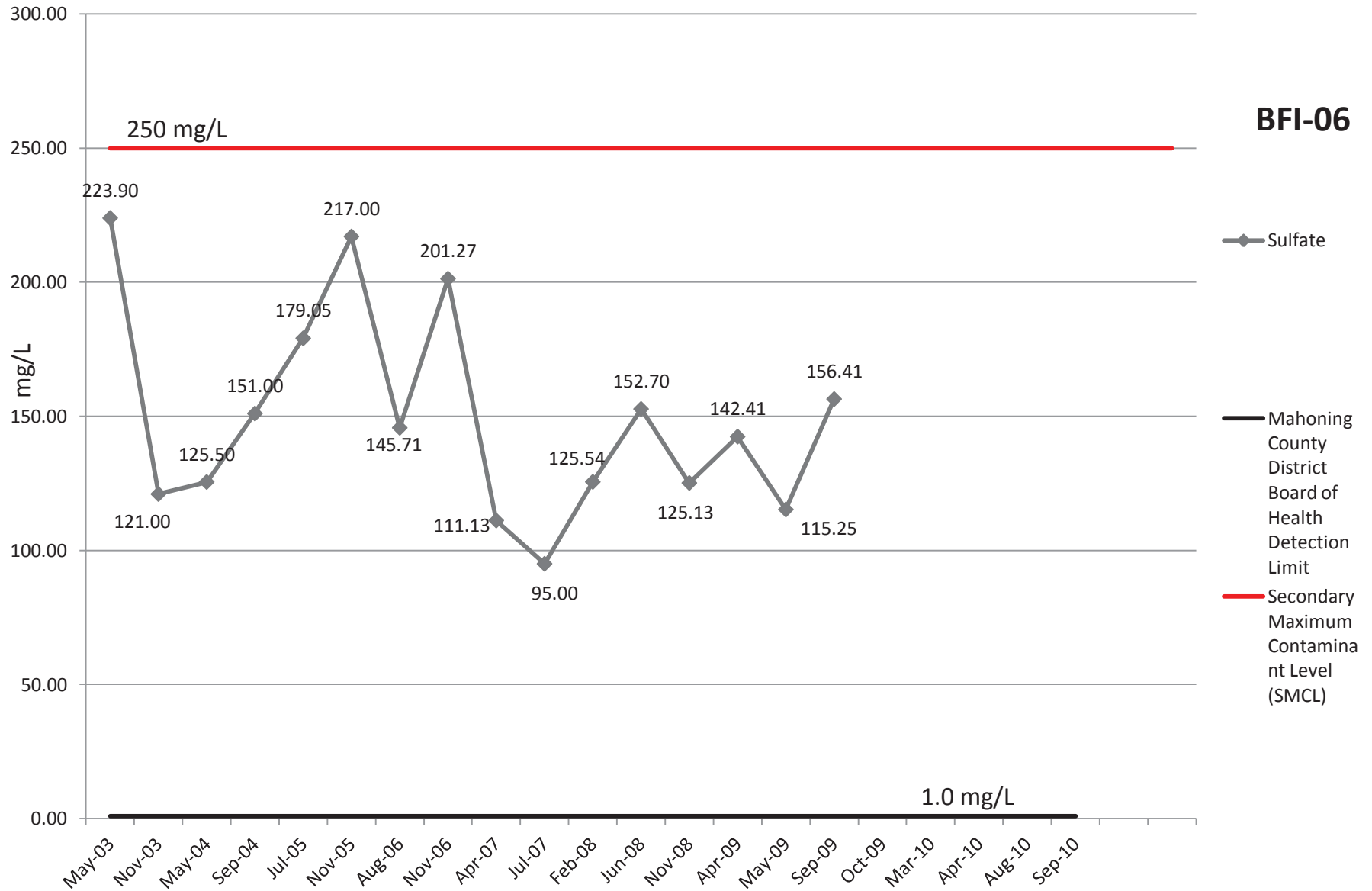
# Solids, Dissolved

**BFI-06**



# Sulfate

**BFI-06**



# Bacteria

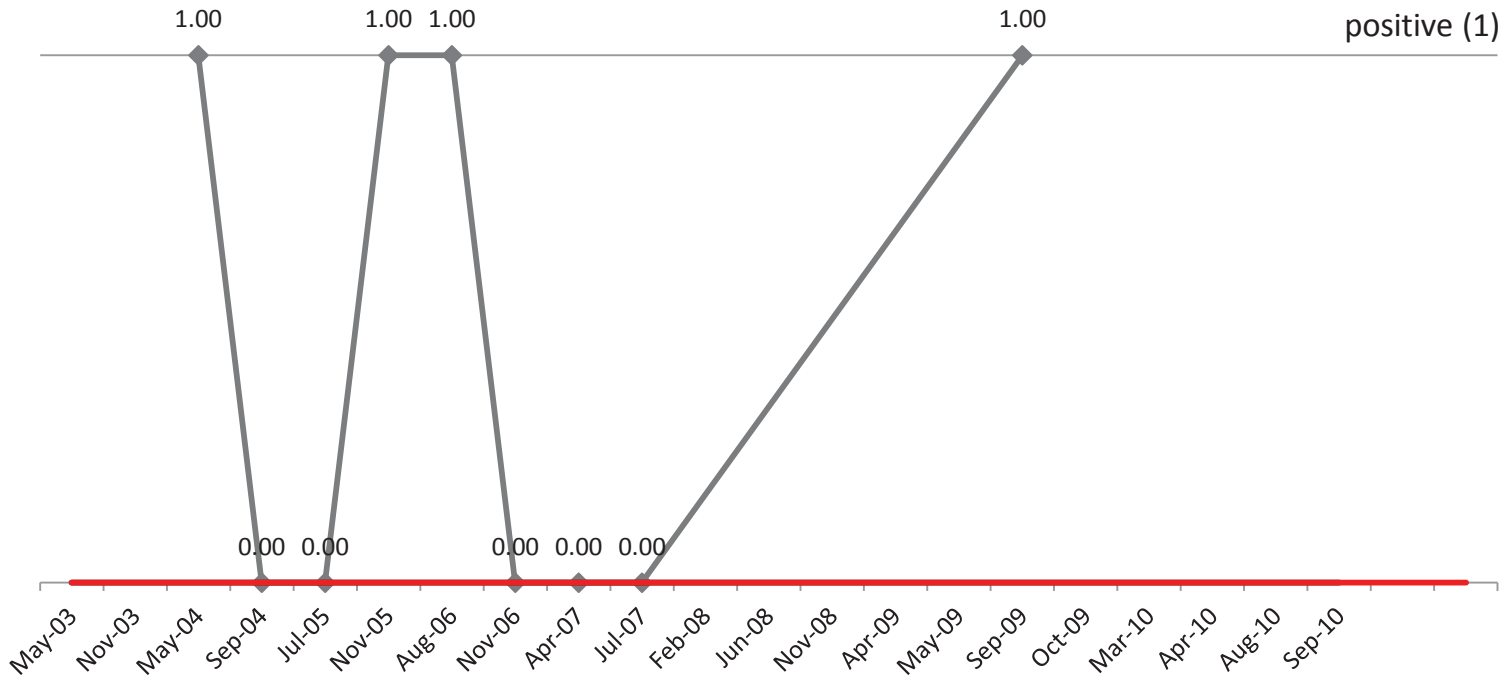
**BFI-06**

Positive/Negative

◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

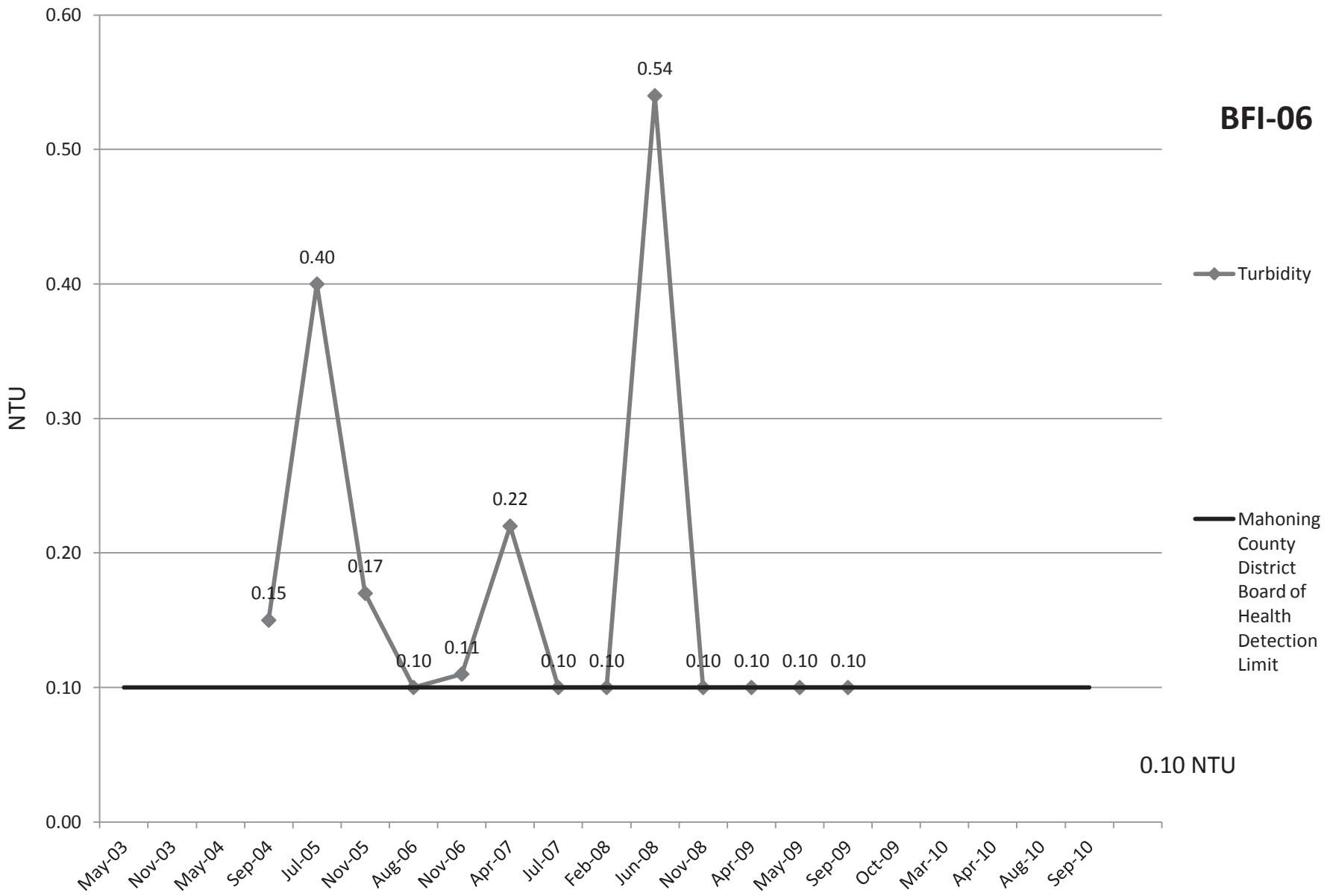
— Maximum  
Contaminant  
Level (MCL)



positive (1)

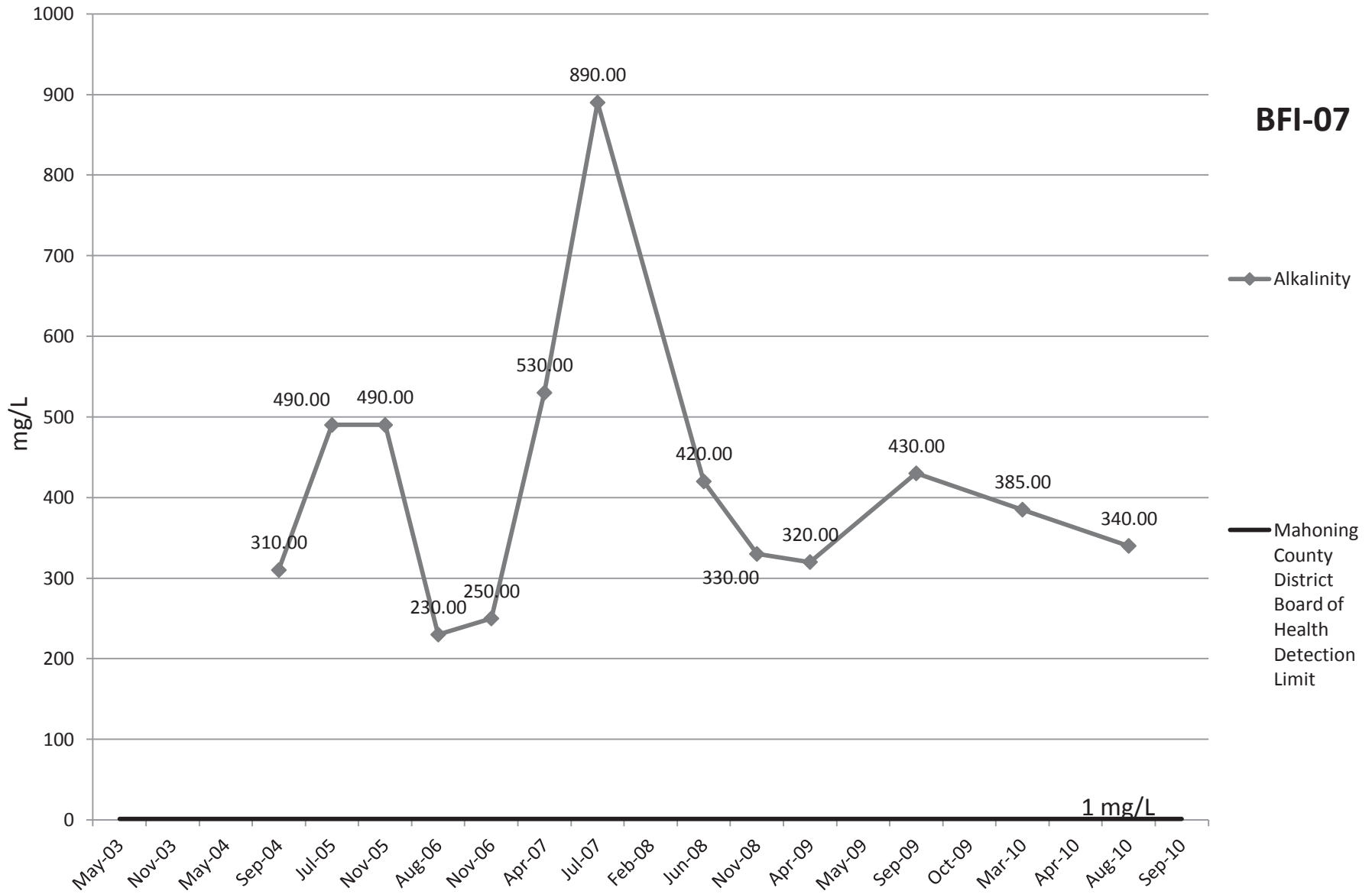
negative (0)

# Turbidity



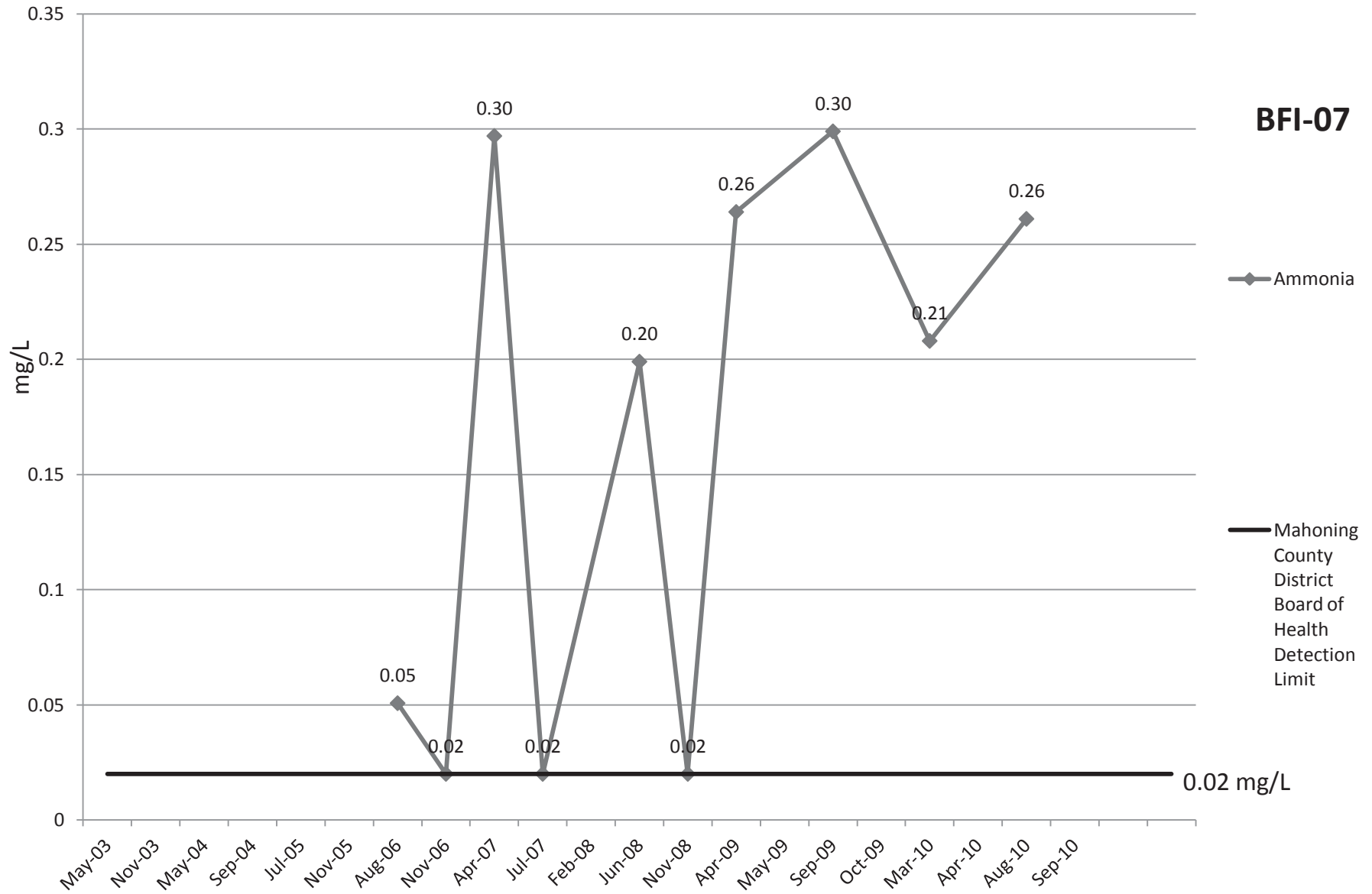
# Alkalinity

**BFI-07**



# Ammonia

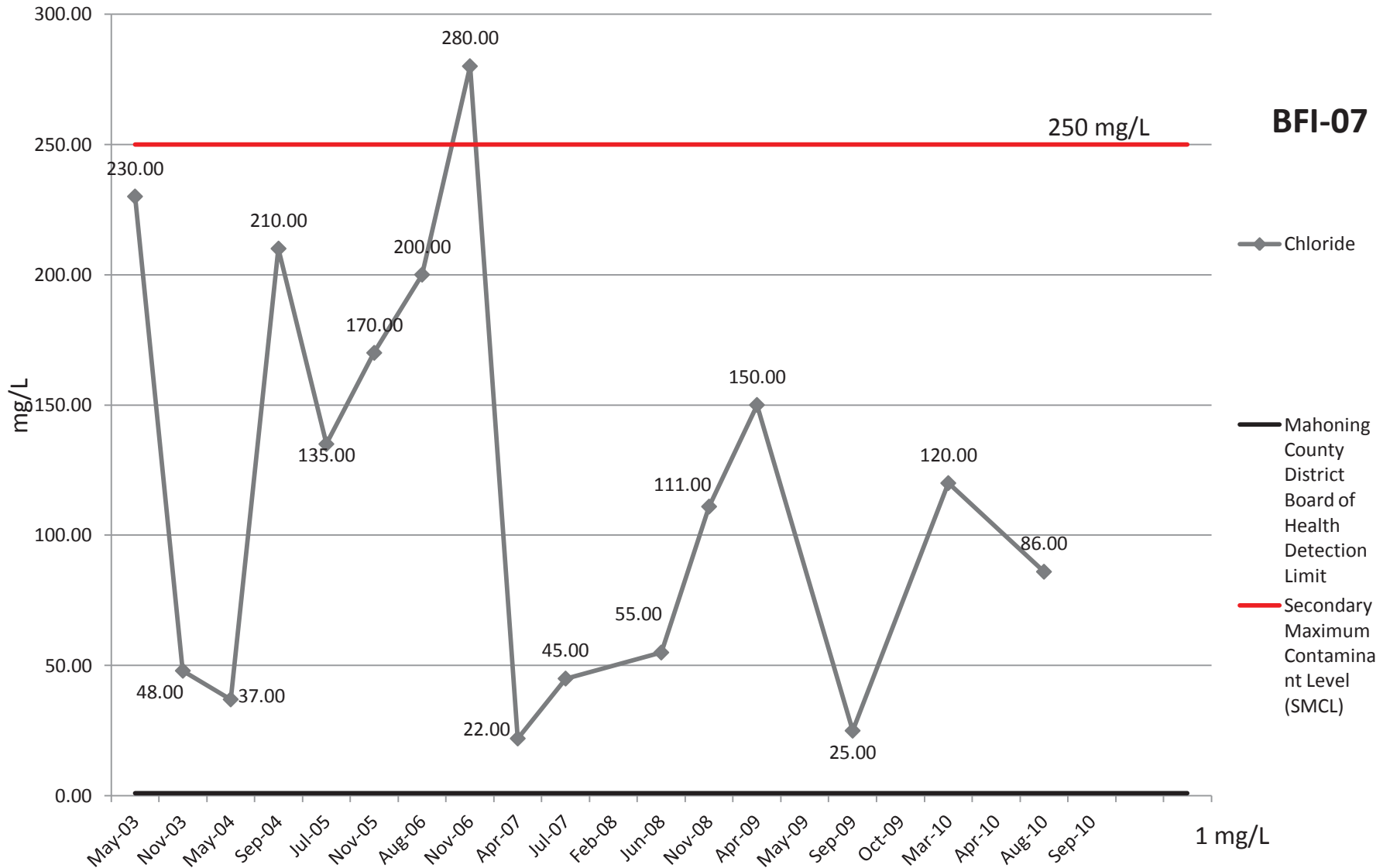
**BFI-07**





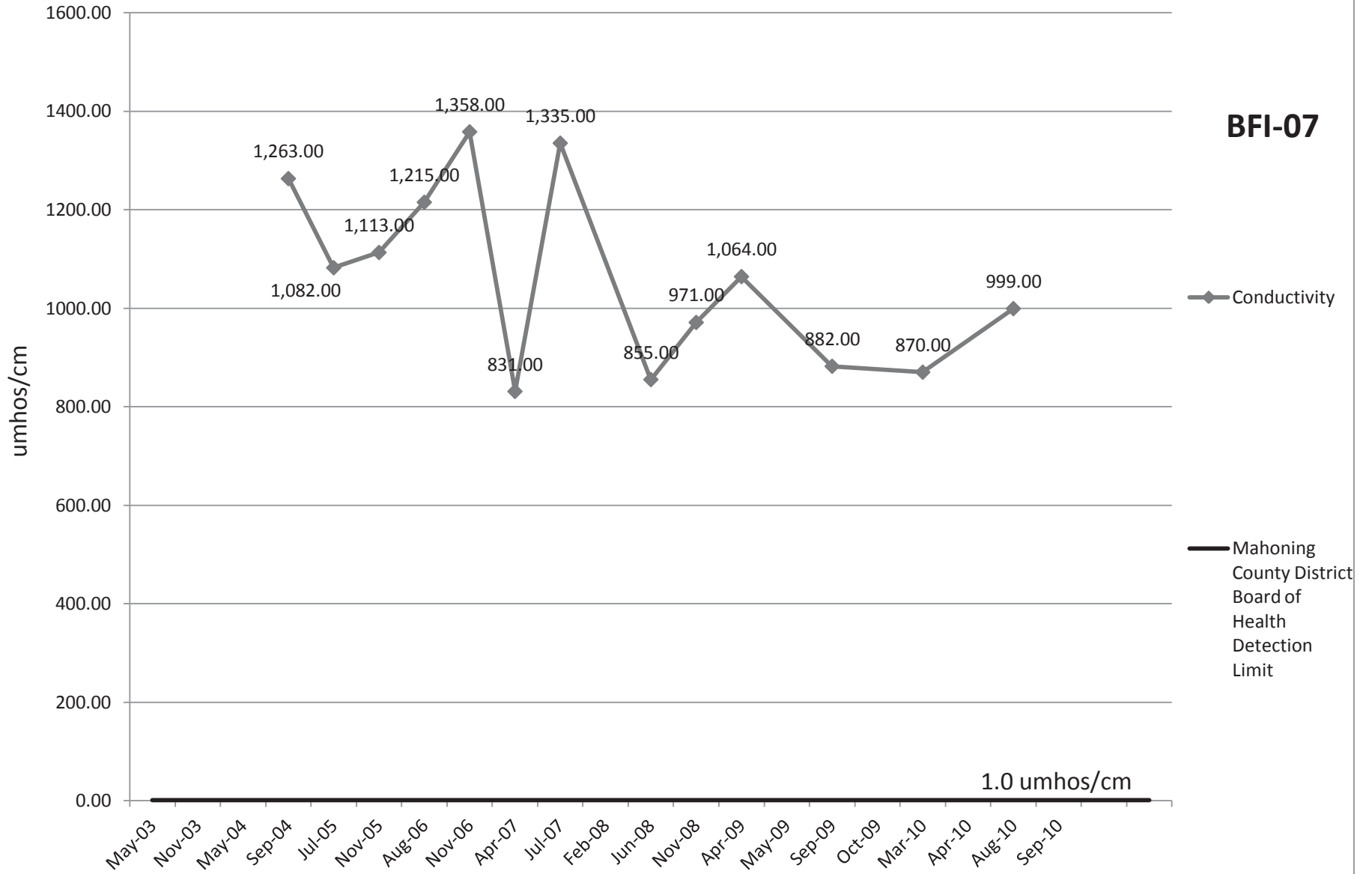
# Chloride

**BFI-07**

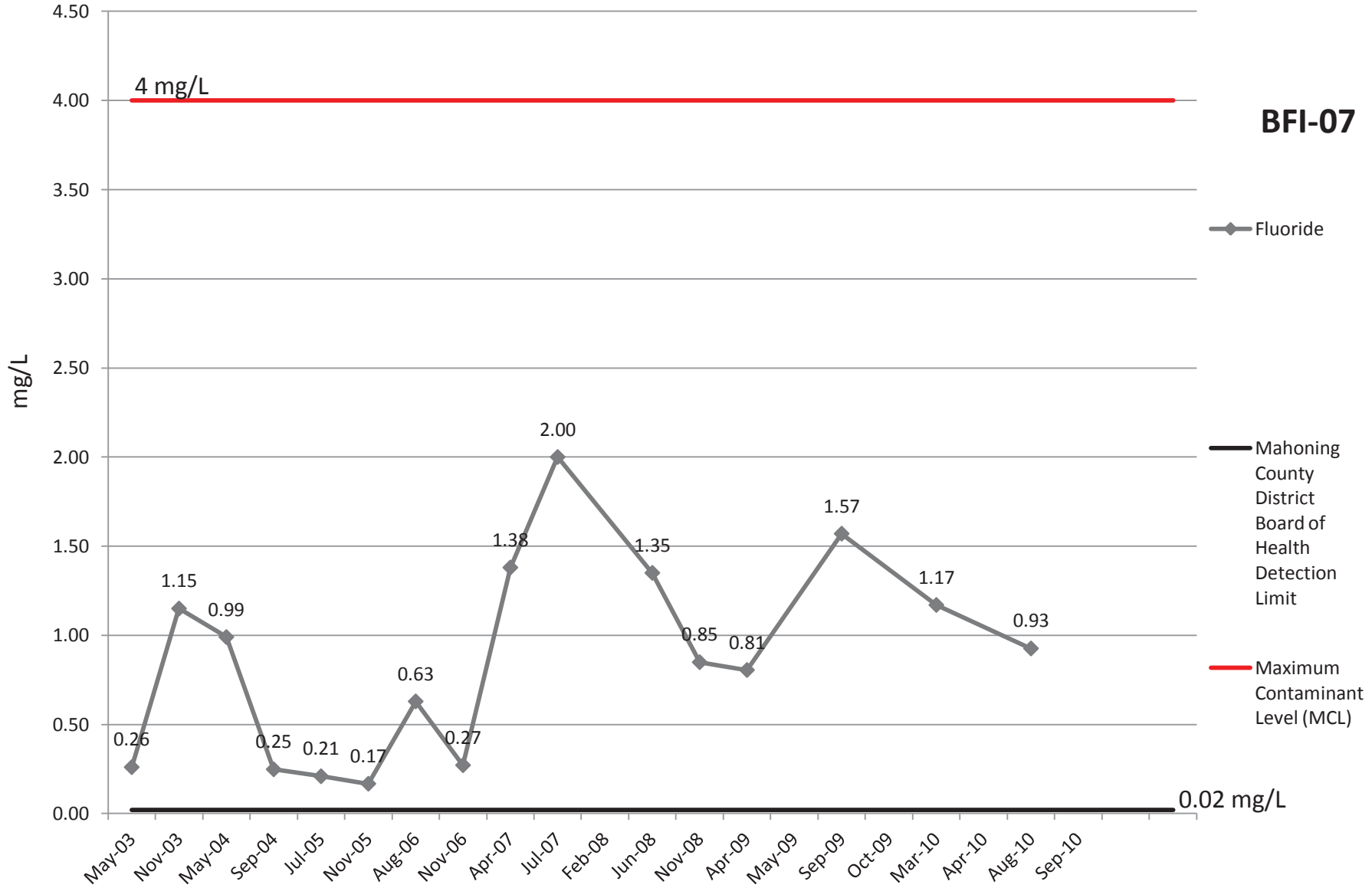


# Conductivity

**BFI-07**

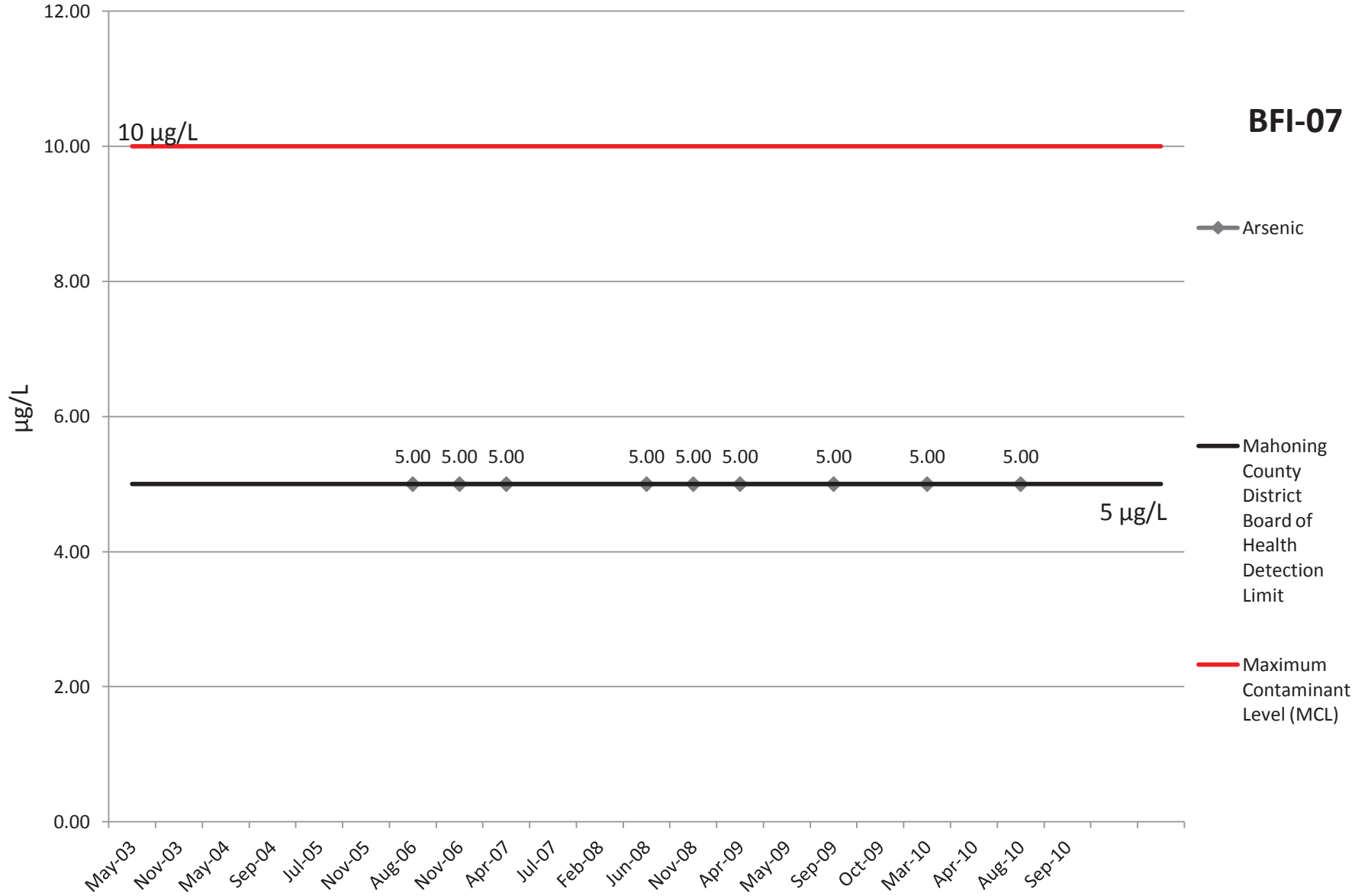


# Fluoride



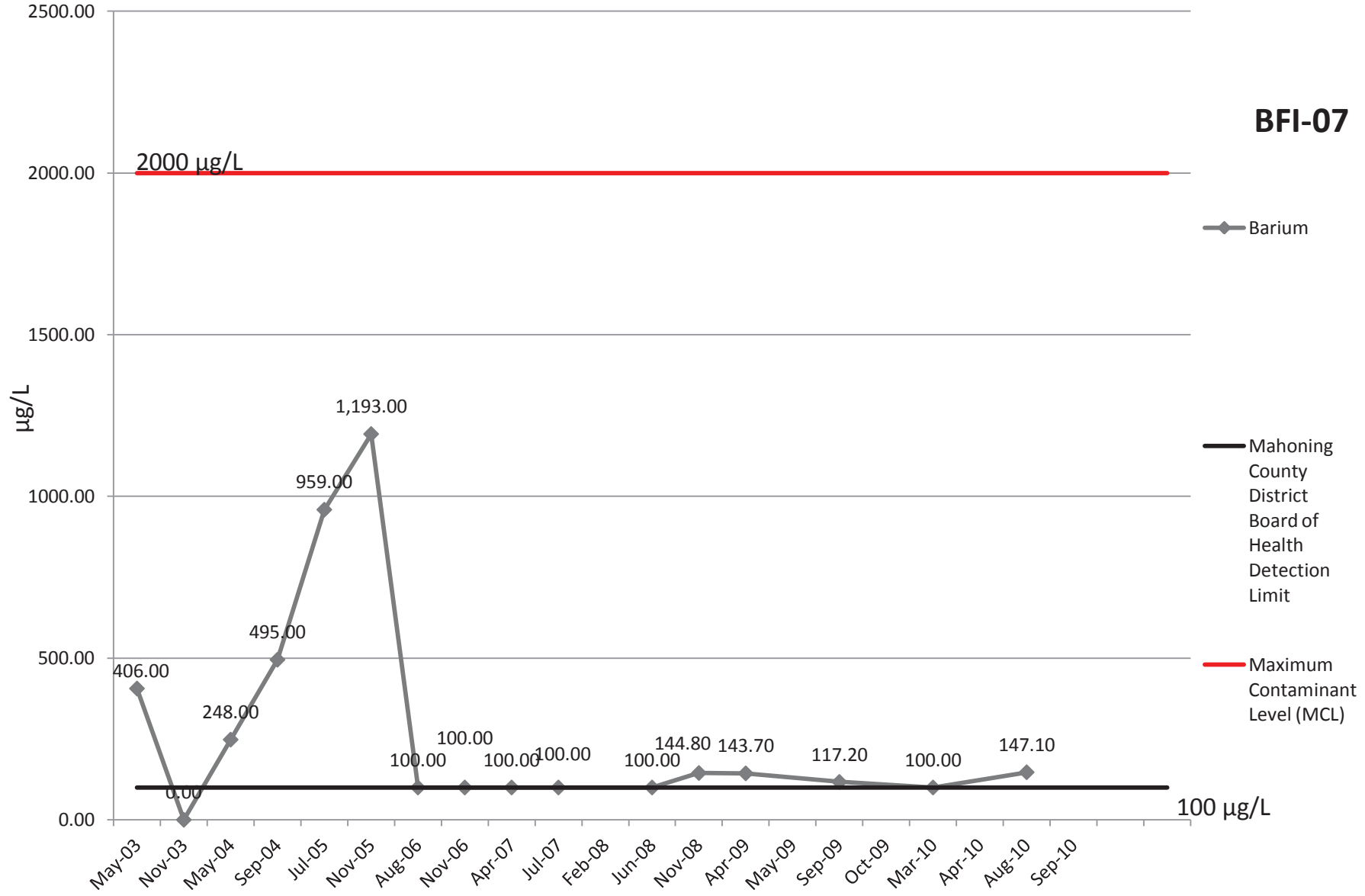
# Arsenic

**BFI-07**



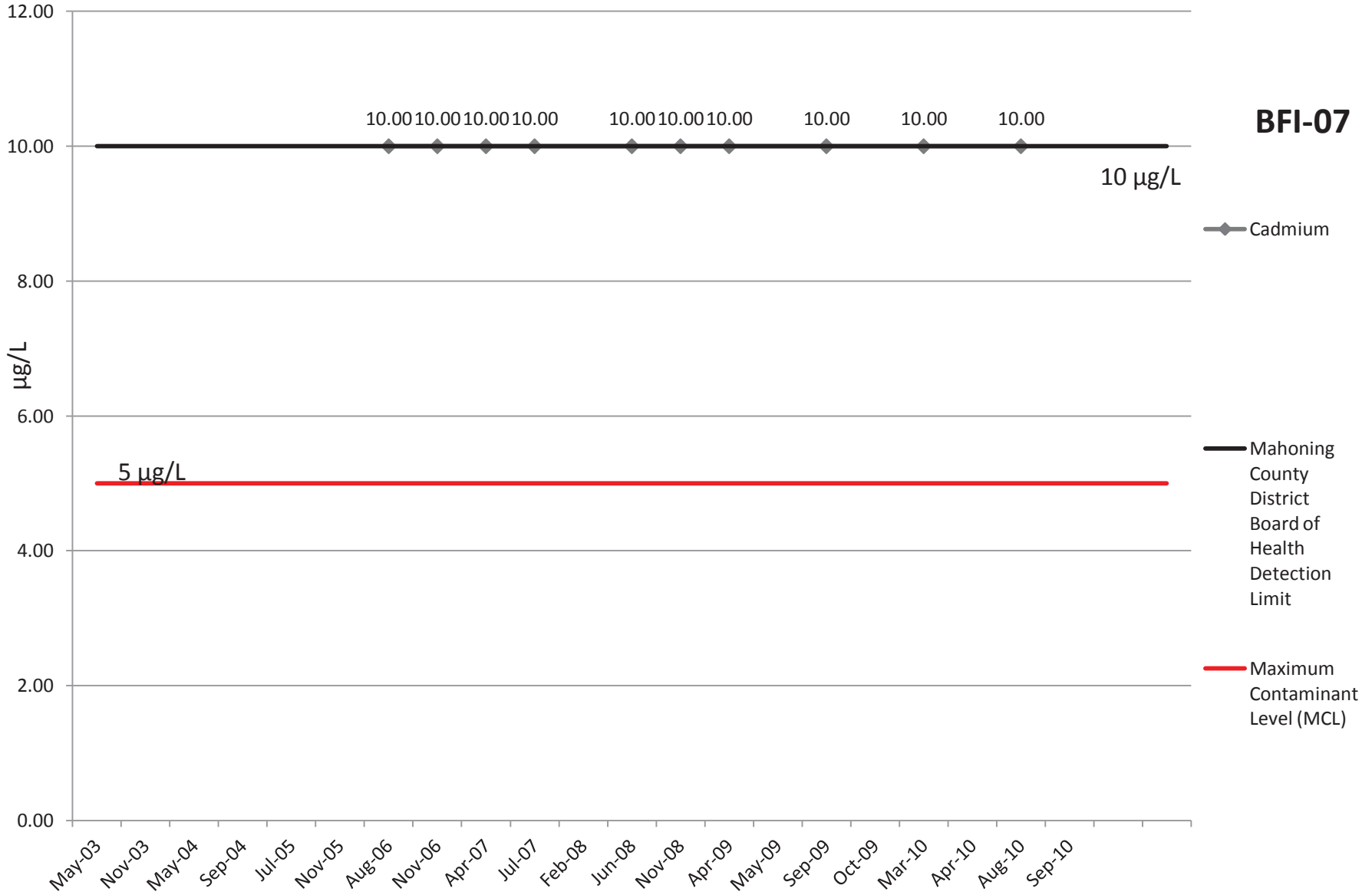
# Barium

**BFI-07**



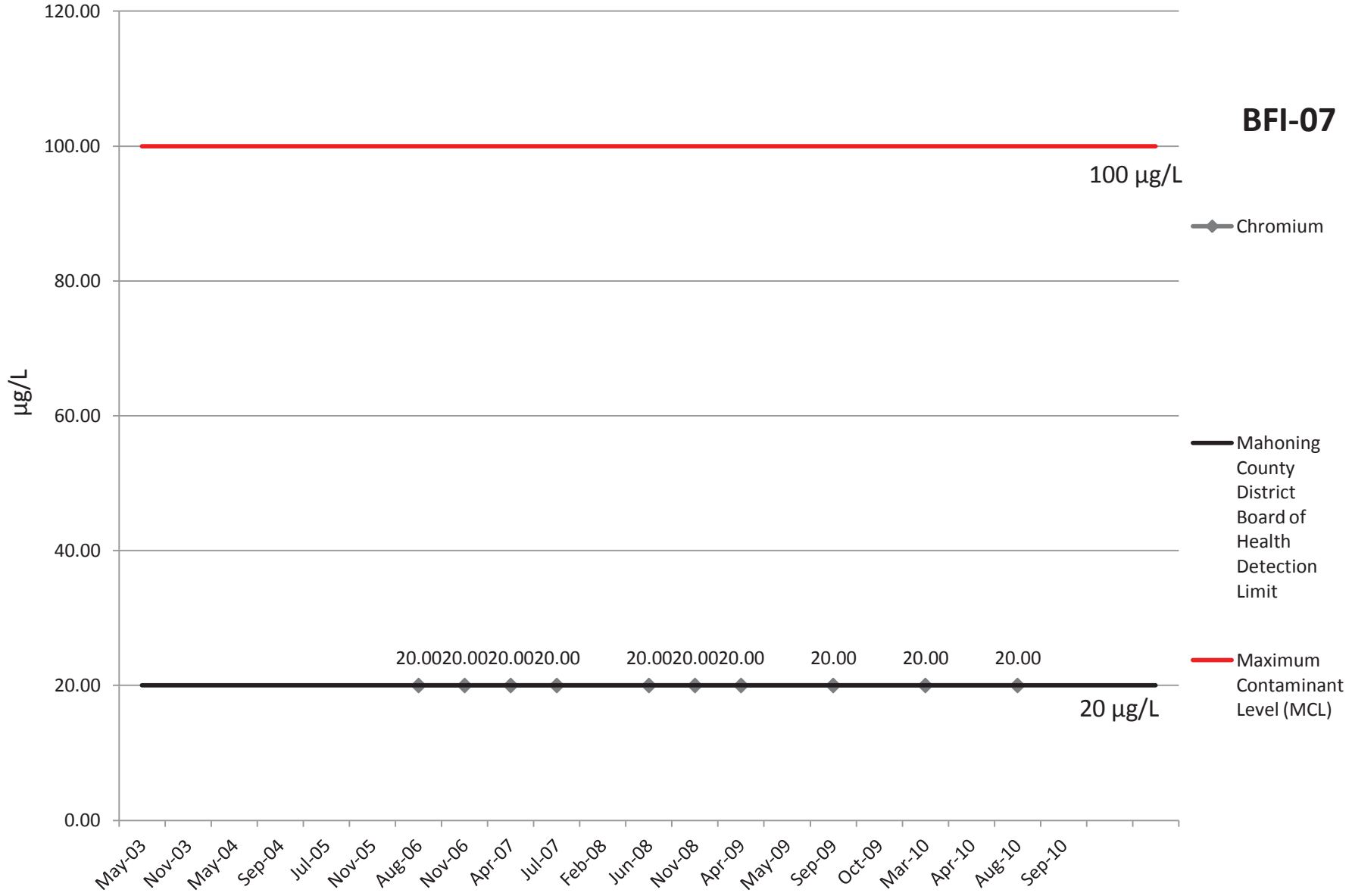
# Cadmium

**BFI-07**

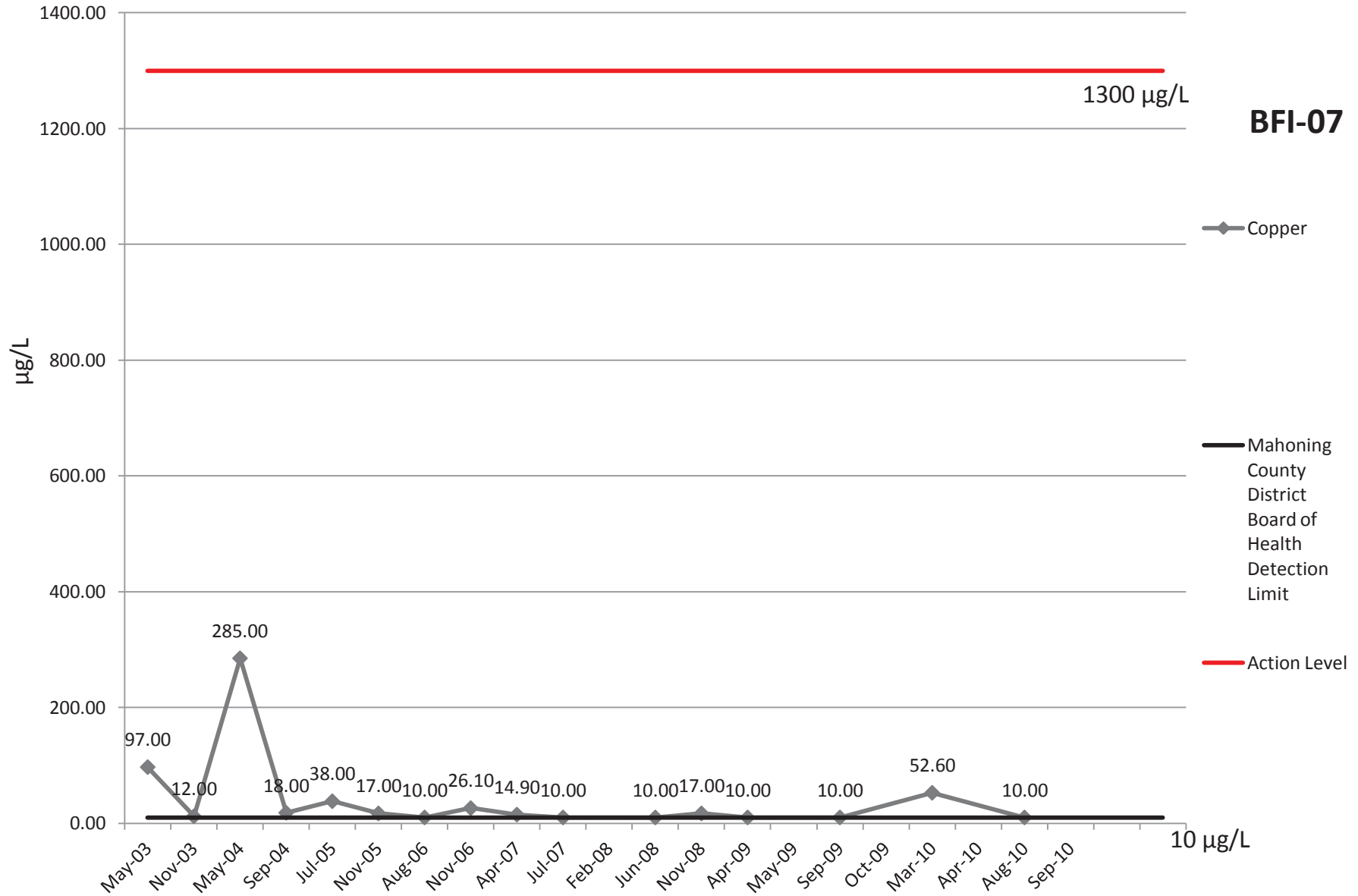


# Chromium

**BFI-07**



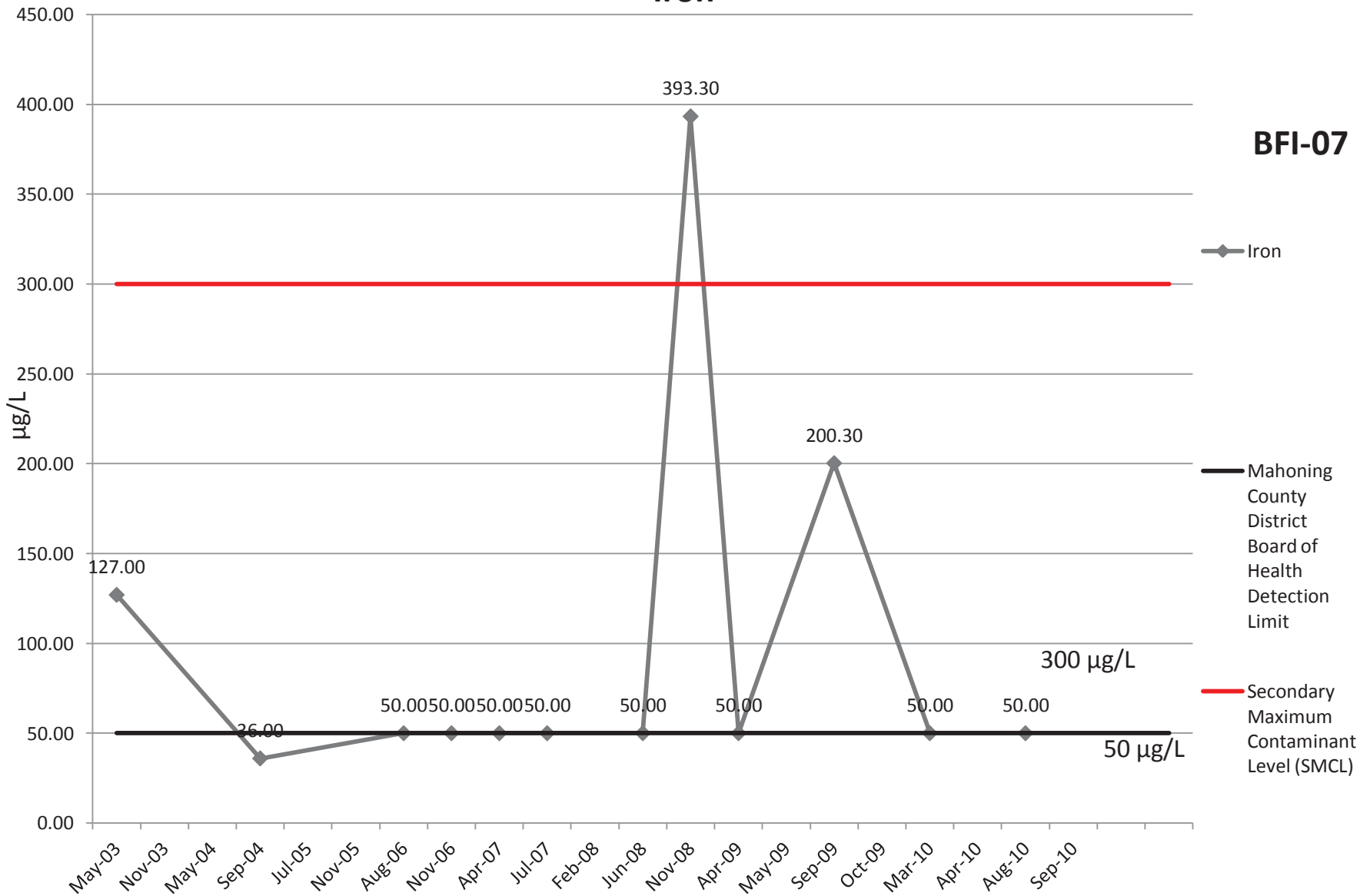
# Copper





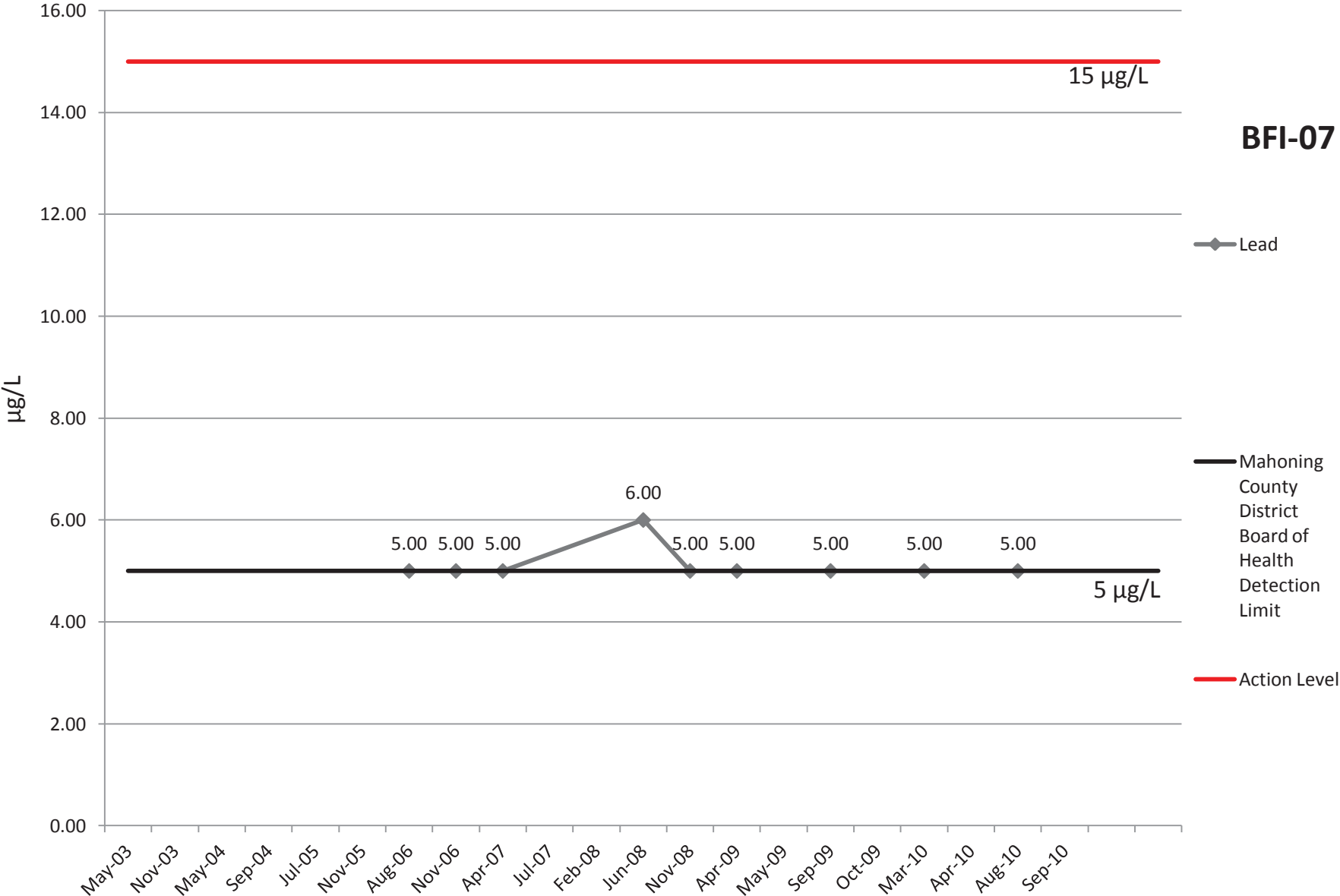
# Iron

**BFI-07**

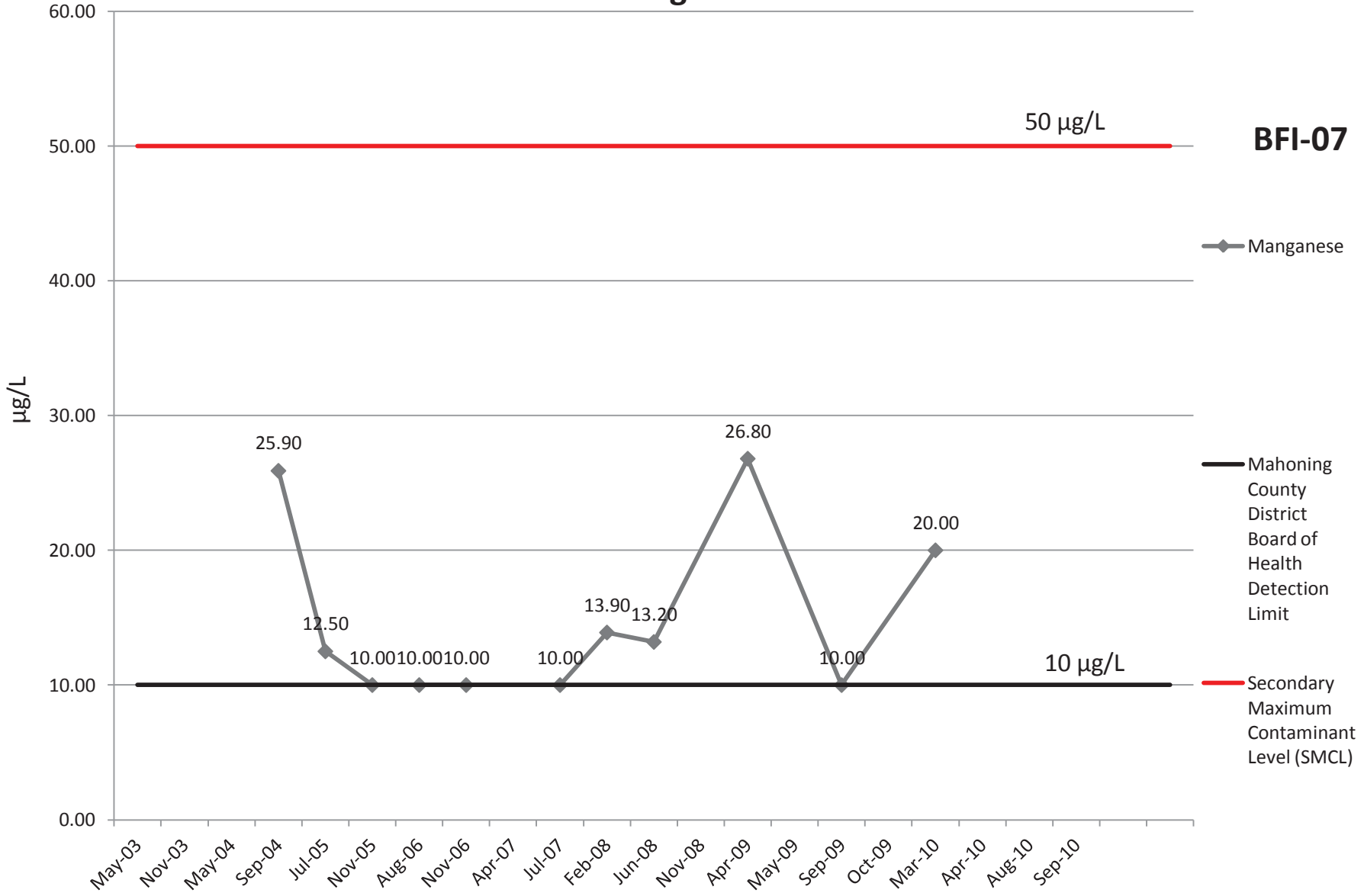


# Lead

**BFI-07**



# Manganese



**BFI-07**

◆ Manganese

— Mahoning County District Board of Health Detection Limit

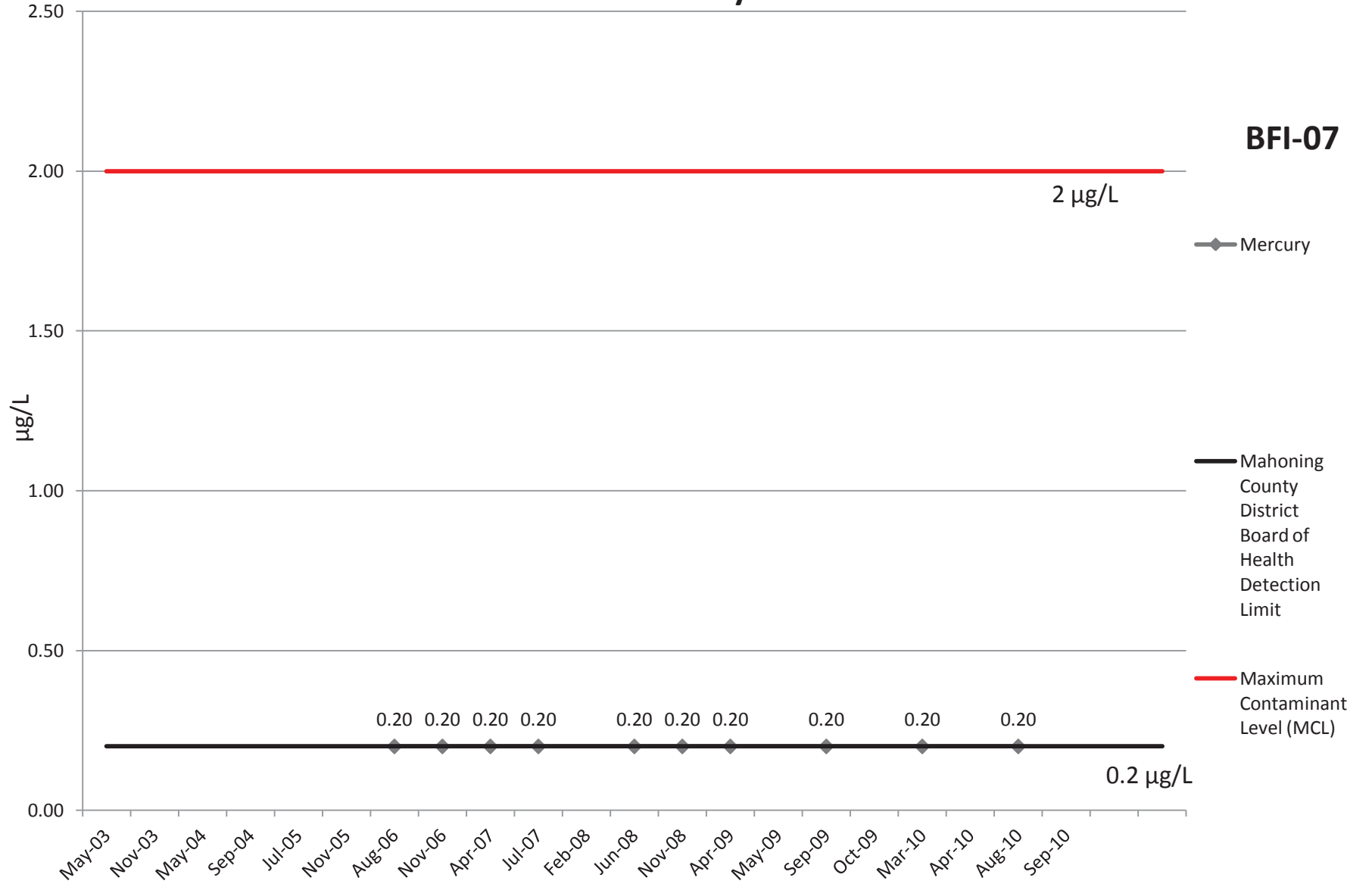
— Secondary Maximum Contaminant Level (SMCL)

# Mercury

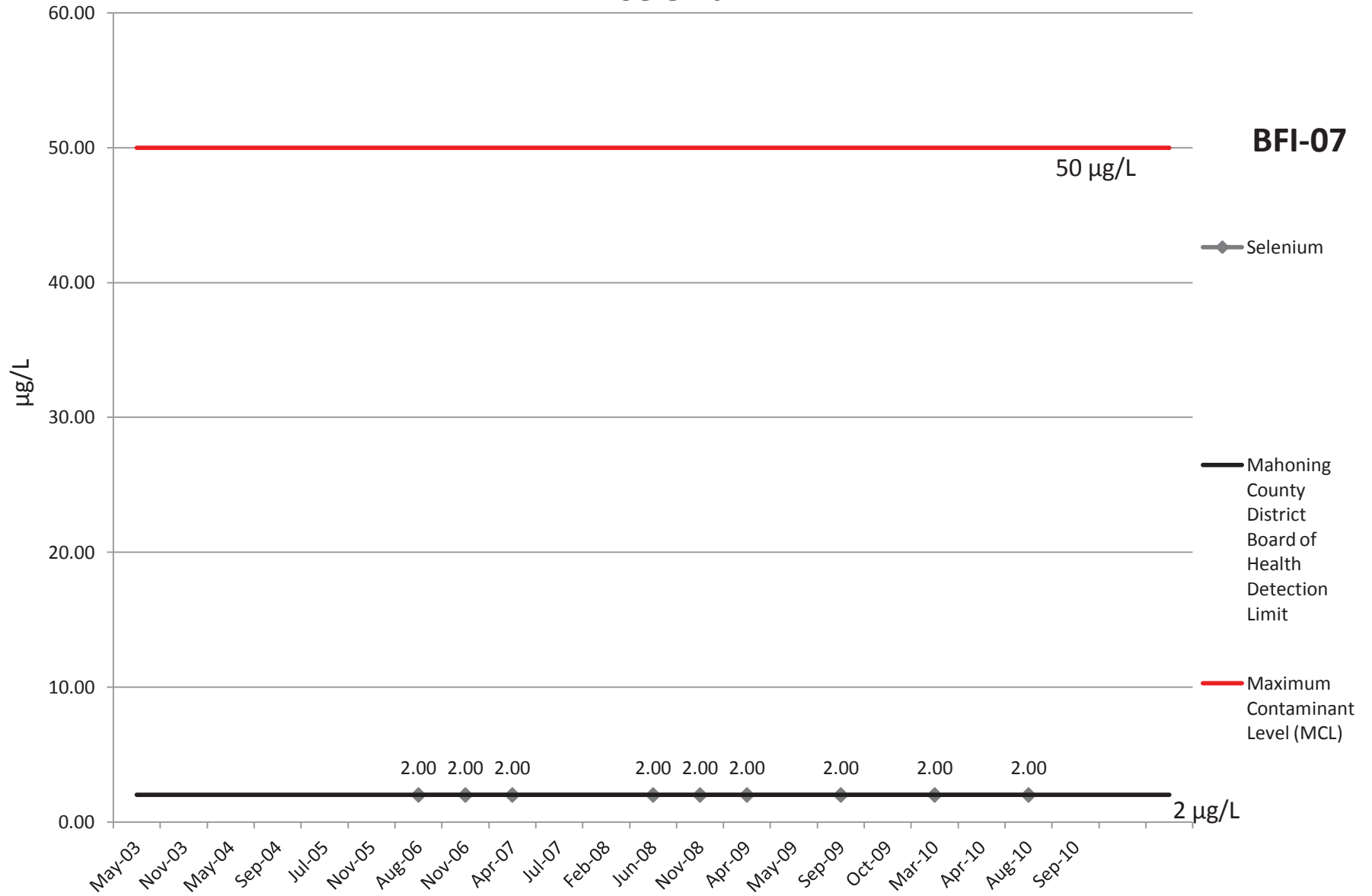
**BFI-07**

2 µg/L

0.2 µg/L

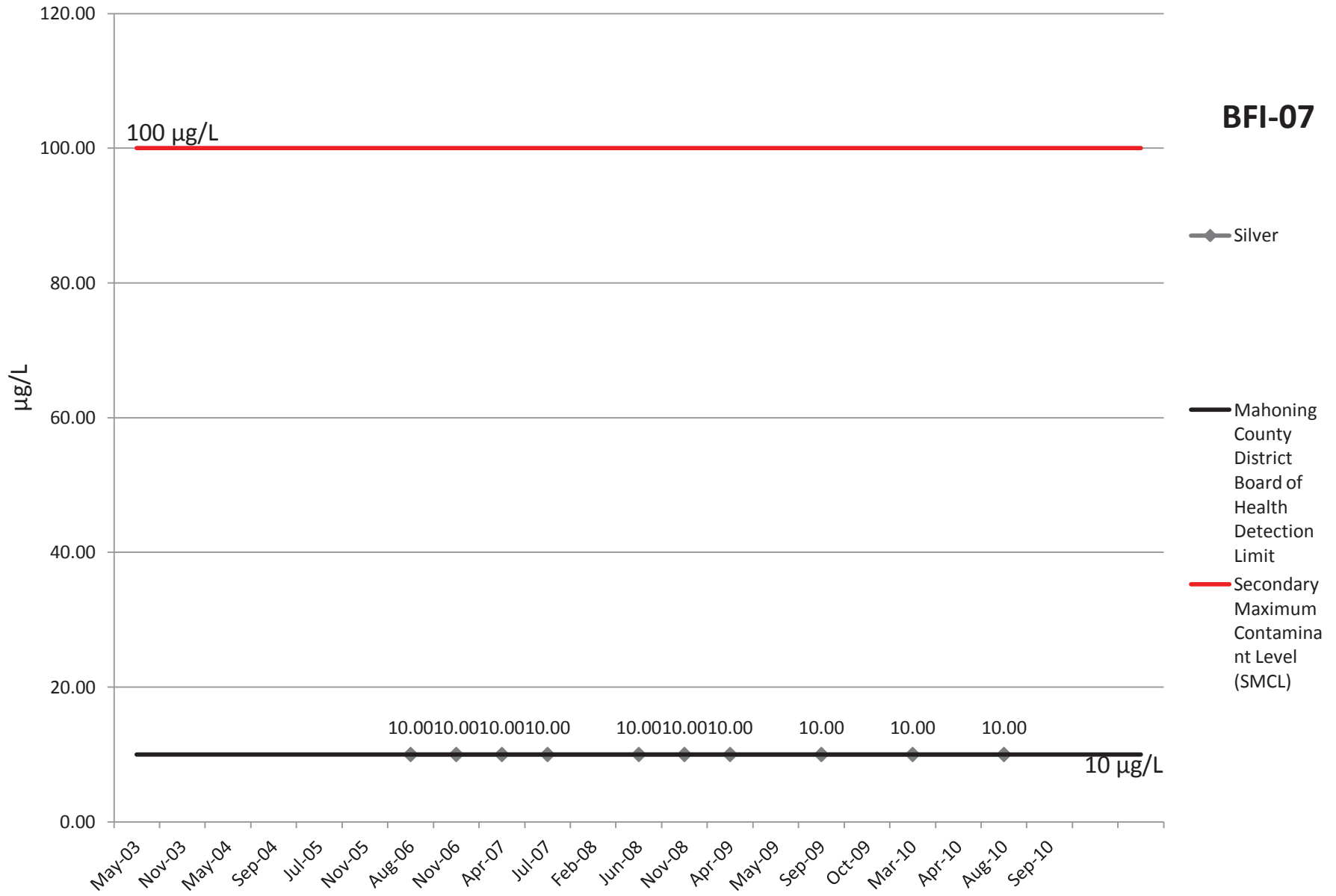


# Selenium



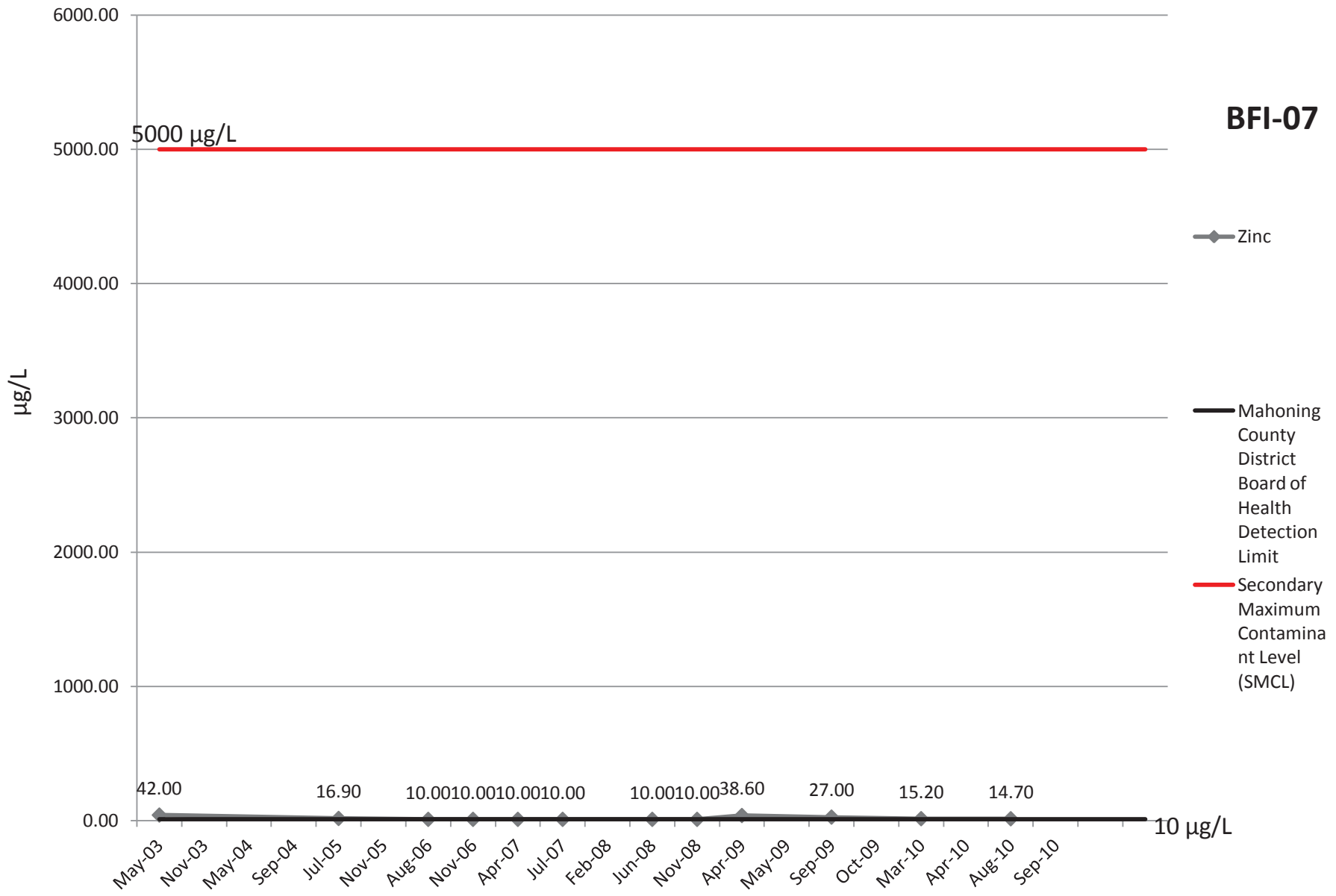
# Silver

**BFI-07**



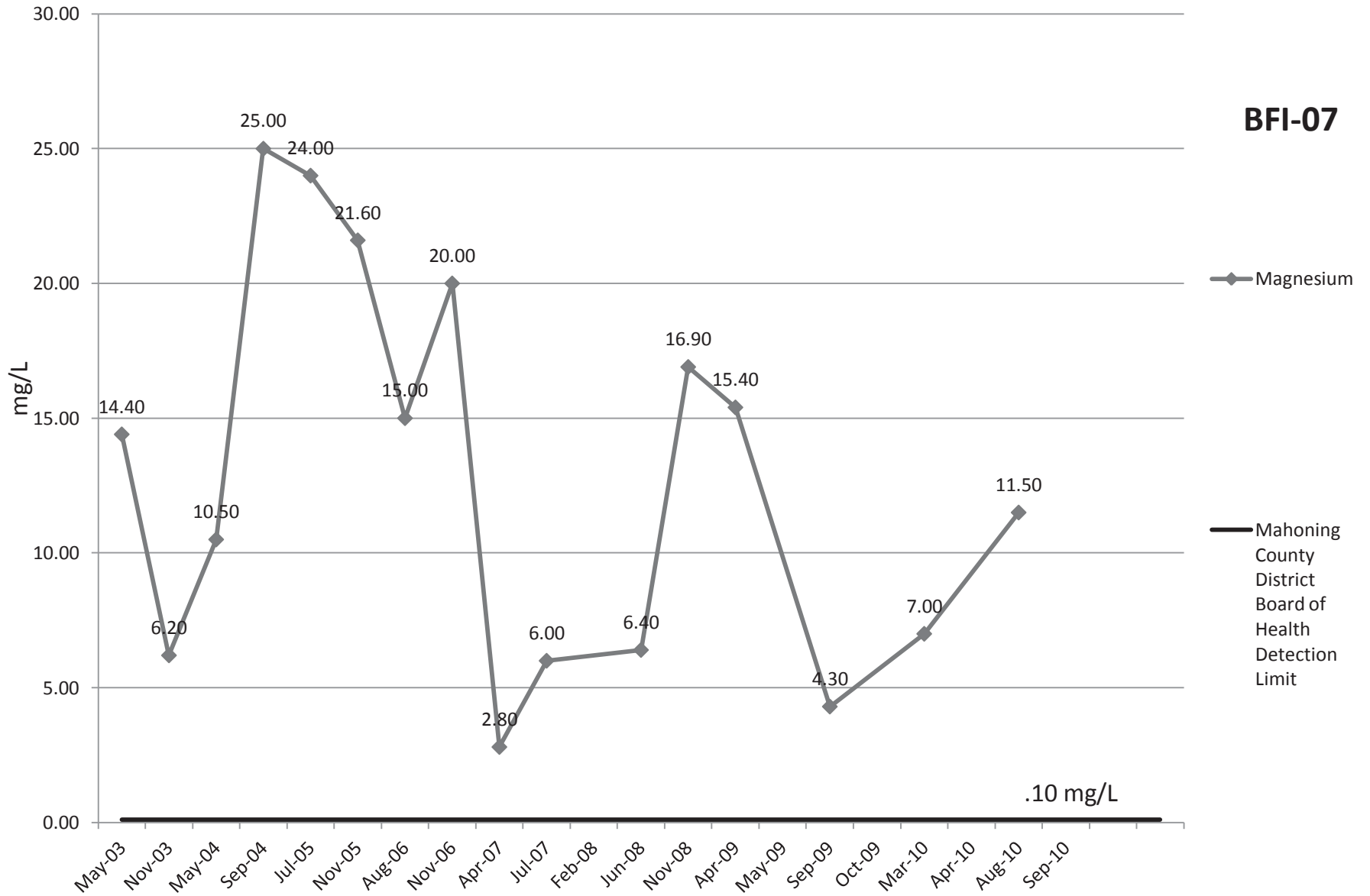
# Zinc

**BFI-07**



# Magnesium

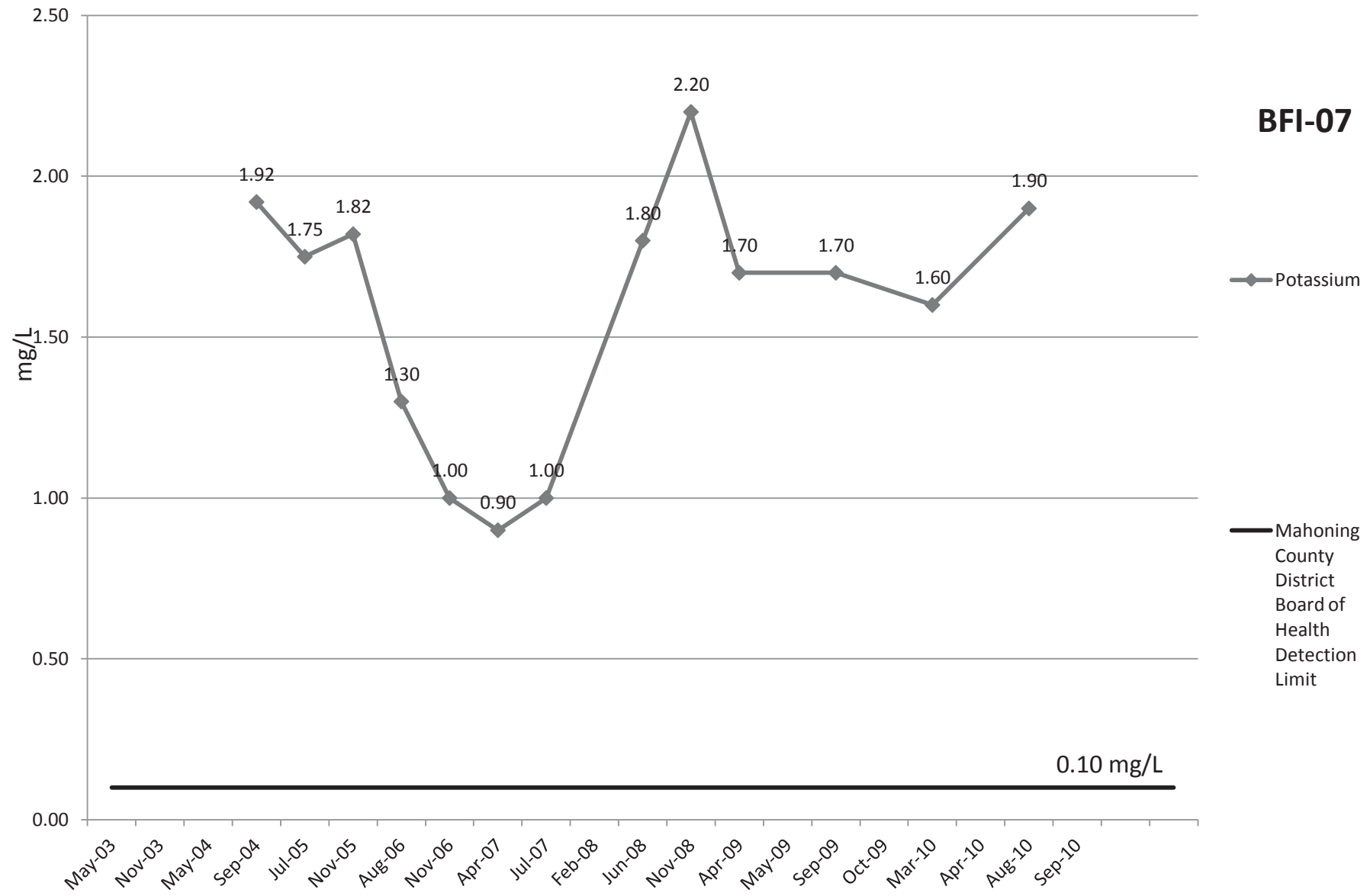
**BFI-07**





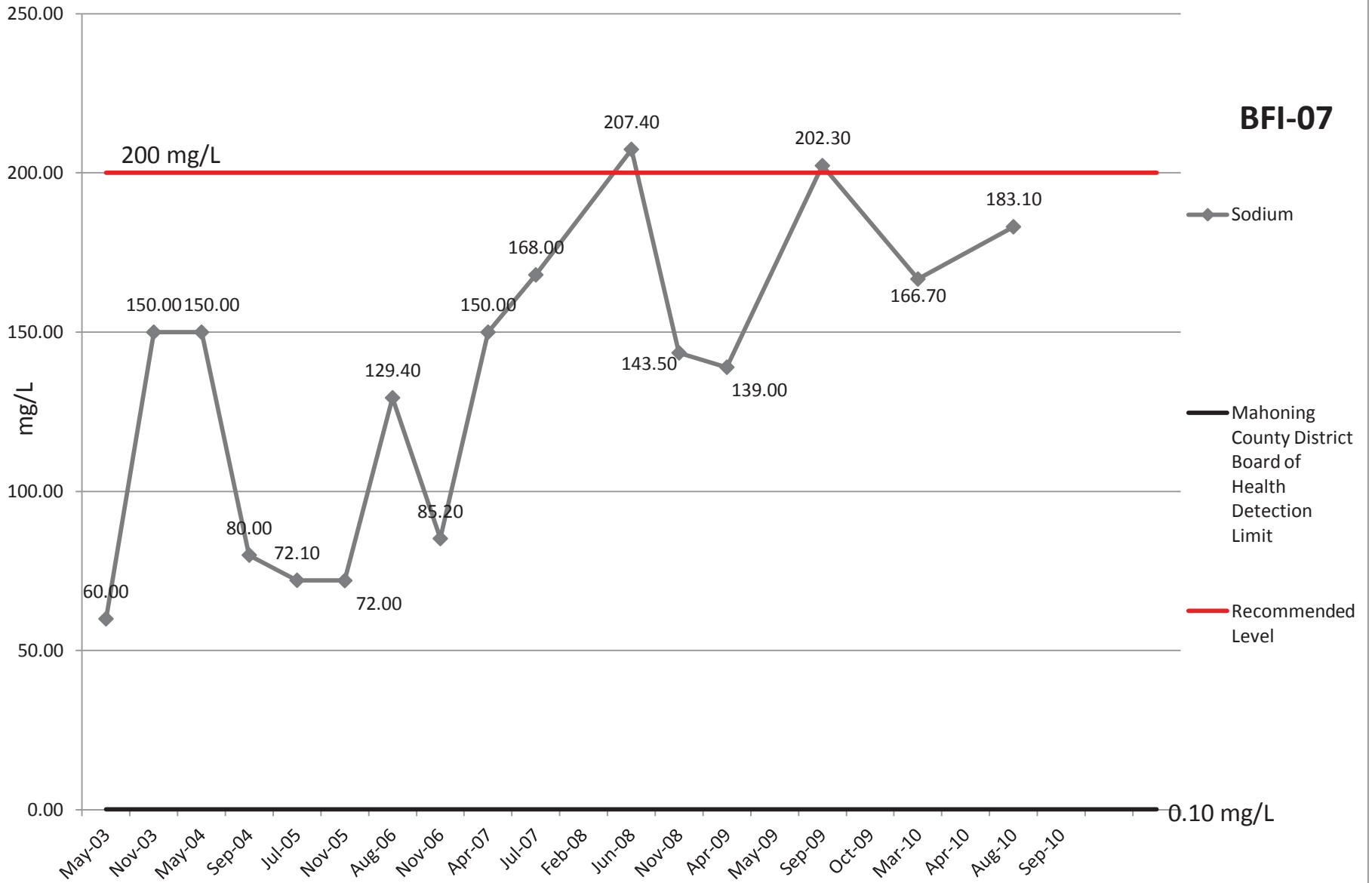
# Potassium

**BFI-07**



# Sodium

**BFI-07**



# Nitrate EPA

**BFI-07**

10 mg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00  
mg/L

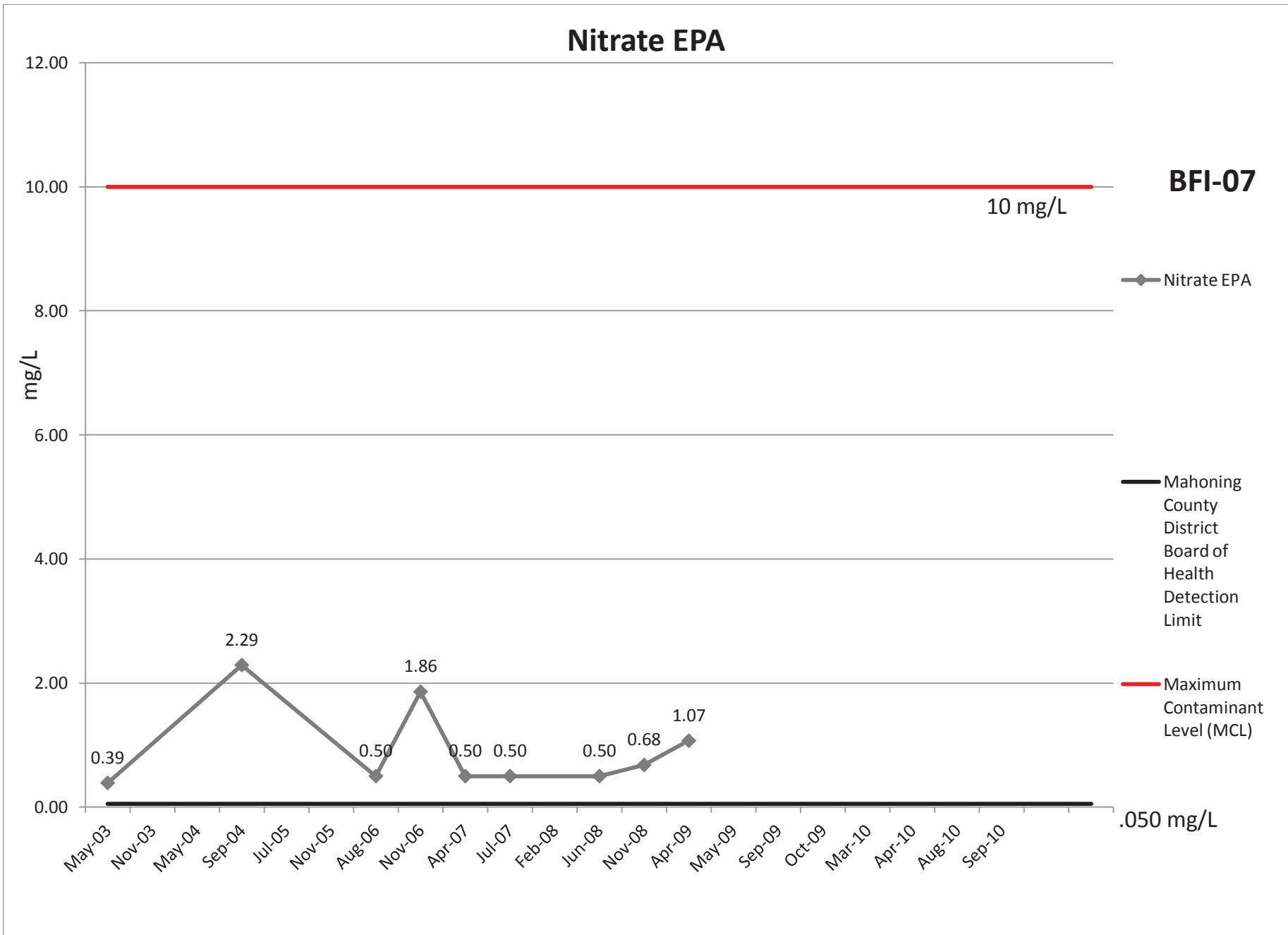
◆ Nitrate EPA

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

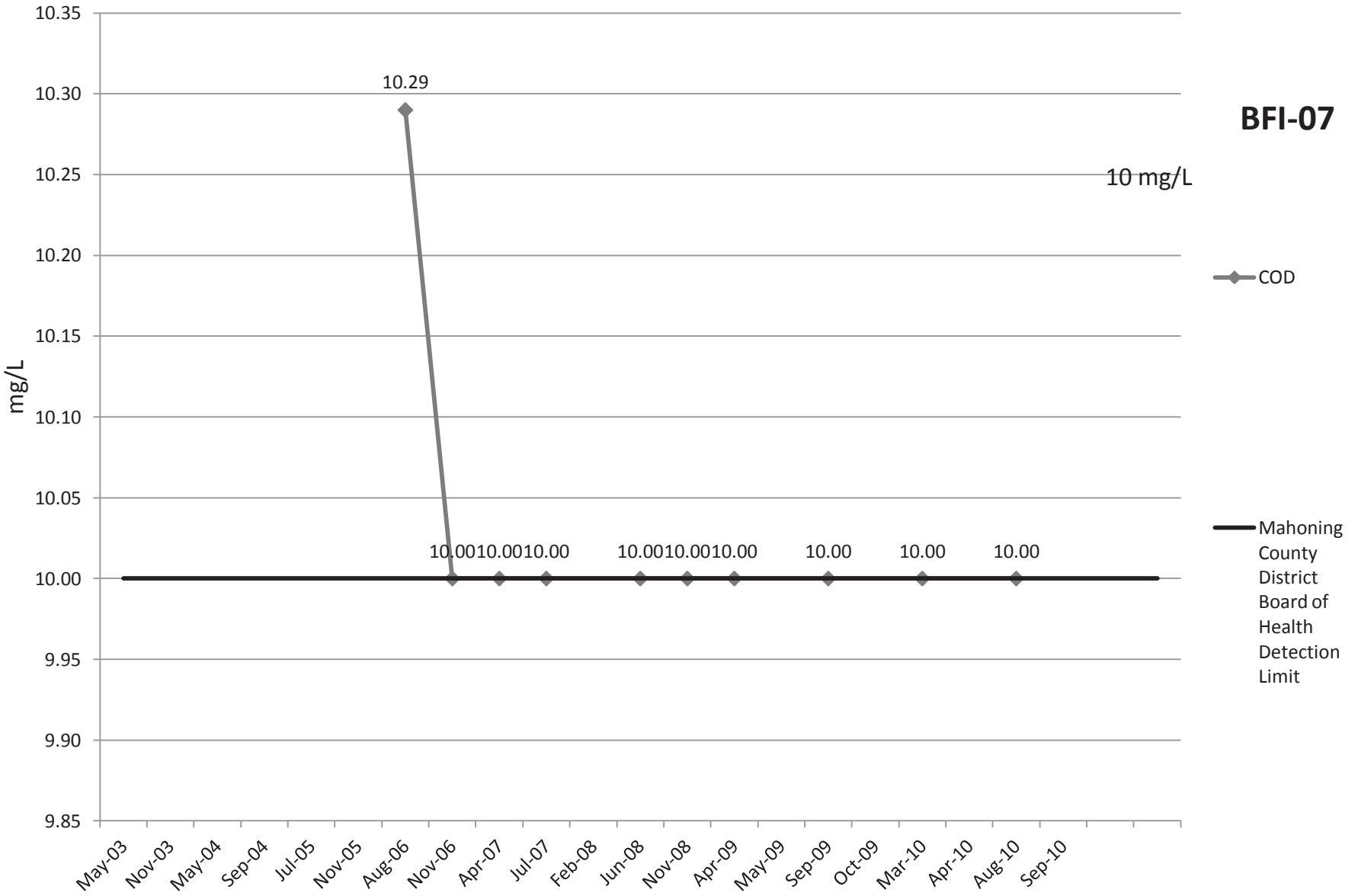
.050 mg/L

May-03 0.39  
Nov-03  
May-04  
Sep-04 2.29  
Jul-05  
Nov-05  
Aug-06 0.50  
Nov-06 1.86  
Apr-07 0.50  
Jul-07 0.50  
Feb-08  
Jun-08 0.50  
Nov-08 0.68  
Apr-09 1.07  
May-09  
Sep-09  
Oct-09  
Mar-10  
Apr-10  
Aug-10  
Sep-10



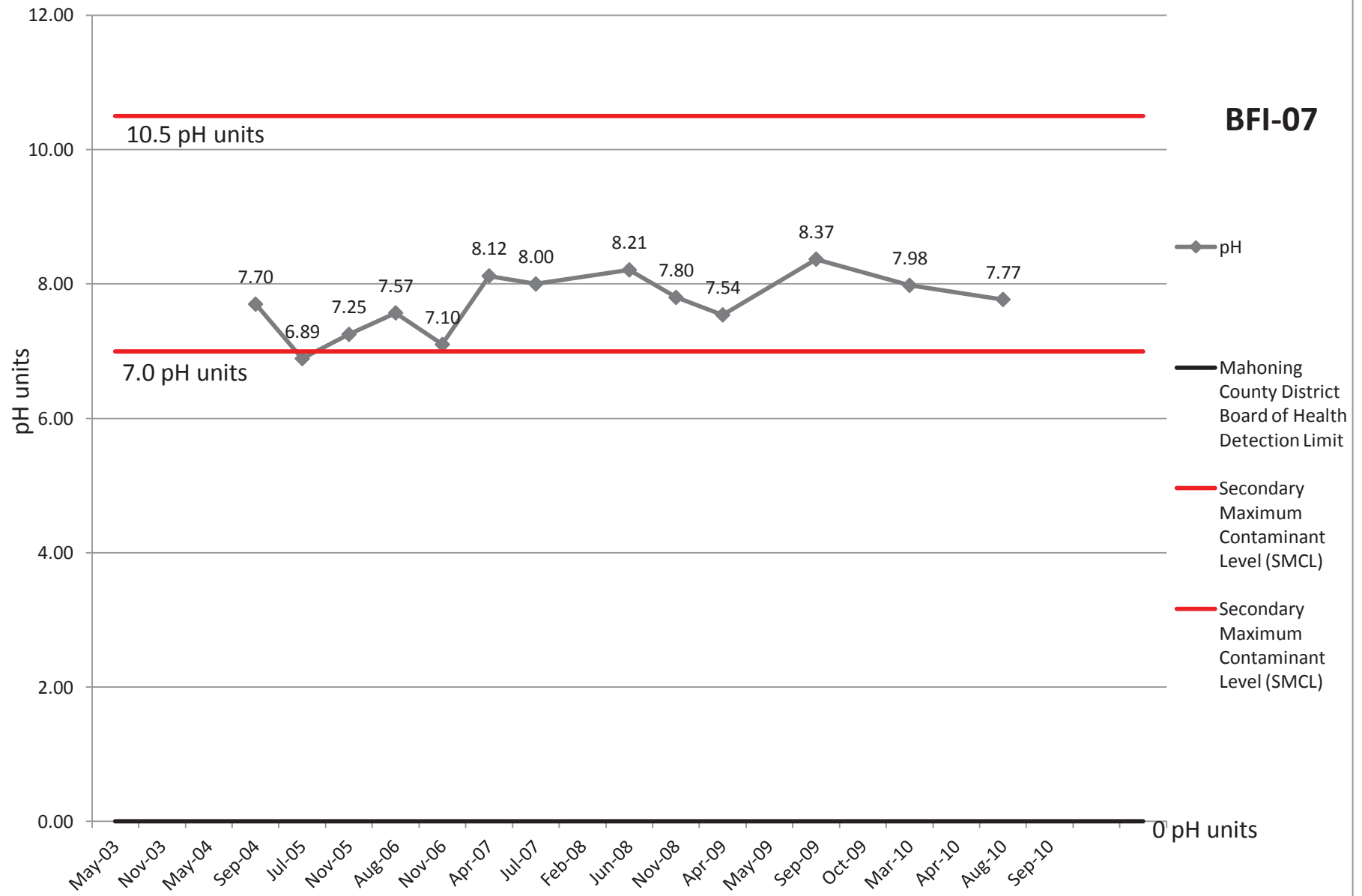
# COD

**BFI-07**



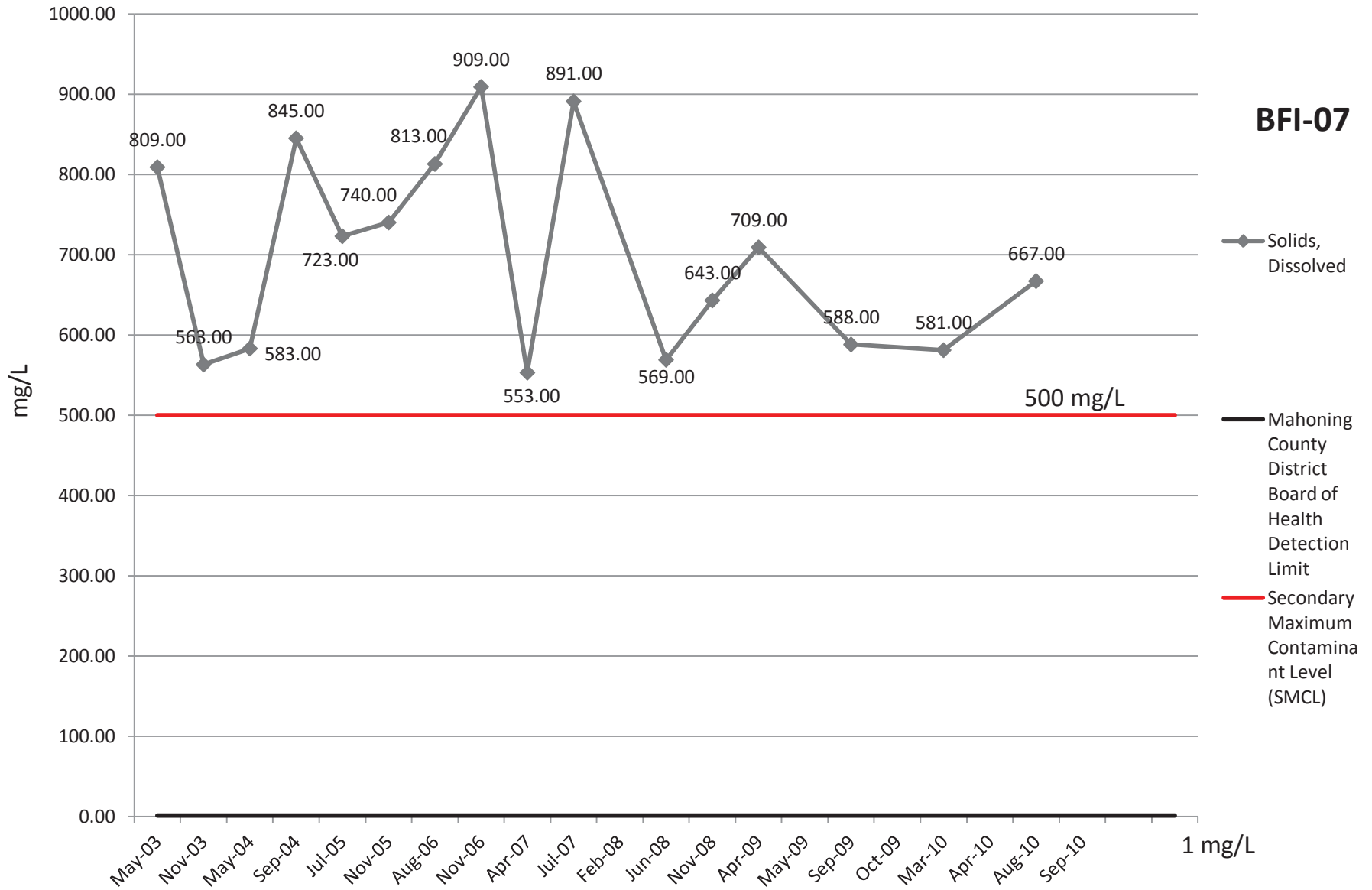
# pH

**BFI-07**



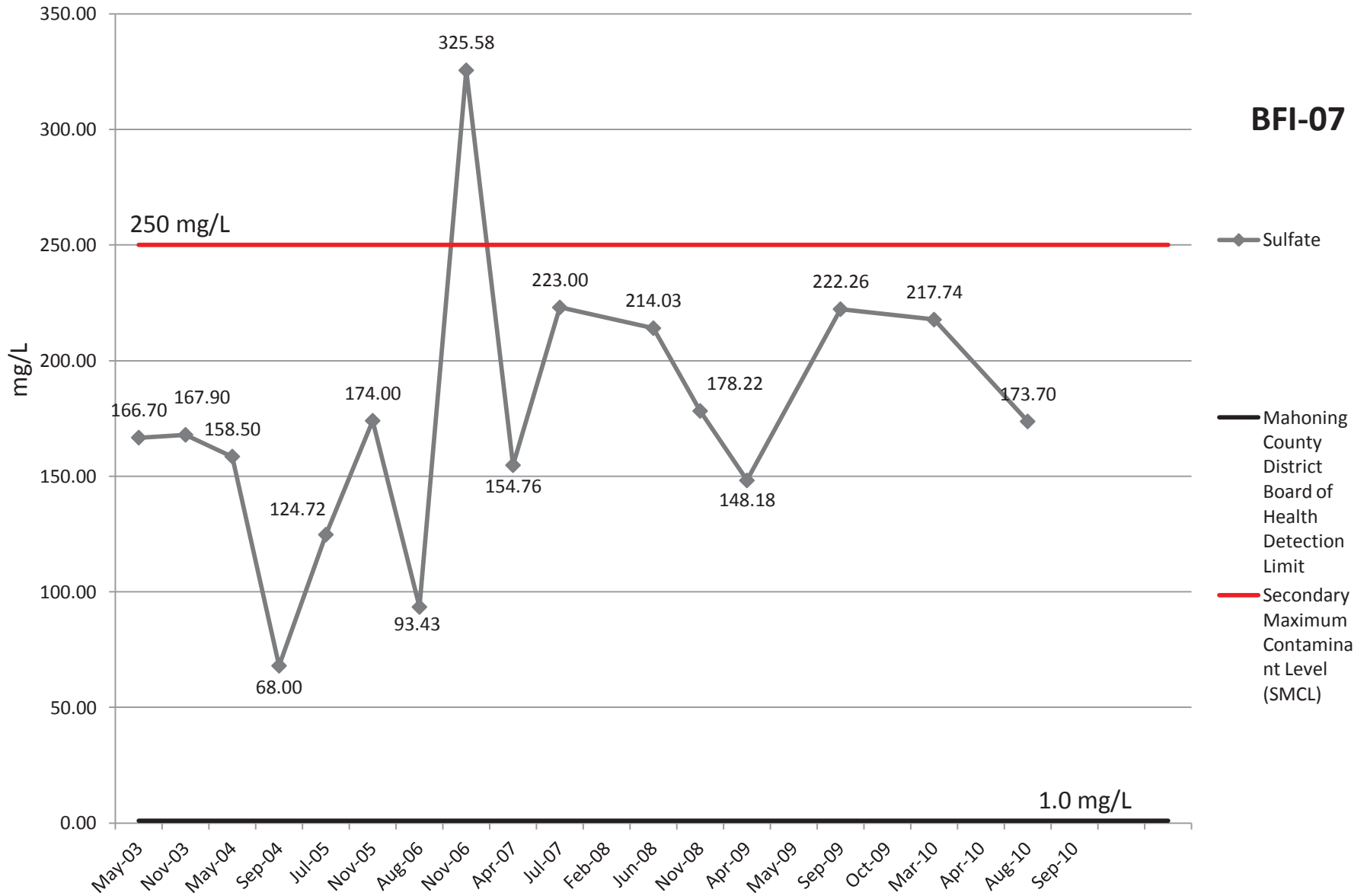
# Solids, Dissolved

**BFI-07**



# Sulfate

**BFI-07**



# Bacteria

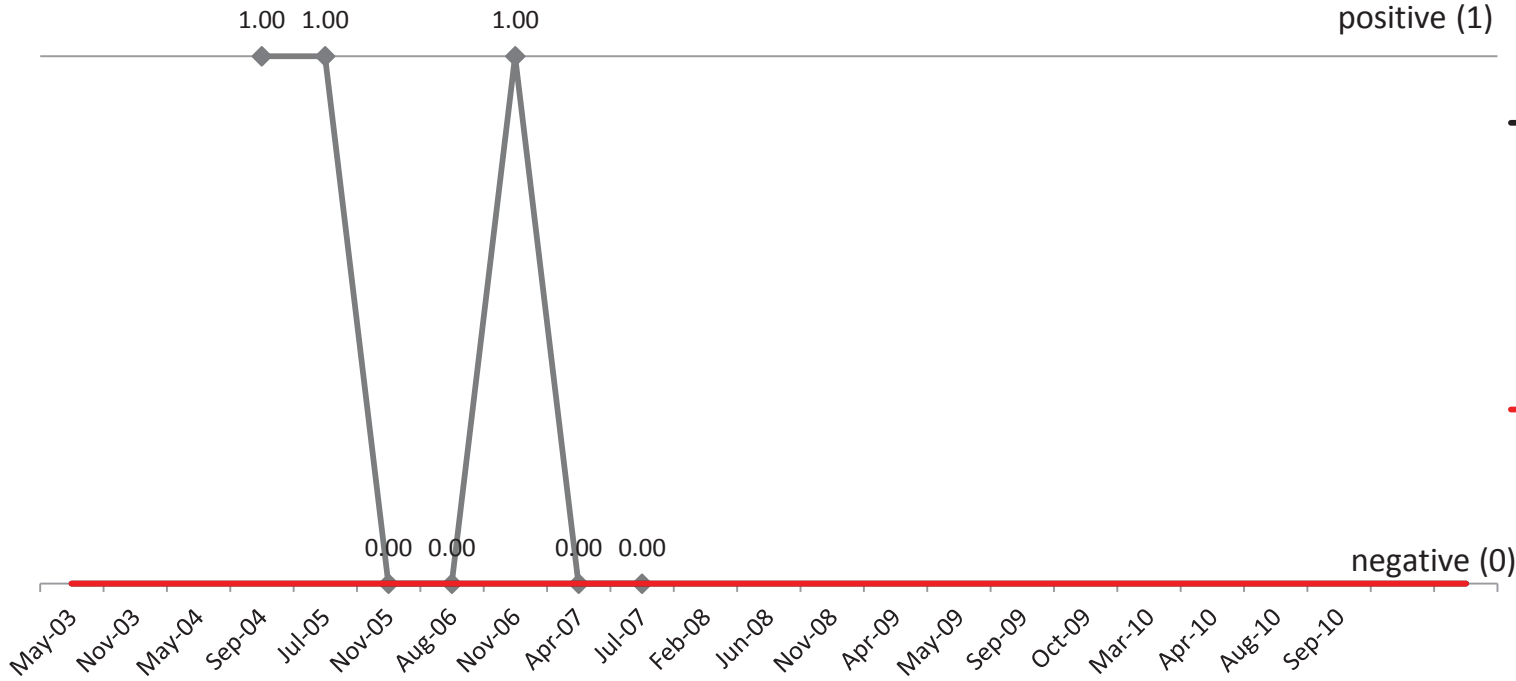
**BFI-07**

Positive/Negative

◆ Bacteria

— Mahoning County District Board of Health Detection Limit

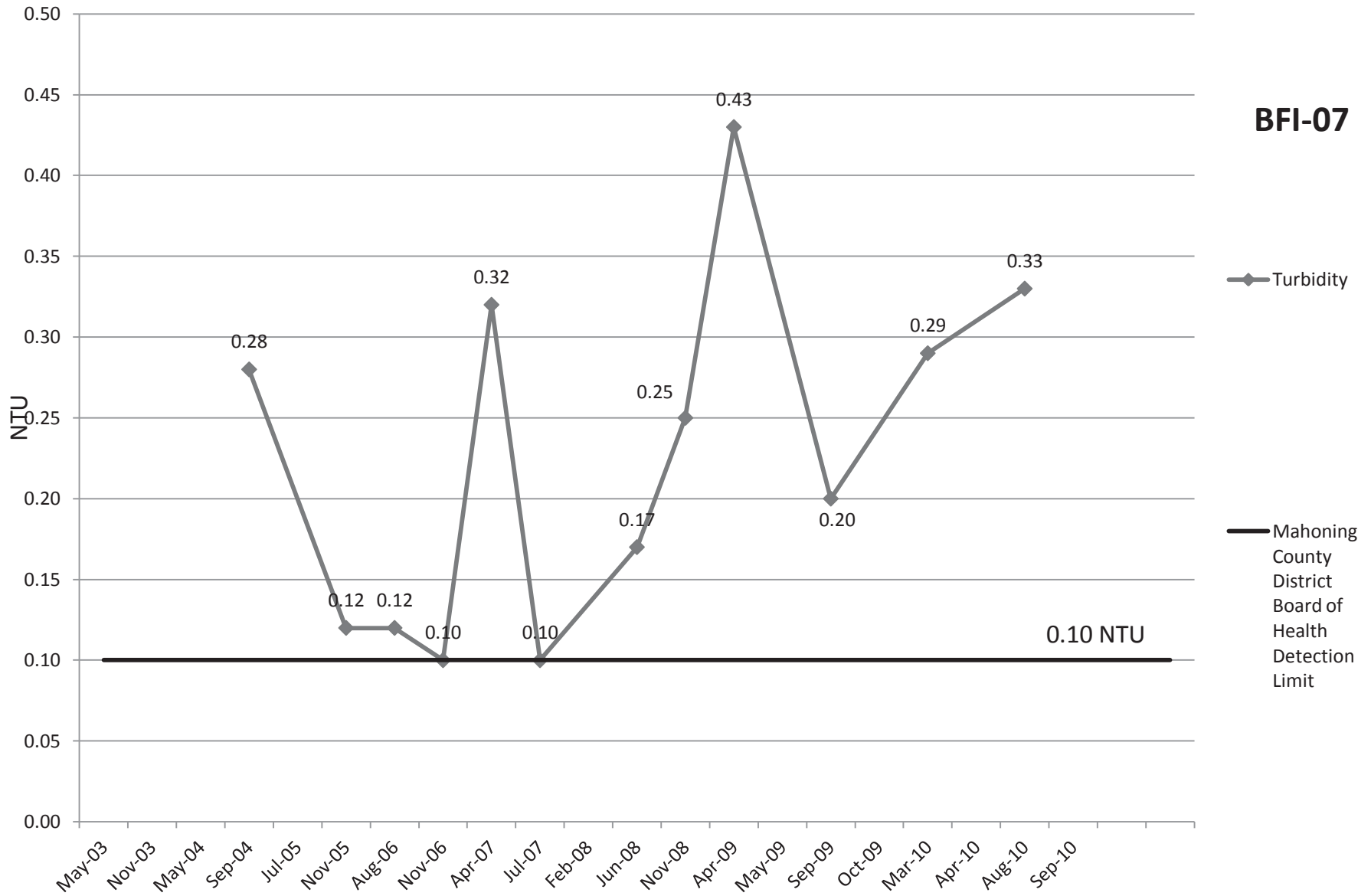
— Maximum Contaminant Level (MCL)



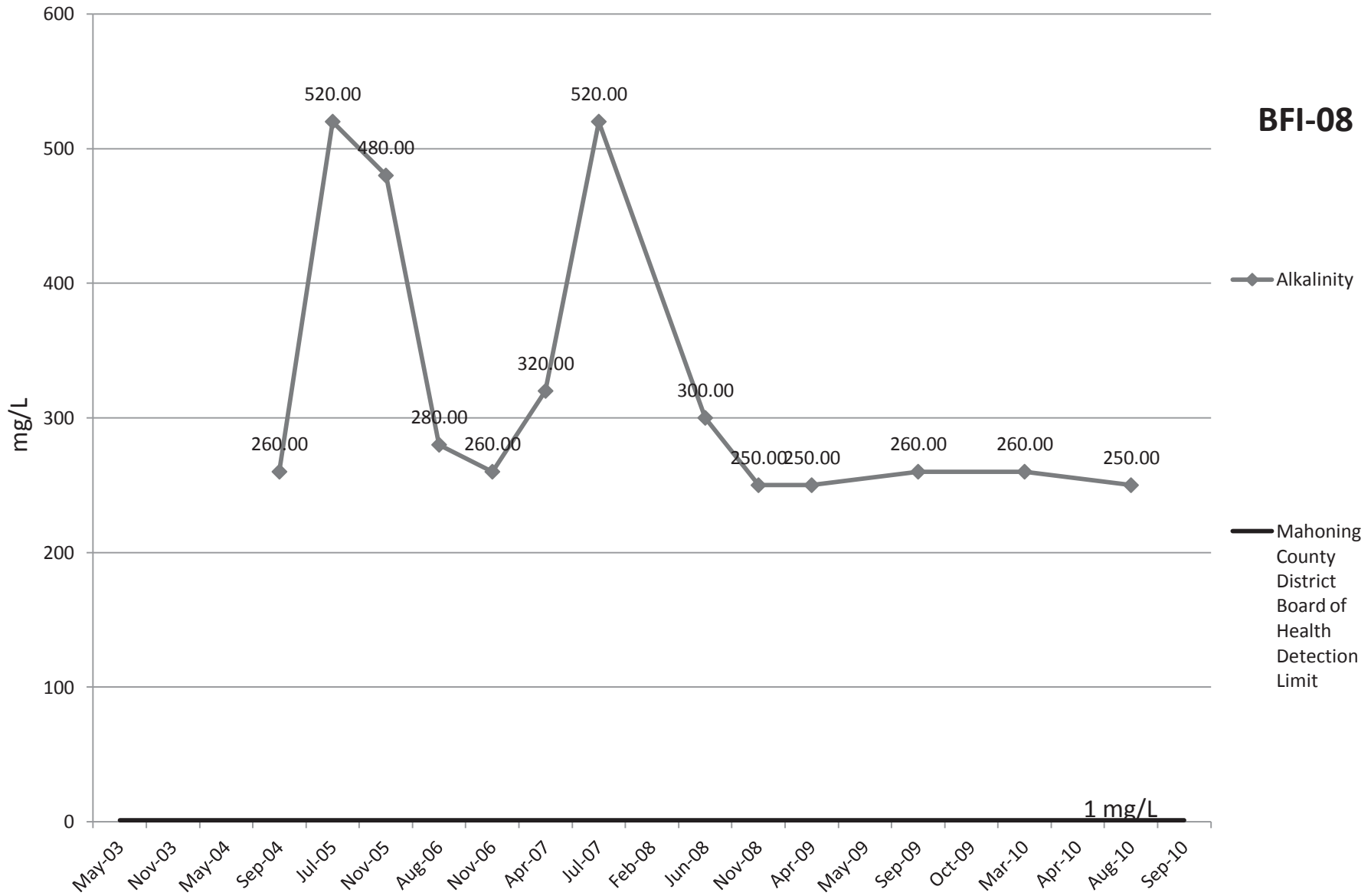


# Turbidity

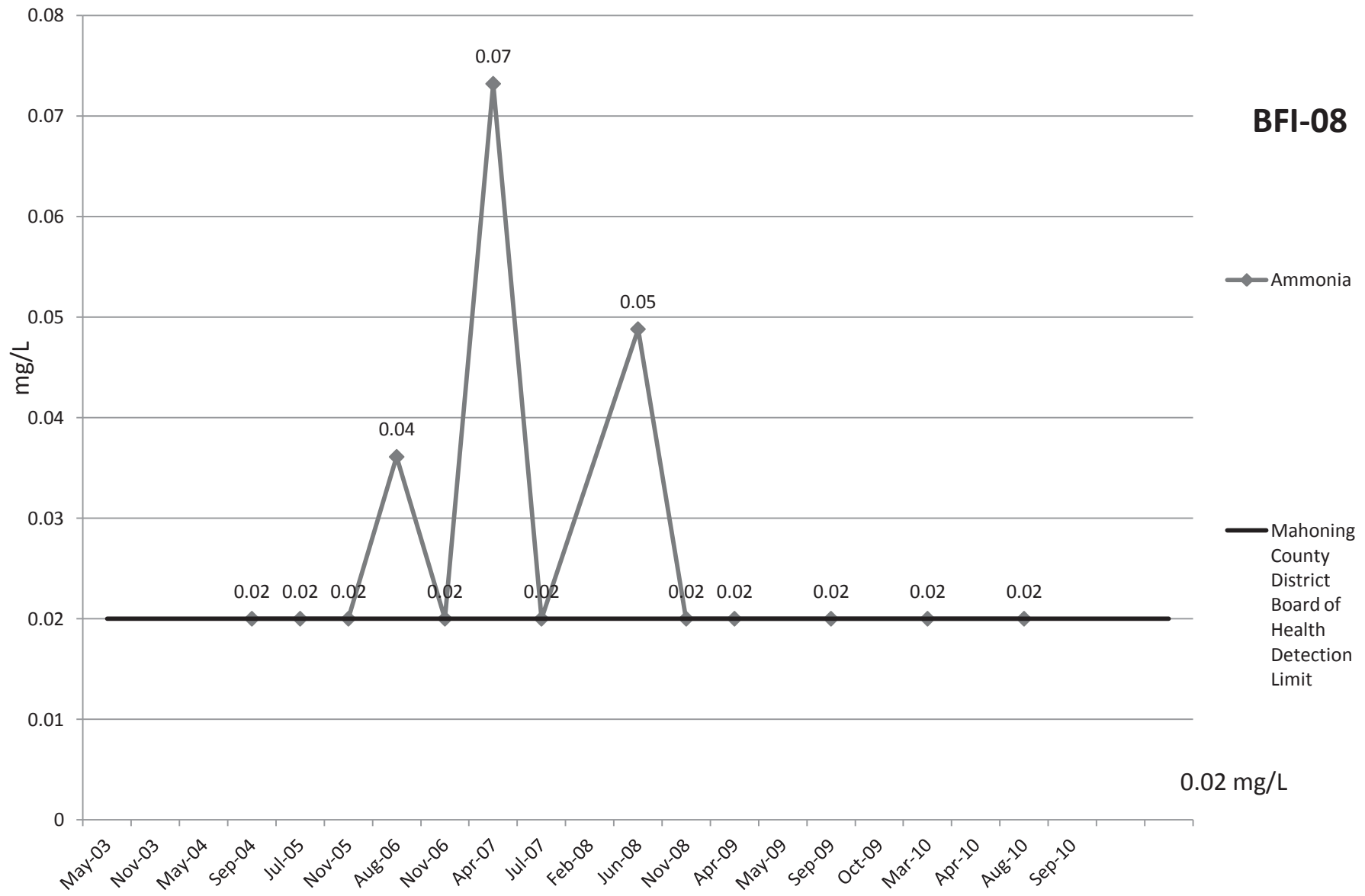
**BFI-07**



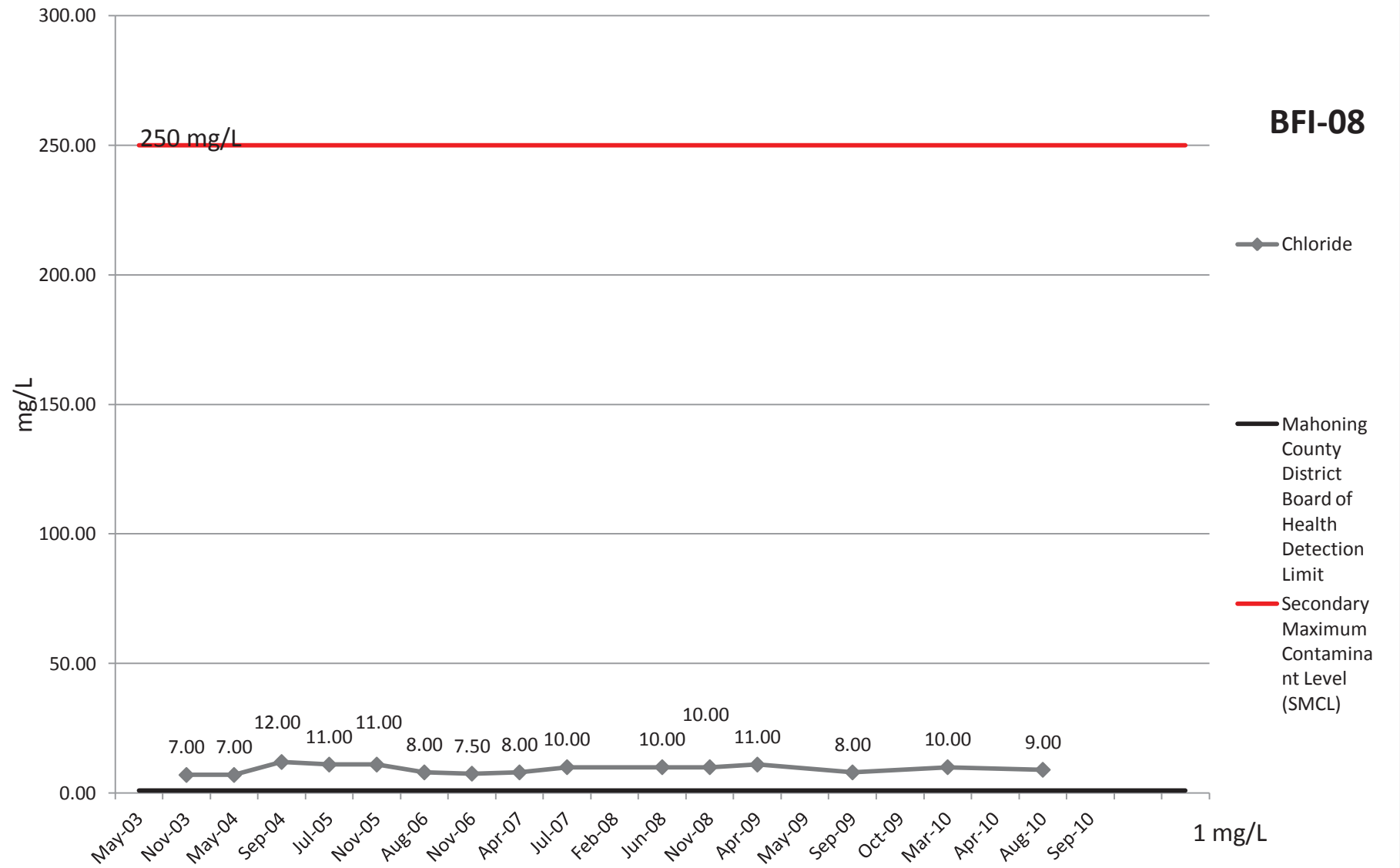
# Alkalinity



# Ammonia

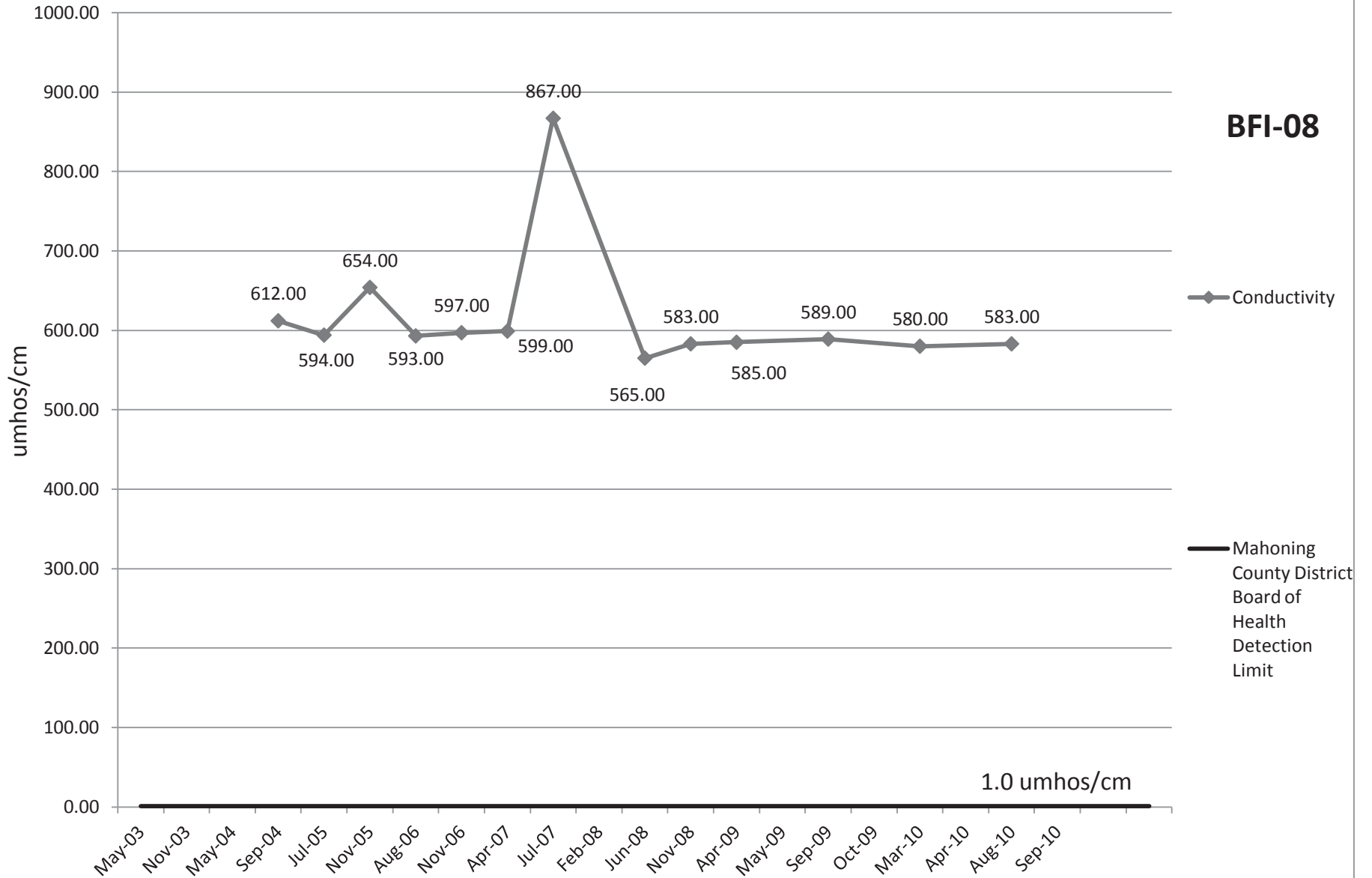


# Chloride

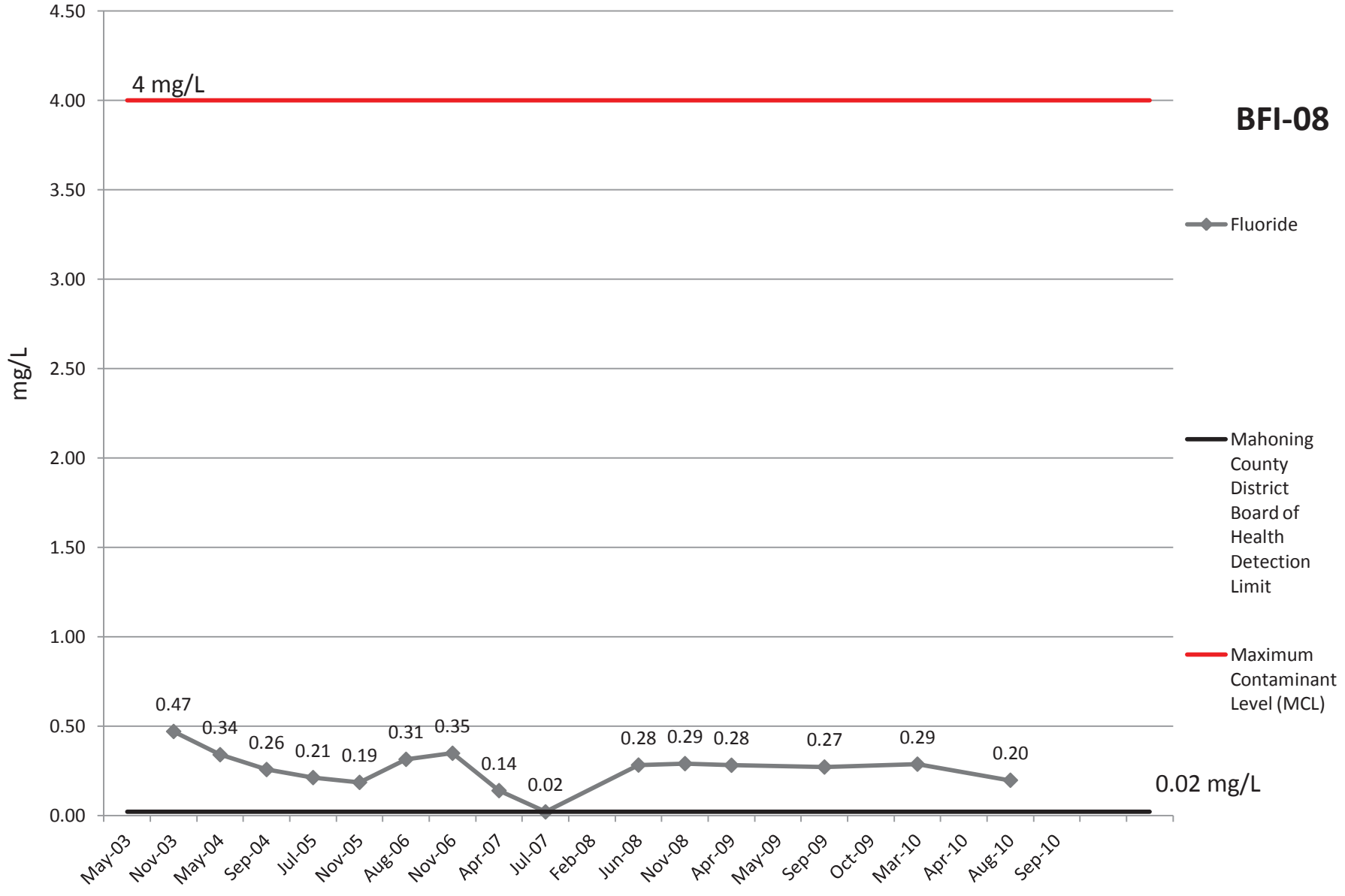


# Conductivity

**BFI-08**

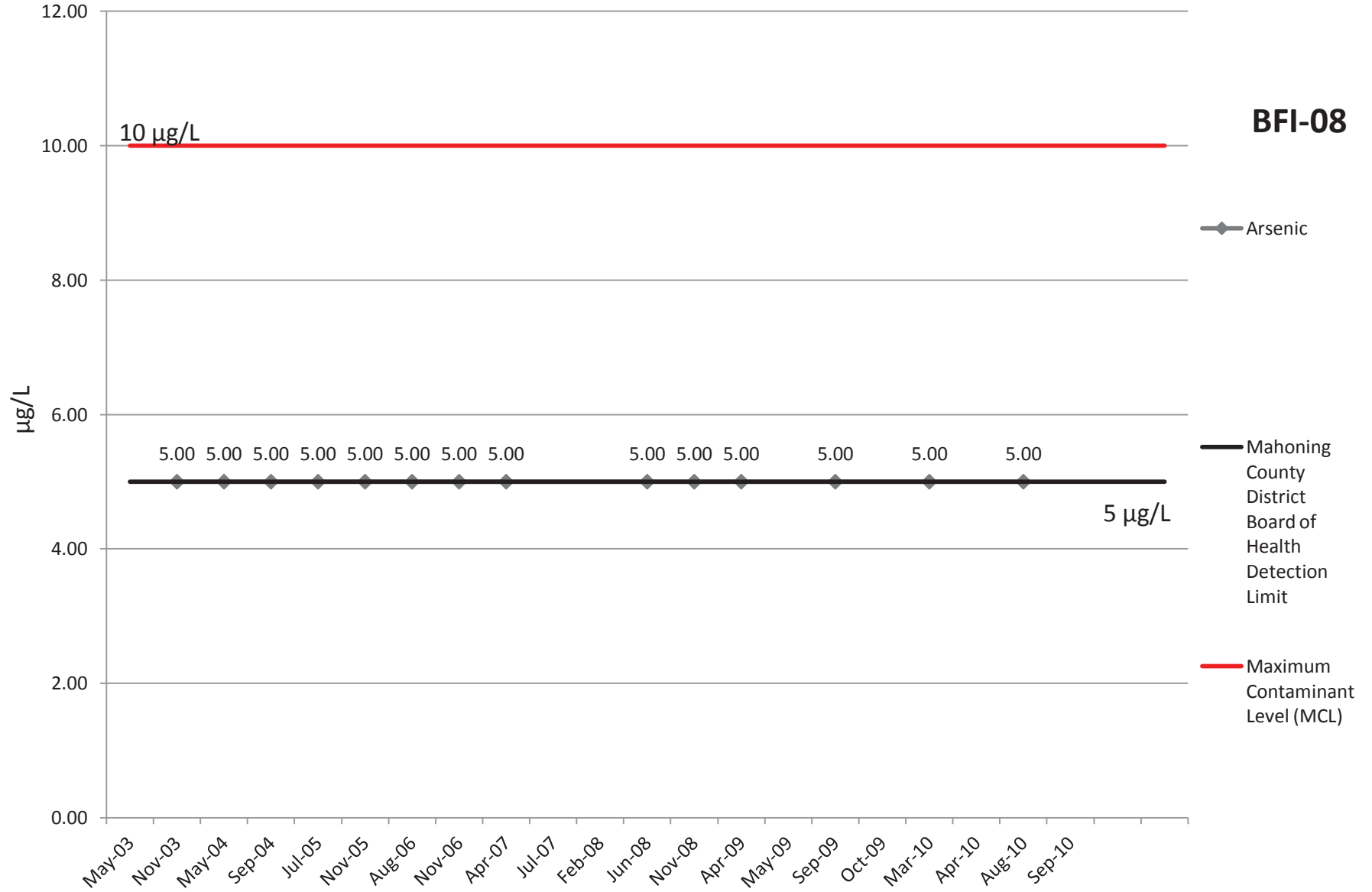


# Fluoride



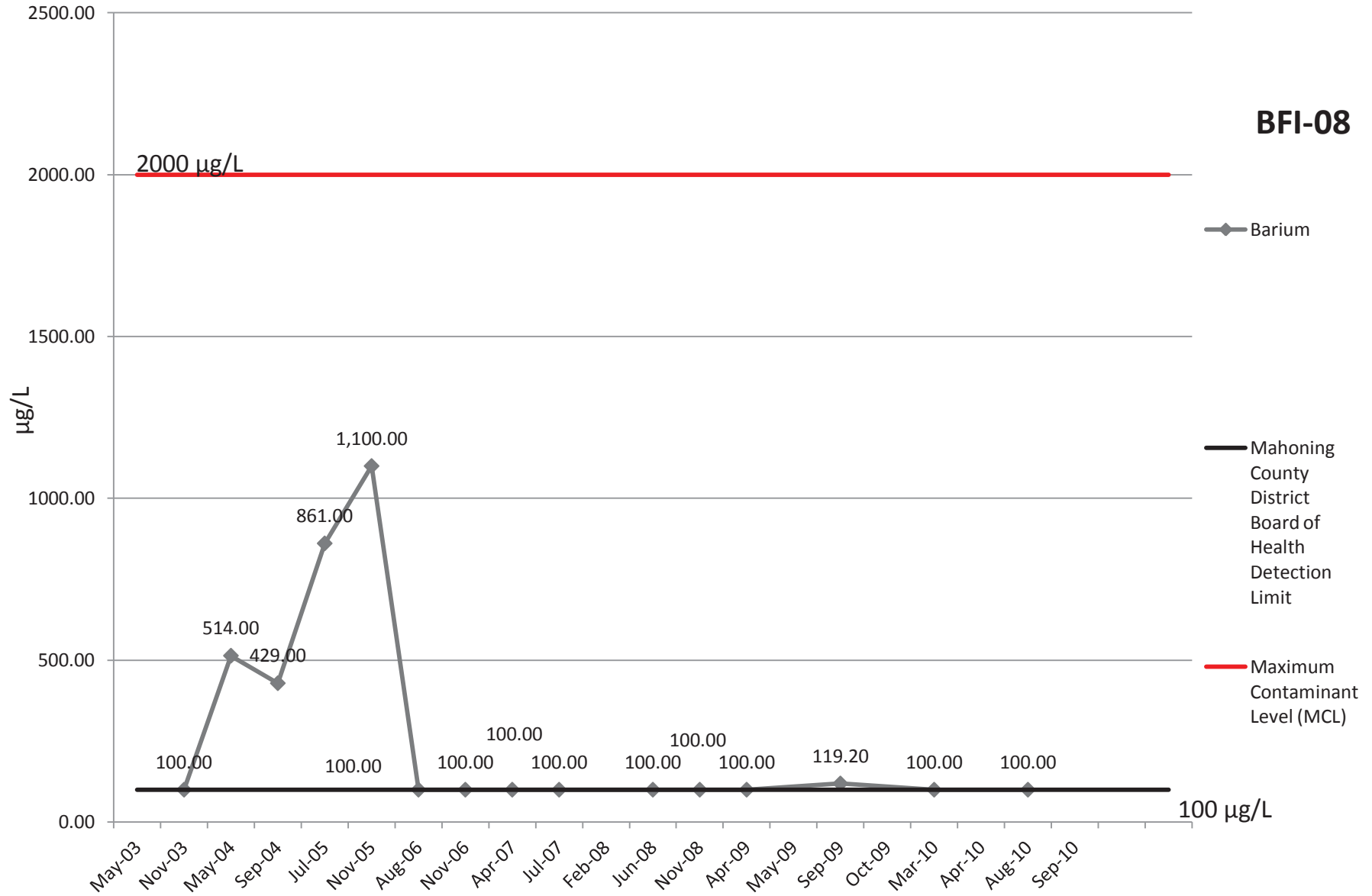
# Arsenic

**BFI-08**



# Barium

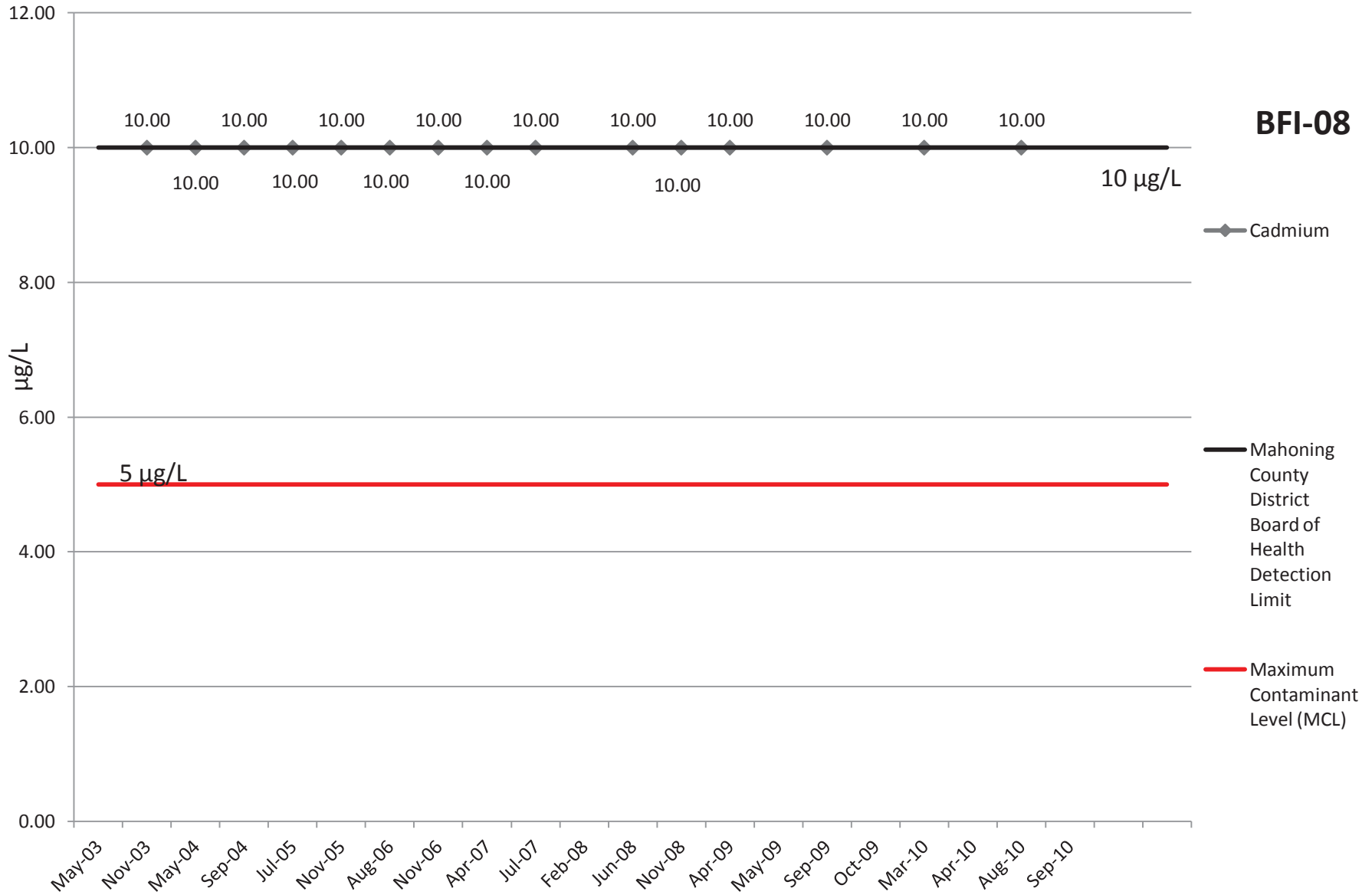
**BFI-08**



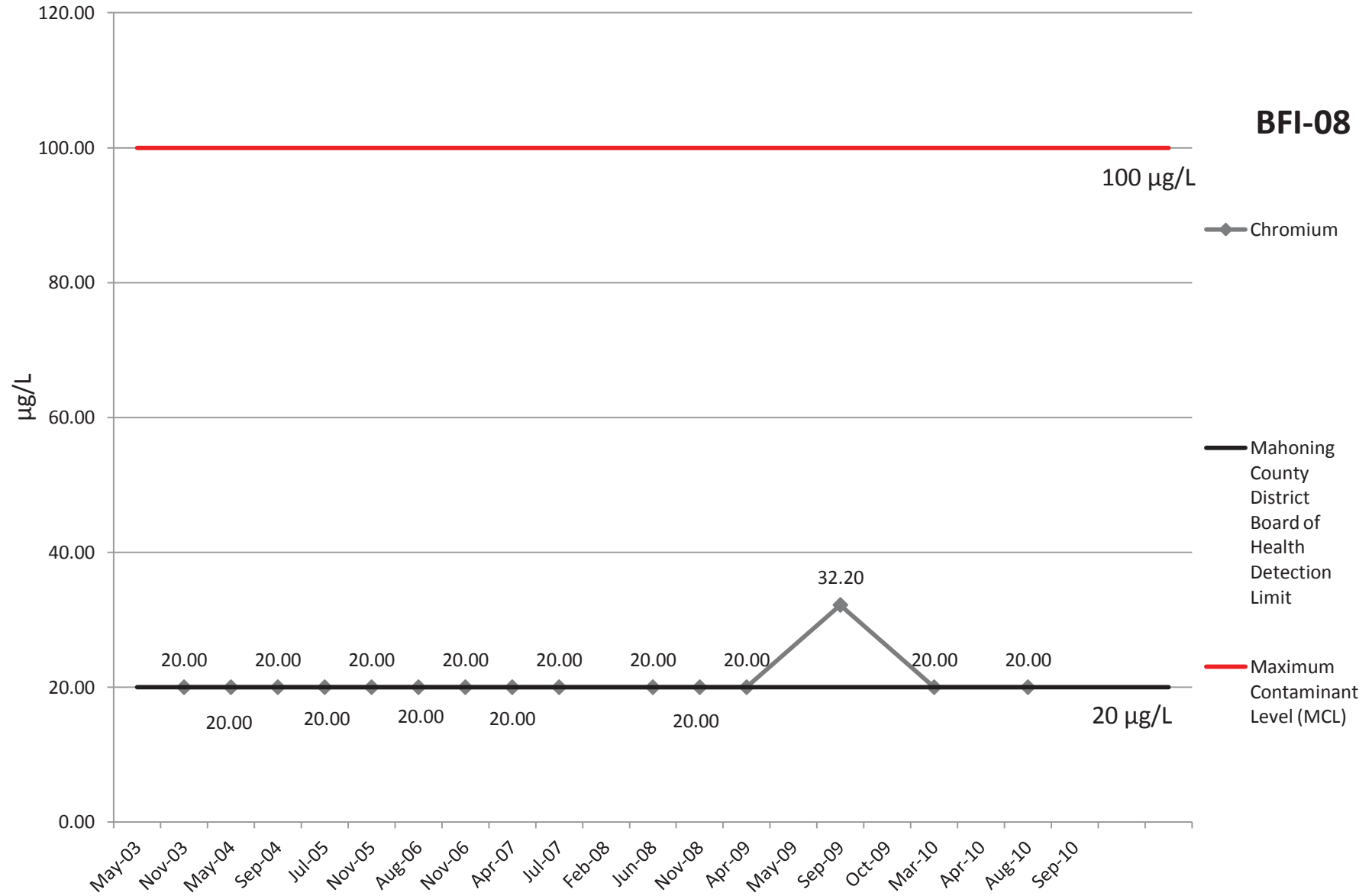


# Cadmium

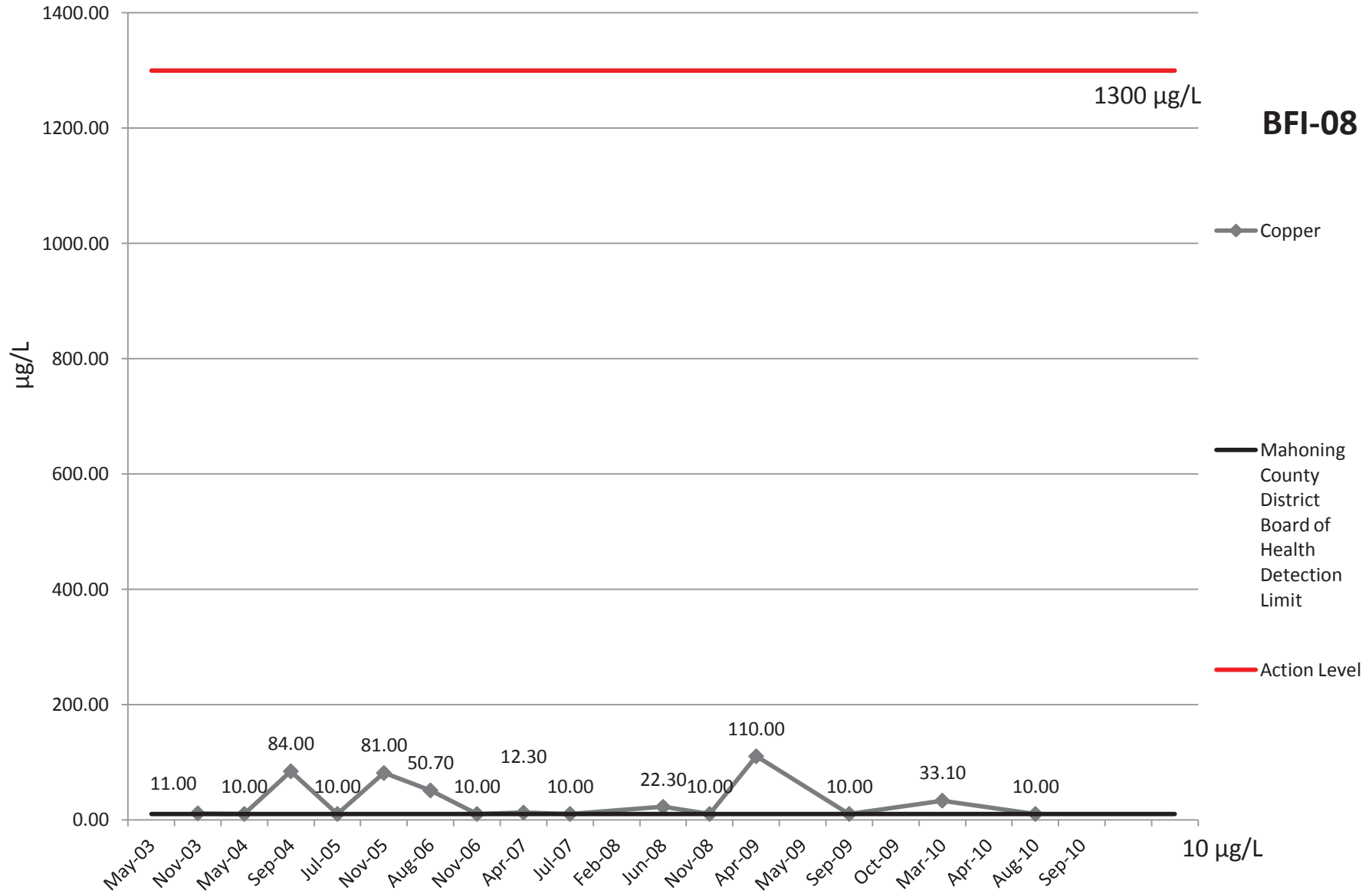
**BFI-08**



# Chromium

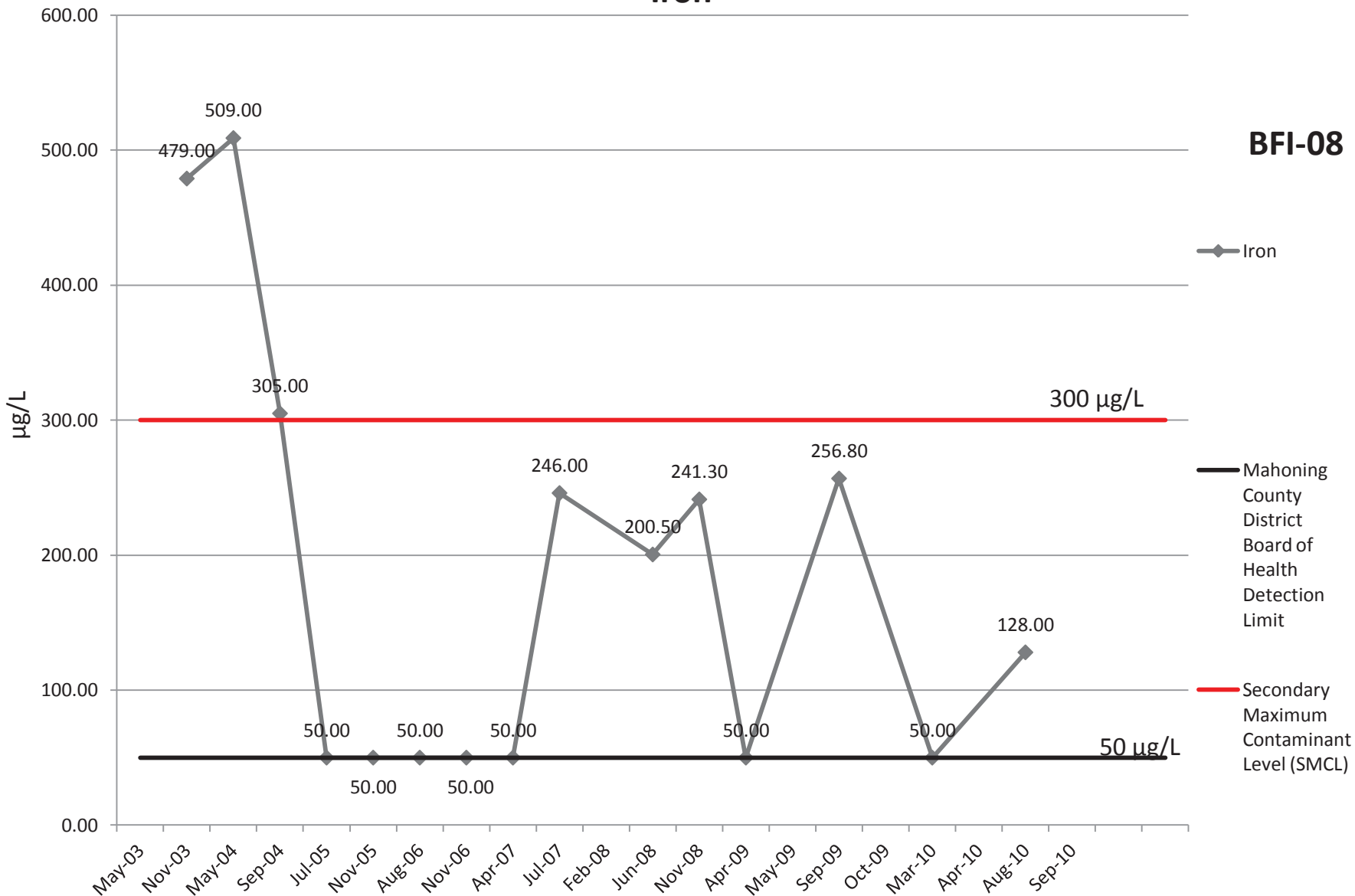


# Copper



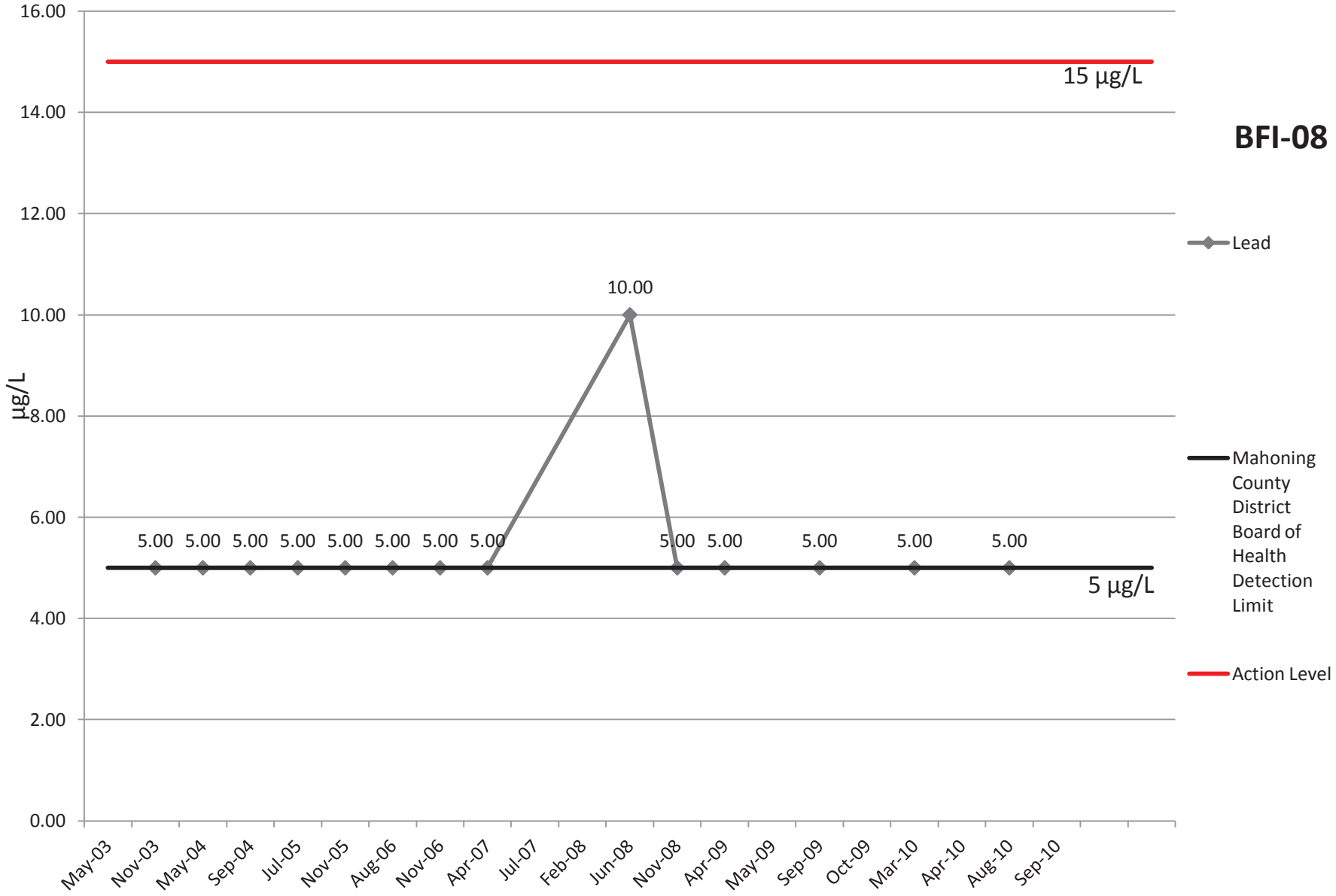
# Iron

**BFI-08**



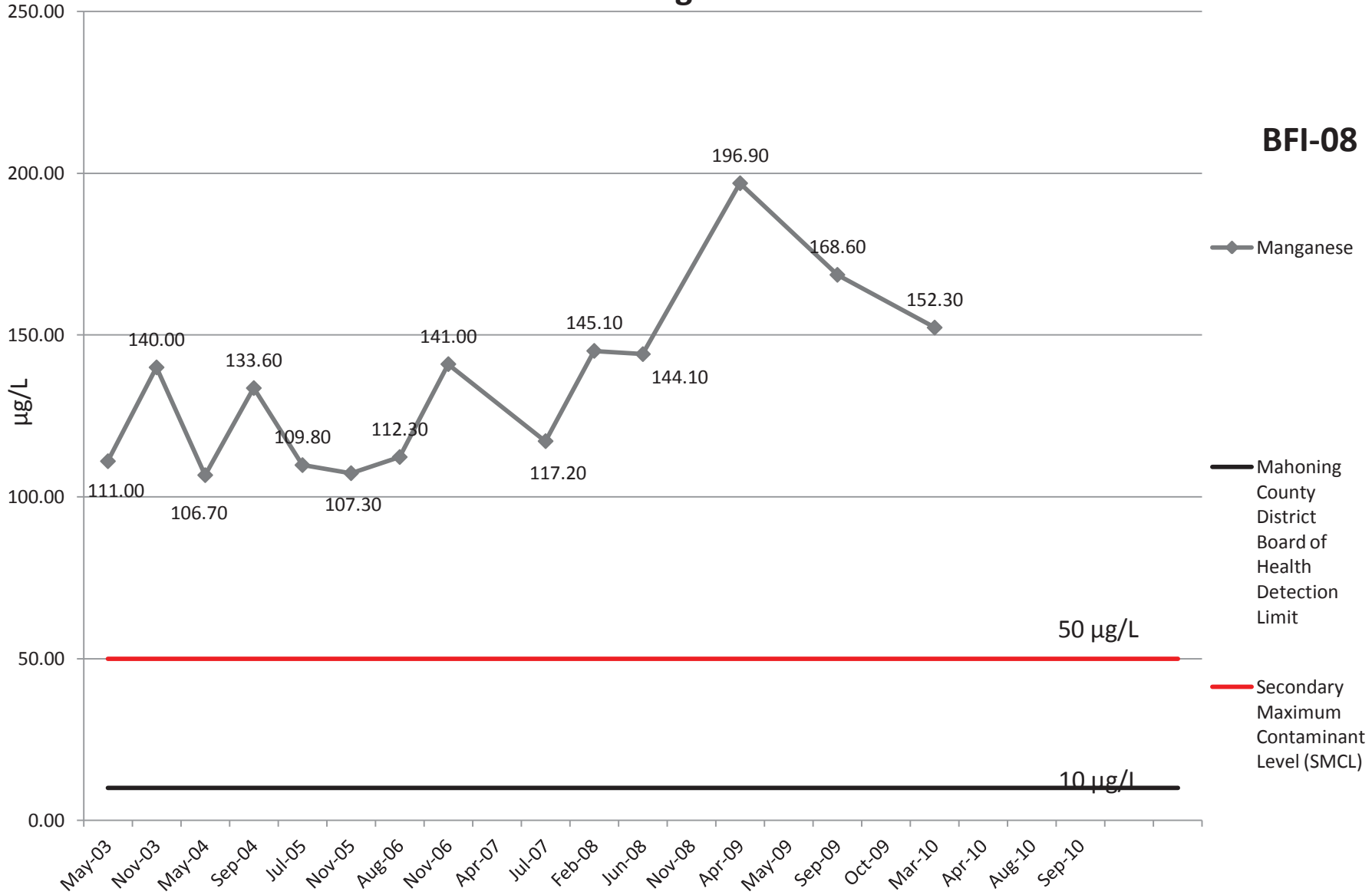
# Lead

## BFI-08



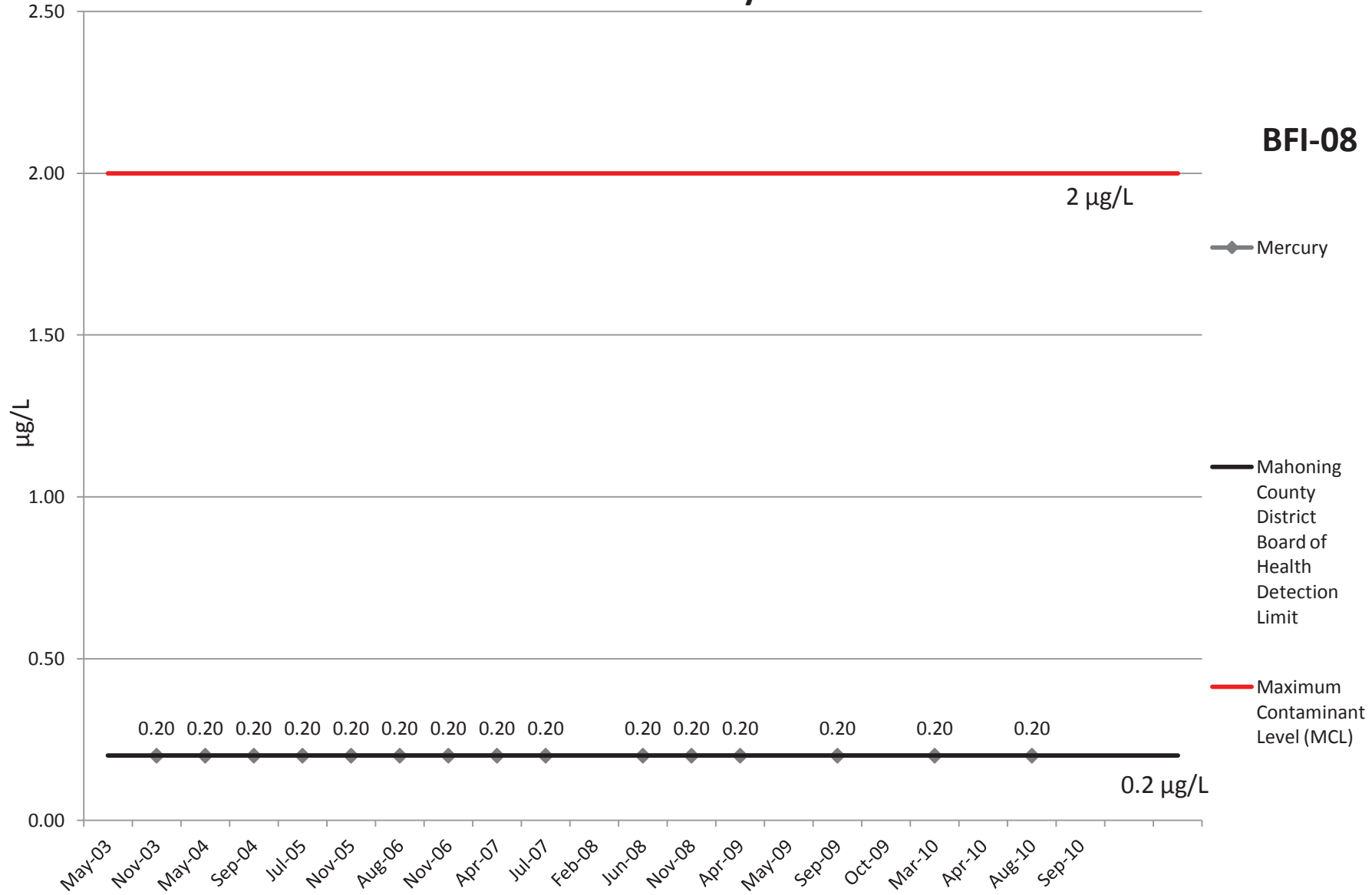
# Manganese

**BFI-08**

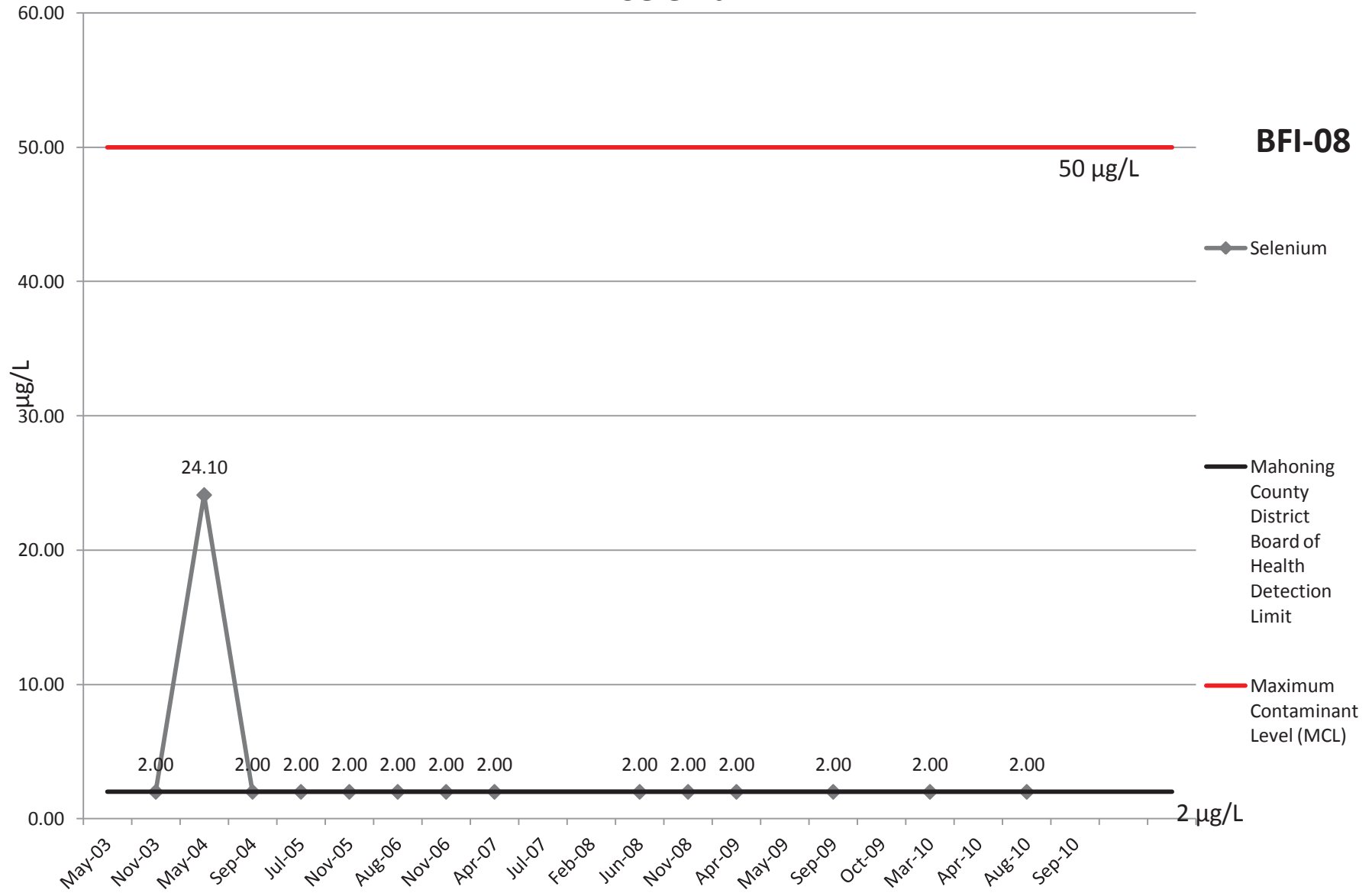


# Mercury

**BFI-08**



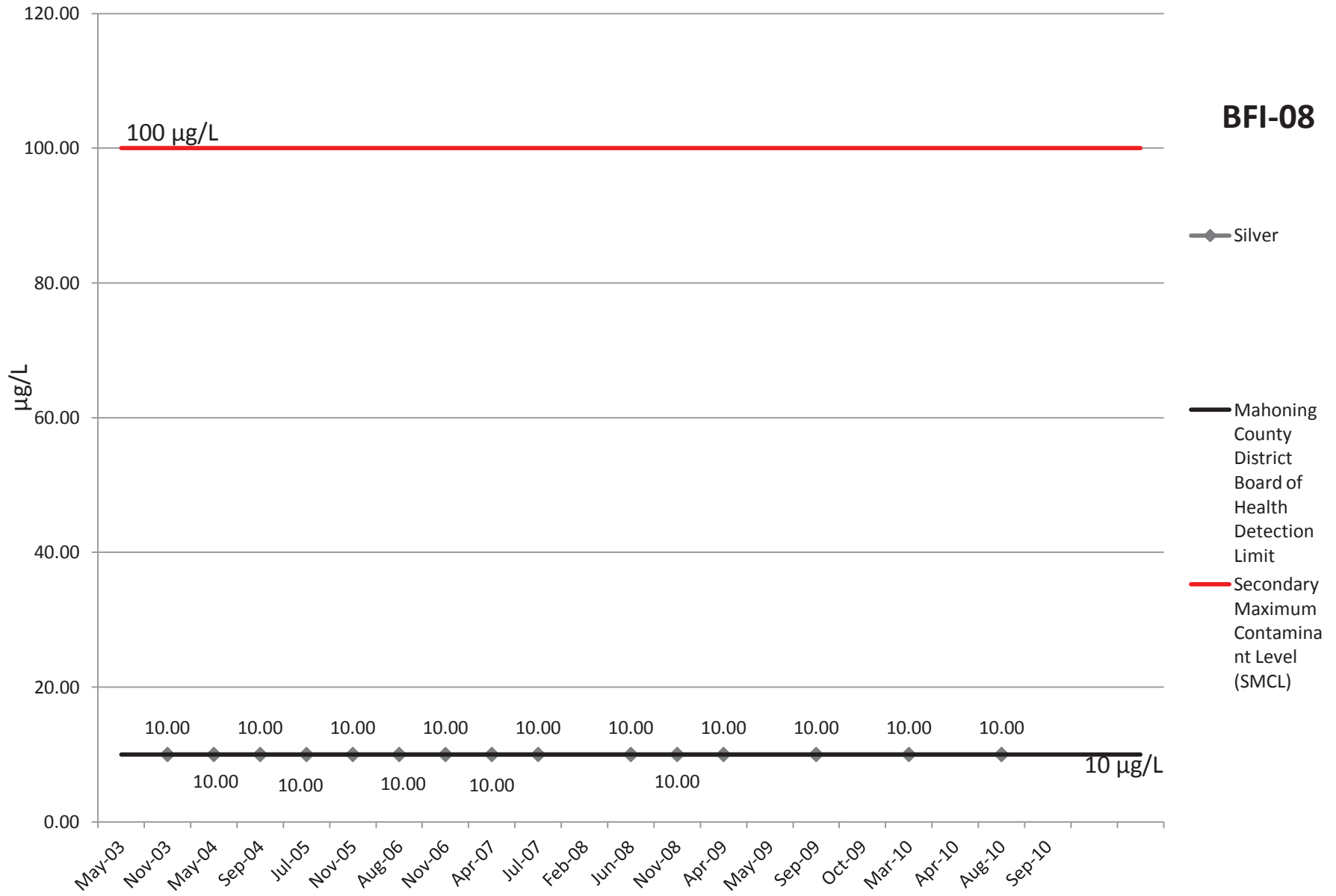
# Selenium



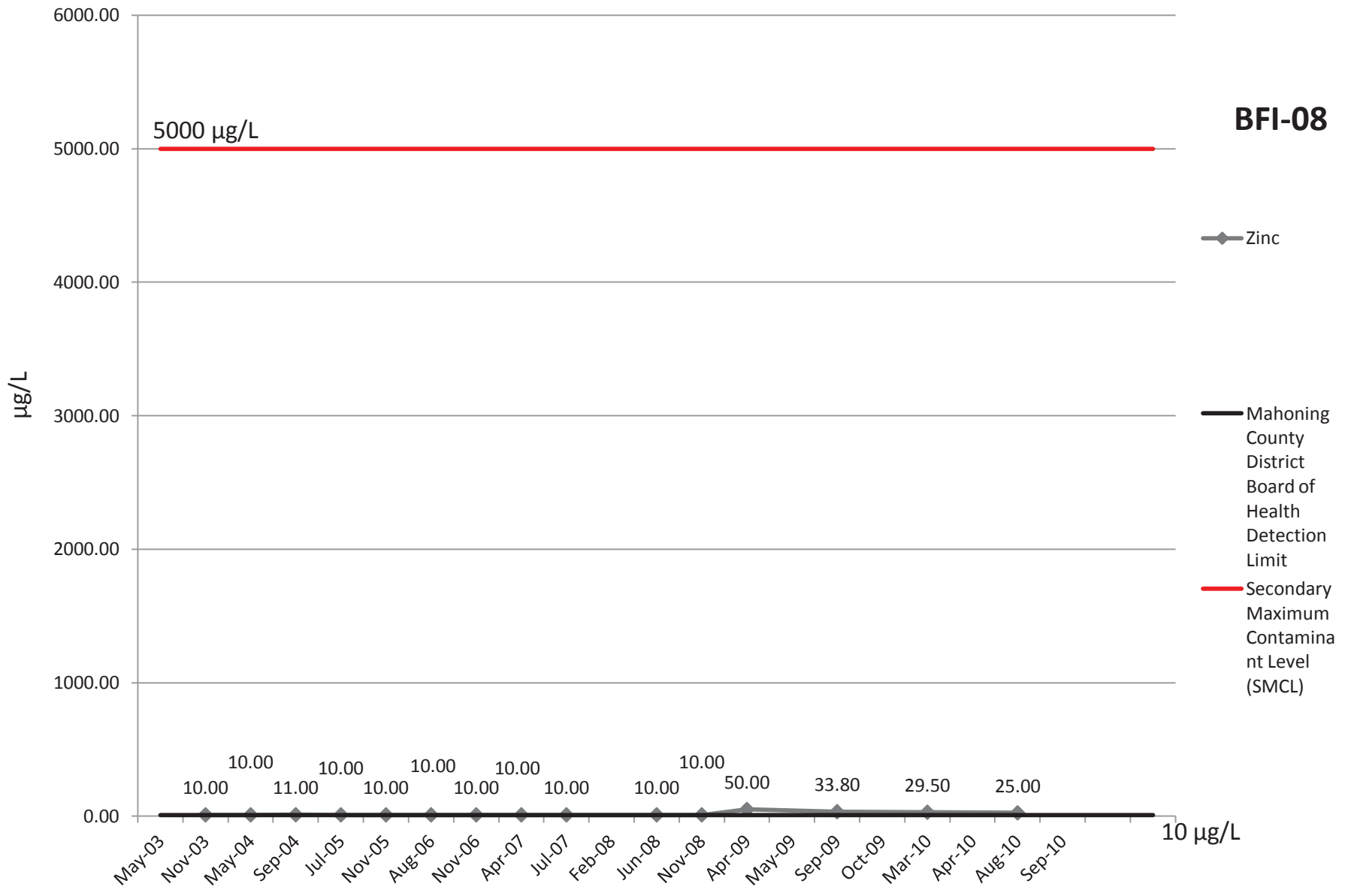


# Silver

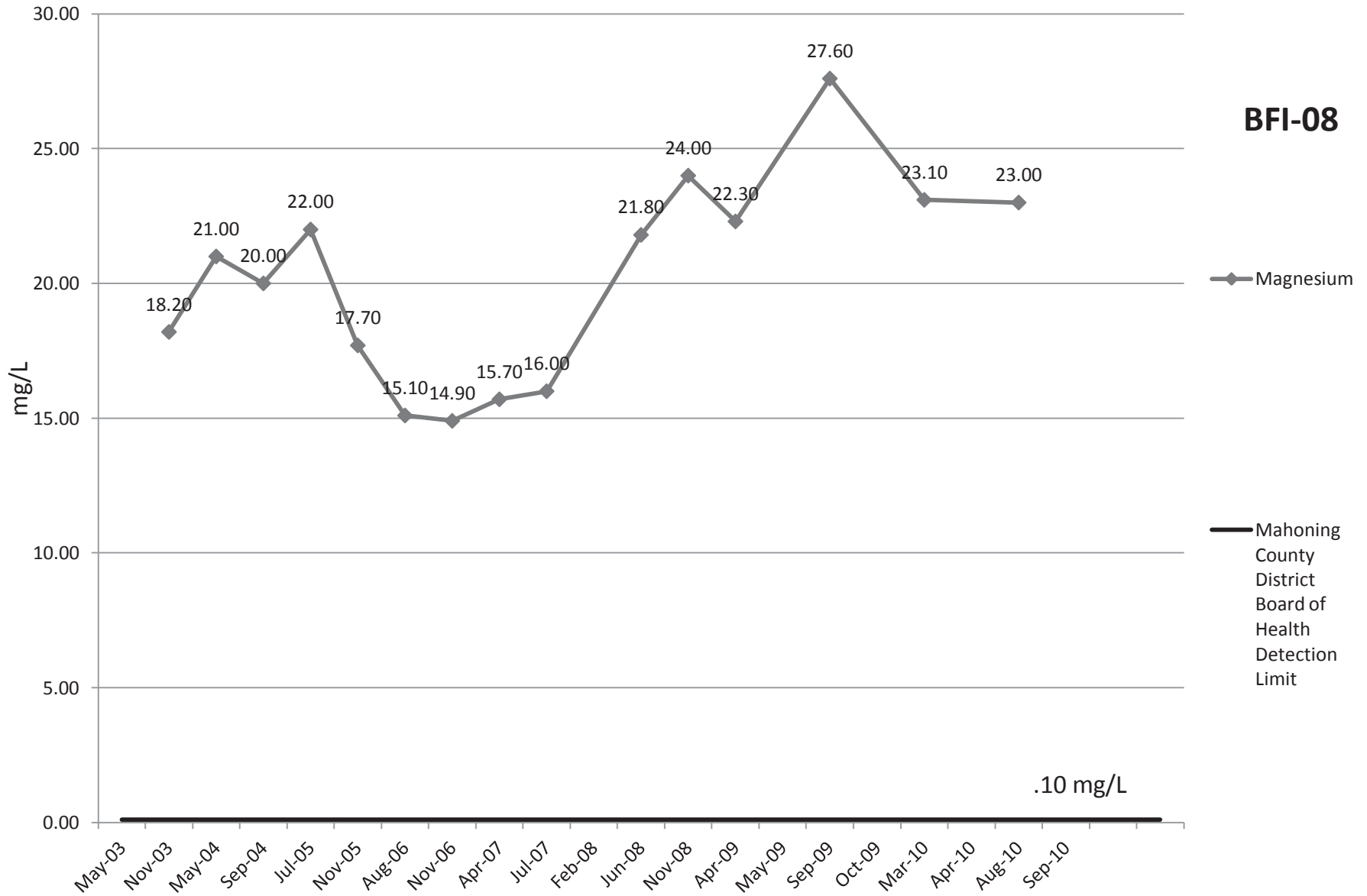
**BFI-08**



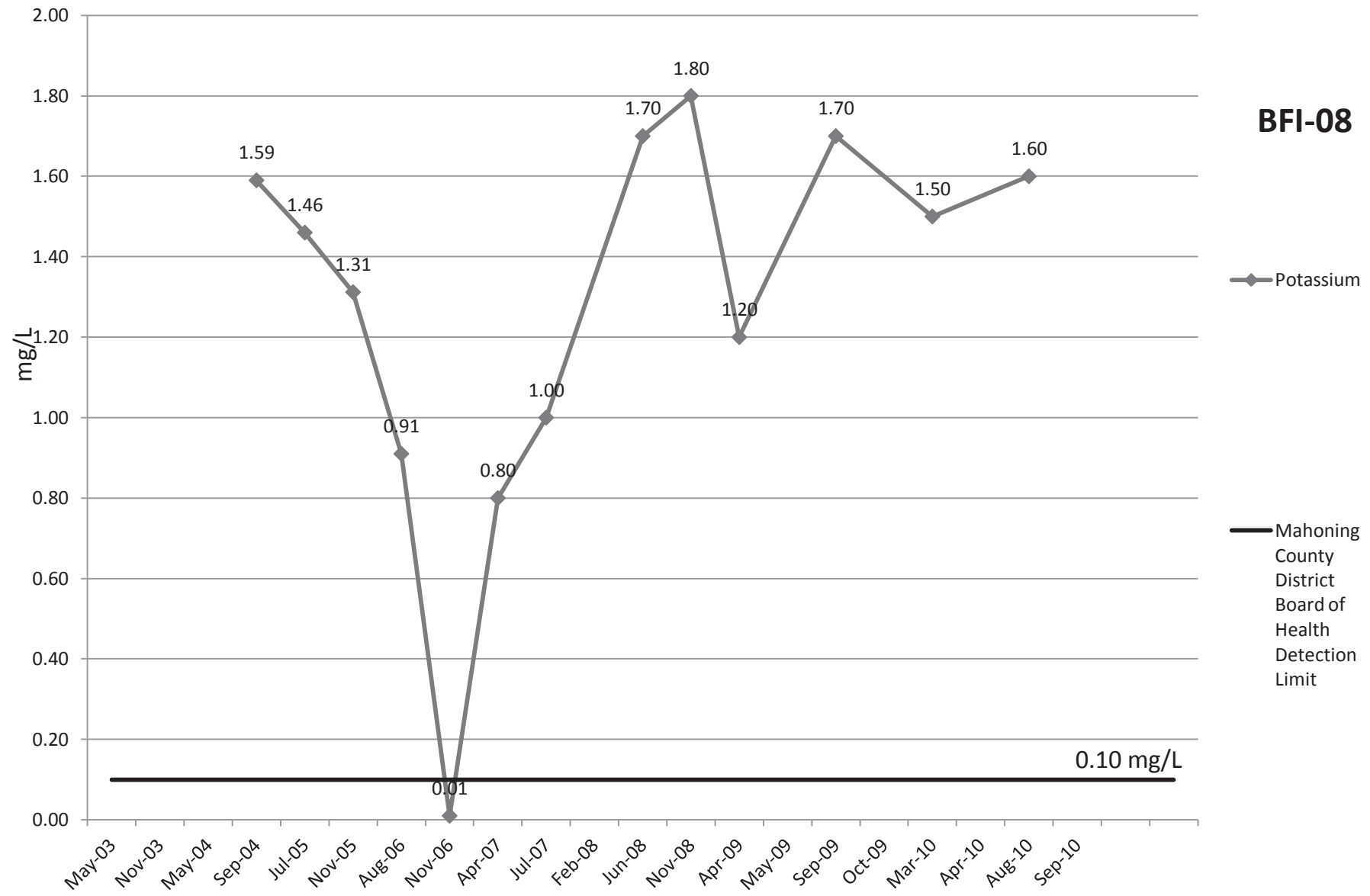
# Zinc



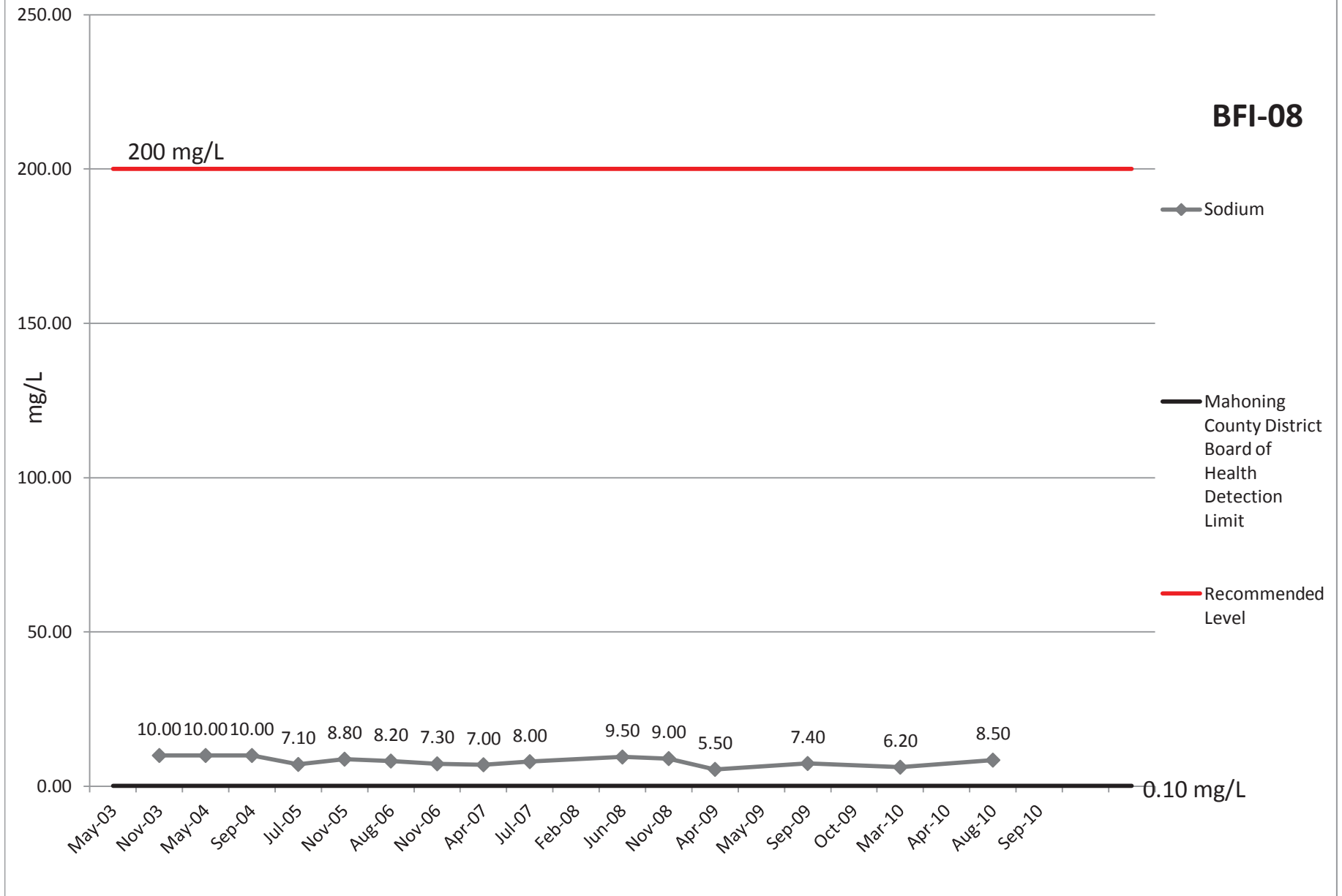
# Magnesium



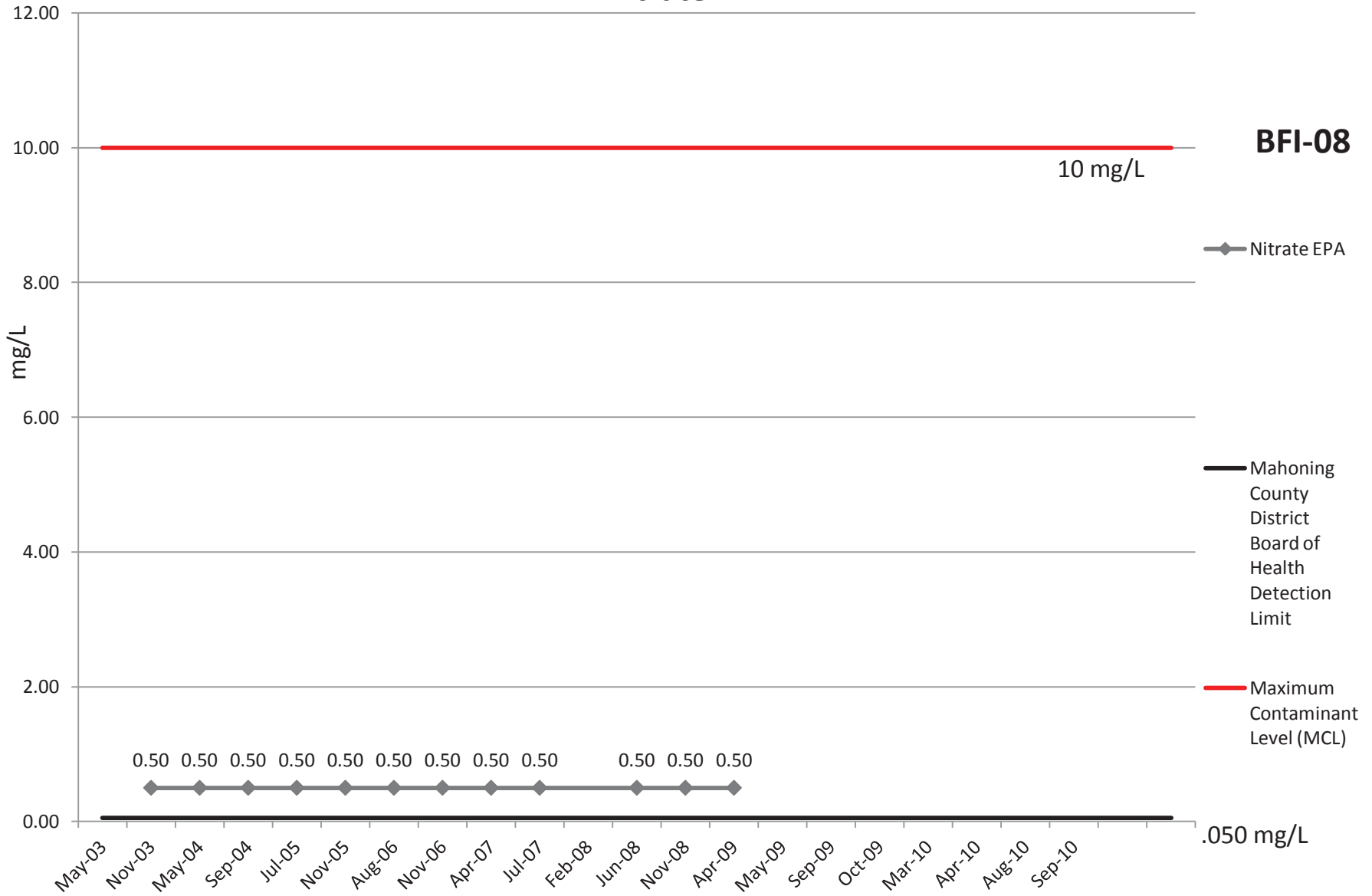
# Potassium



# Sodium



# Nitrate EPA



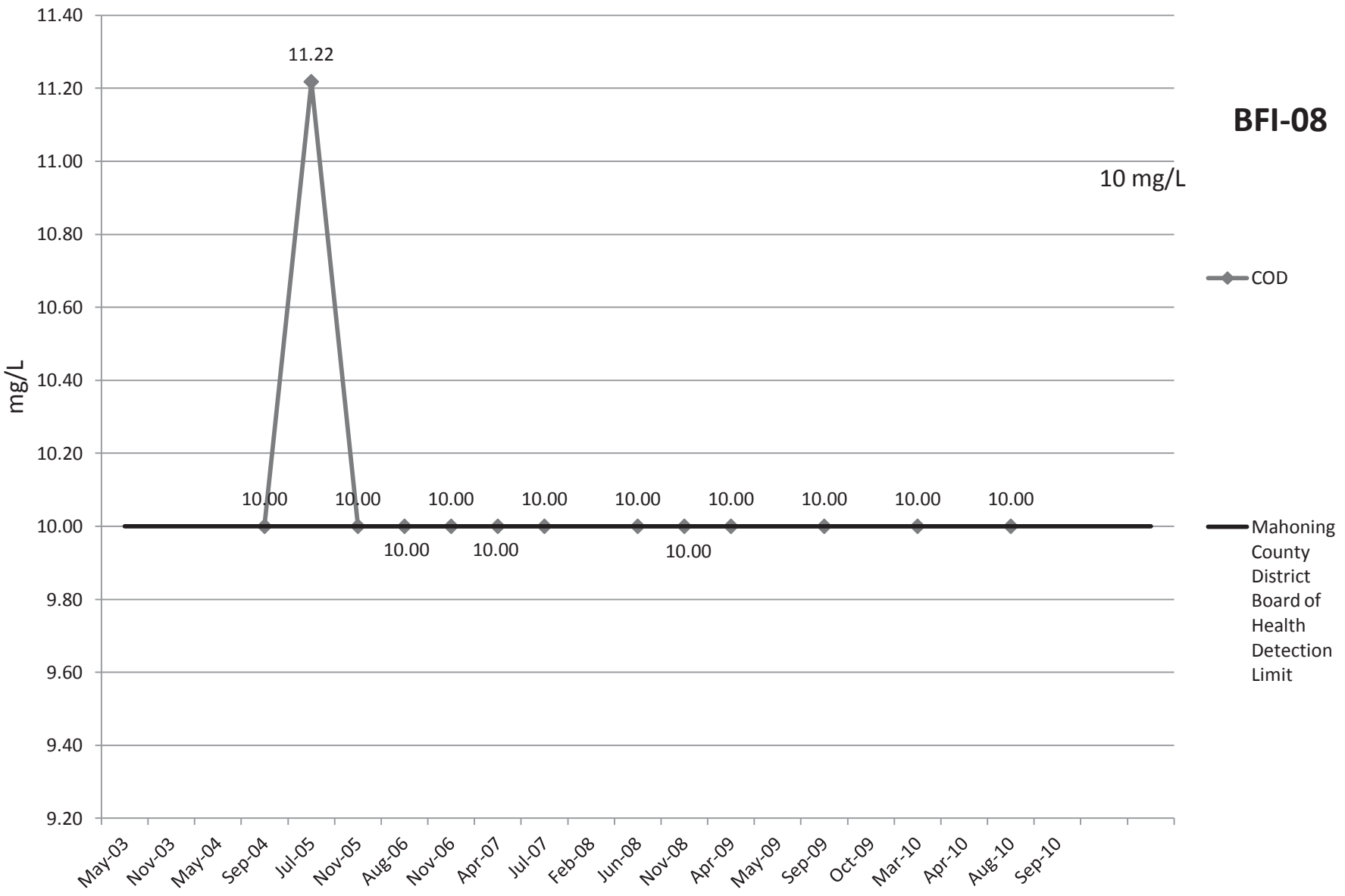
**BFI-08**

◆ Nitrate EPA

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

# COD



**BFI-08**

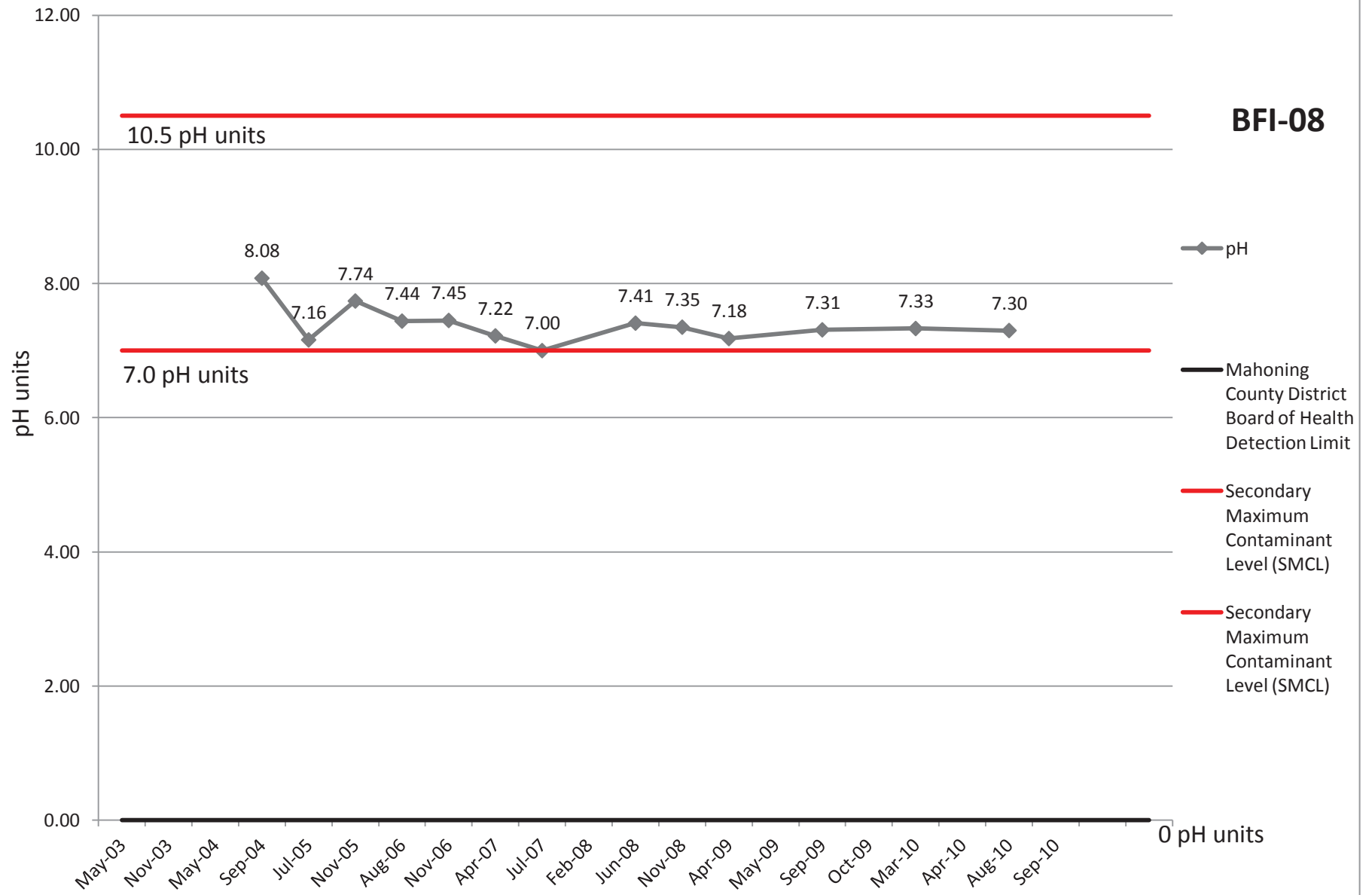
10 mg/L

◆ COD

— Mahoning County District Board of Health Detection Limit

# pH

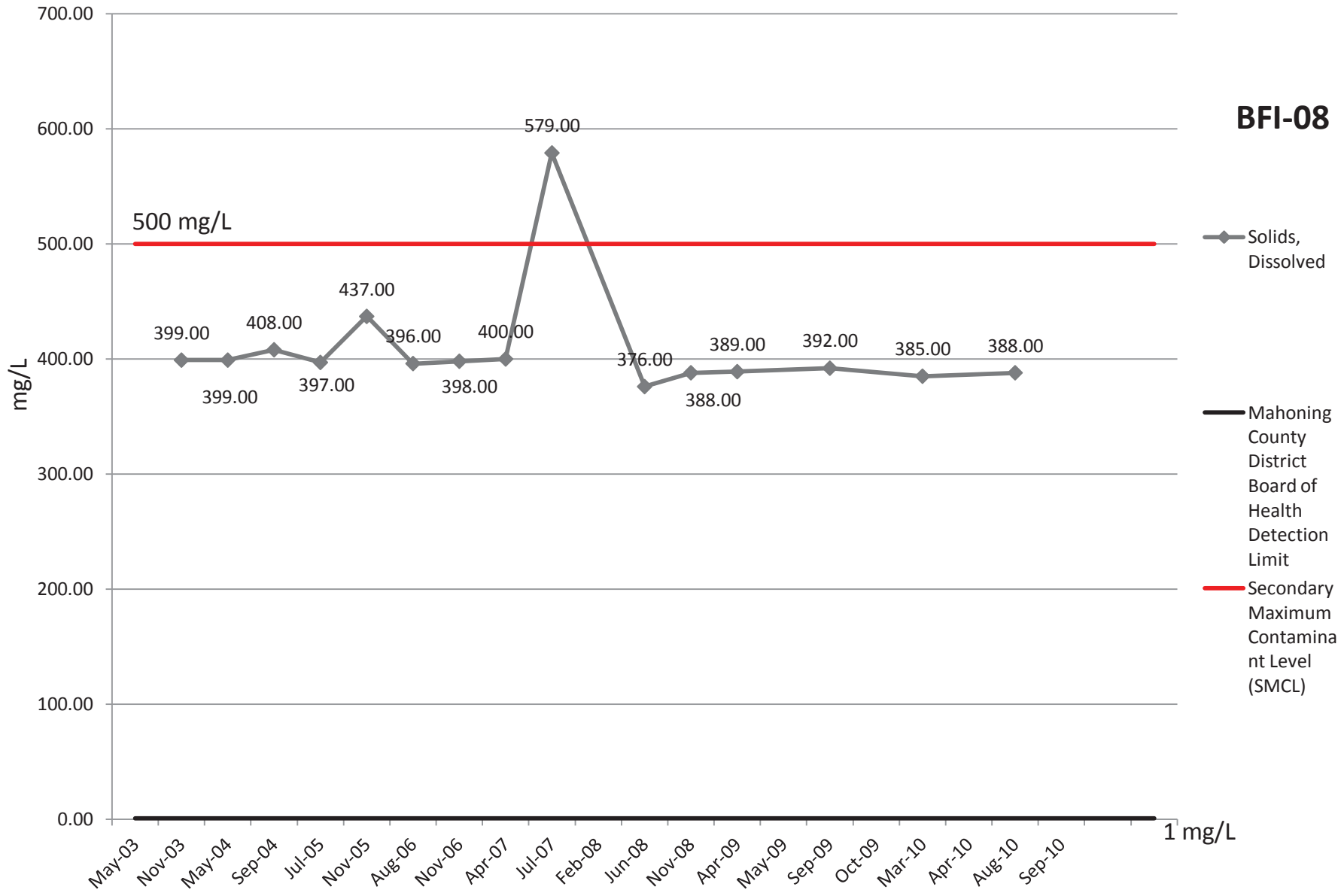
**BFI-08**





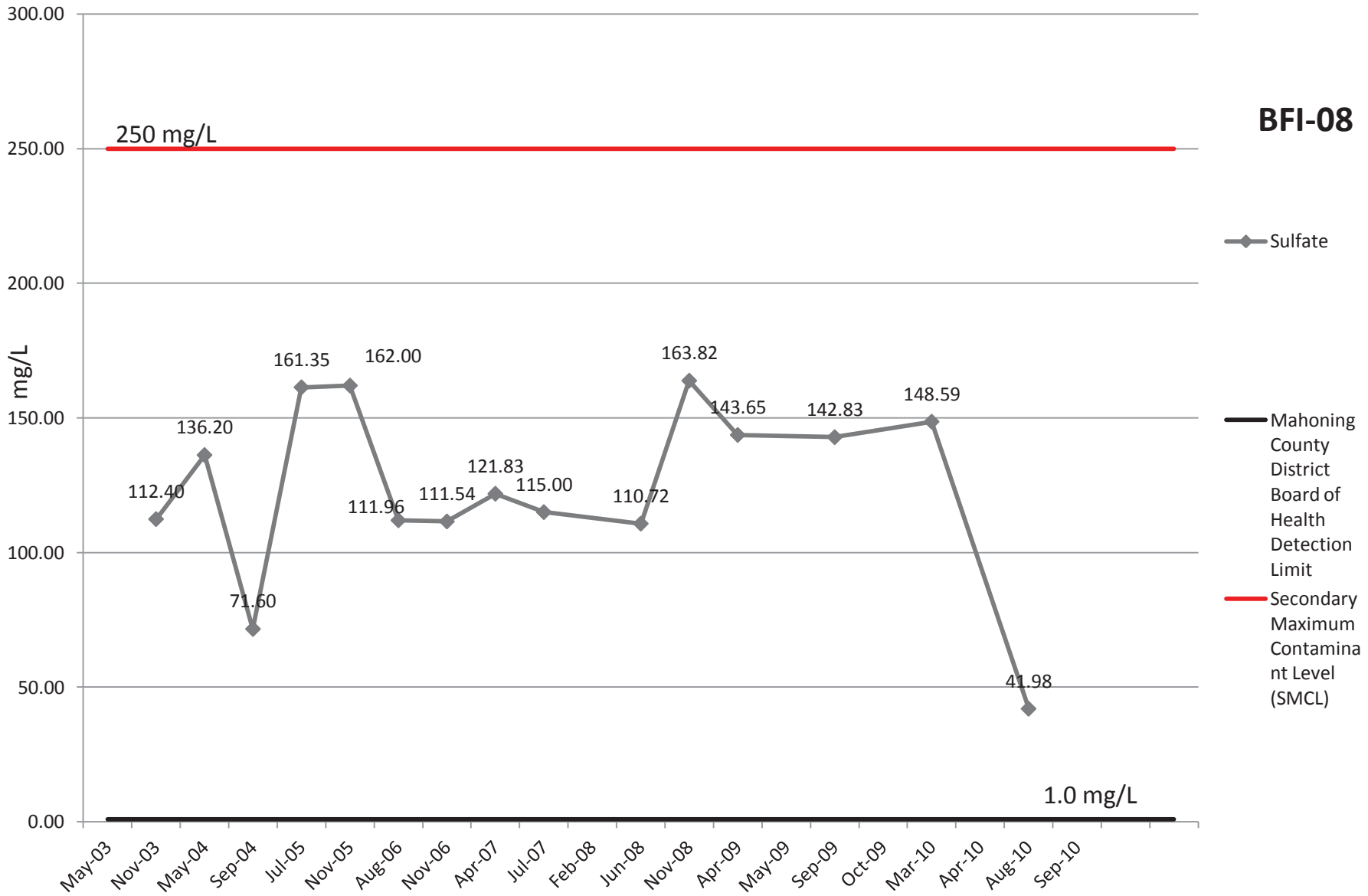
# Solids, Dissolved

**BFI-08**



# Sulfate

**BFI-08**



# Bacteria

positive (1)

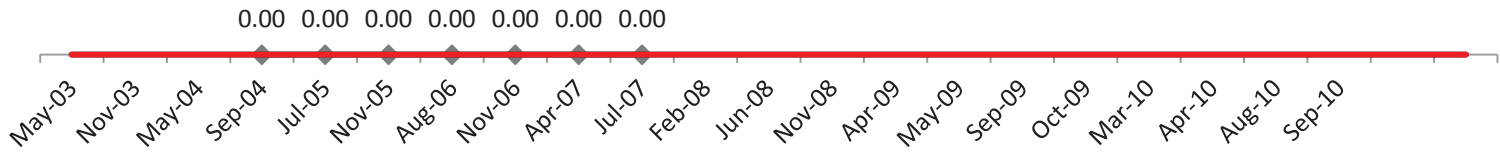
**BFI-08**

Positive/Negative

◆ Bacteria

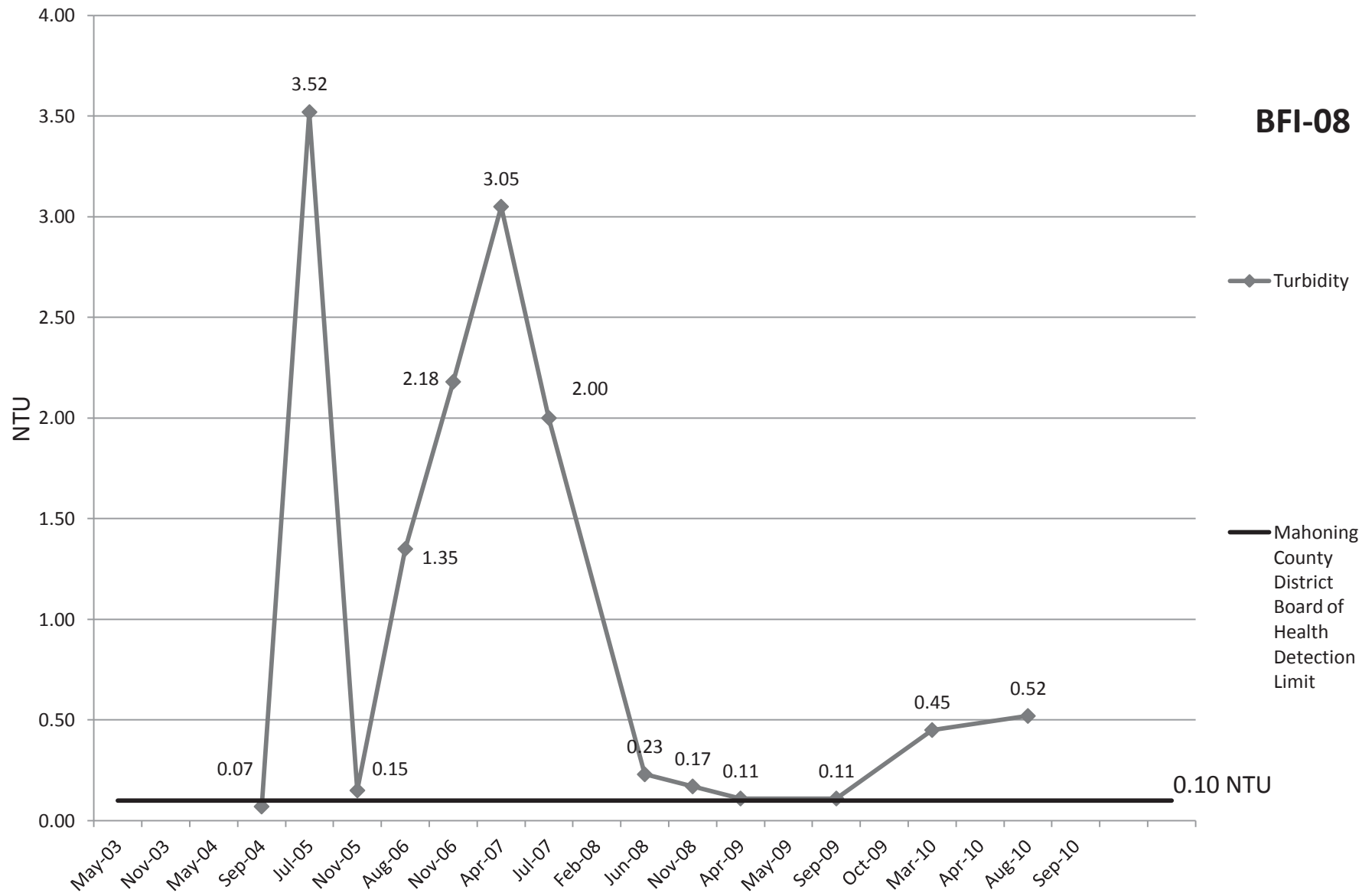
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

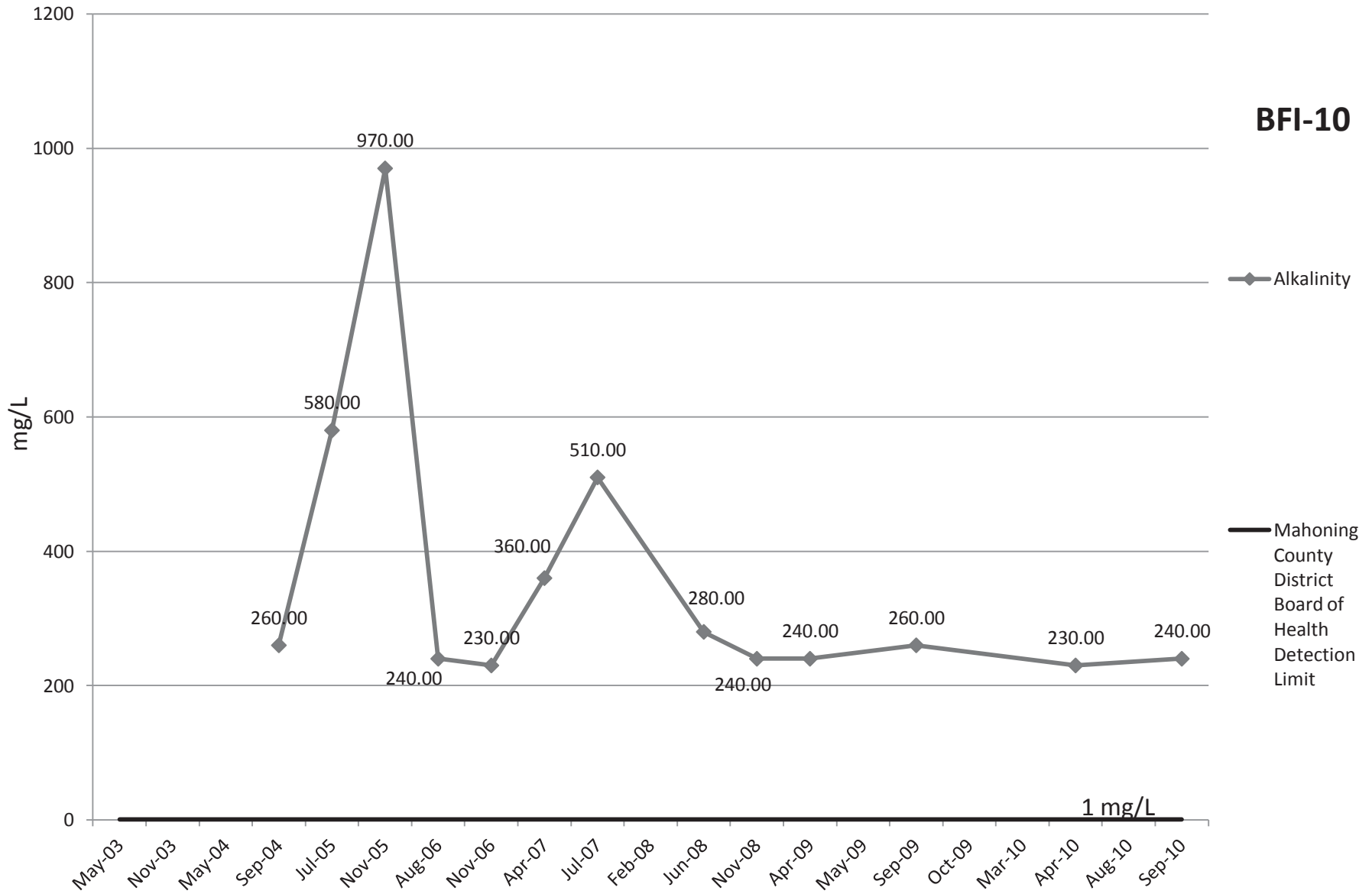


negative (0)

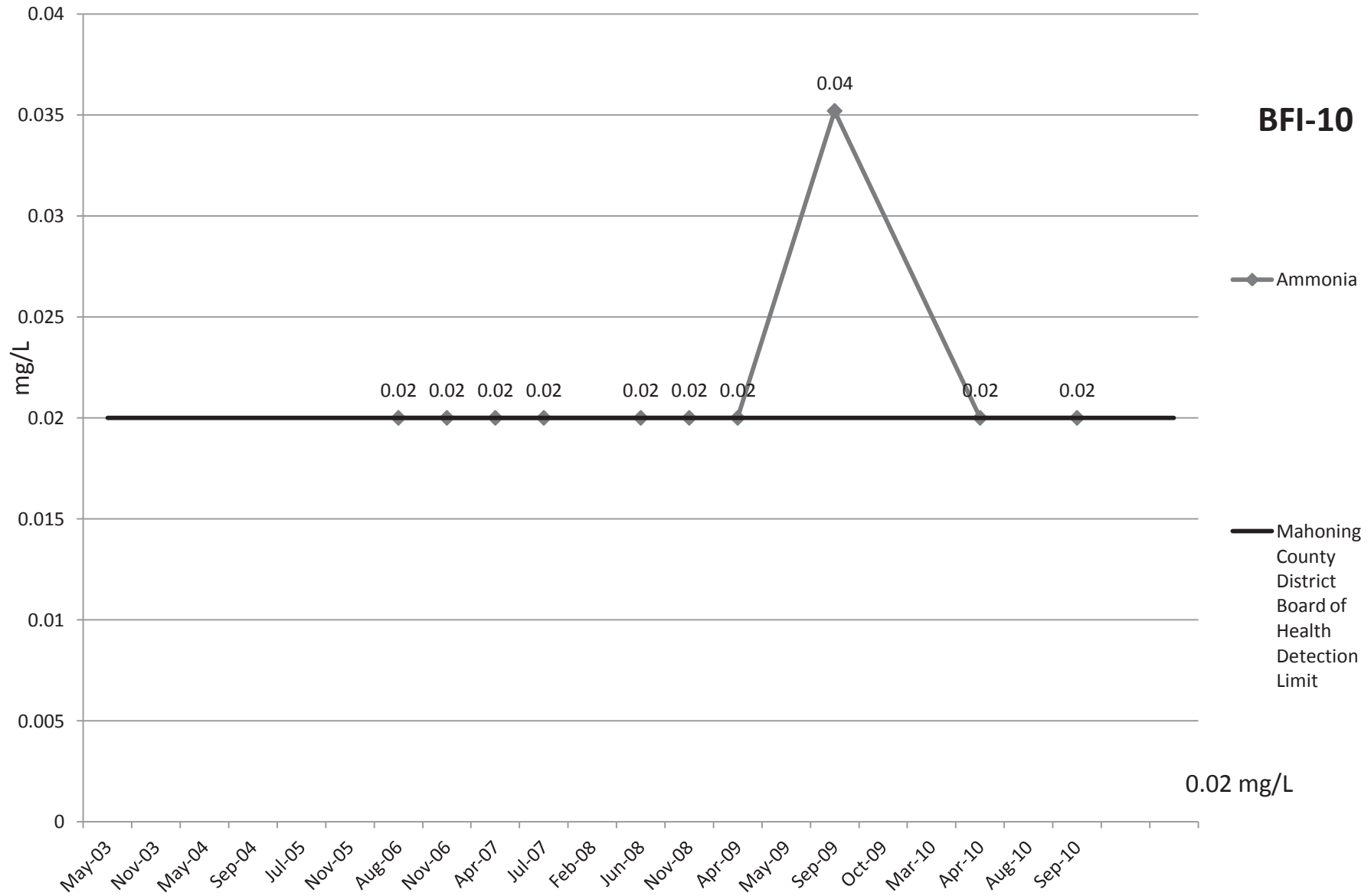
# Turbidity



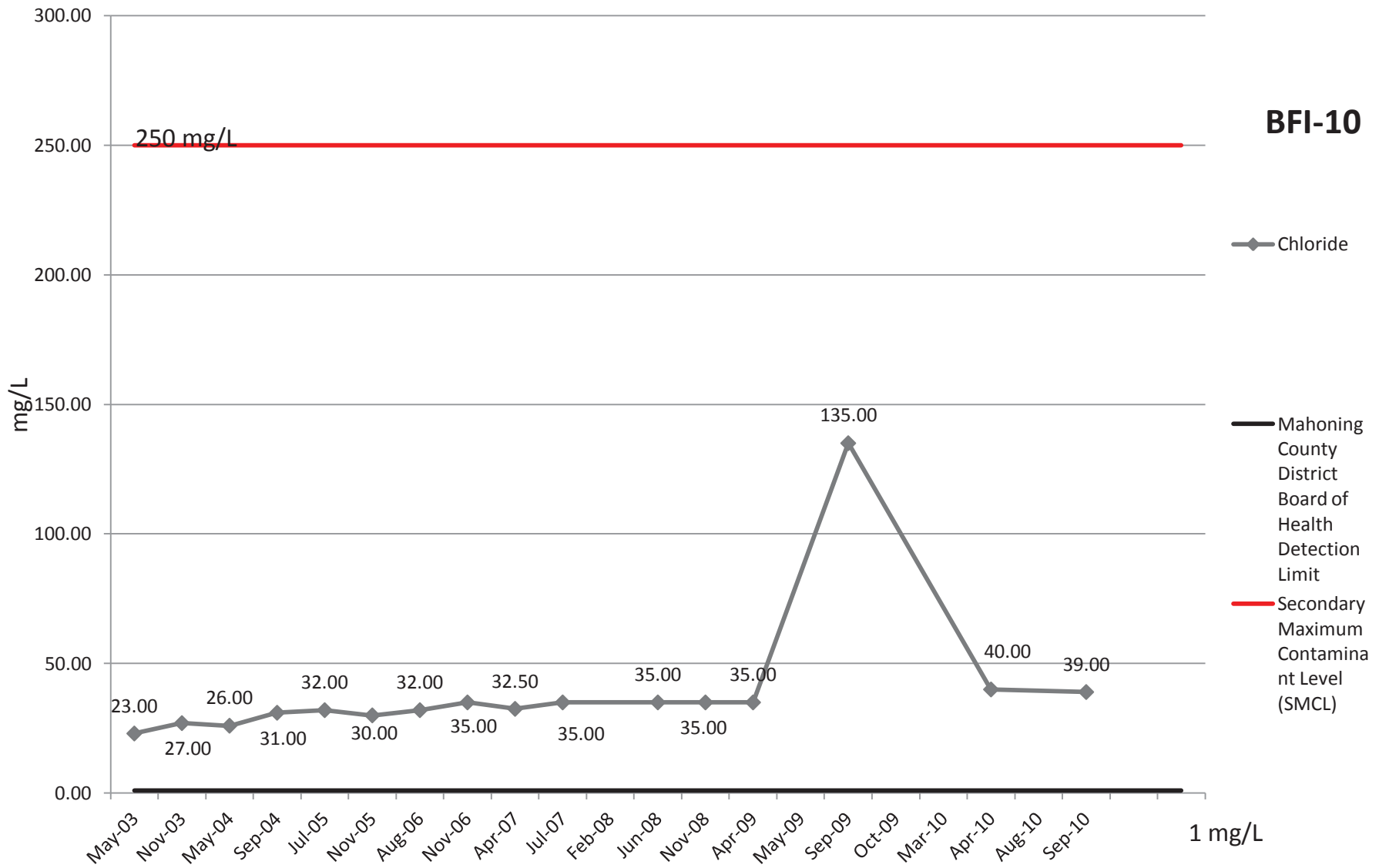
# Alkalinity



# Ammonia

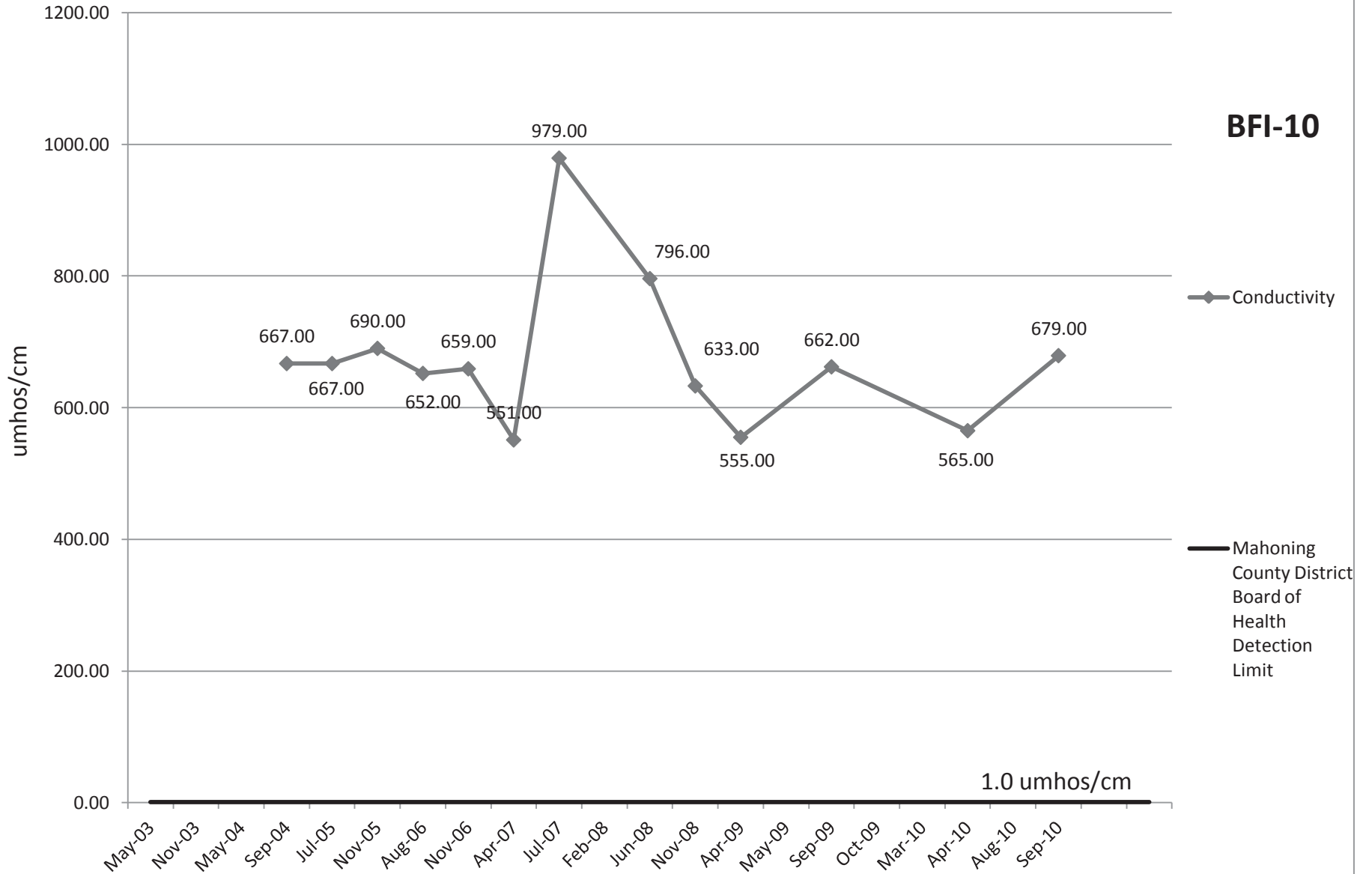


# Chloride



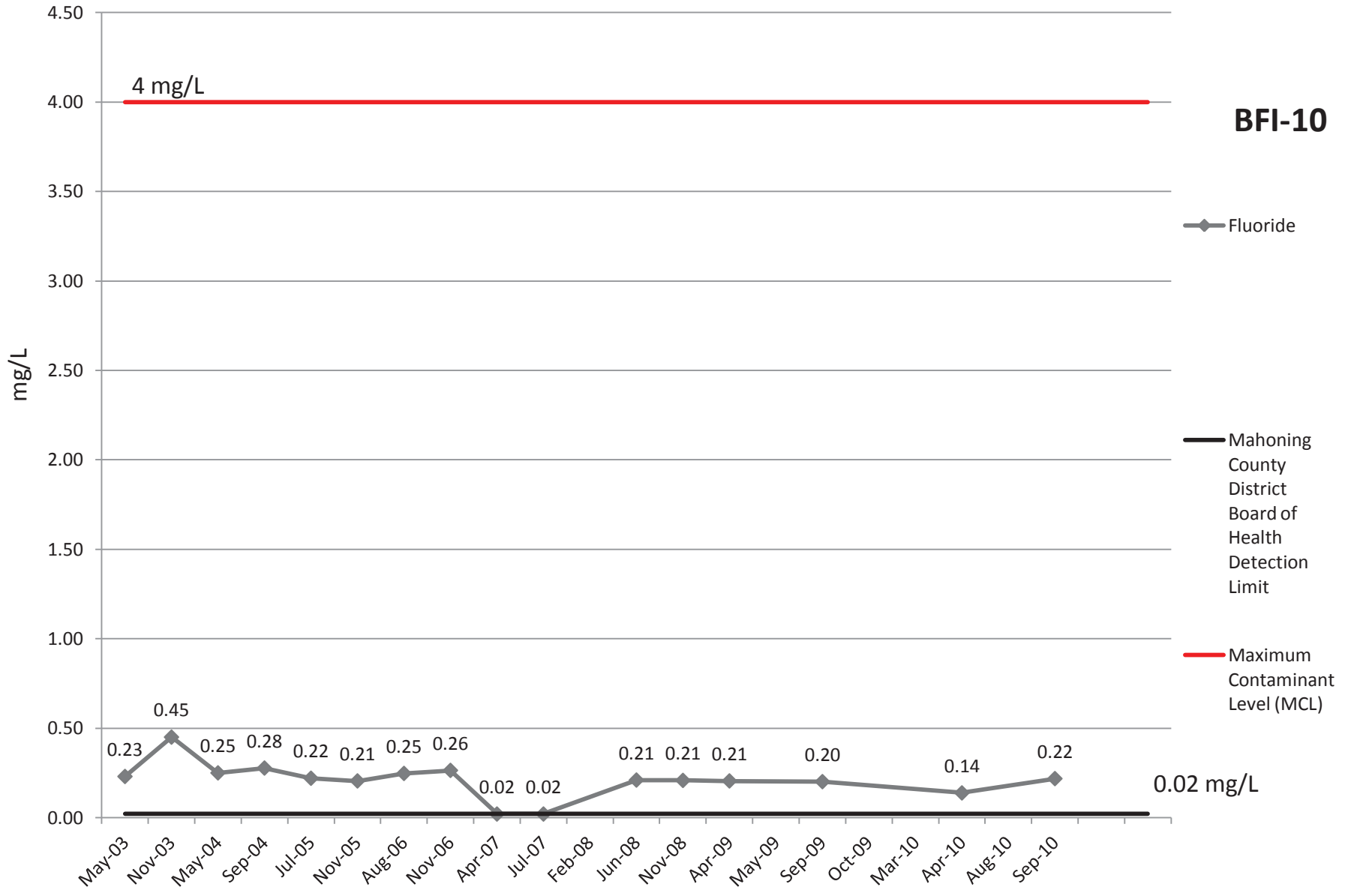
# Conductivity

**BFI-10**



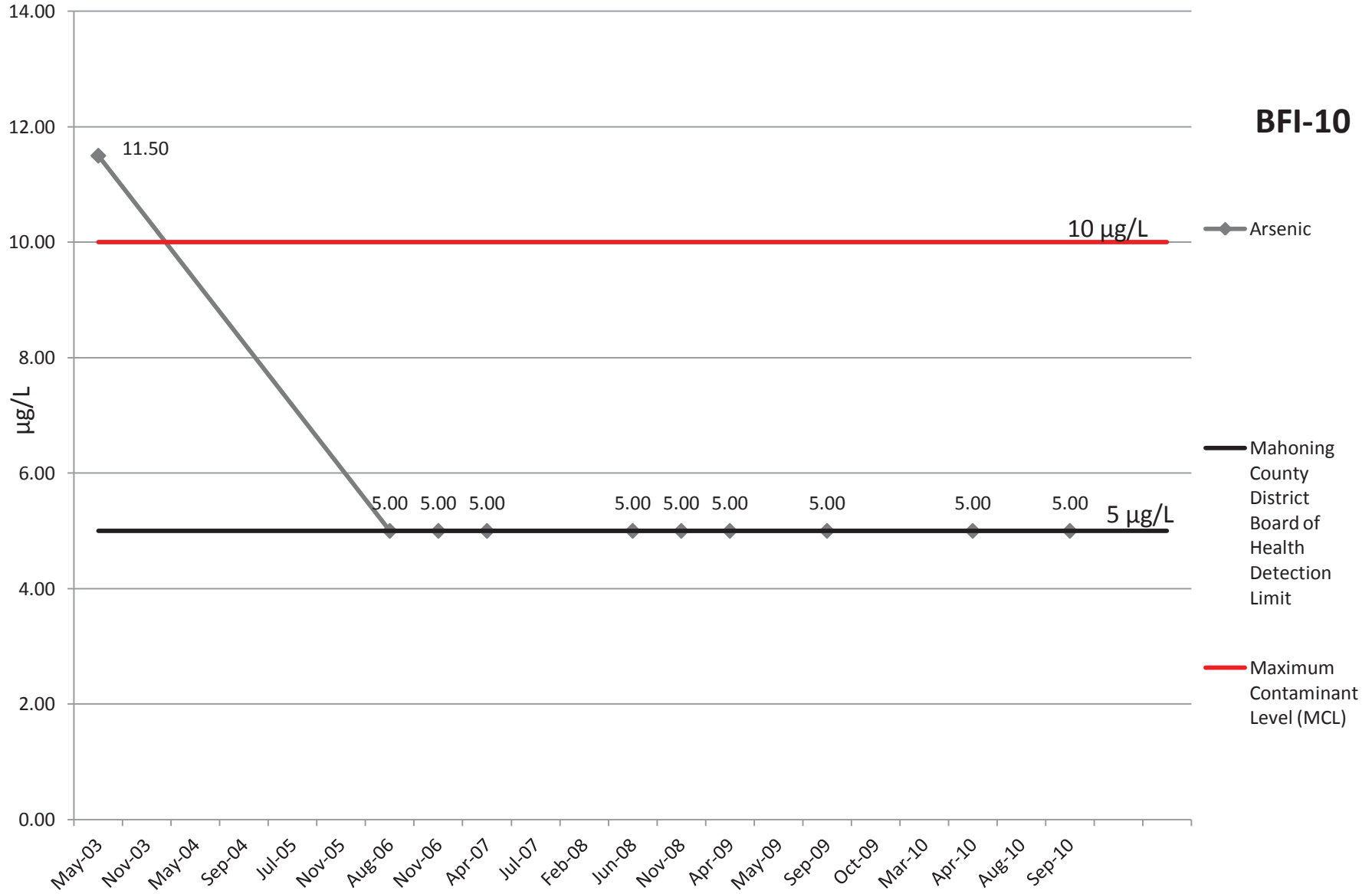


# Fluoride

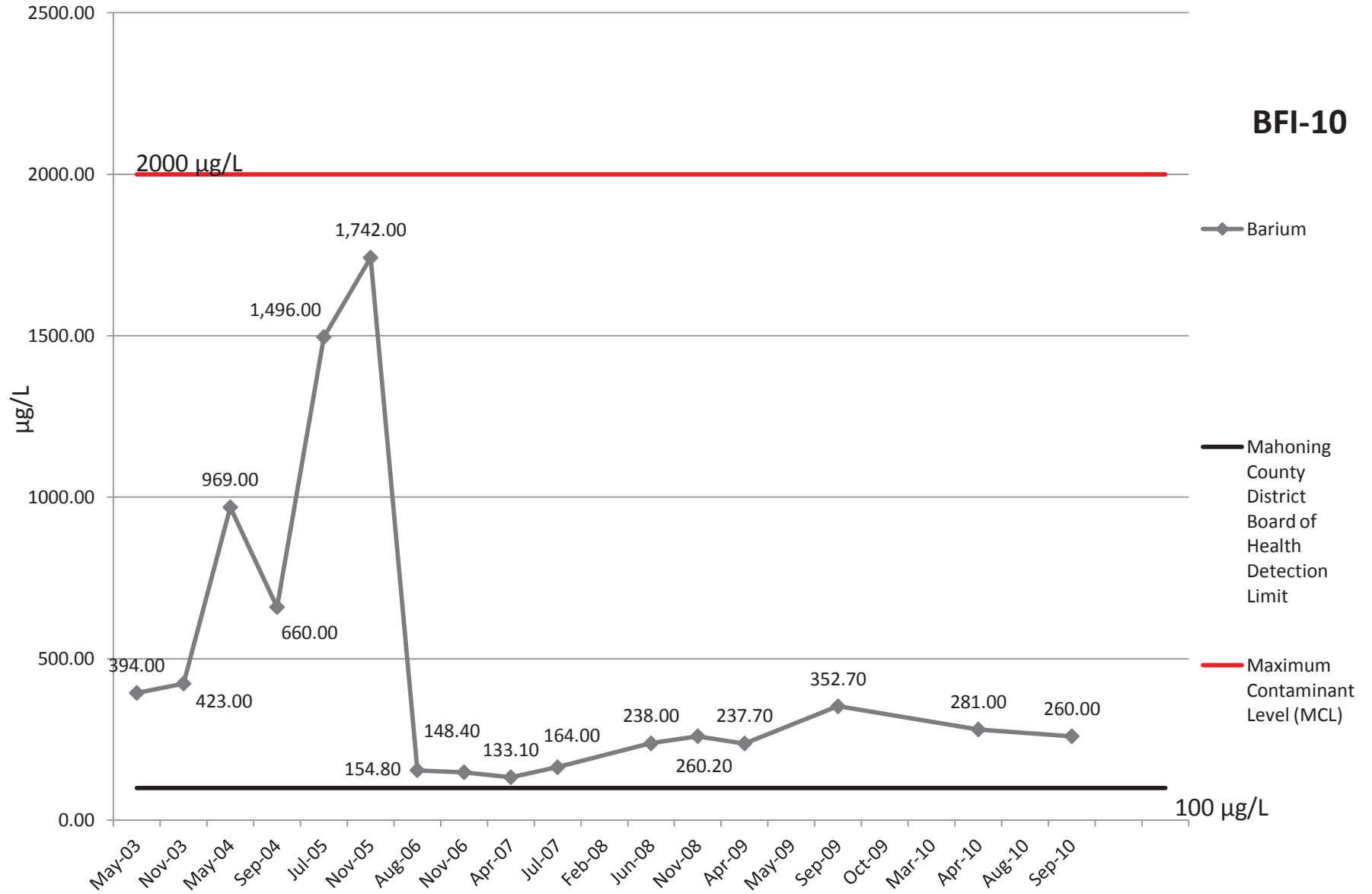


# Arsenic

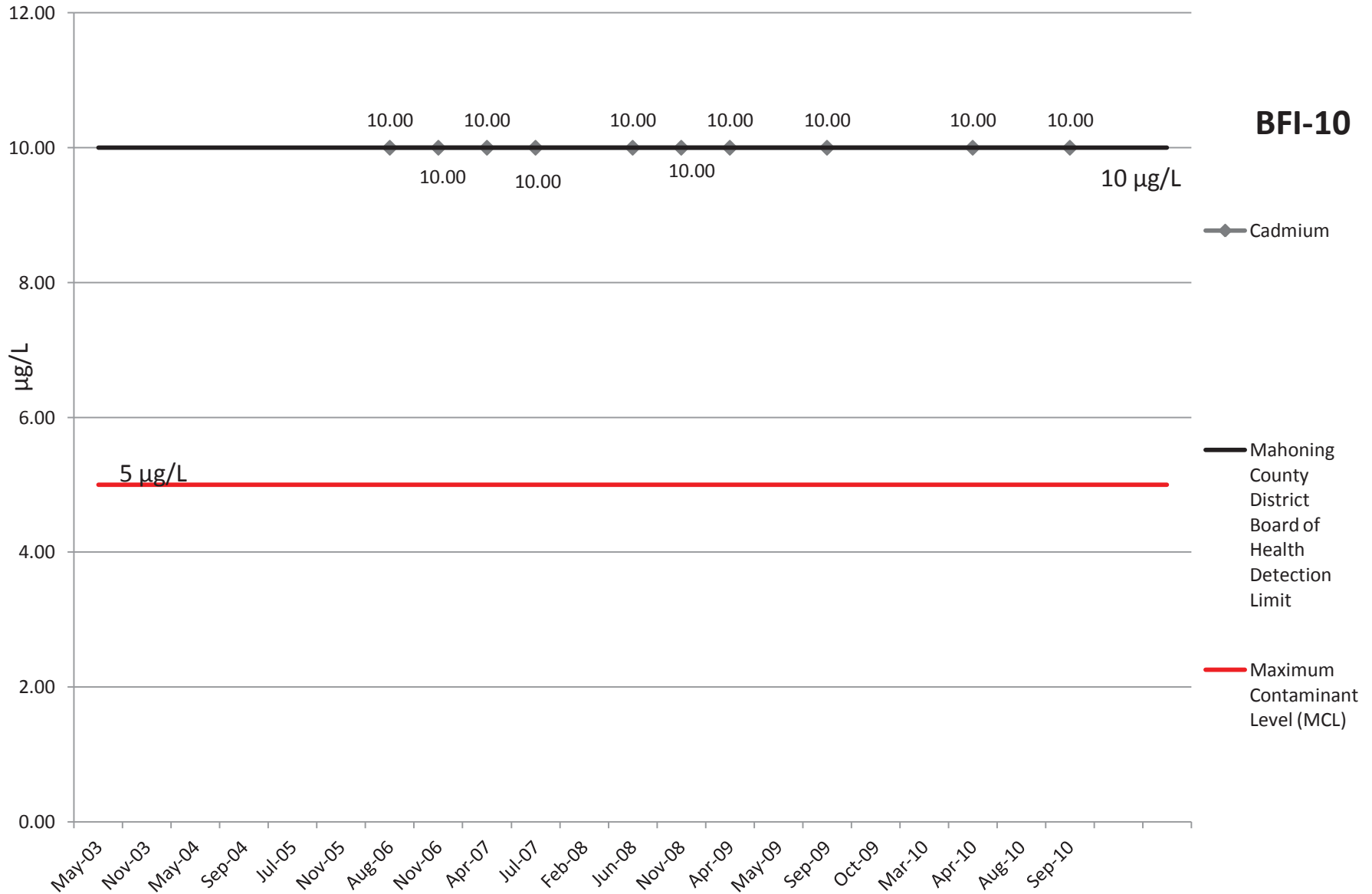
**BFI-10**



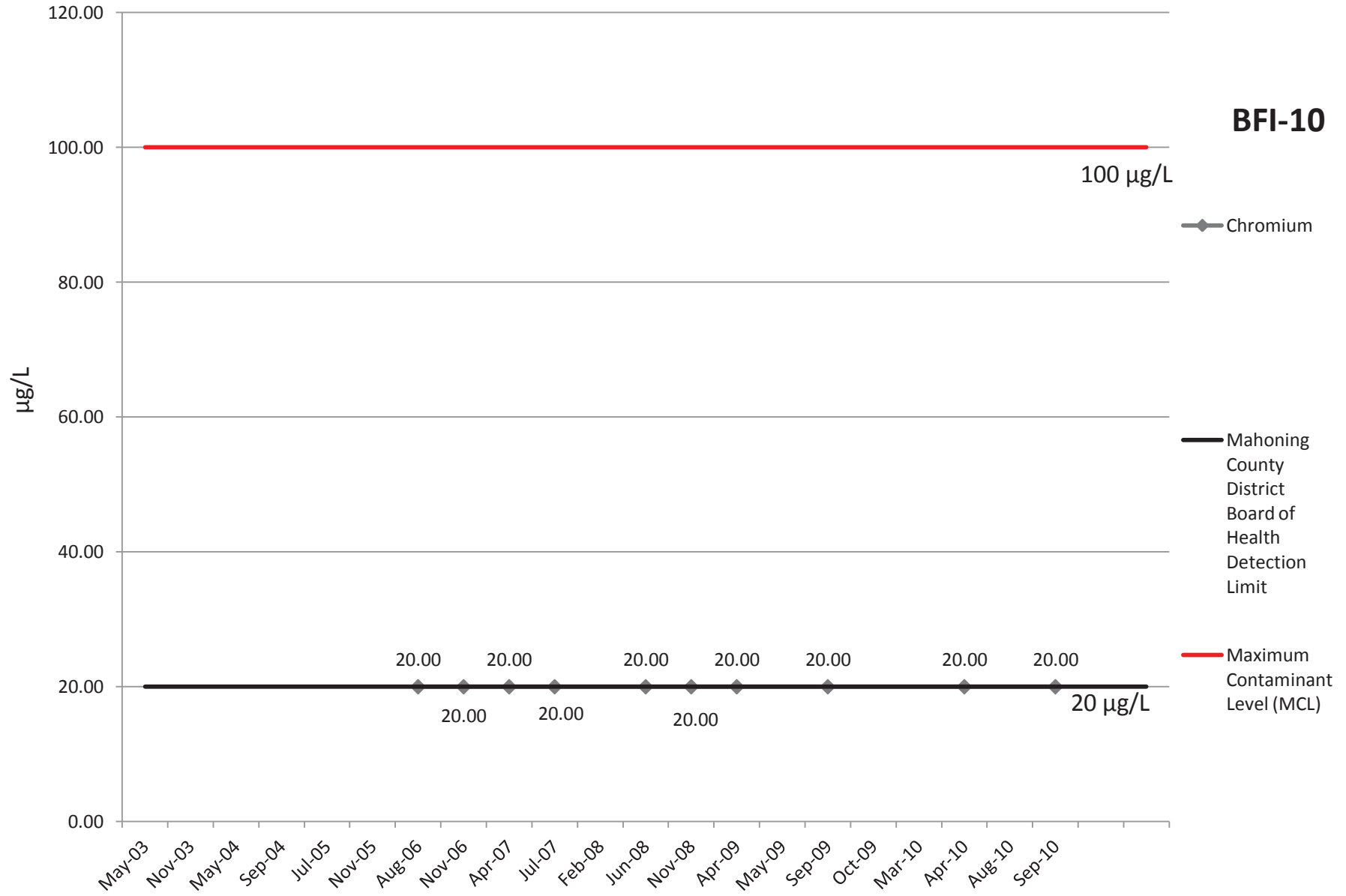
# Barium



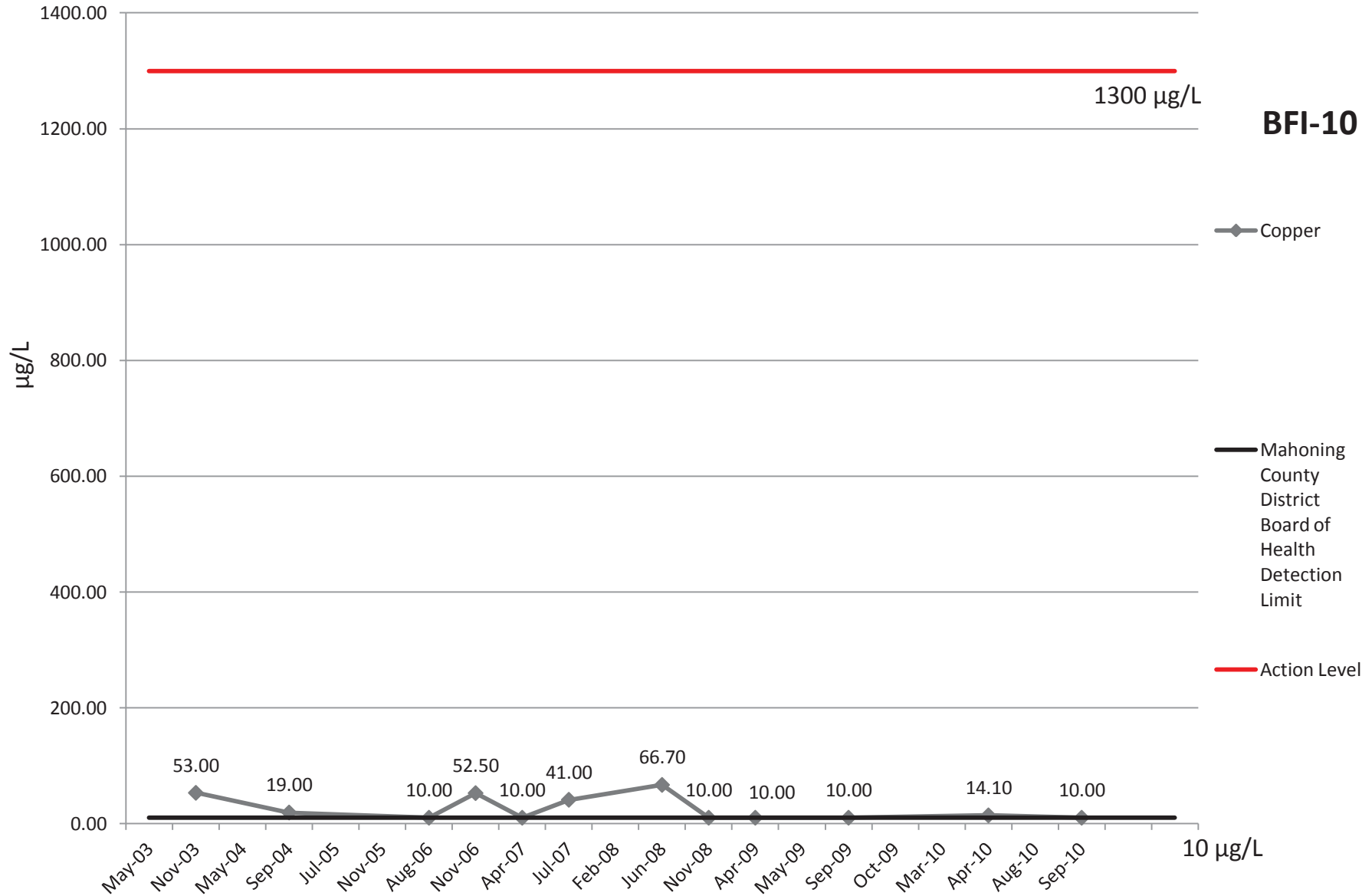
# Cadmium



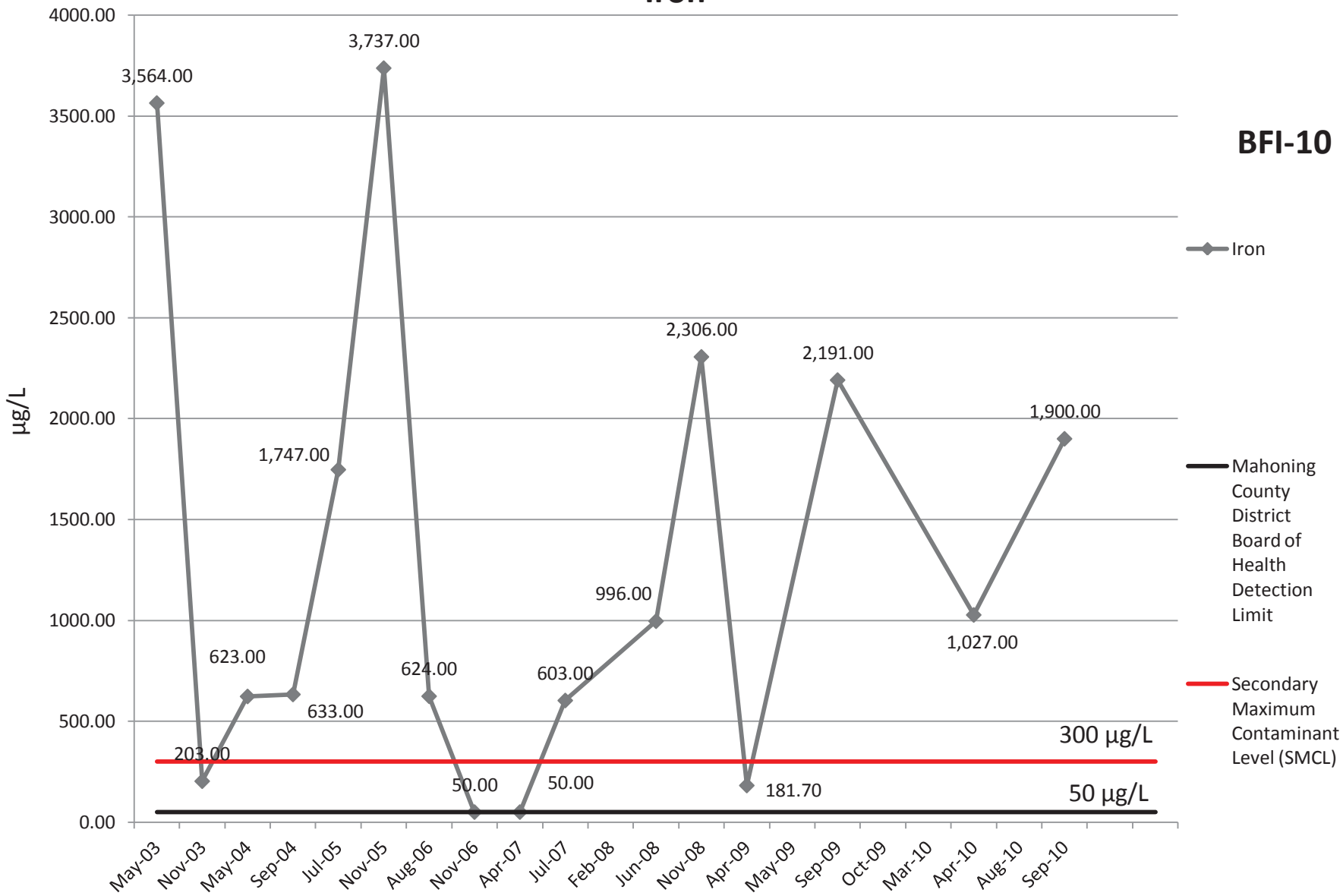
# Chromium



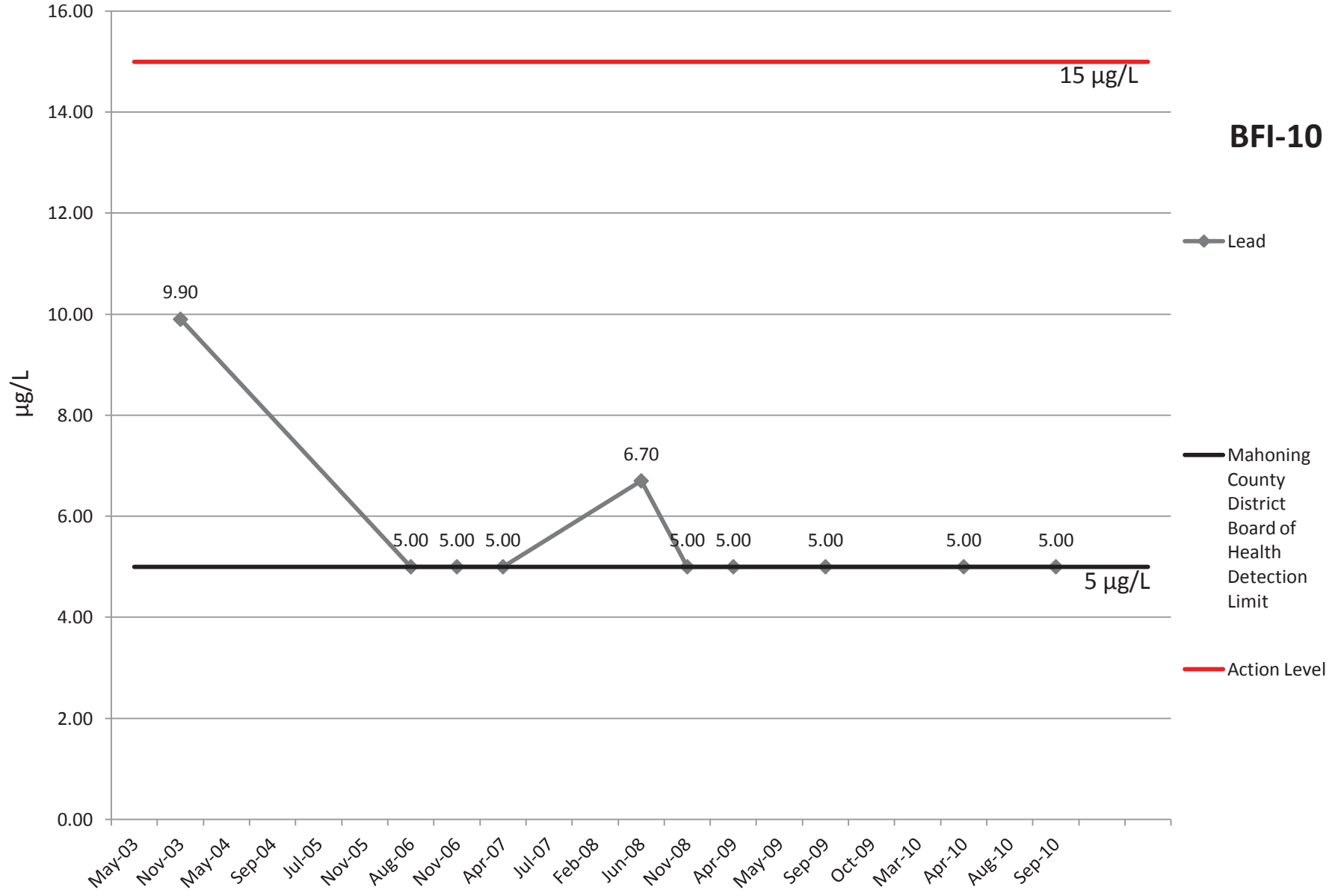
# Copper



# Iron

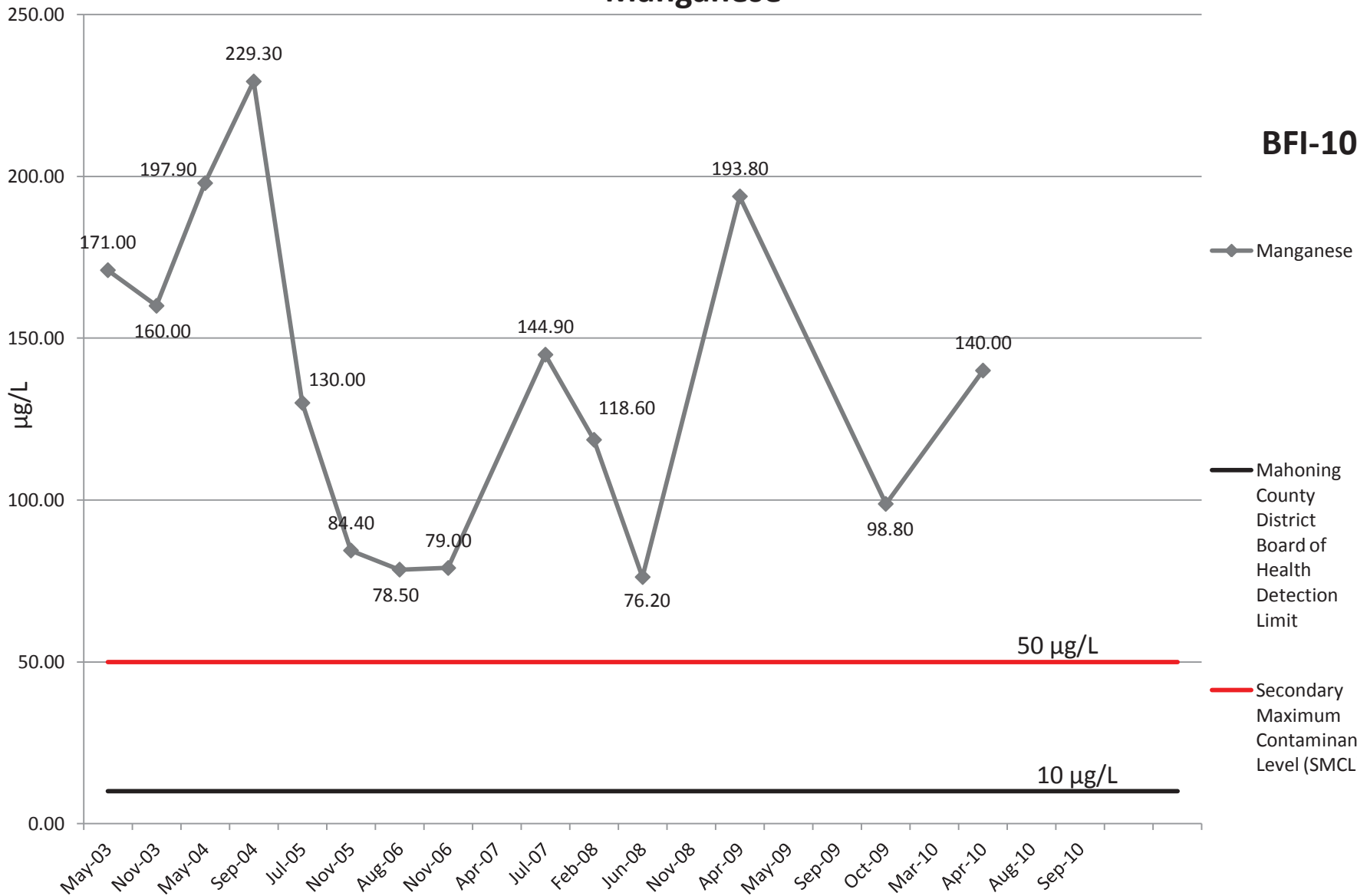


# Lead



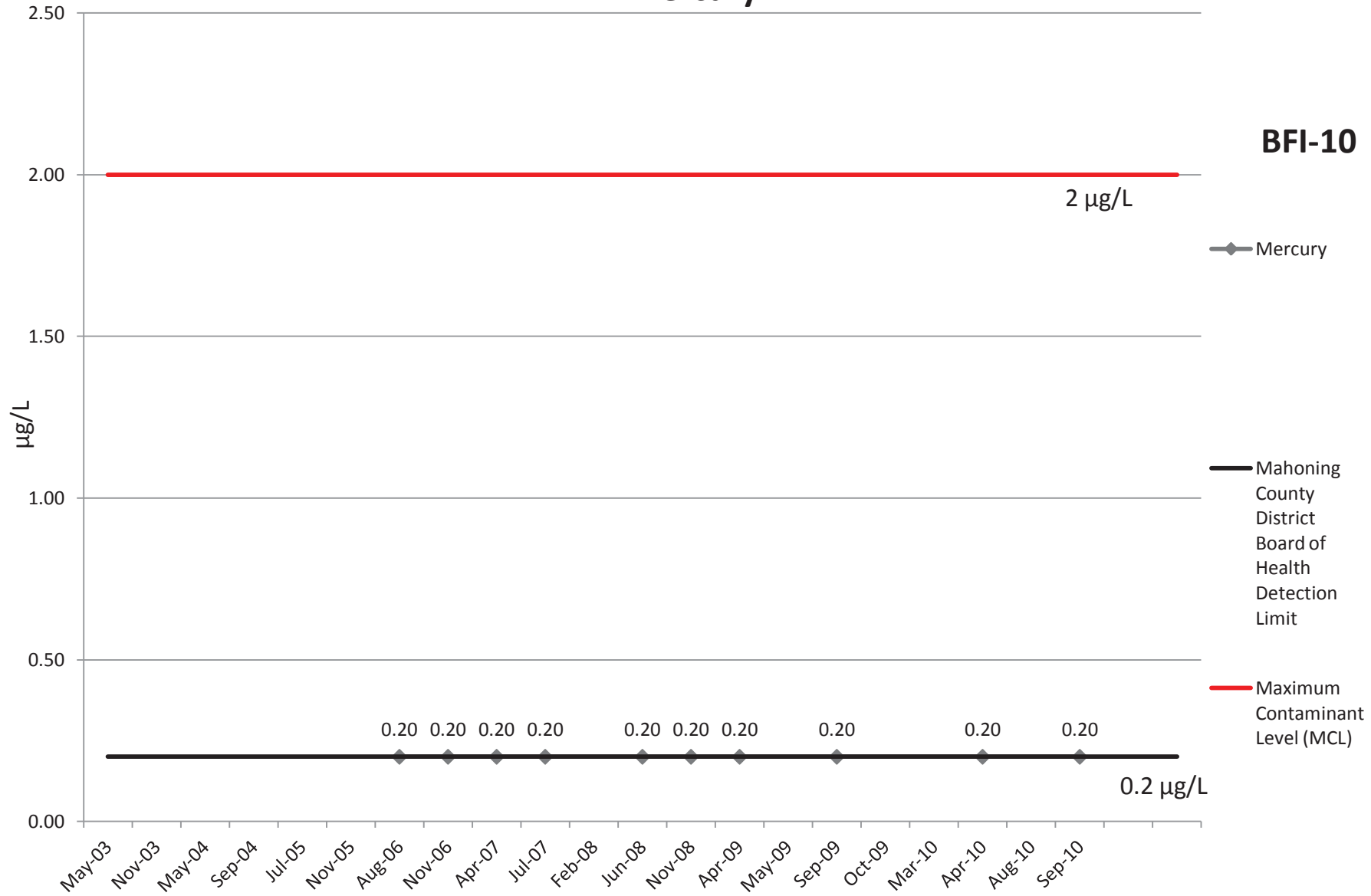


# Manganese

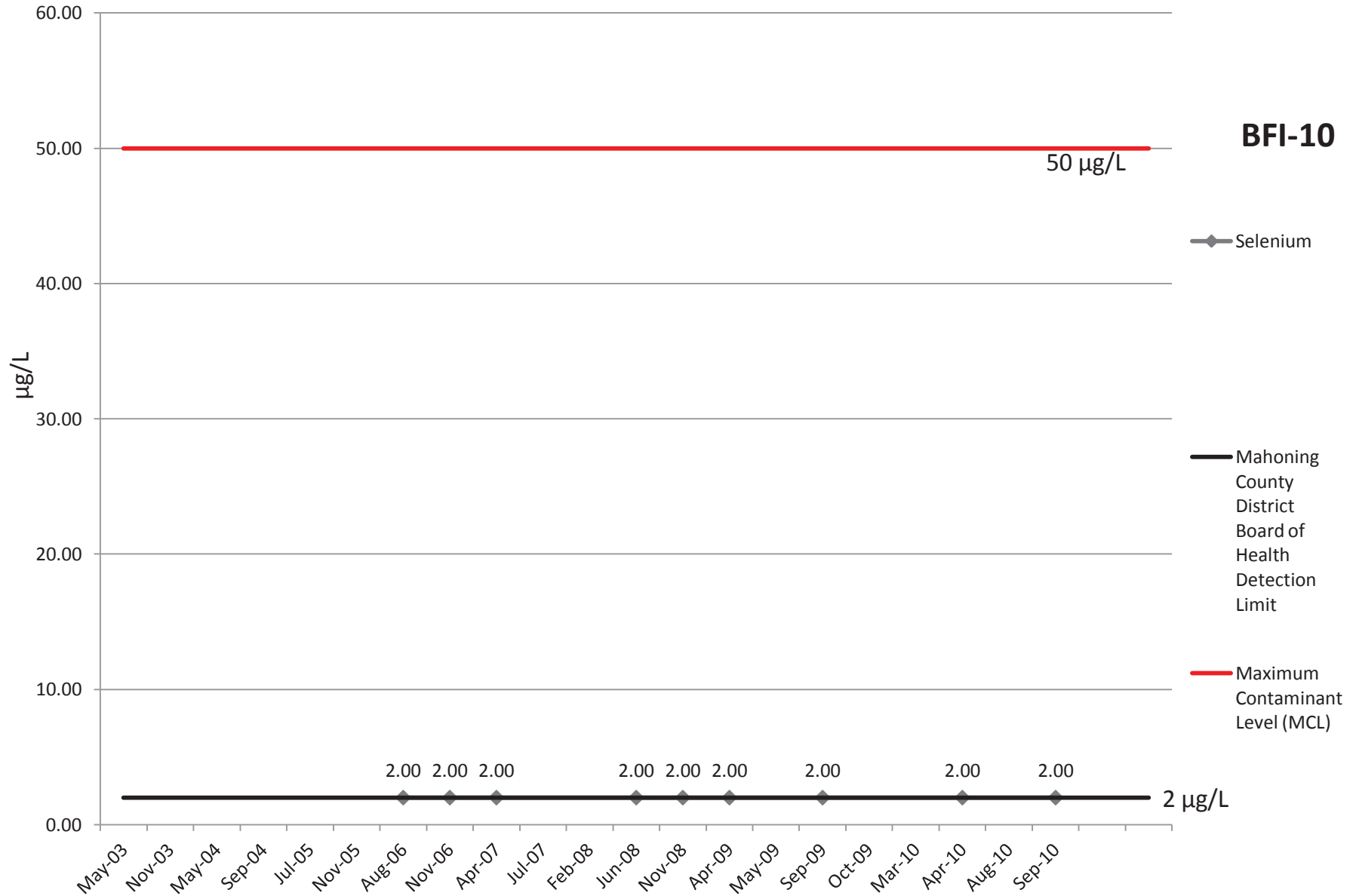


# Mercury

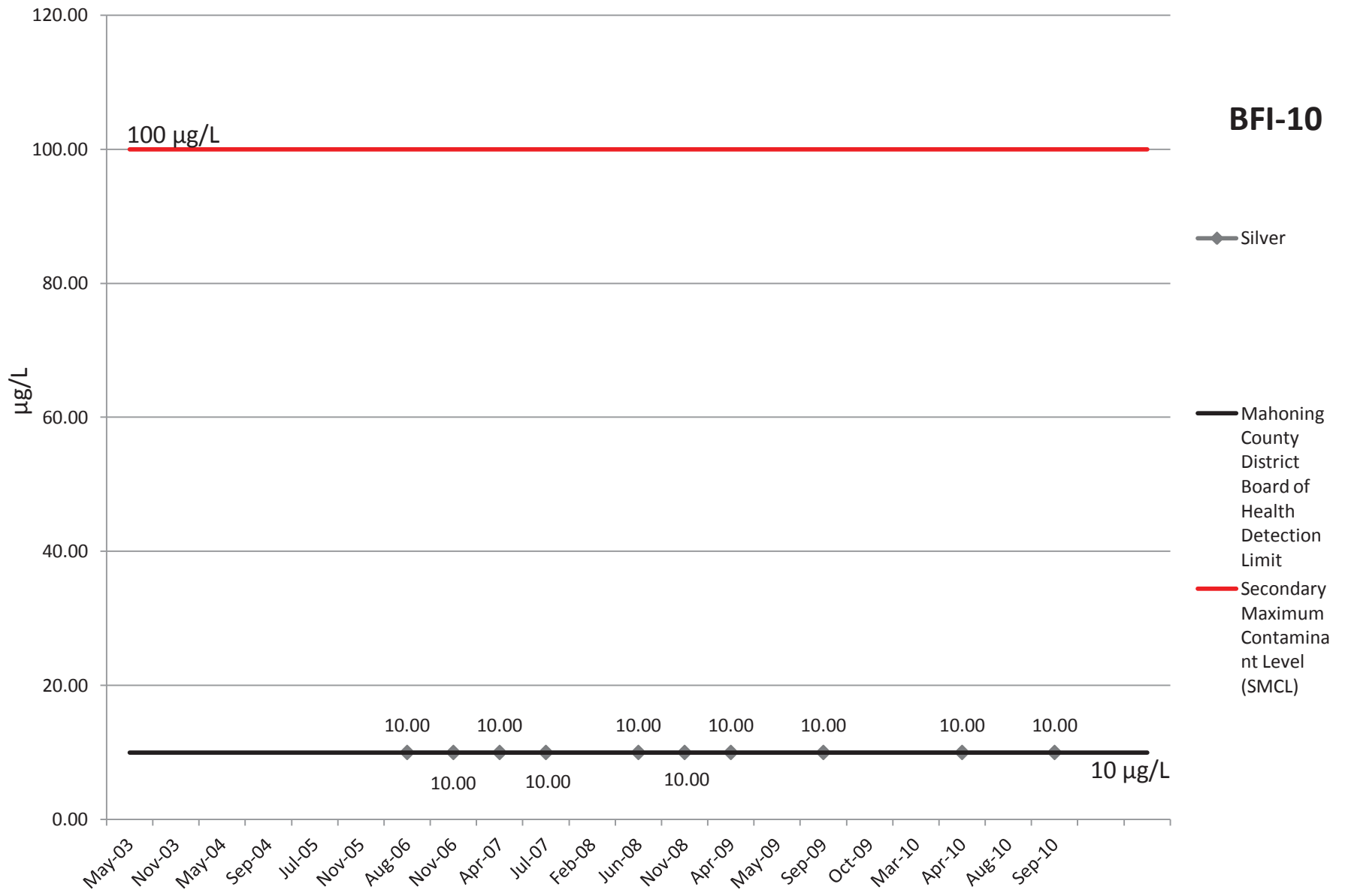
**BFI-10**



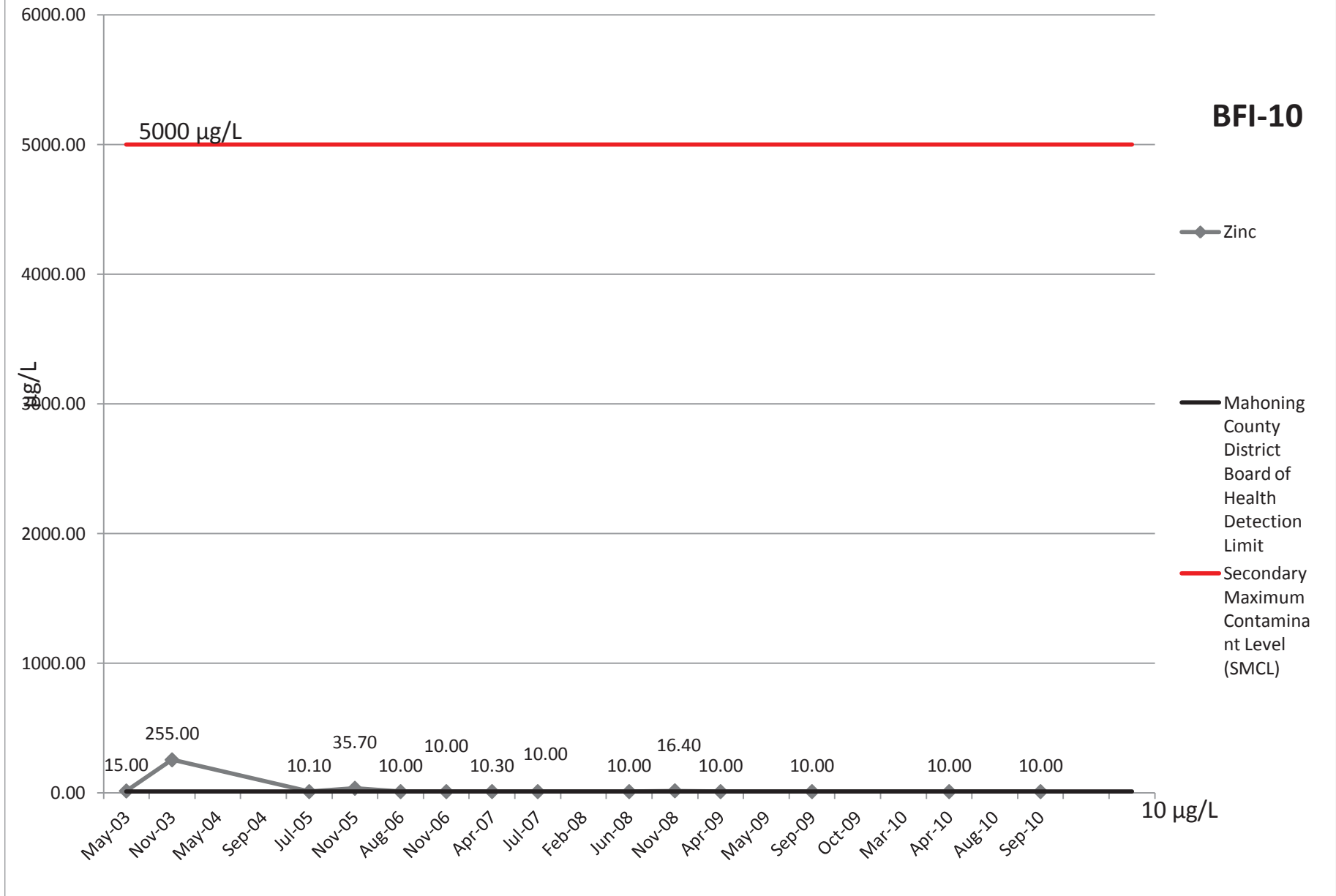
# Selenium



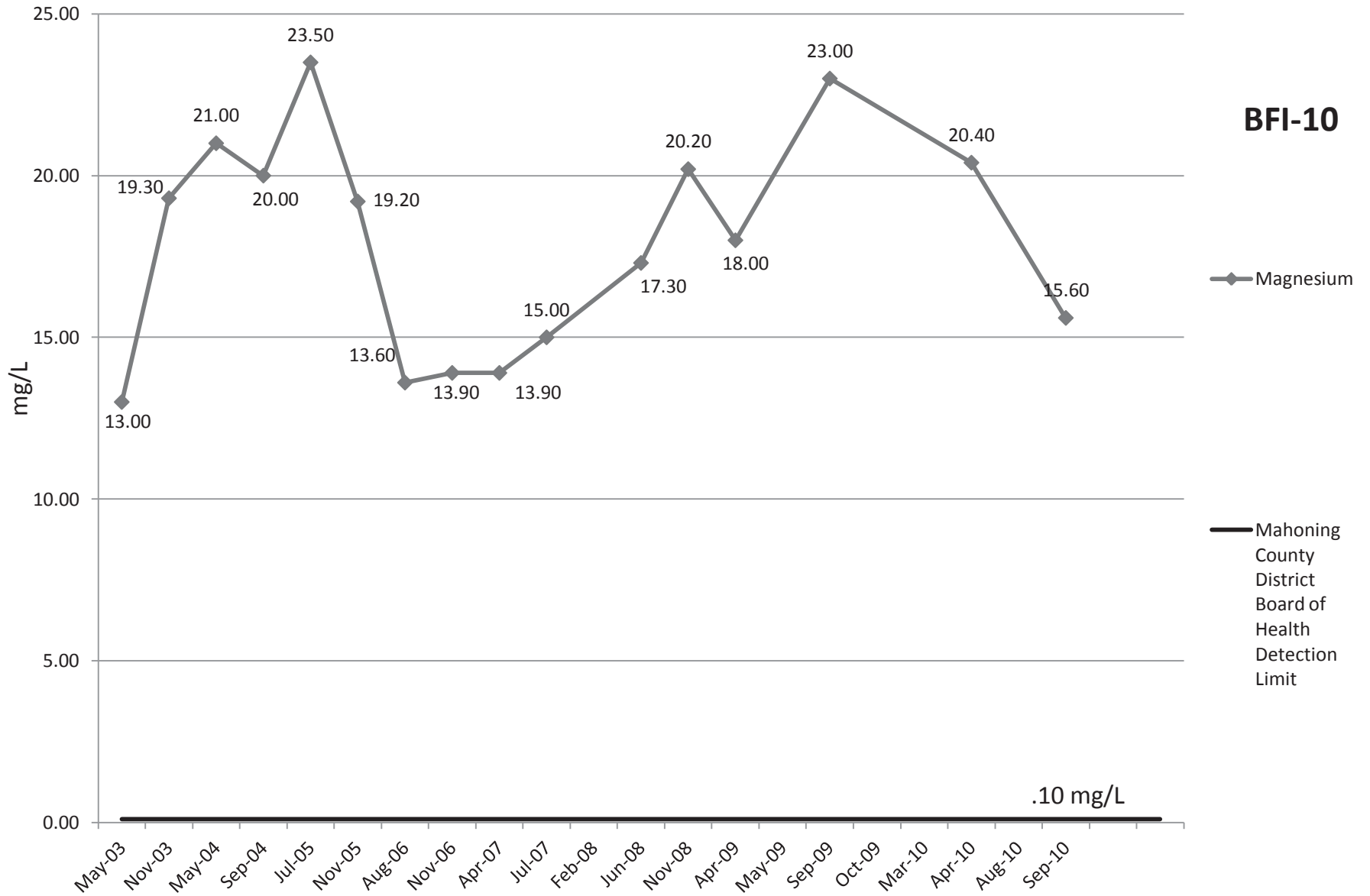
# Silver



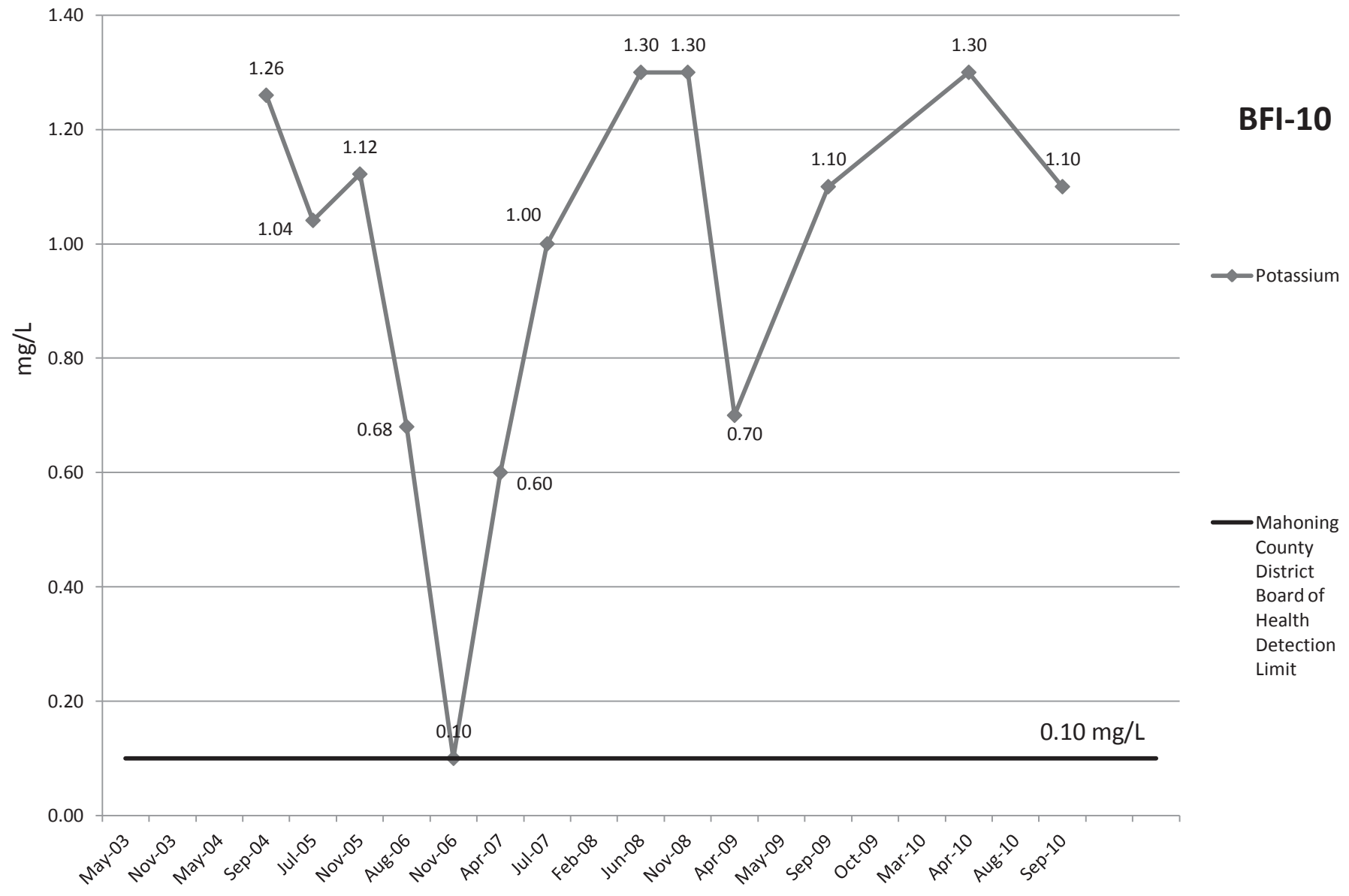
# Zinc



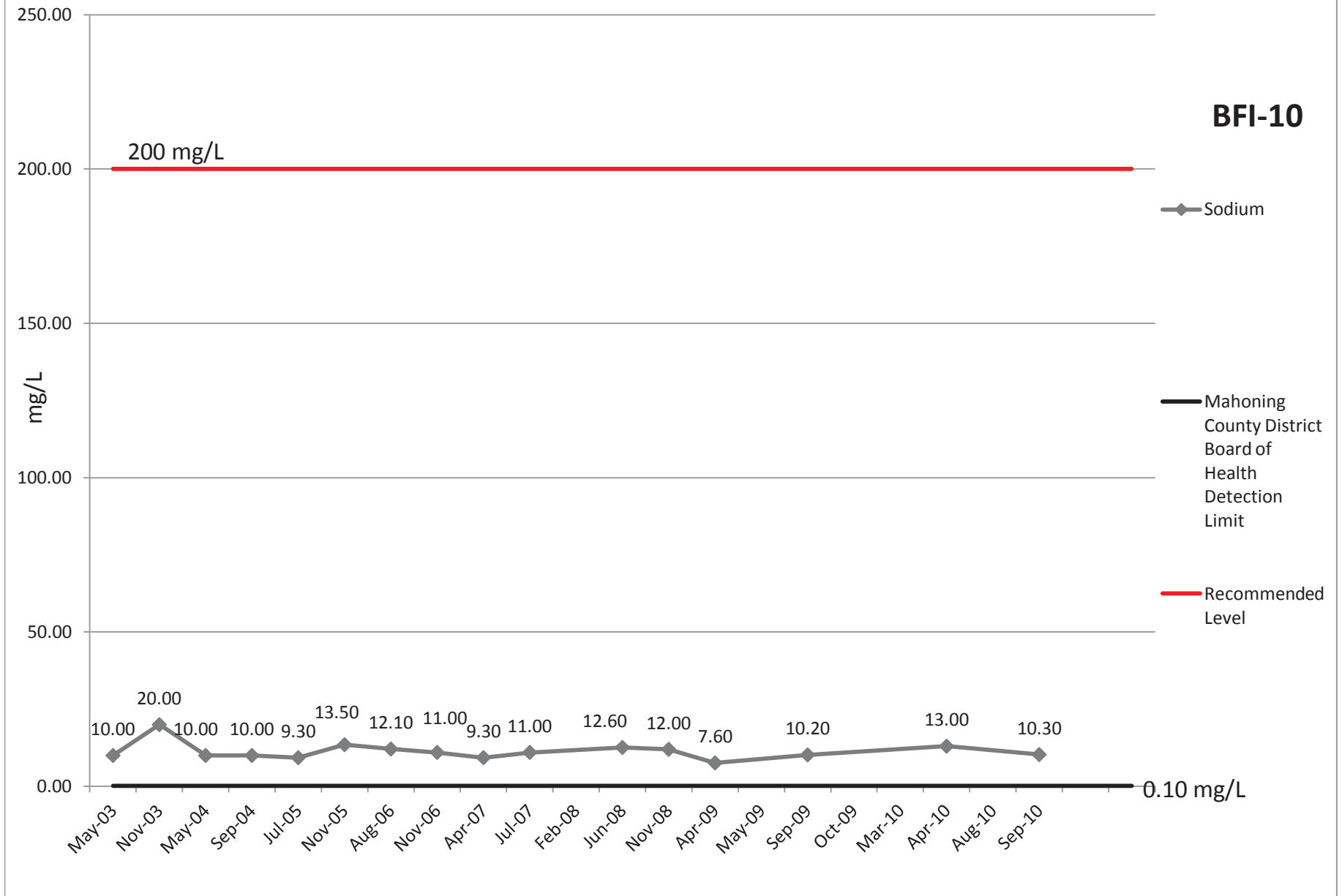
# Magnesium



# Potassium

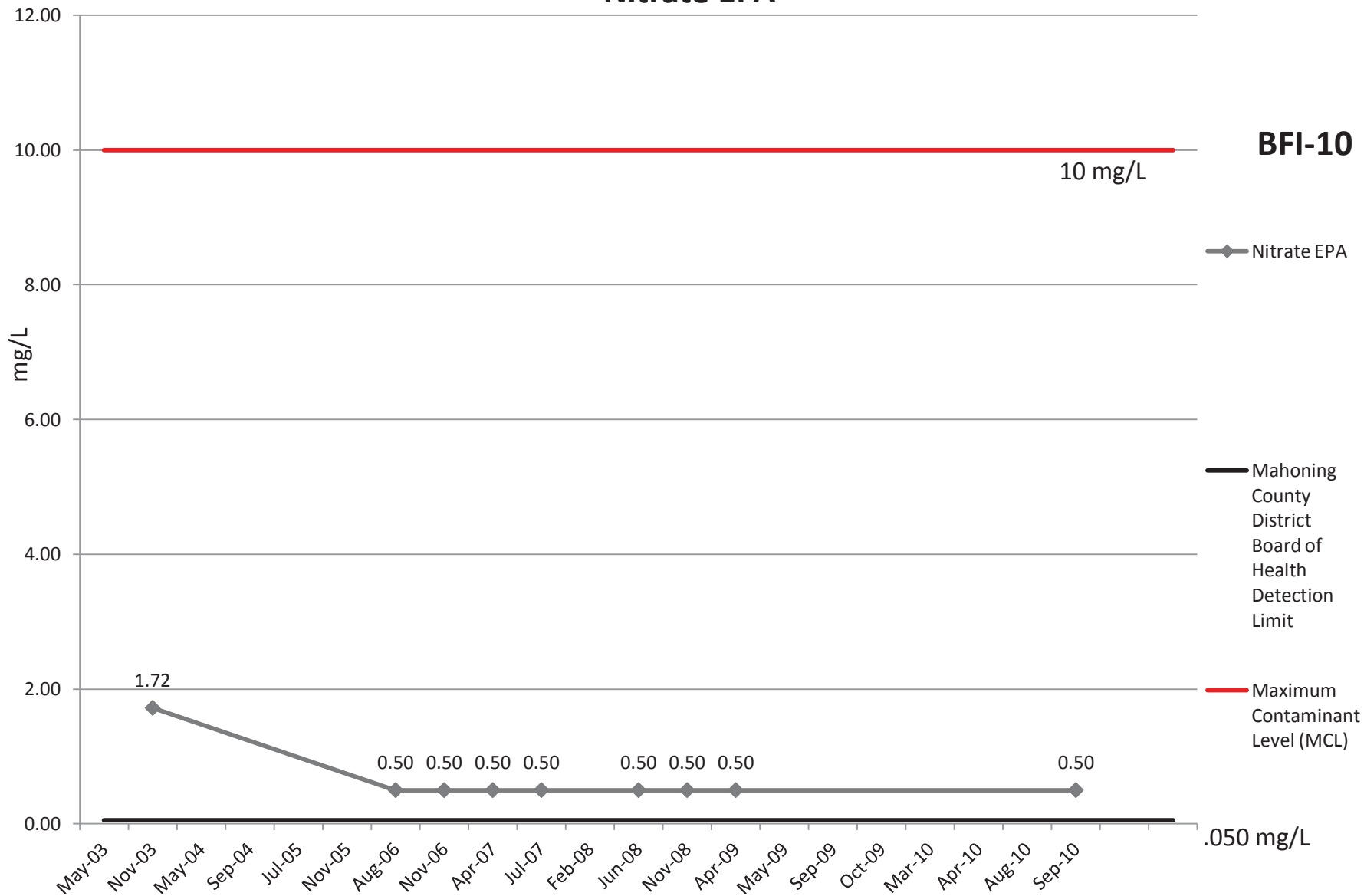


# Sodium

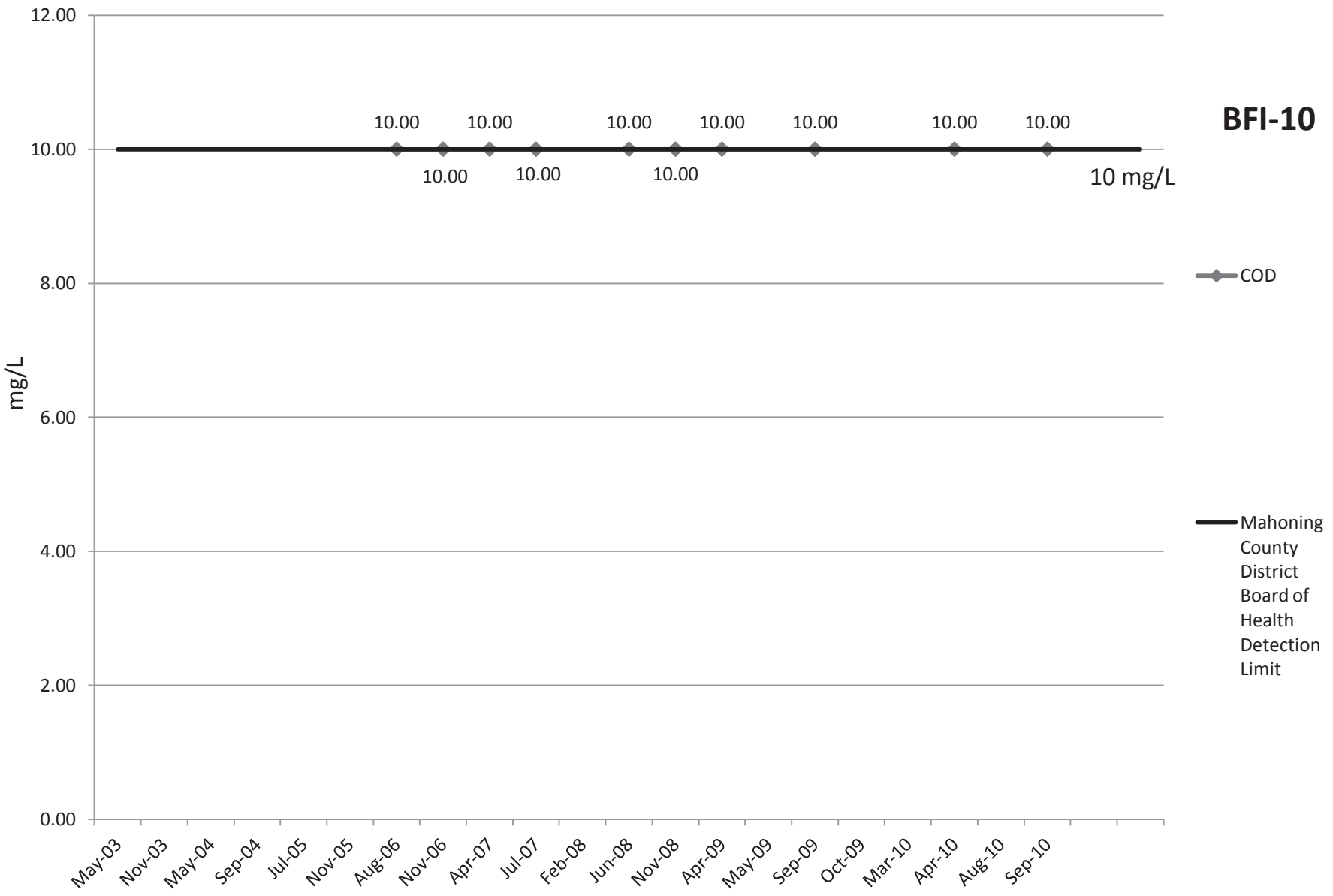




# Nitrate EPA



# COD



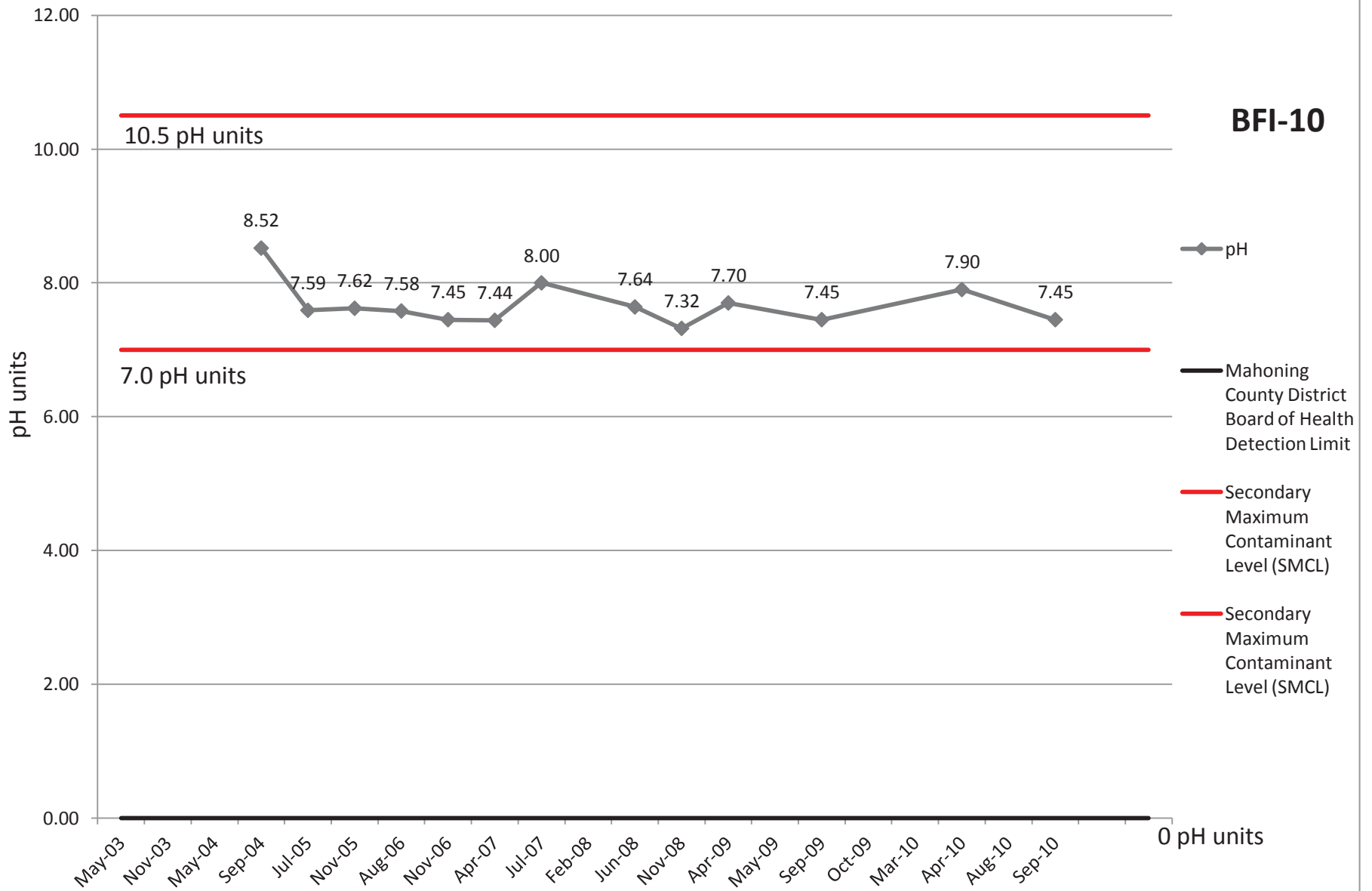
**BFI-10**

◆ COD

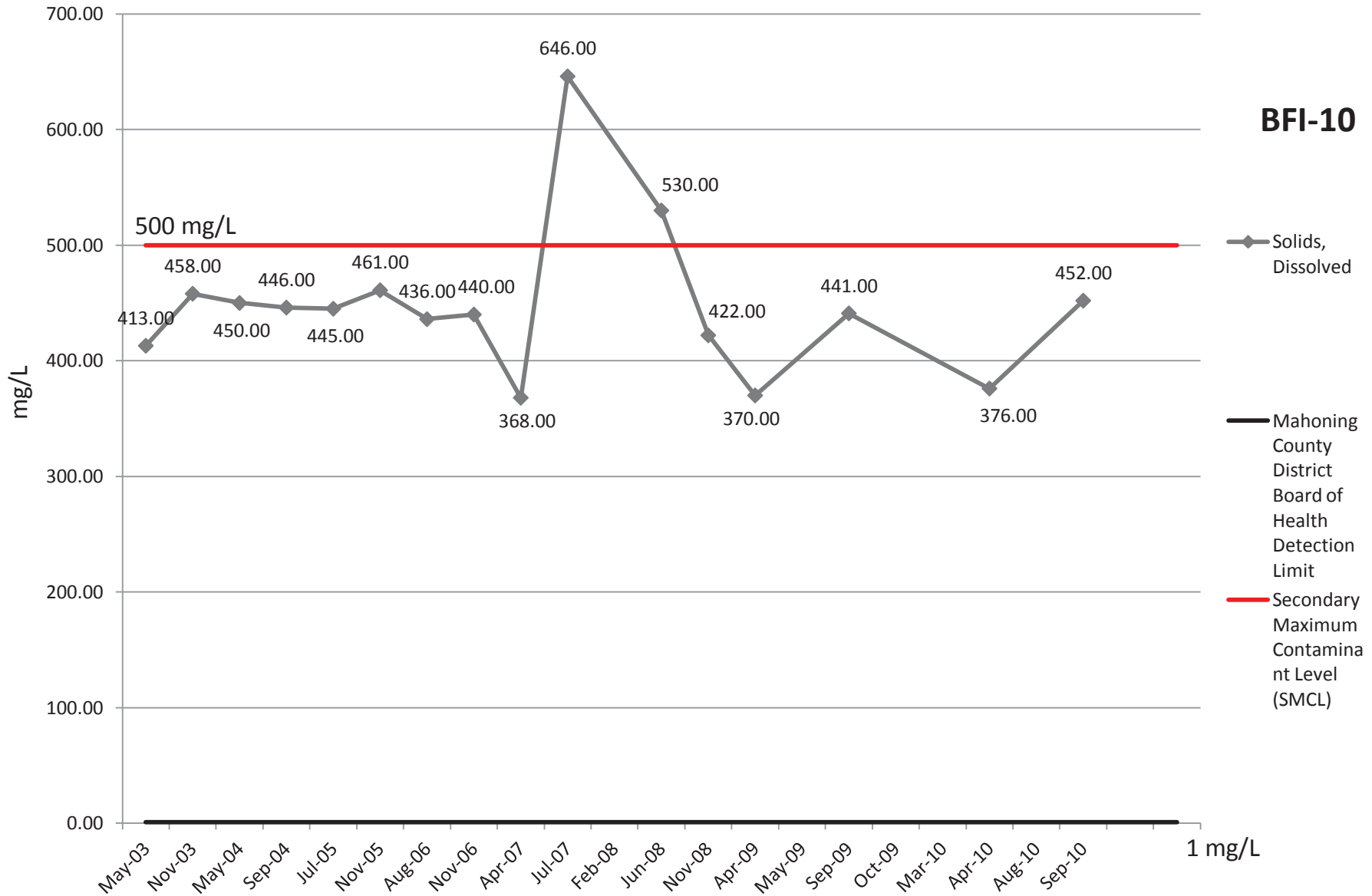
— Mahoning County District Board of Health Detection Limit

10 mg/L

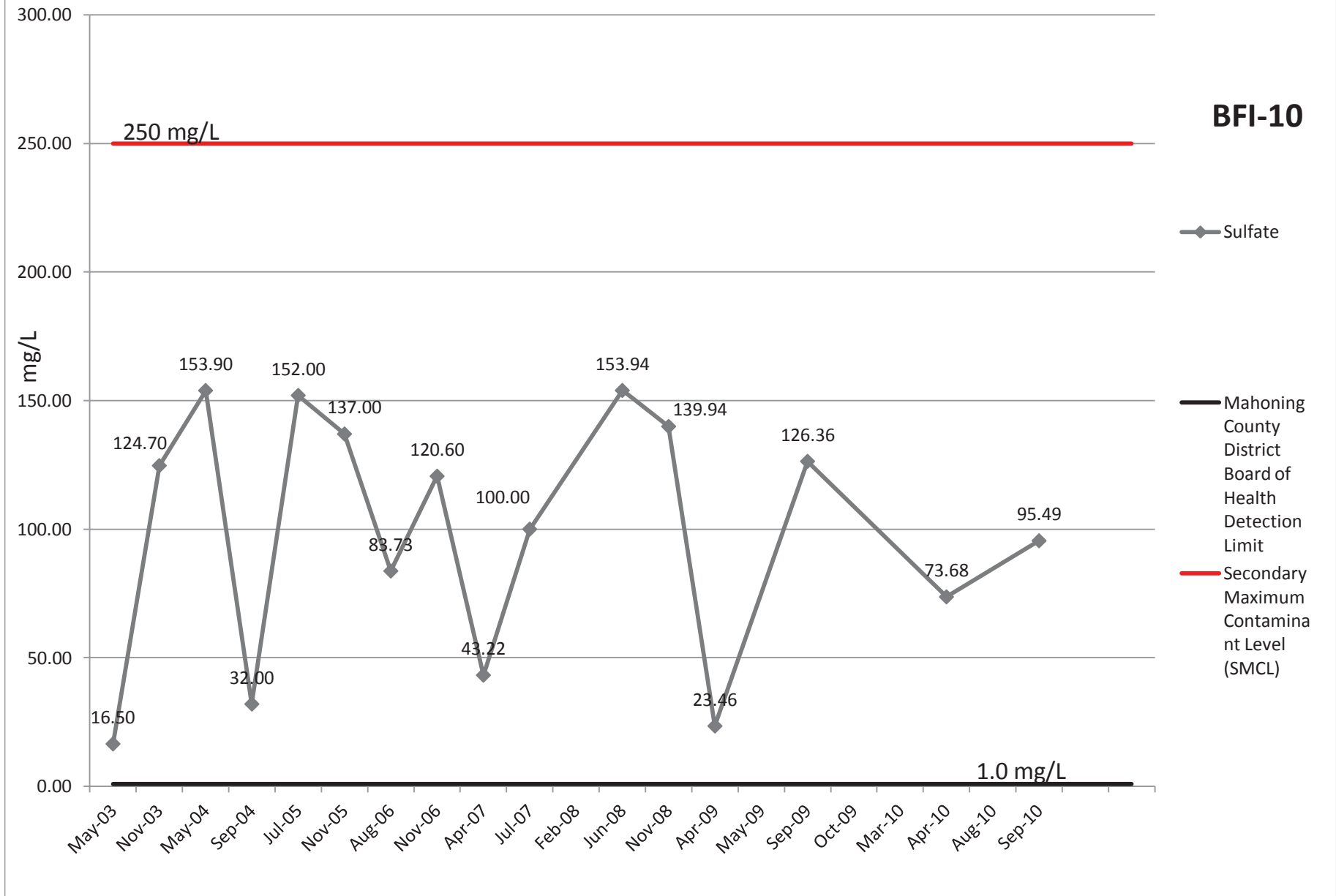
# pH



# Solids, Dissolved



# Sulfate



# Bacteria

## BFI-10

Positive/Negative

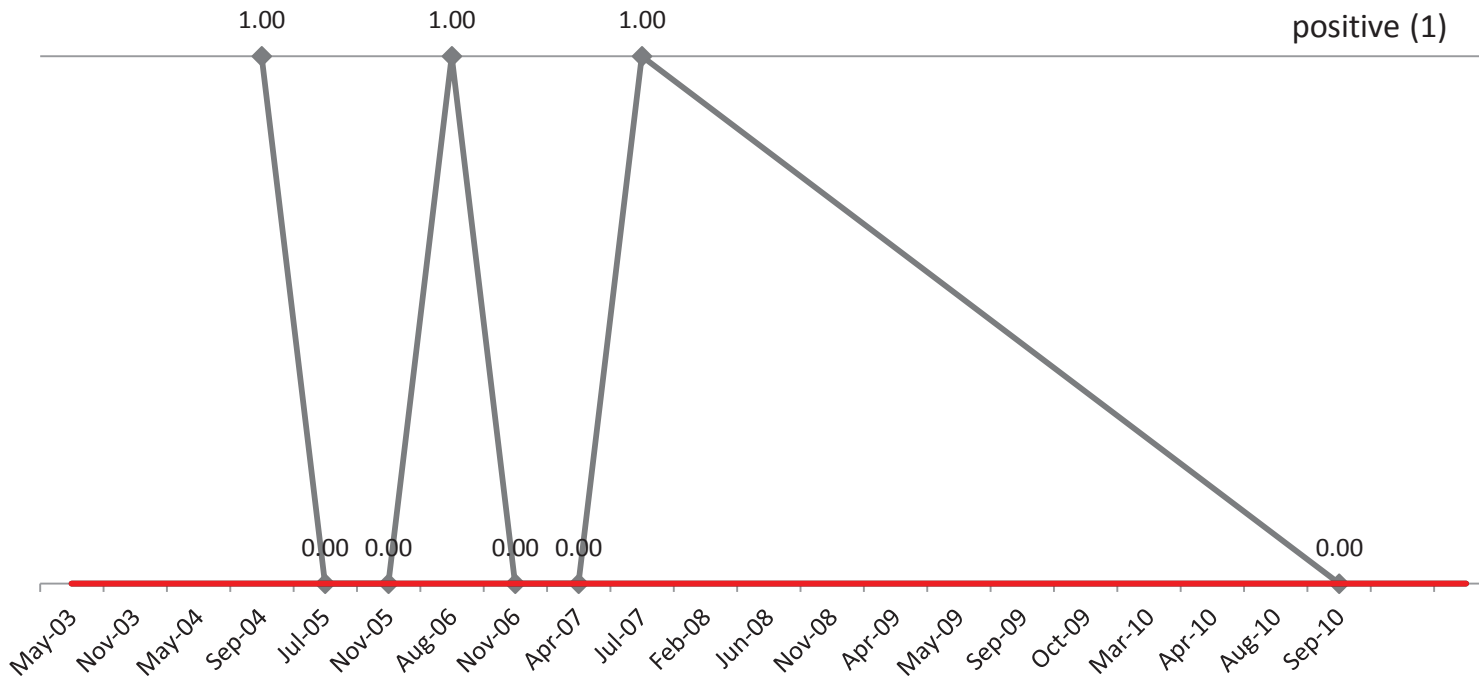
◆ Bacteria

positive (1)

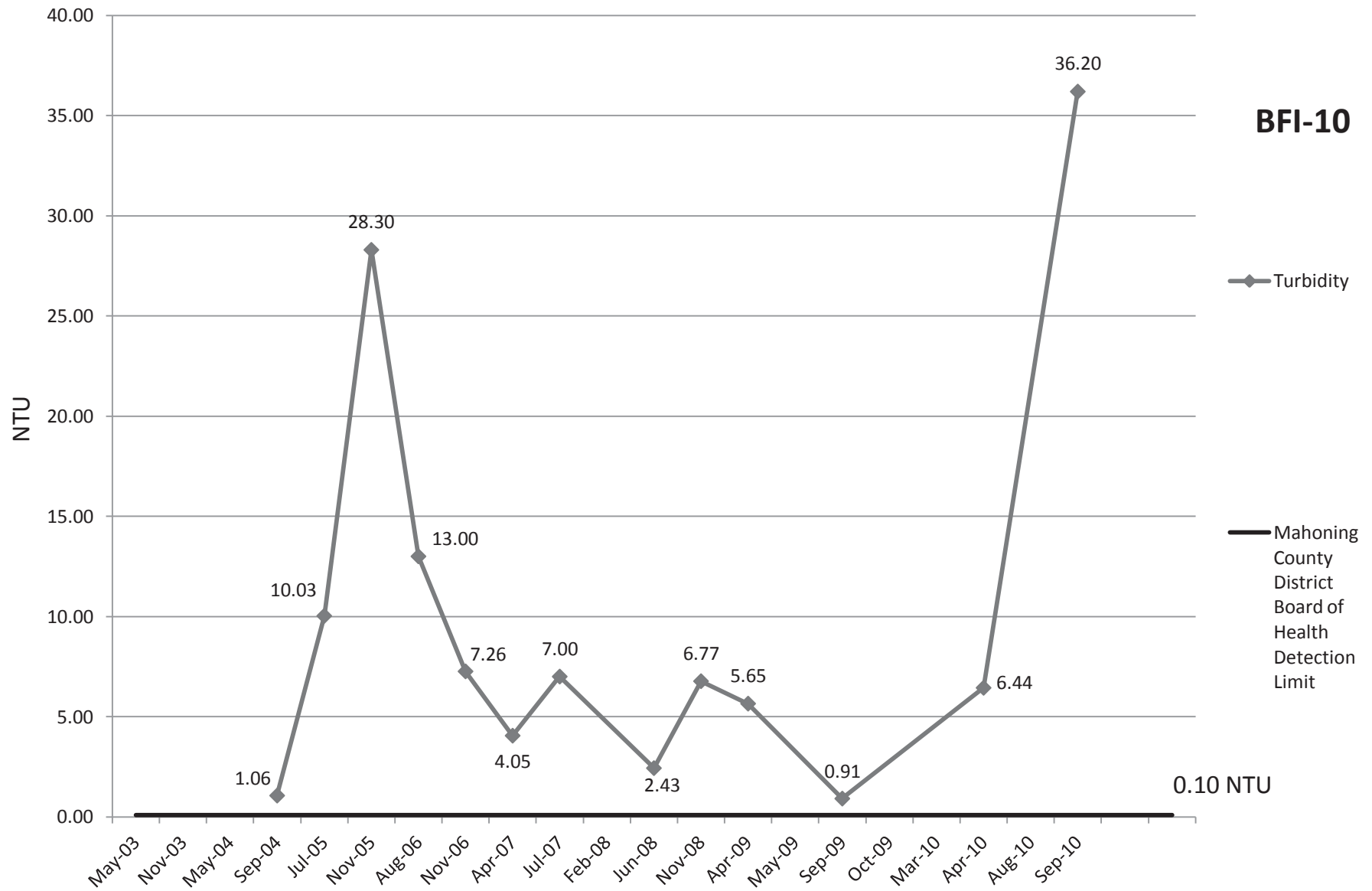
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

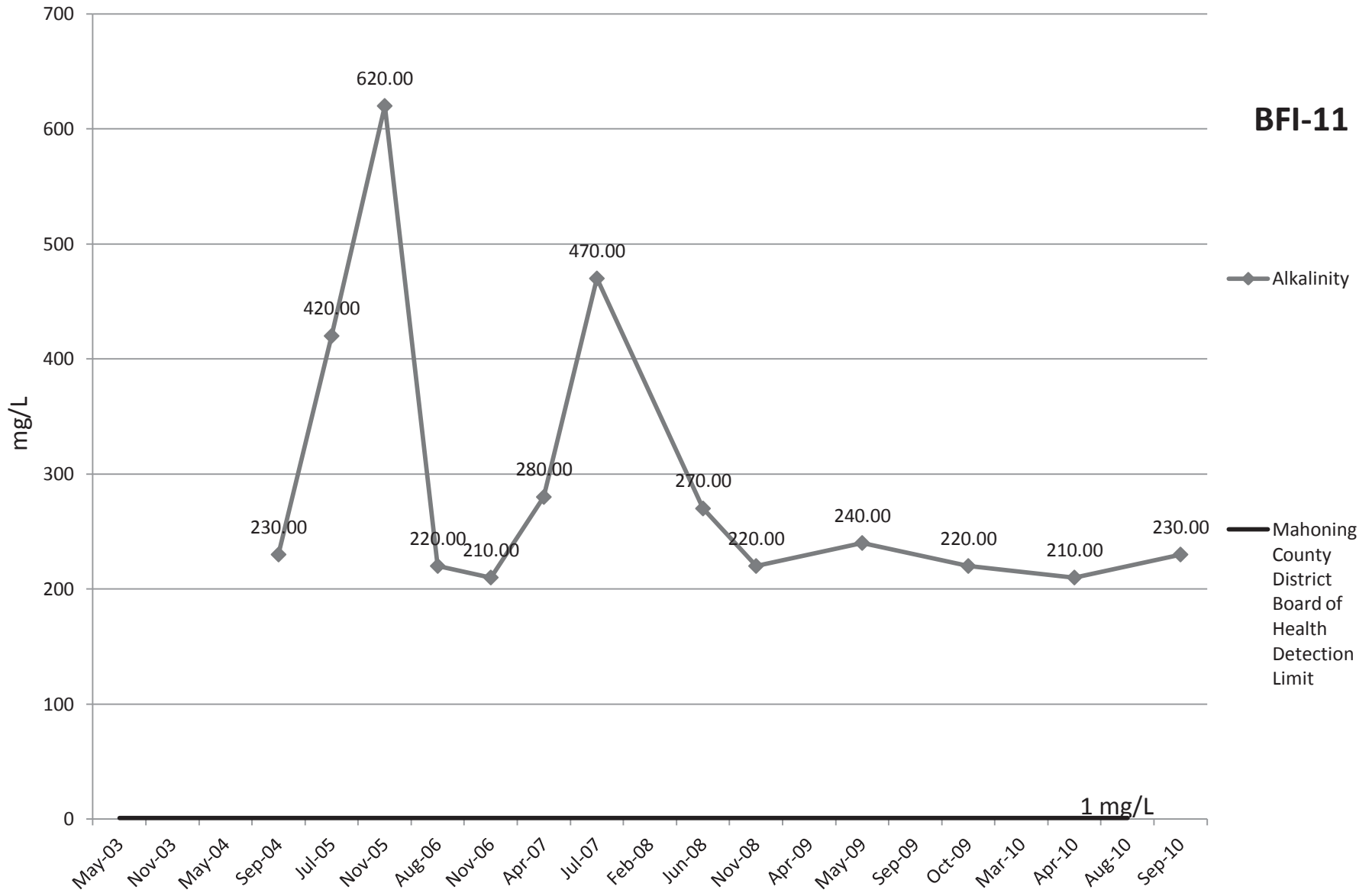
negative (0)



# Turbidity

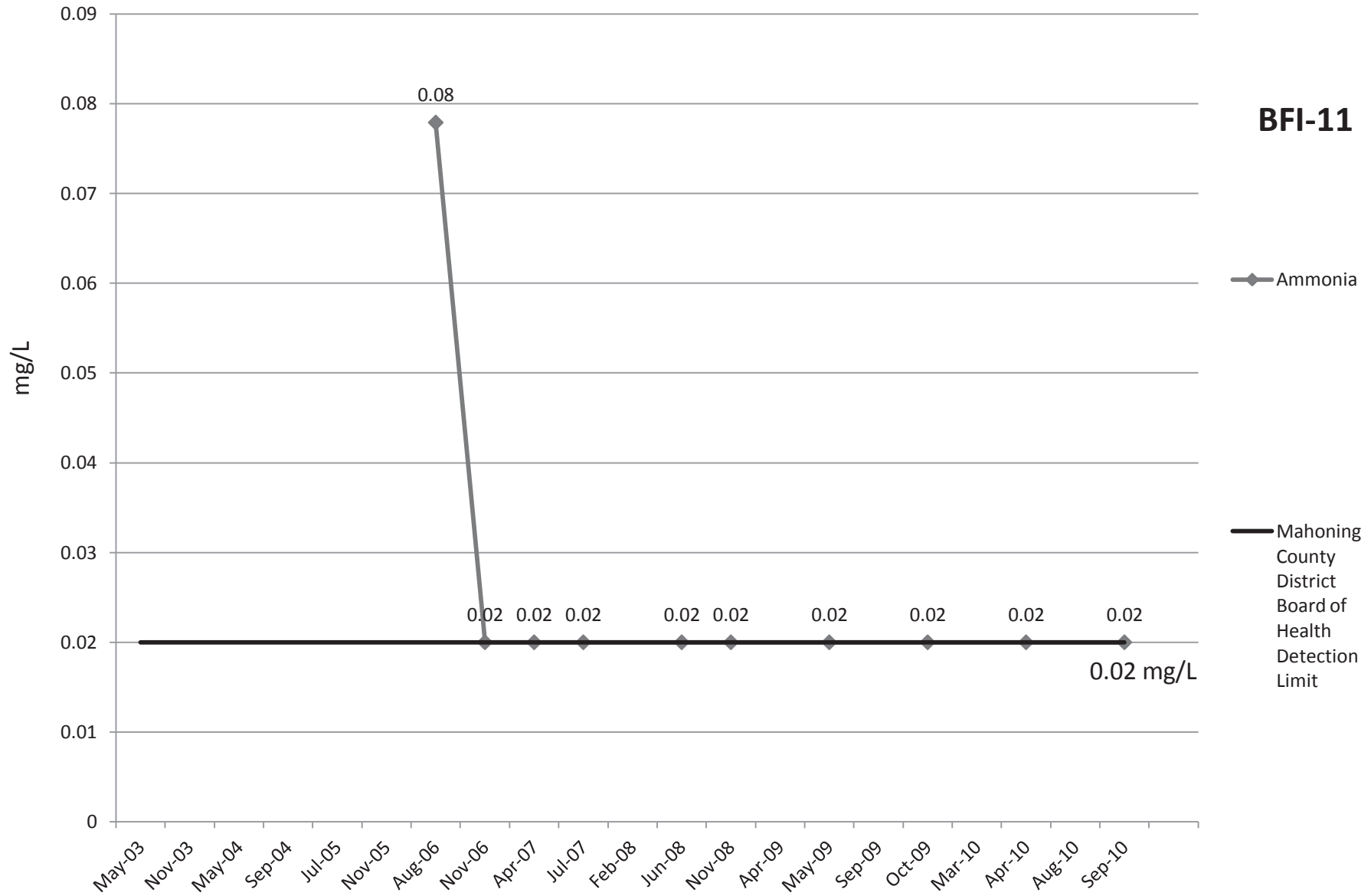


# Alkalinity

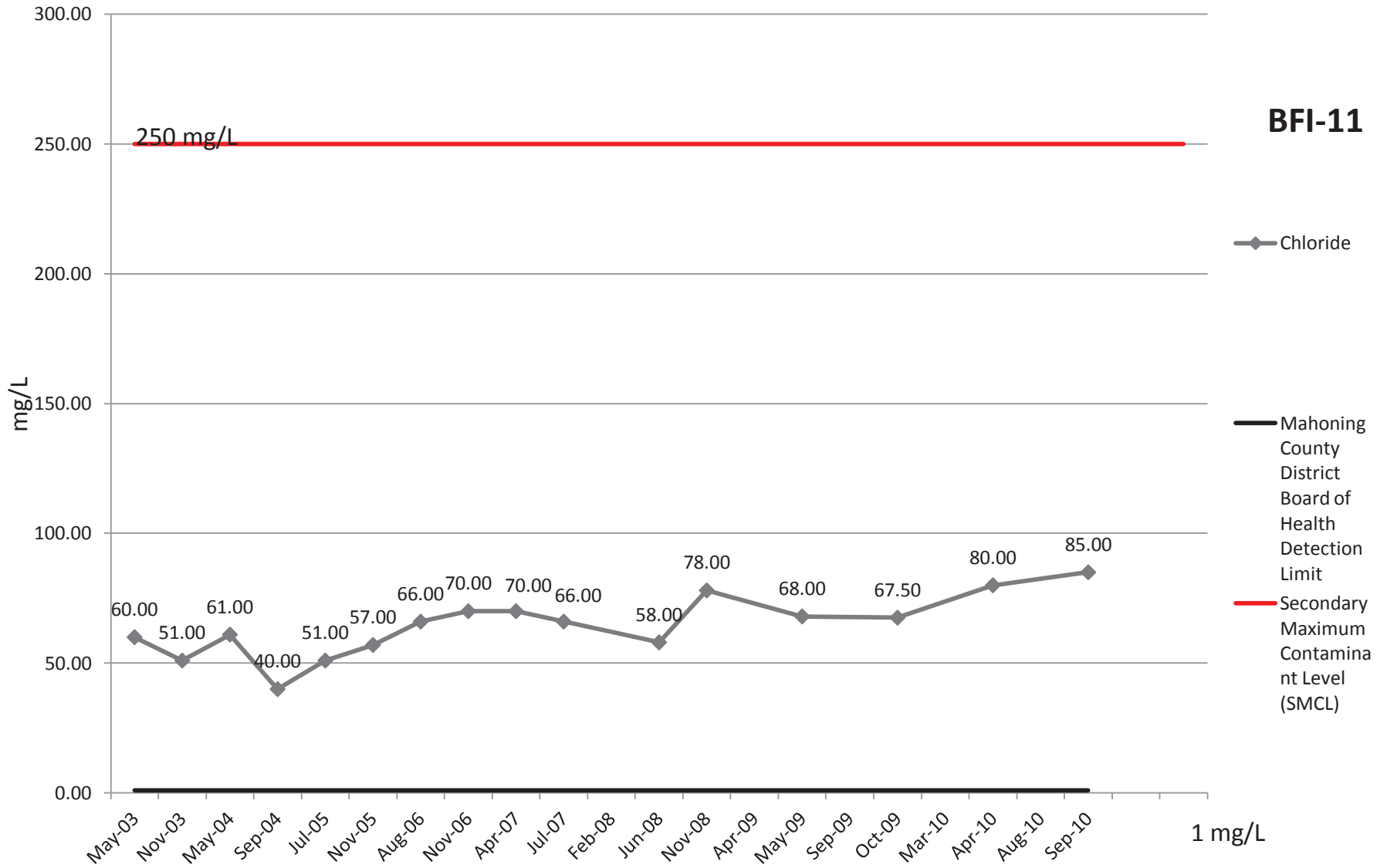




# Ammonia

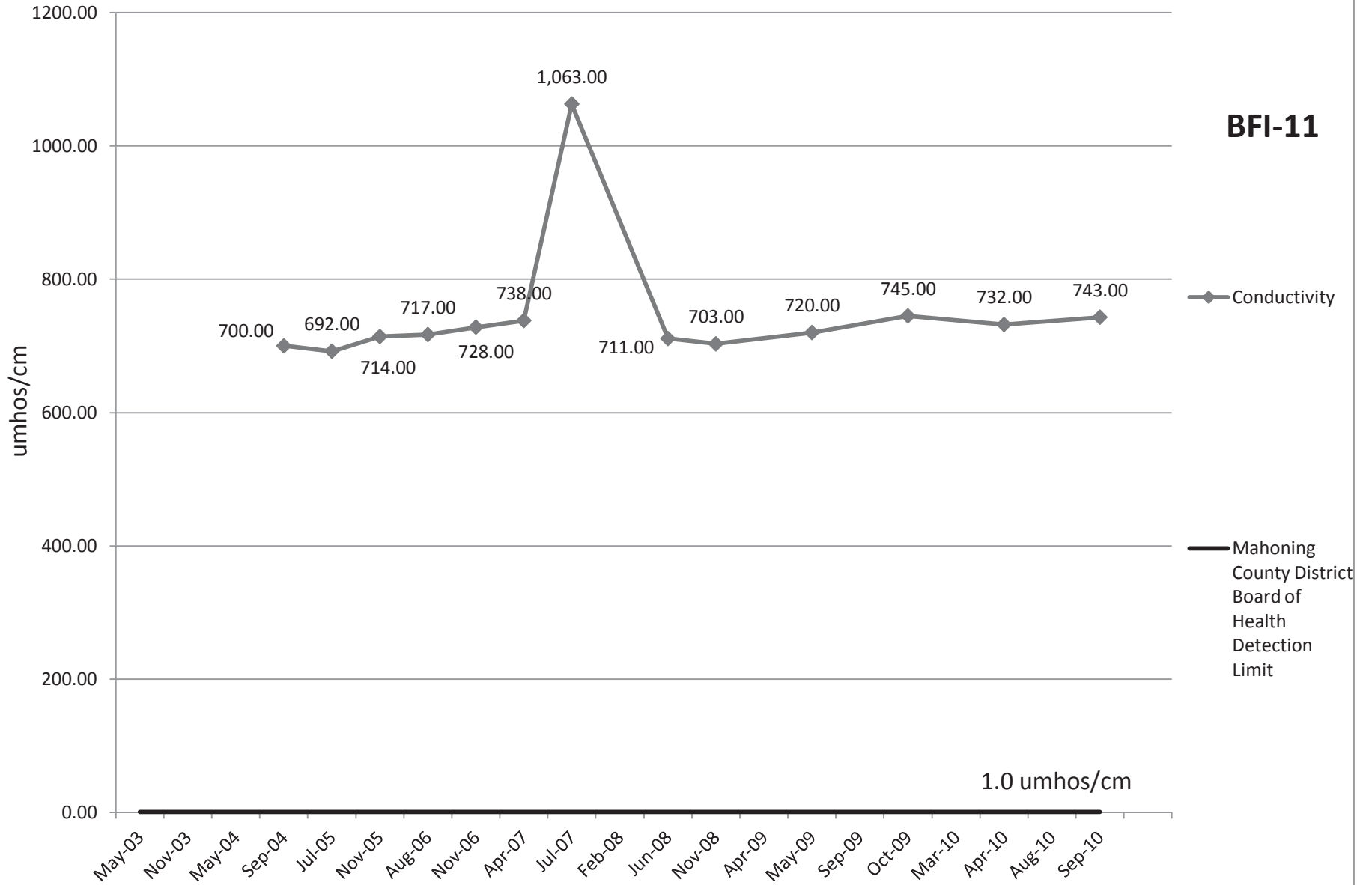


# Chloride

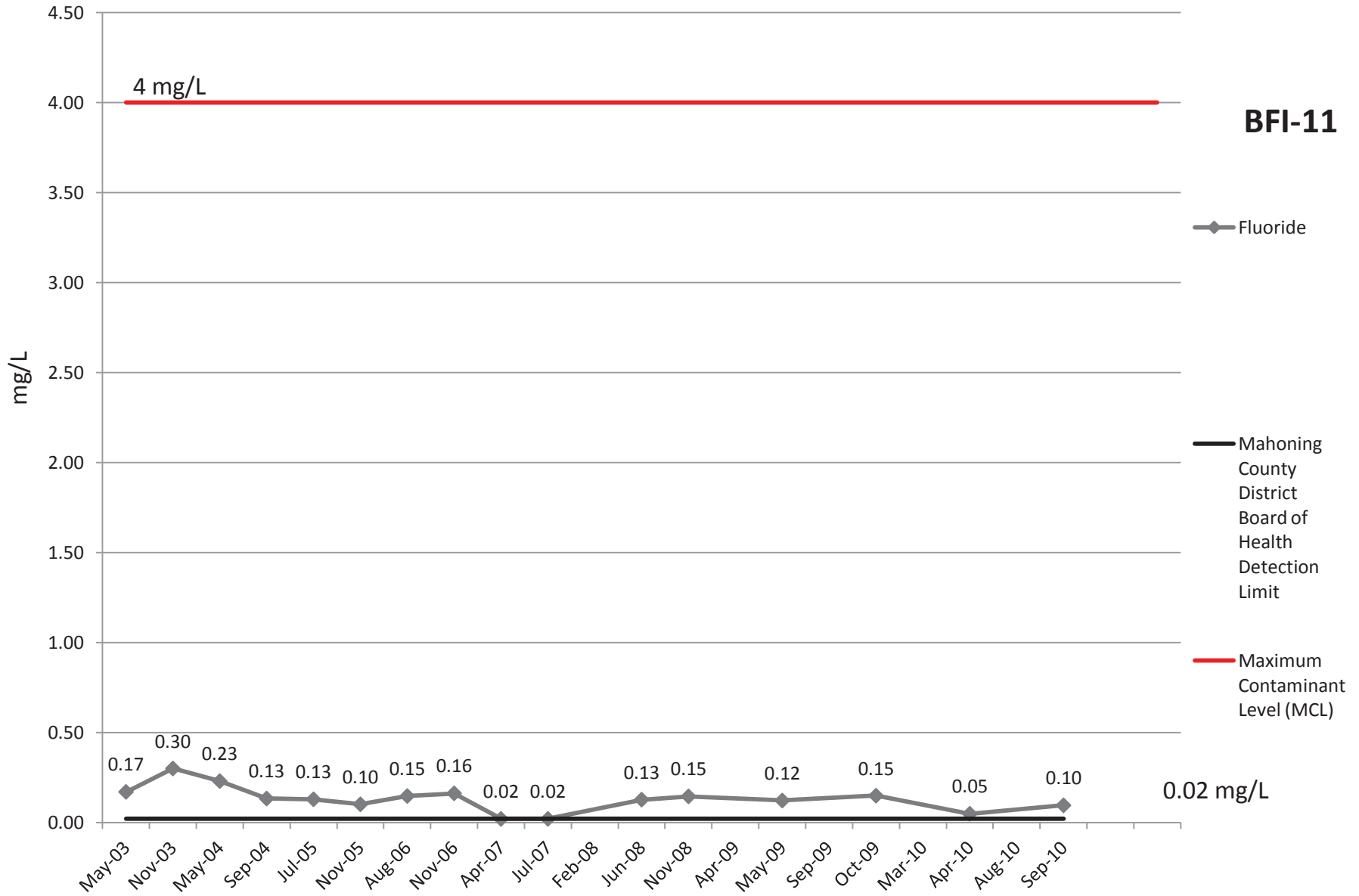


# Conductivity

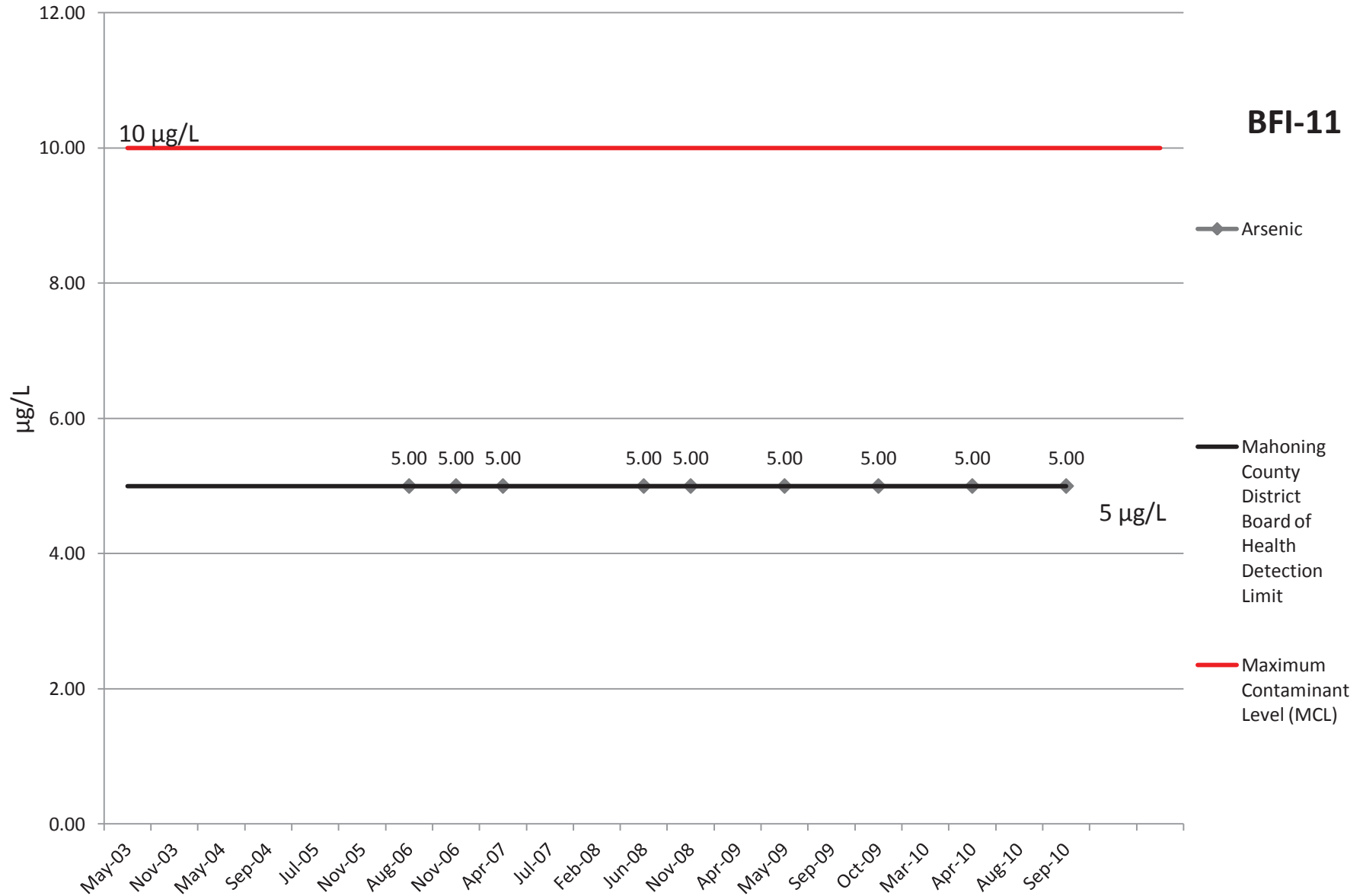
**BFI-11**



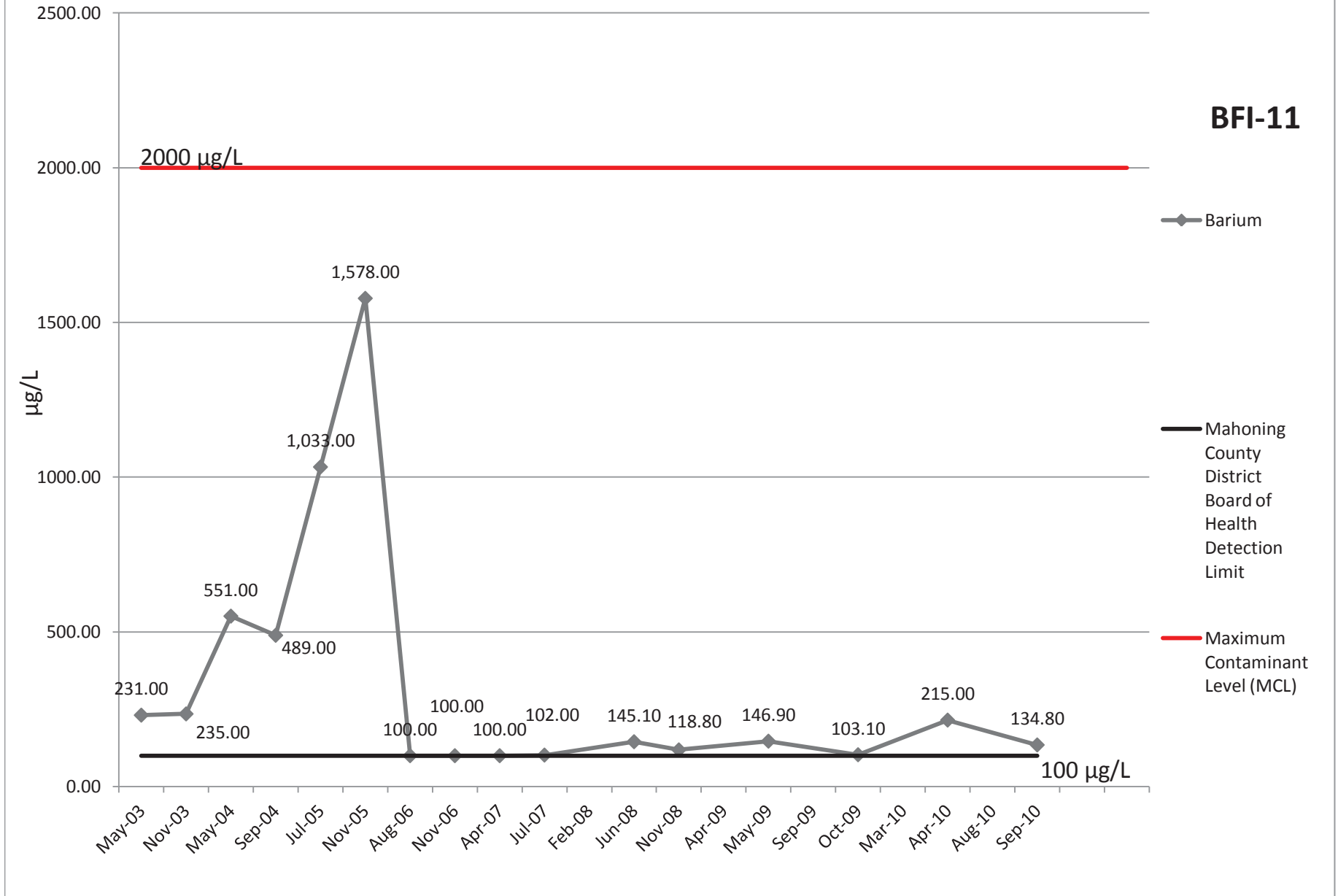
# Fluoride



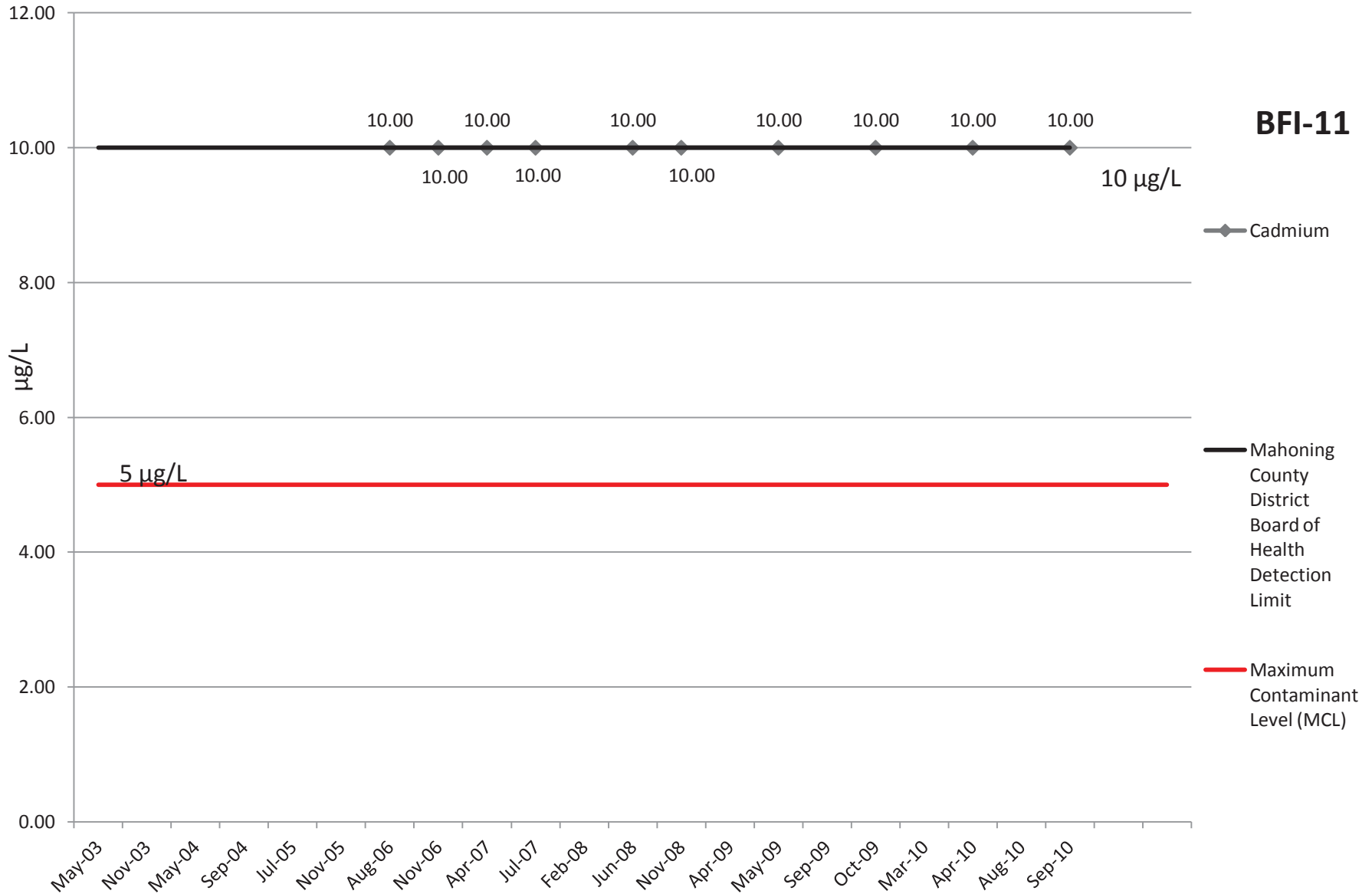
# Arsenic



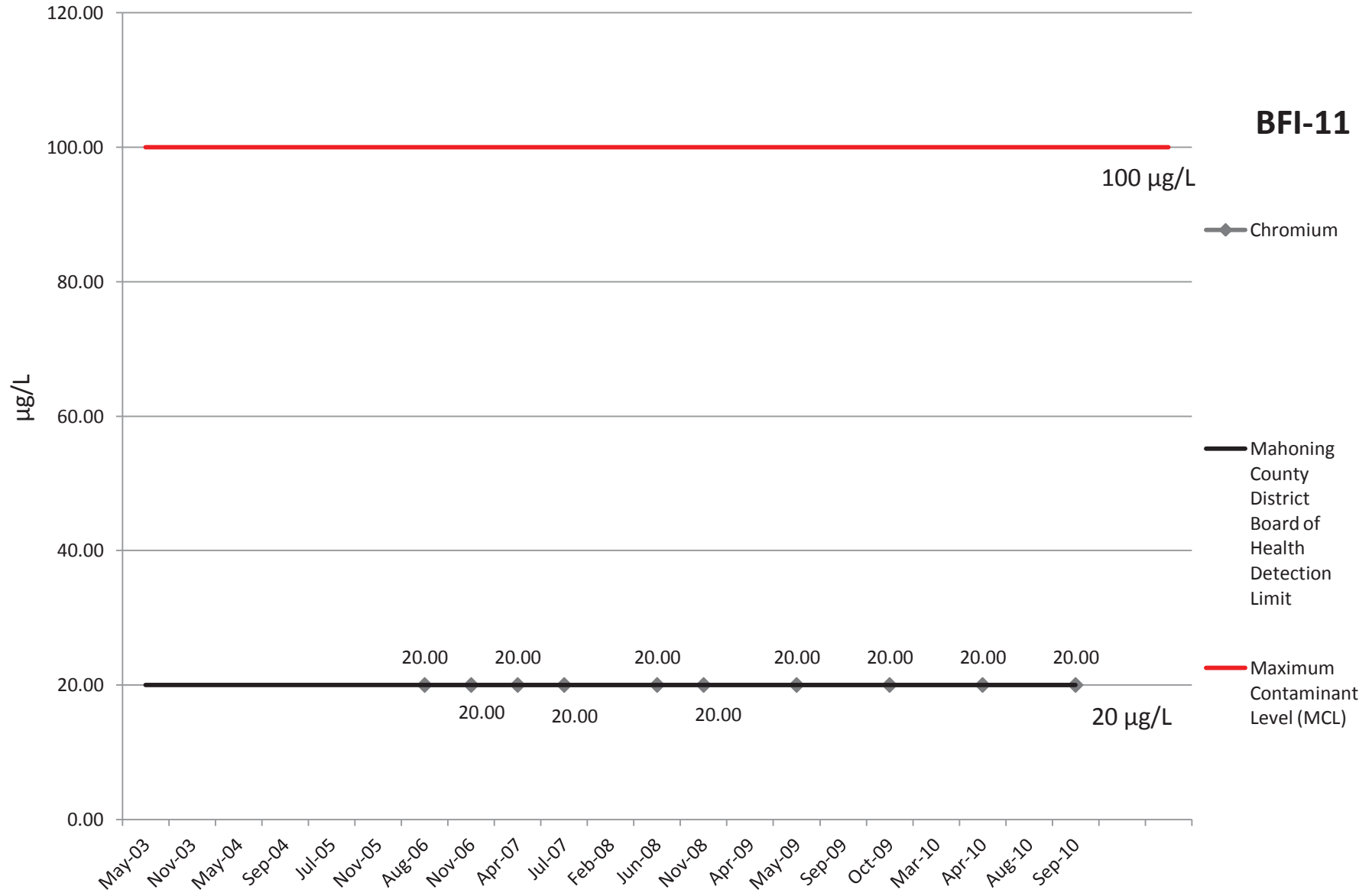
# Barium



# Cadmium

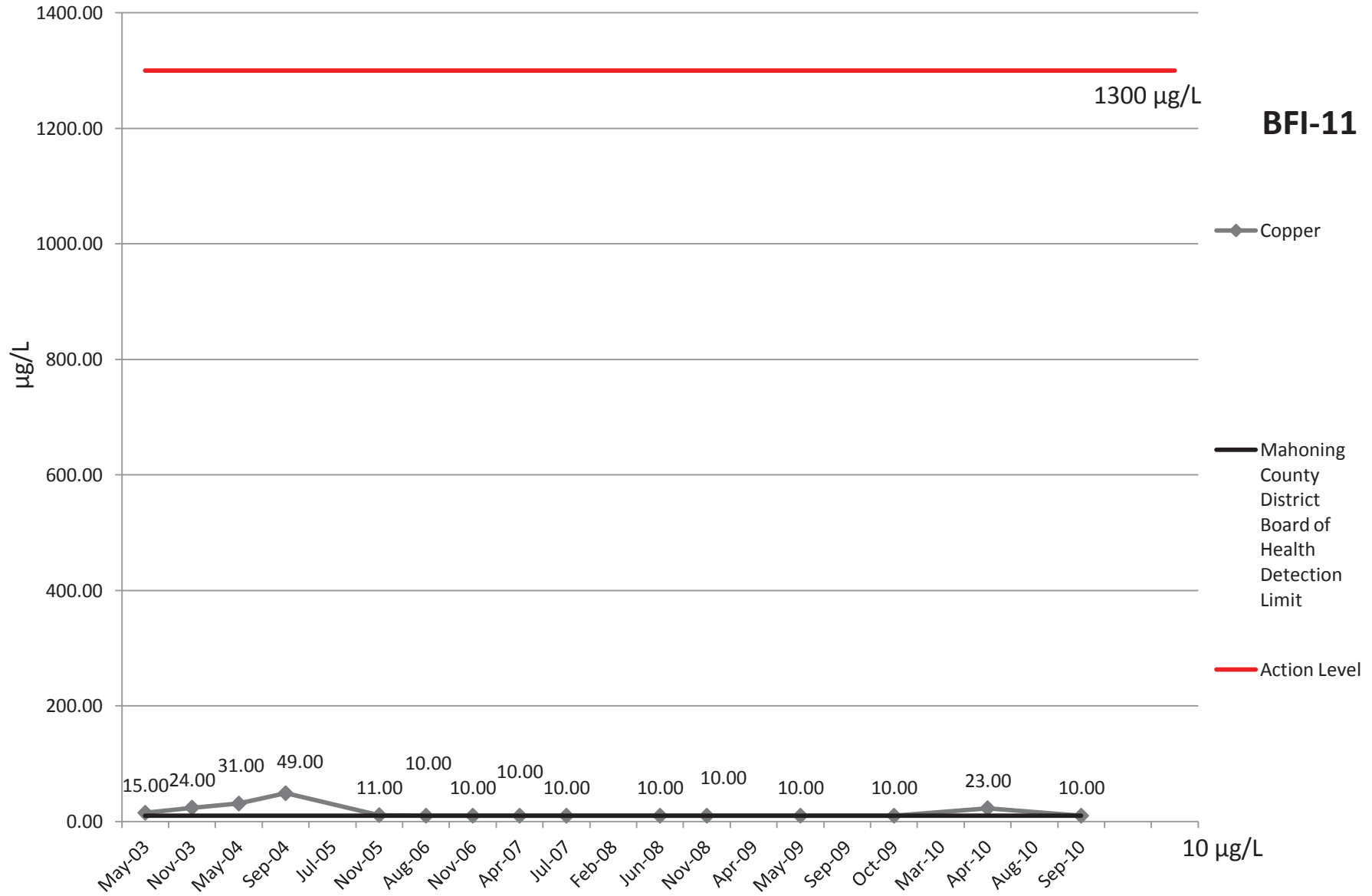


# Chromium



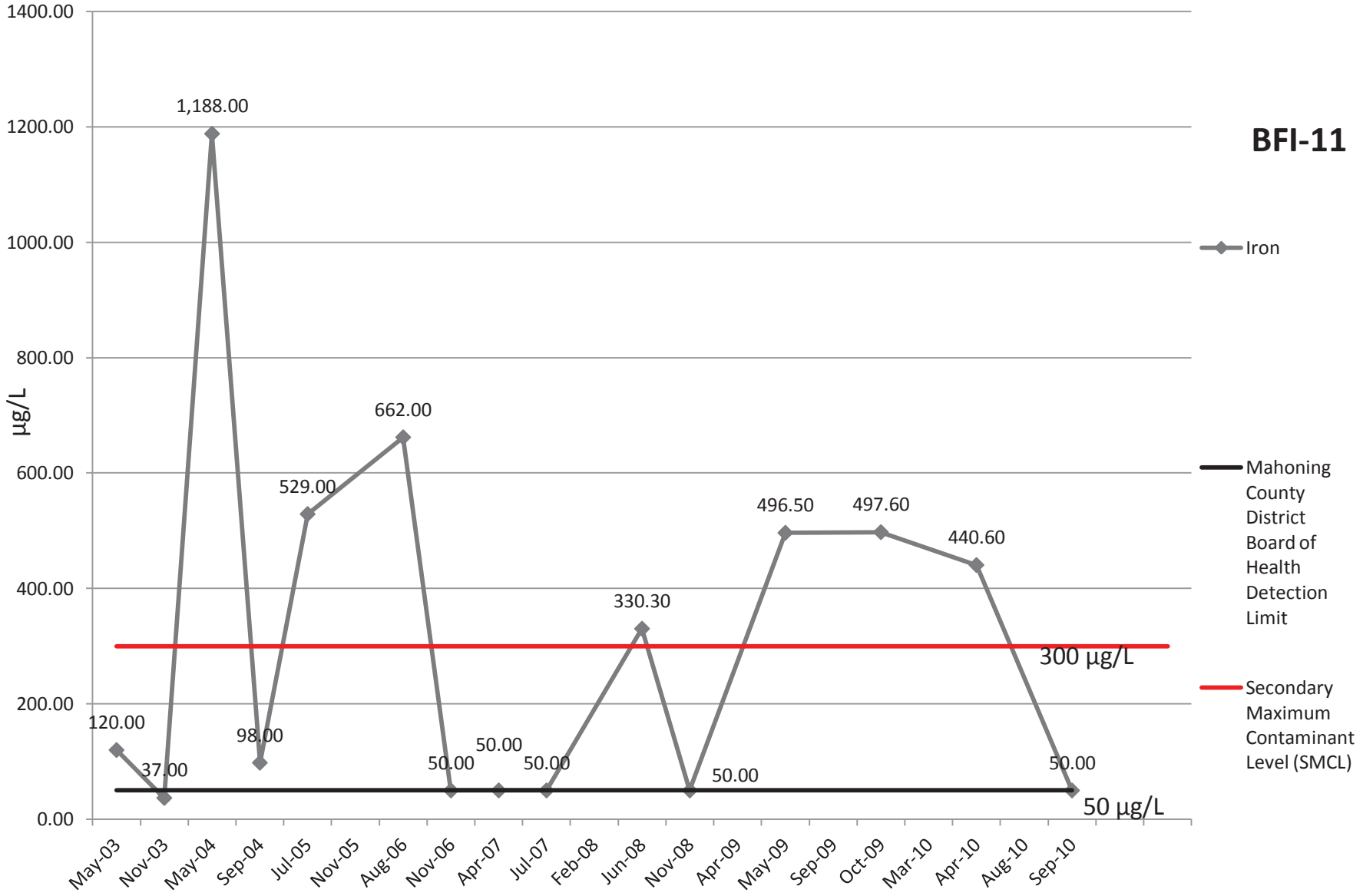


# Copper



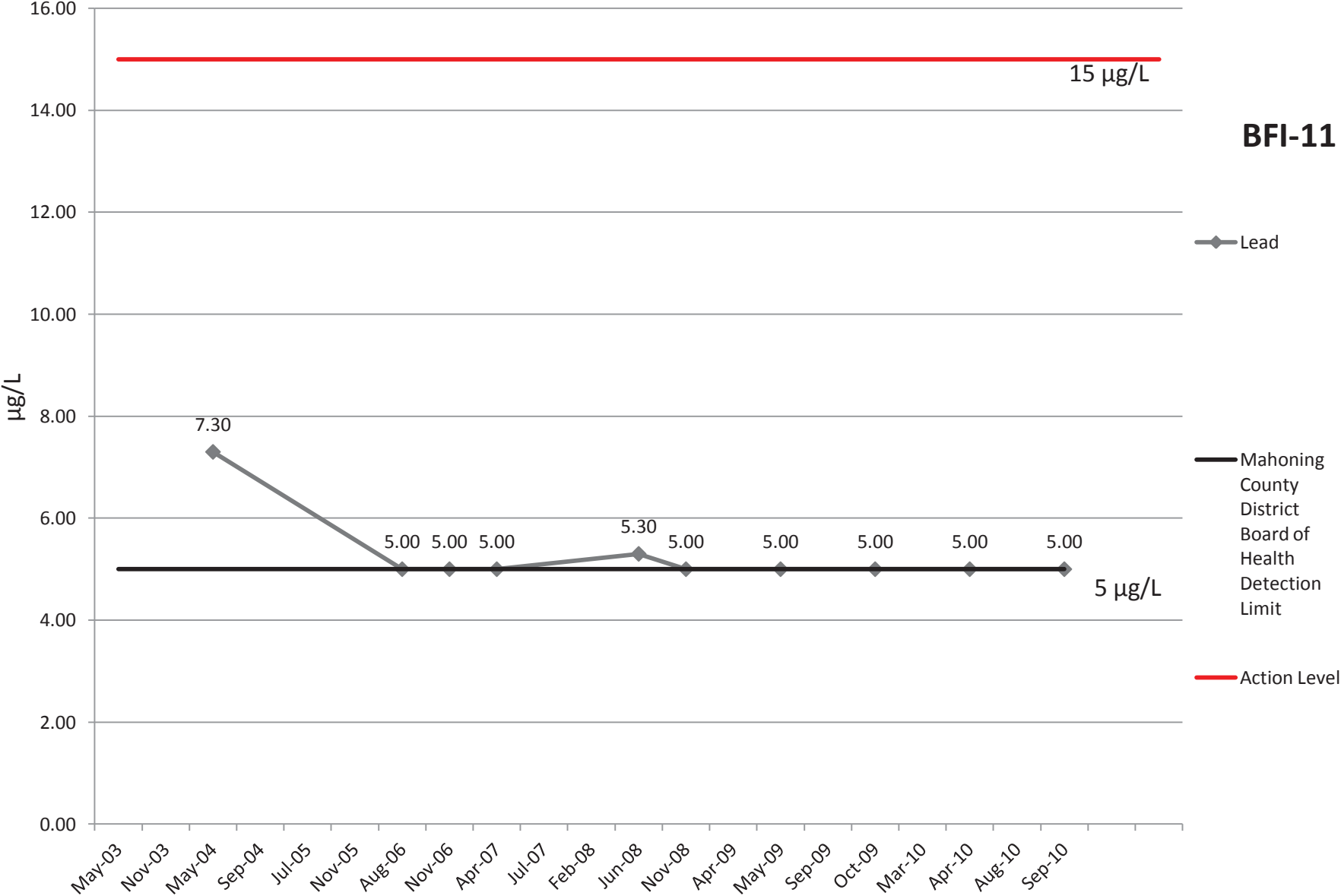
# Iron

**BFI-11**



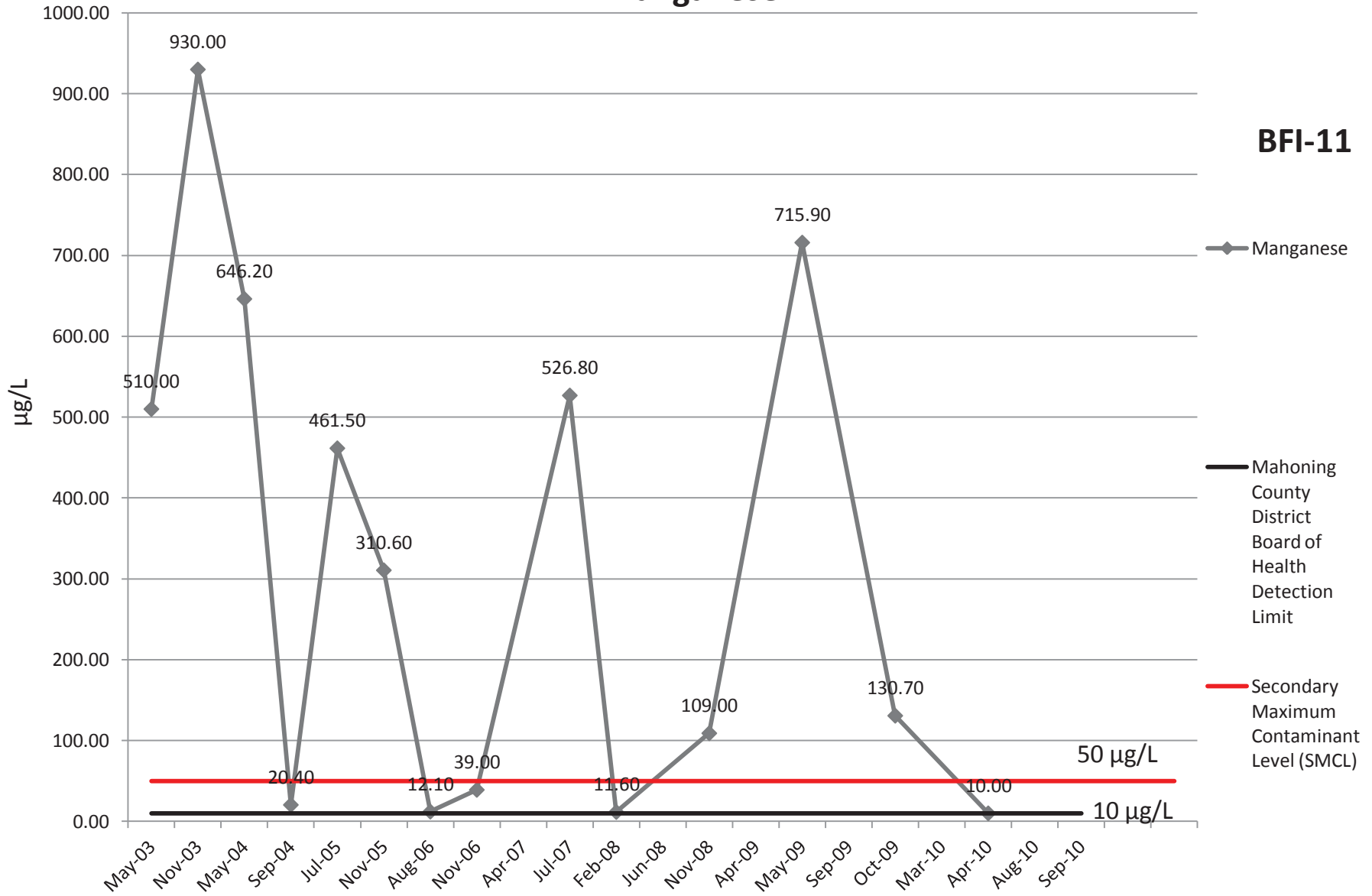
# Lead

**BFI-11**



# Manganese

**BFI-11**



# Mercury

**BFI-11**

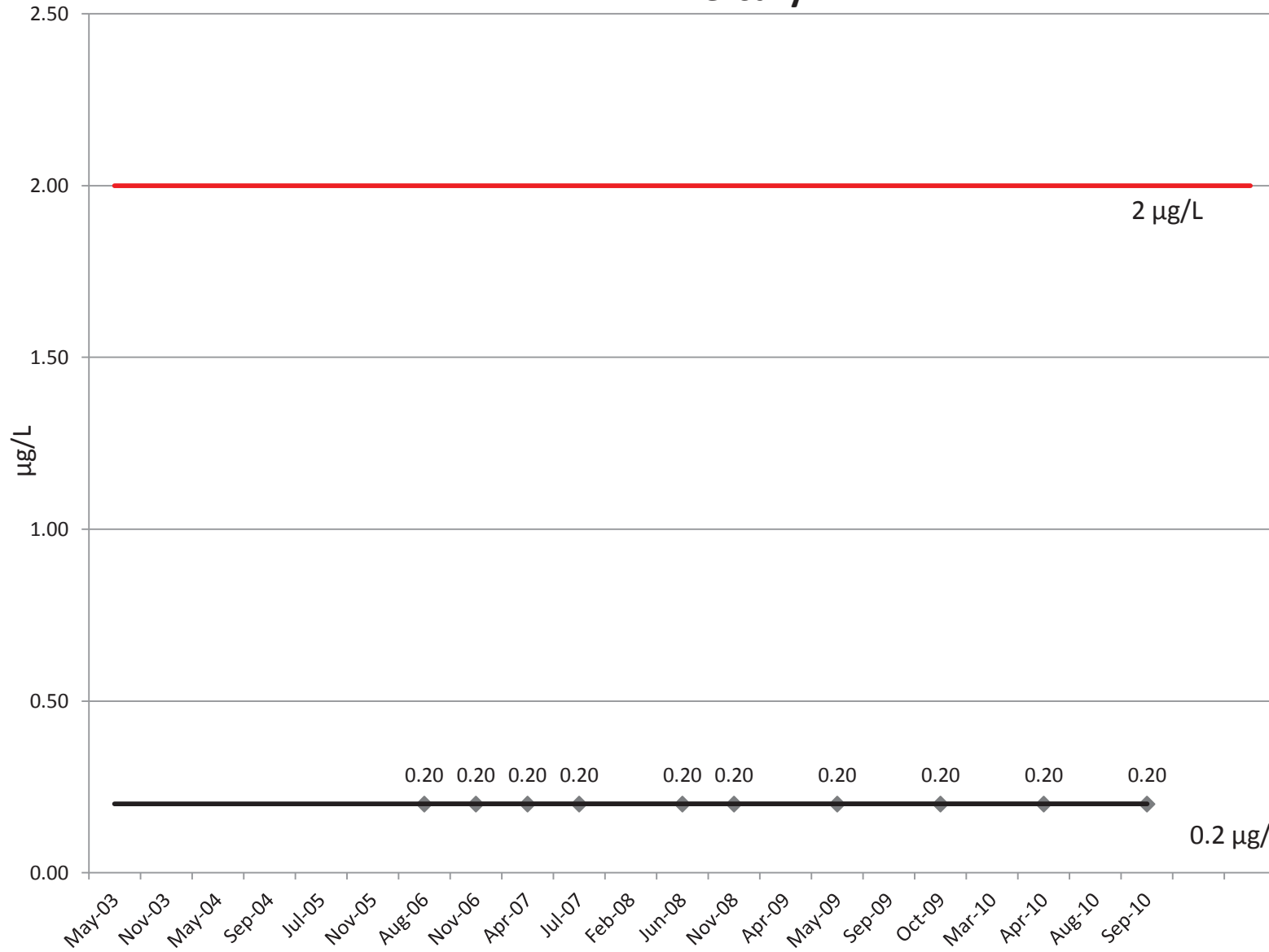
2 µg/L

Mercury

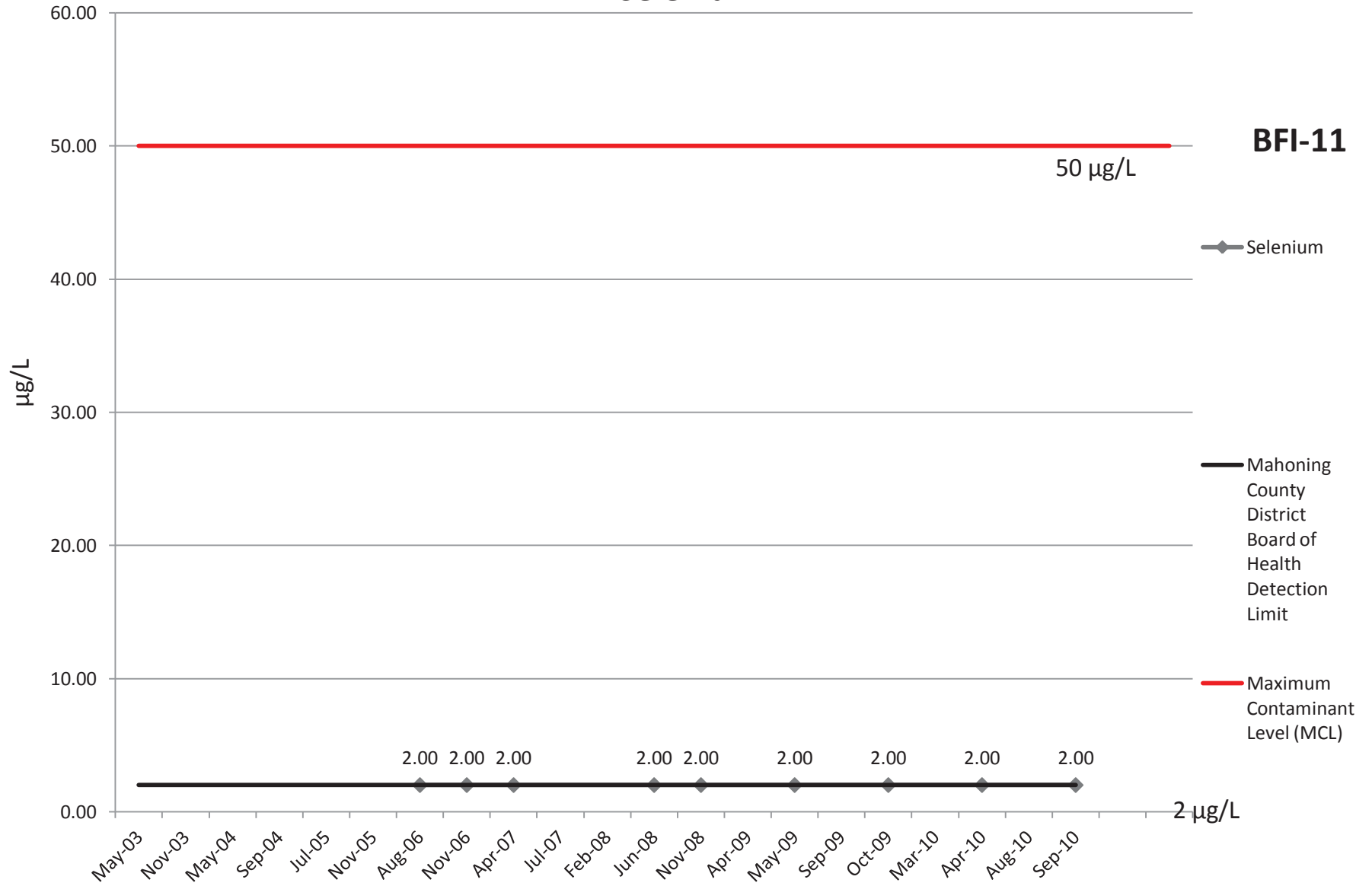
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

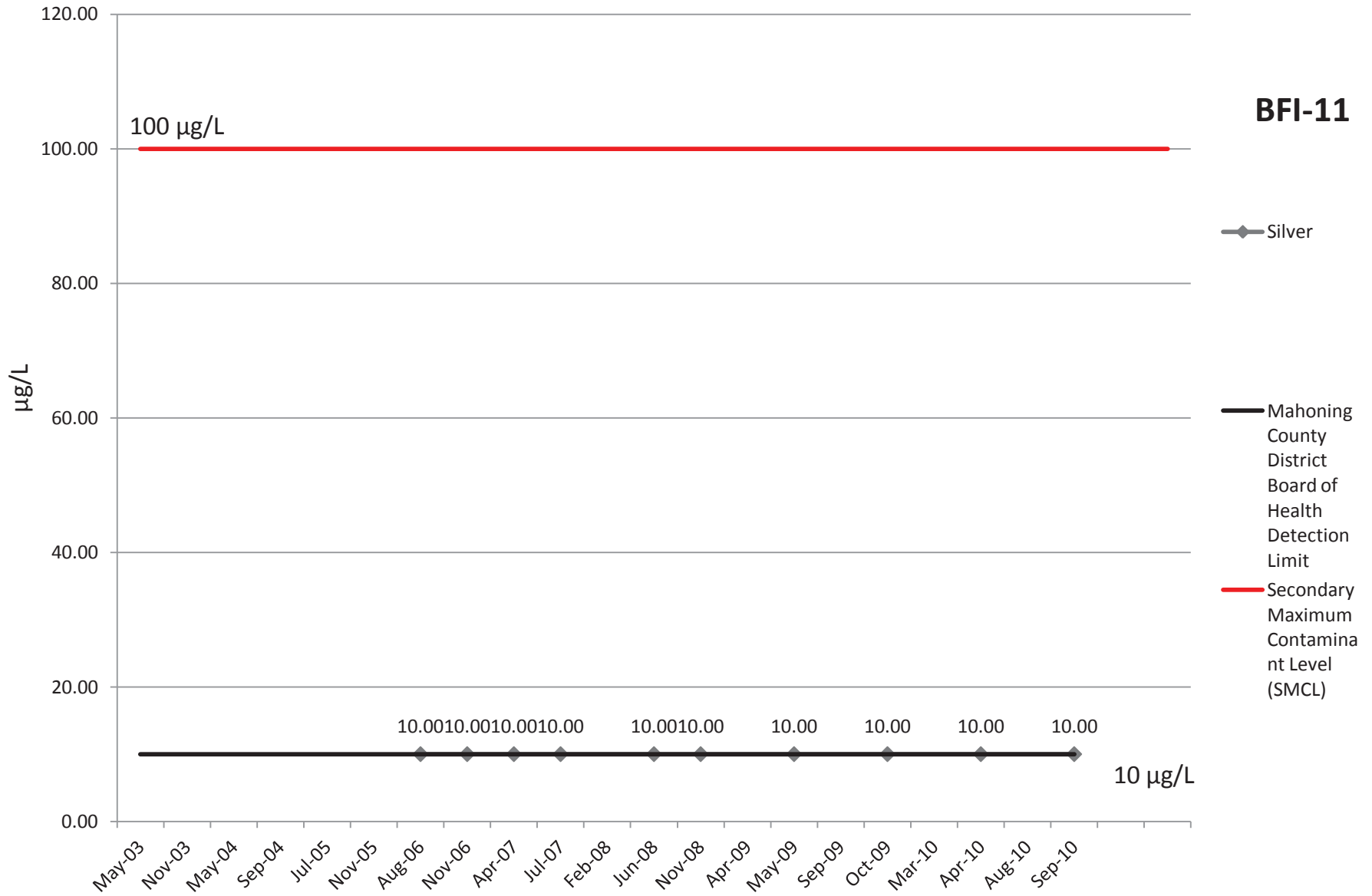
0.2 µg/L



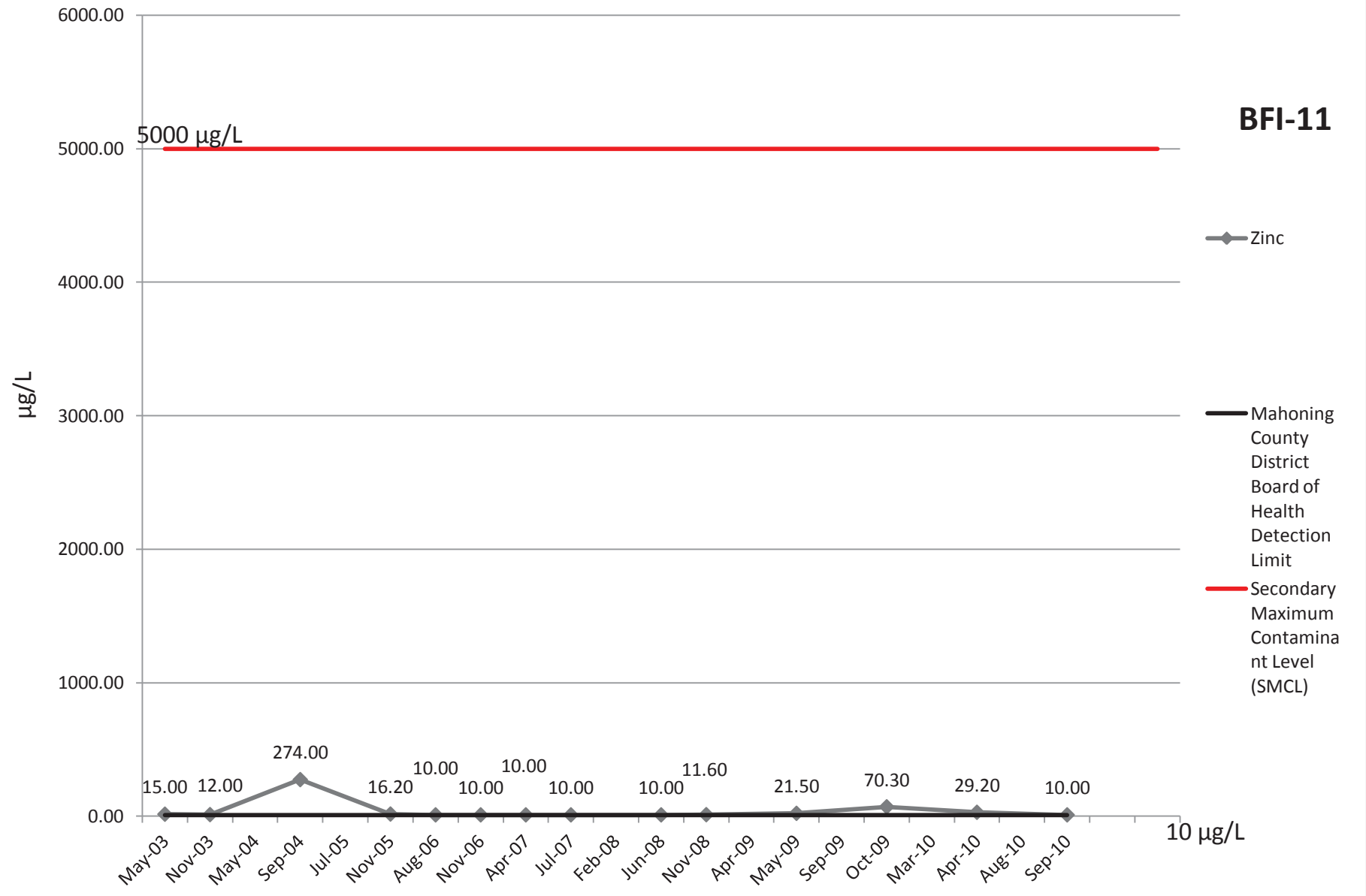
# Selenium



# Silver

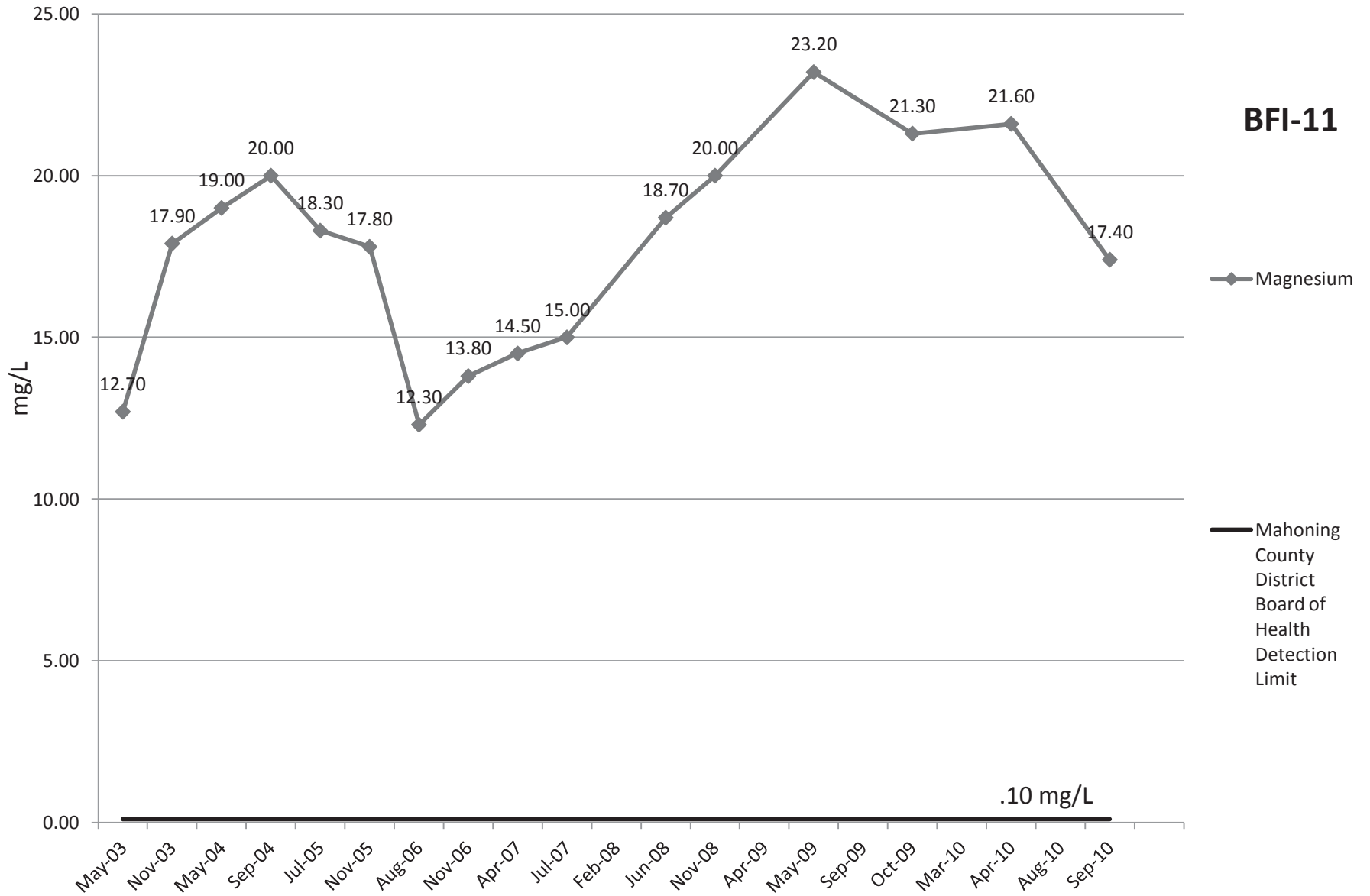


# Zinc

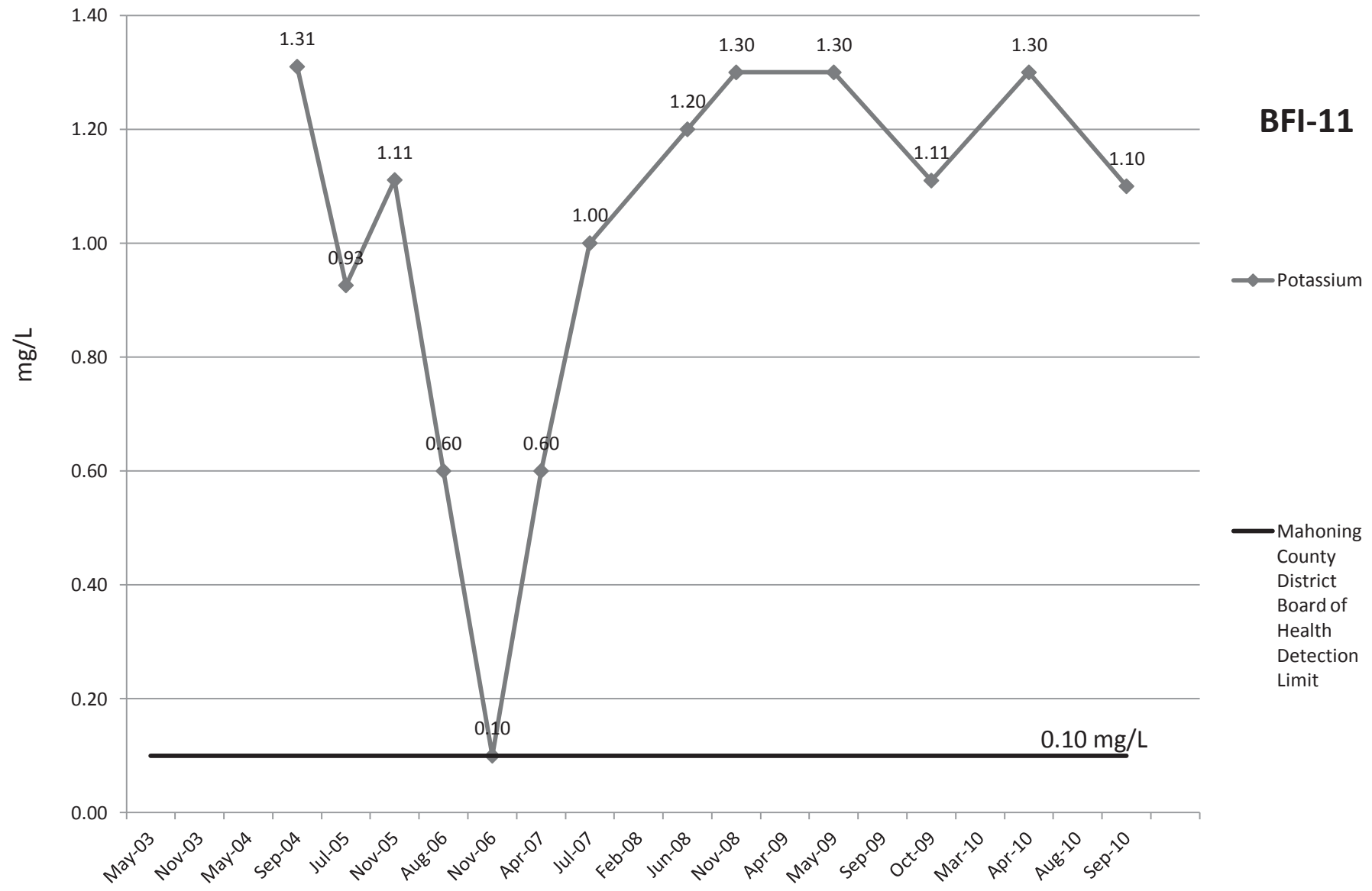




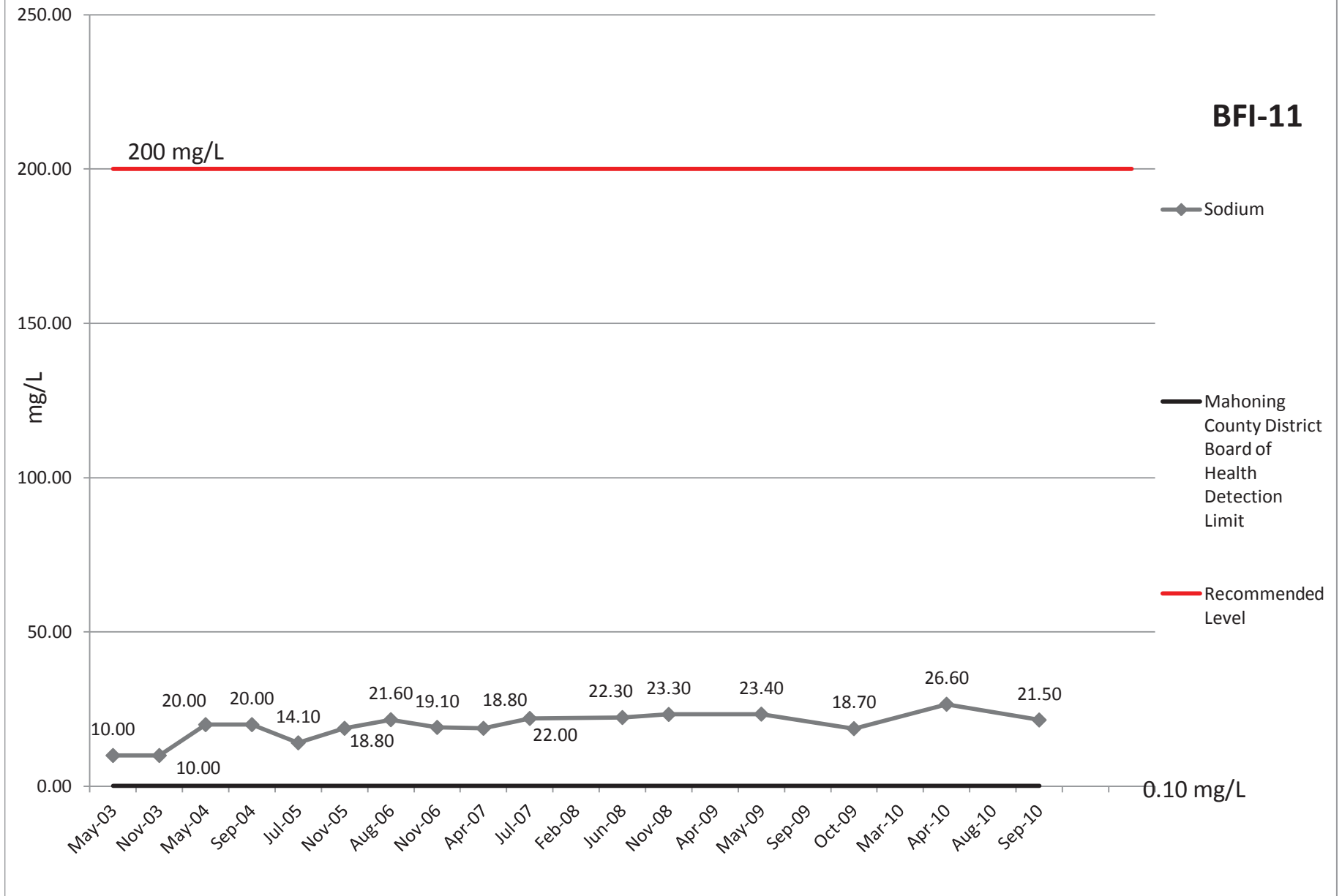
# Magnesium



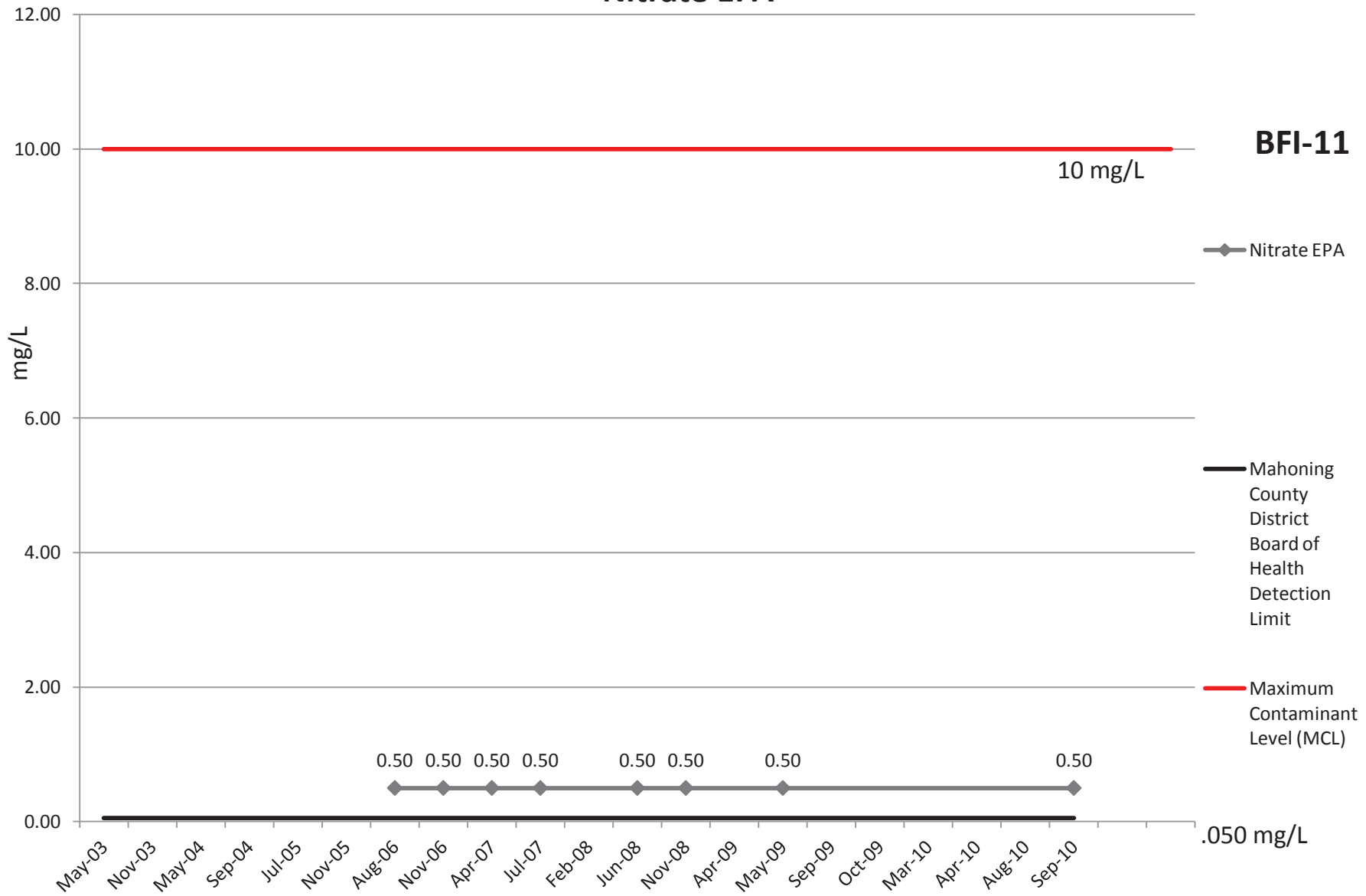
# Potassium



# Sodium



# Nitrate EPA



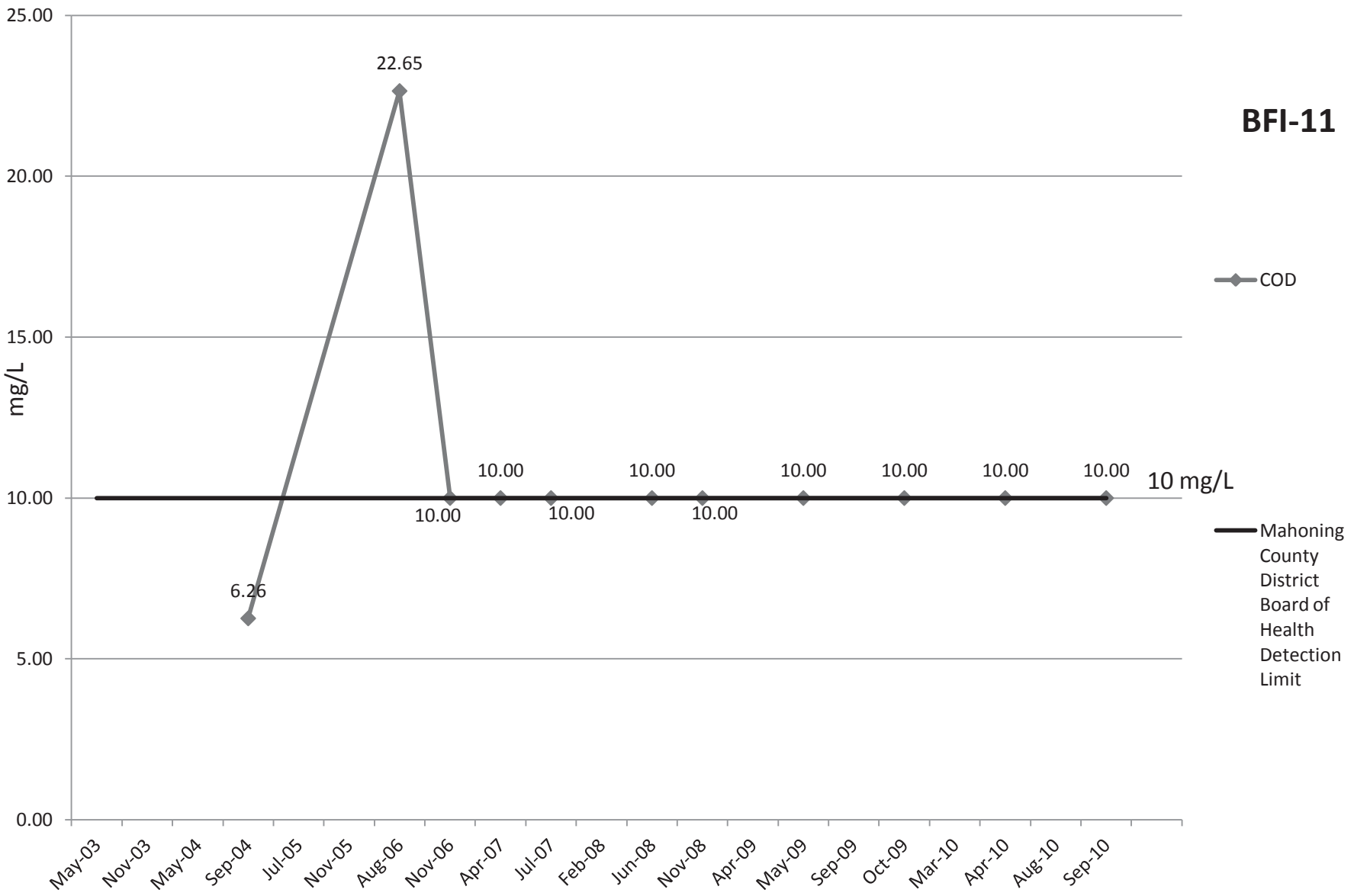
**BFI-11**

◆ Nitrate EPA

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

# COD

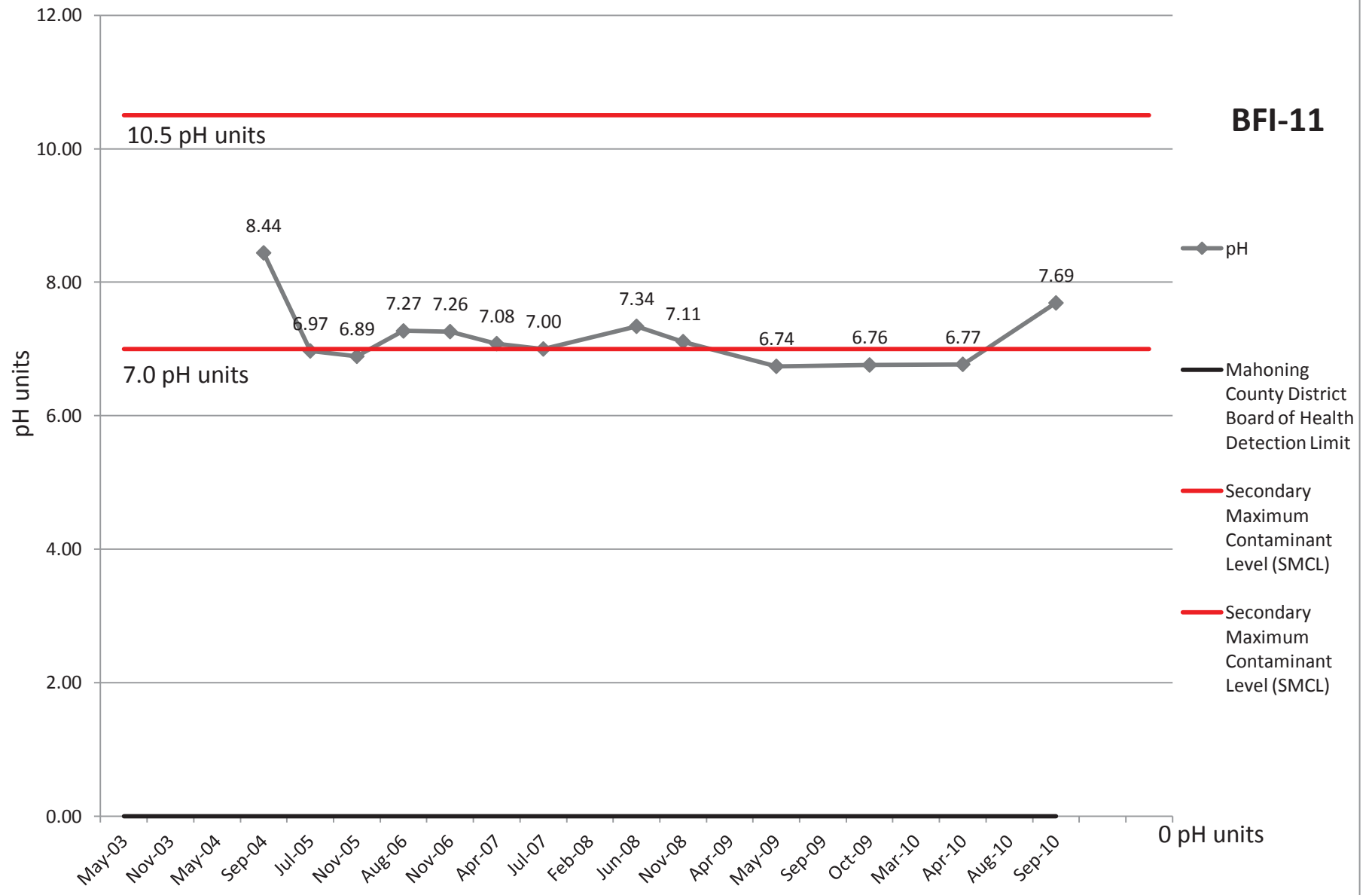


**BFI-11**

◆ COD

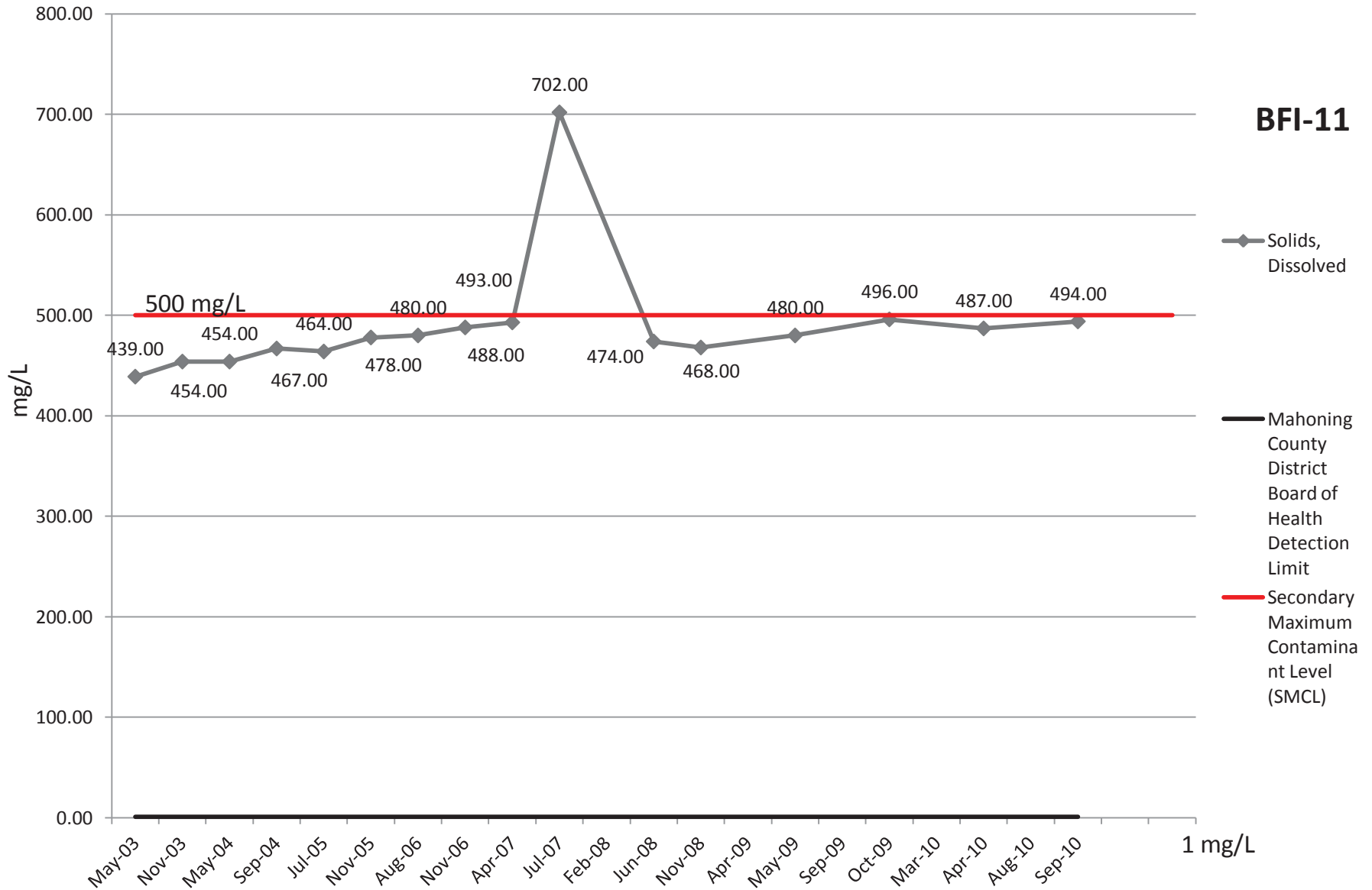
— Mahoning County District Board of Health Detection Limit

# pH

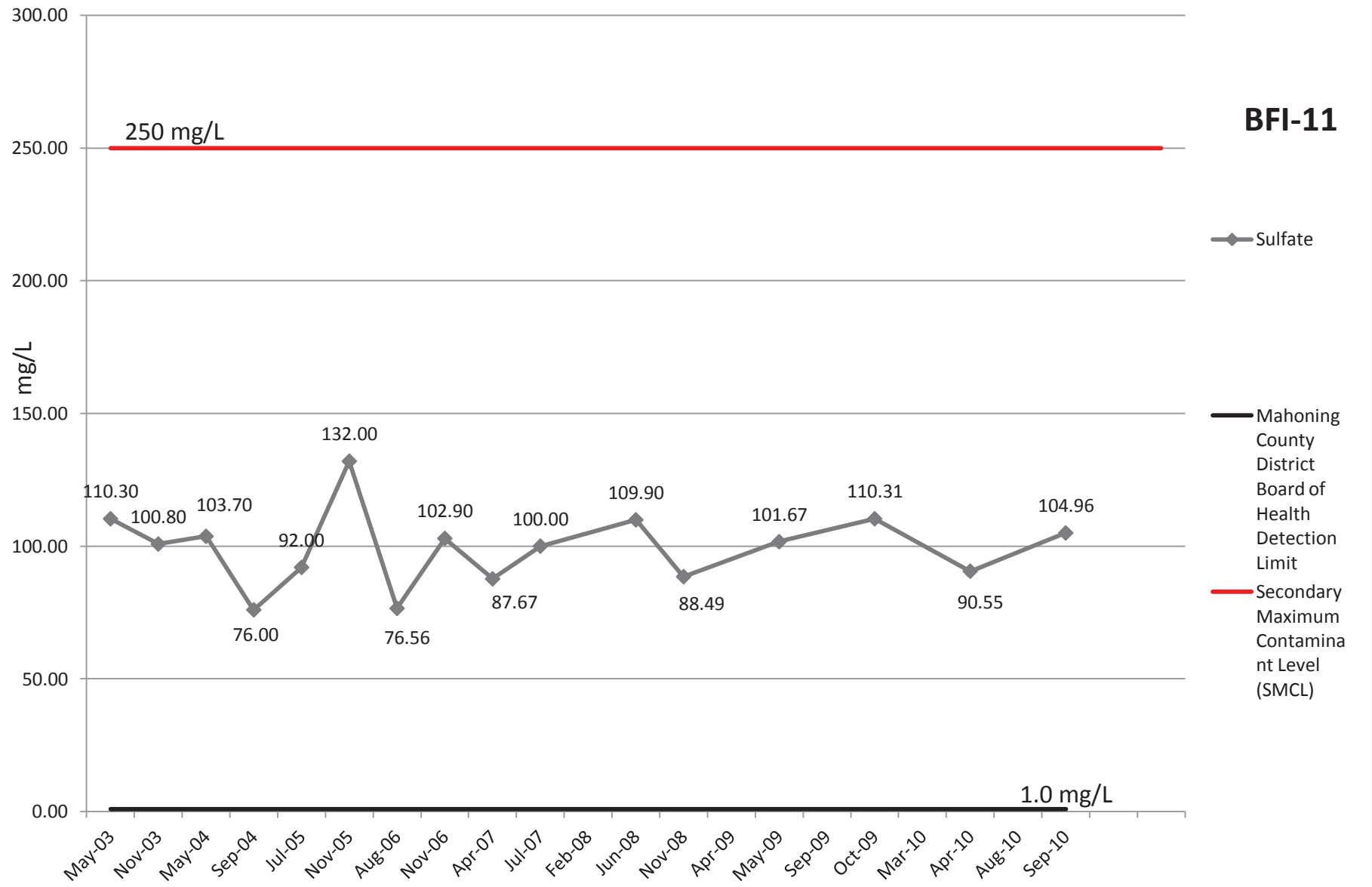


# Solids, Dissolved

**BFI-11**



# Sulfate





# Bacteria

## BFI-11

Positive/Negative

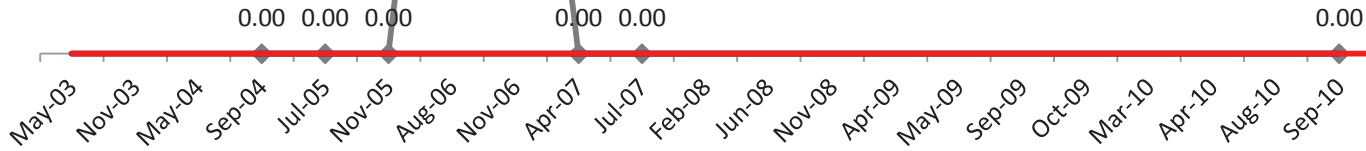
◆ Bacteria

positive (1)

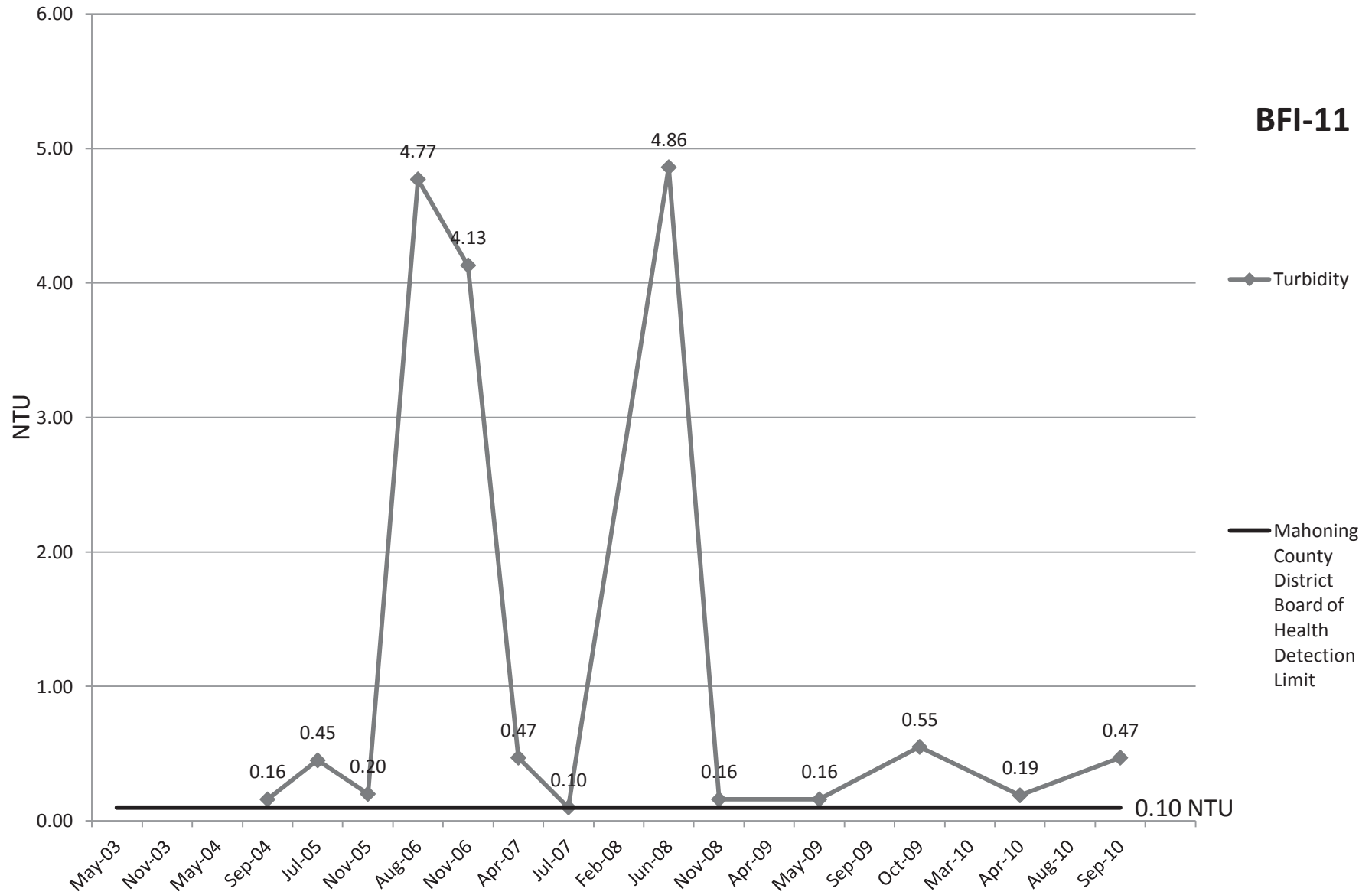
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

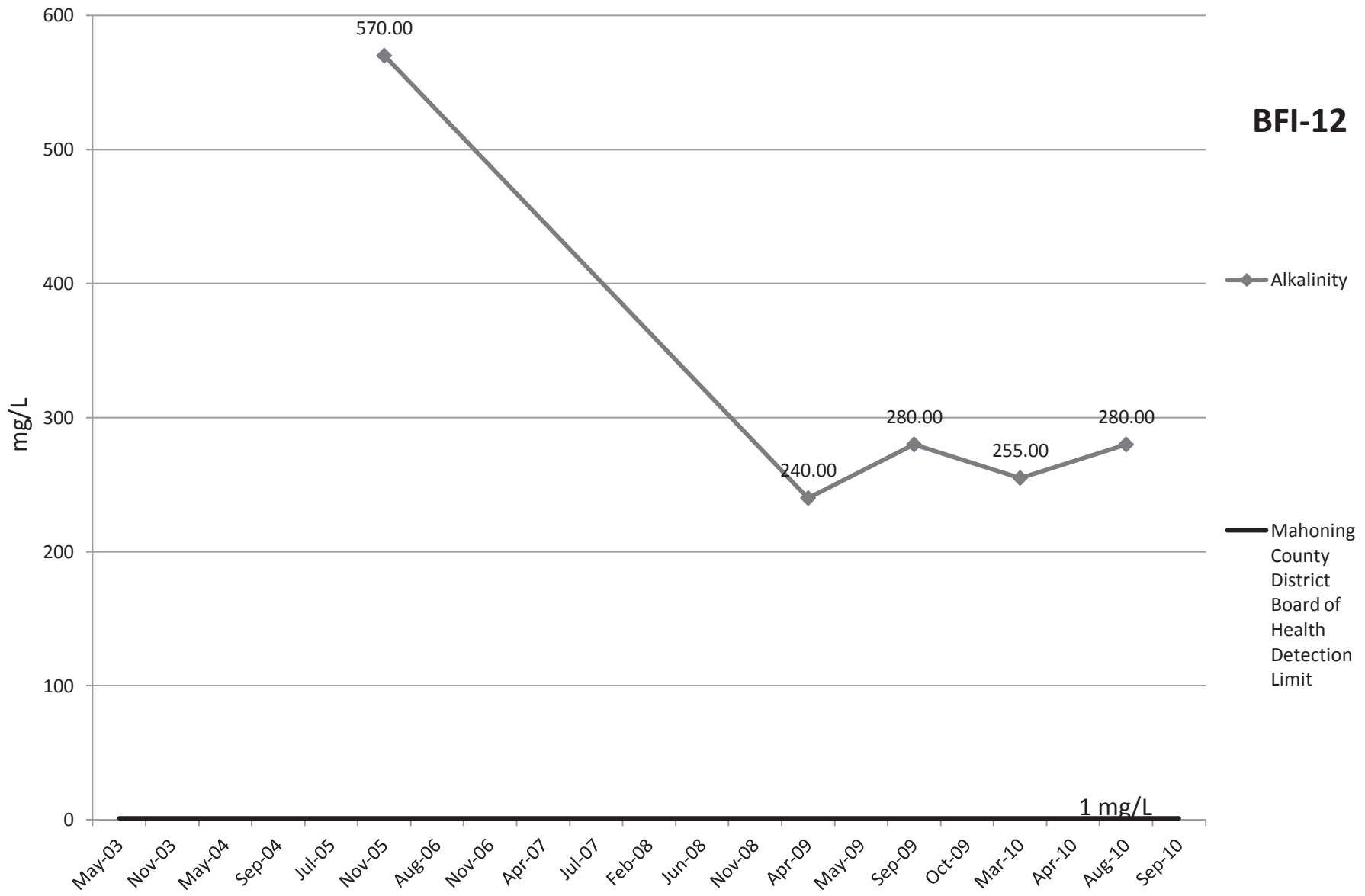
negative (0)



# Turbidity



# Alkalinity

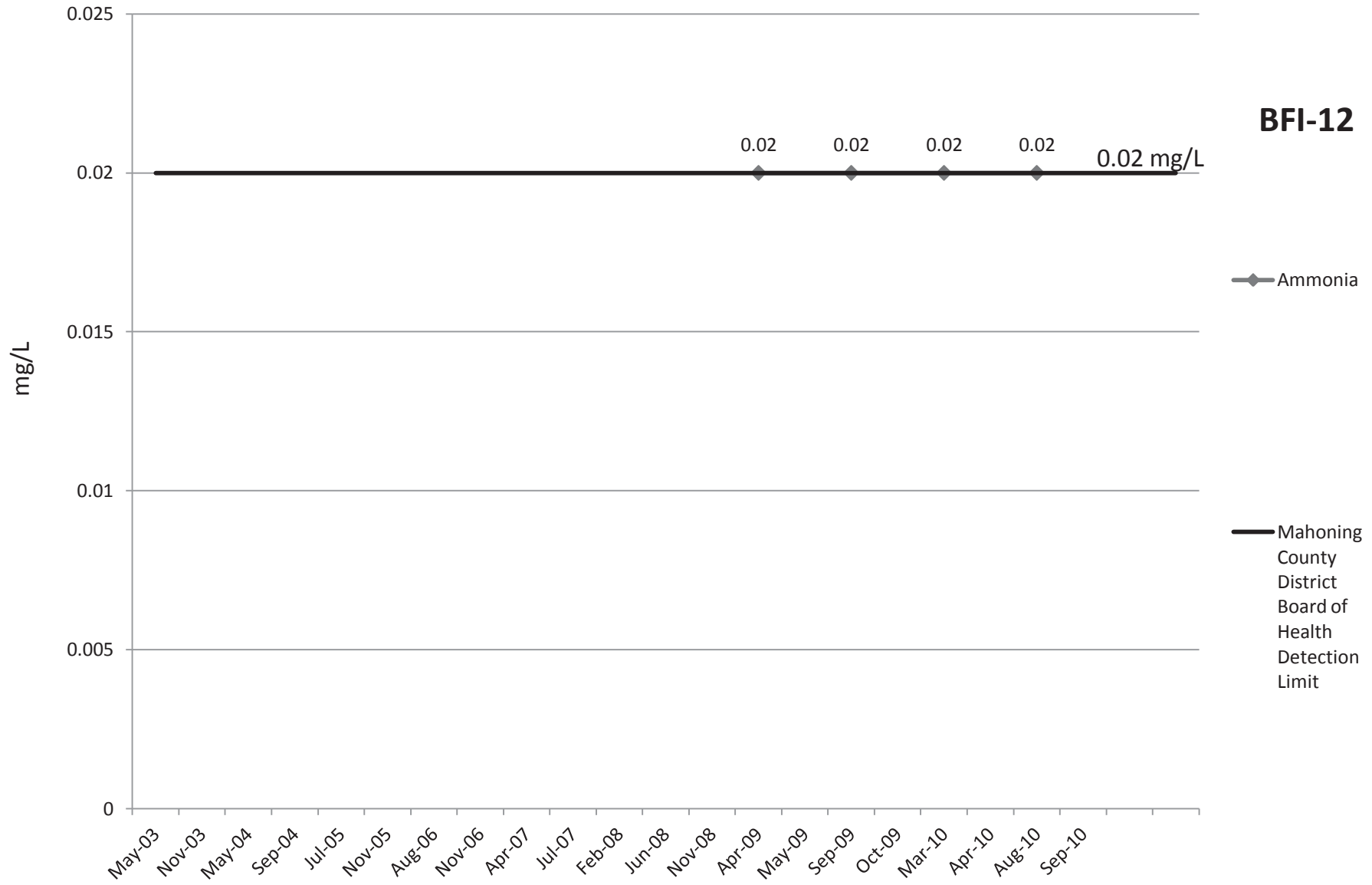


**BFI-12**

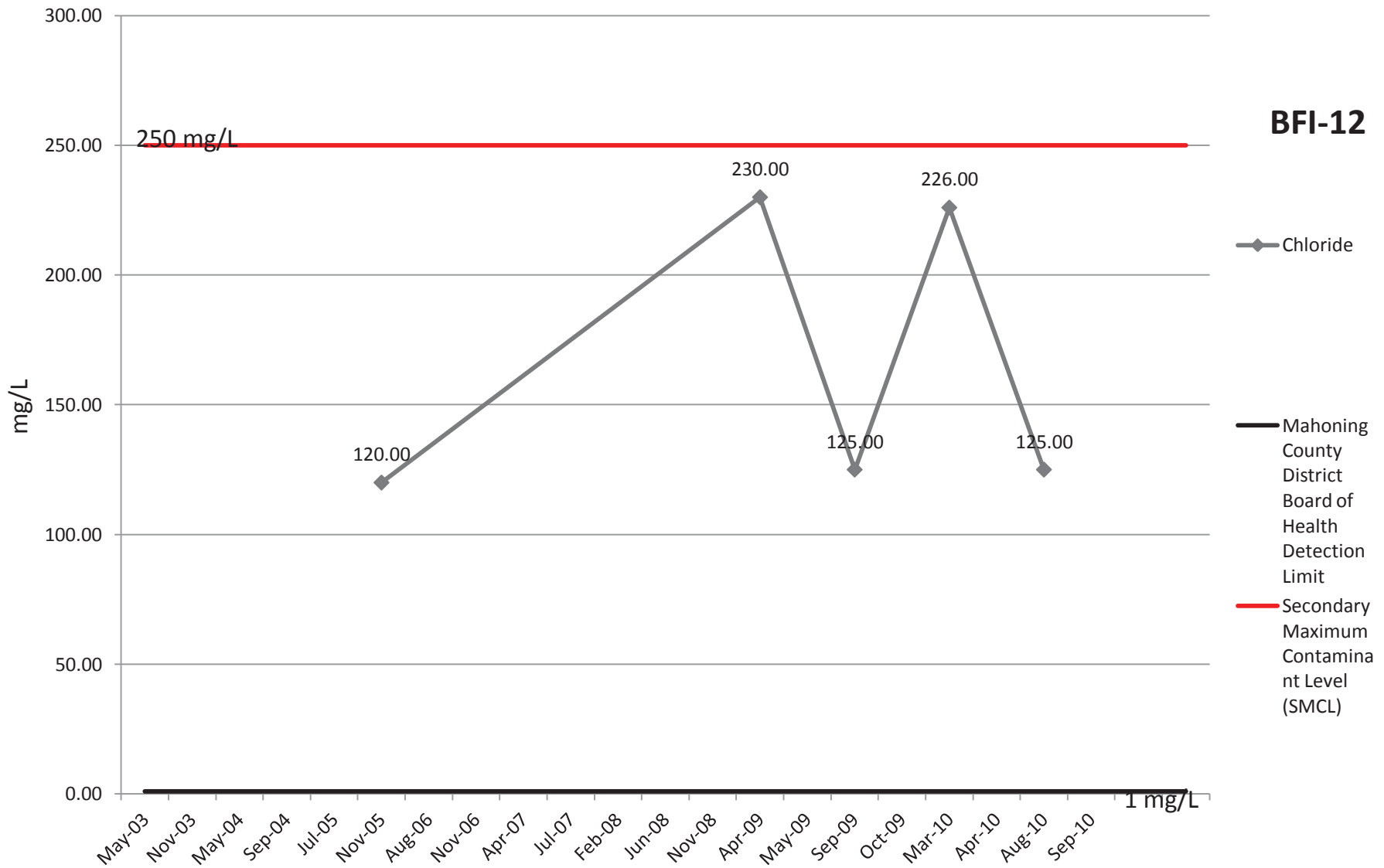
◆ Alkalinity

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

# Ammonia

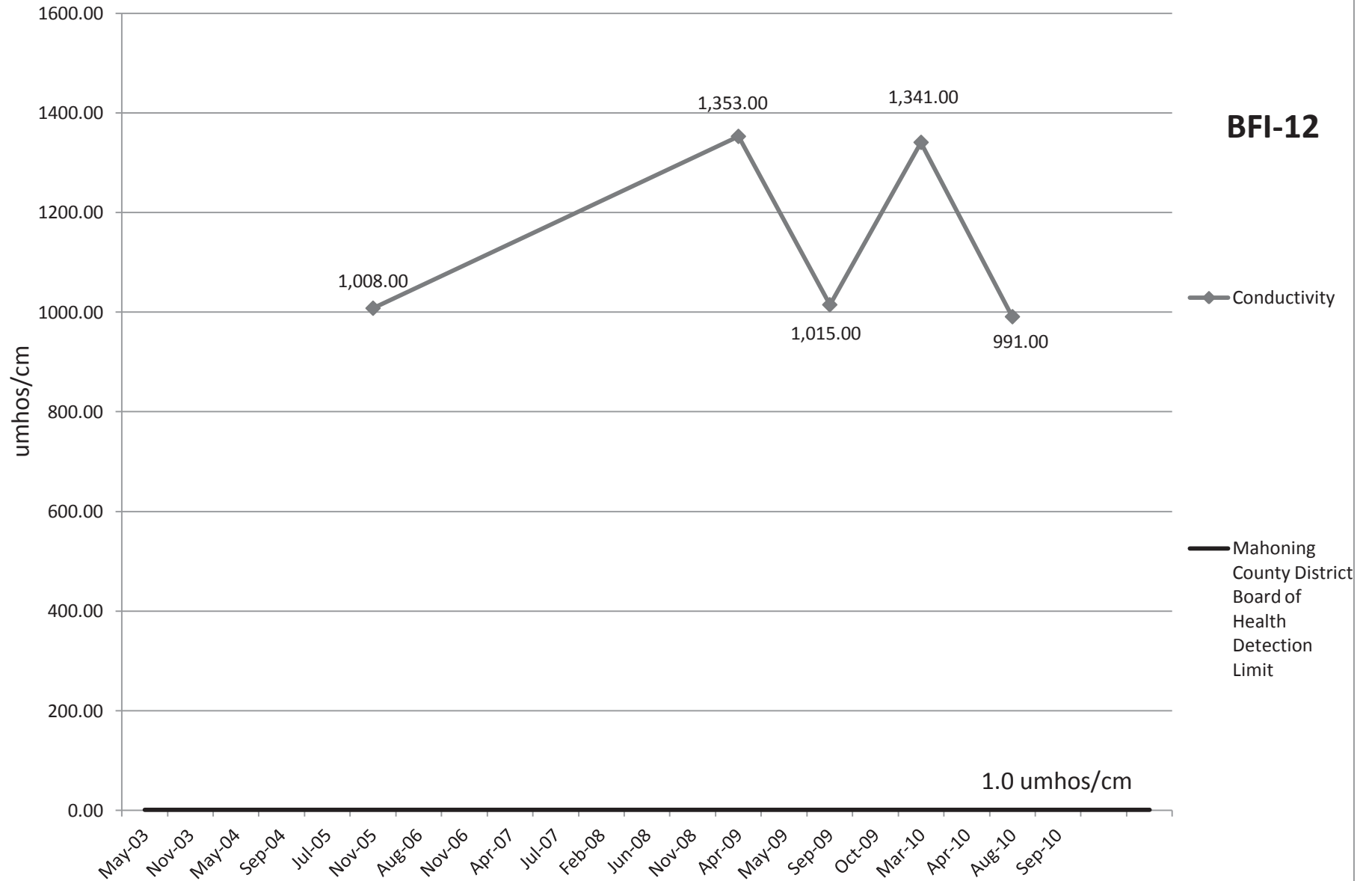


# Chloride



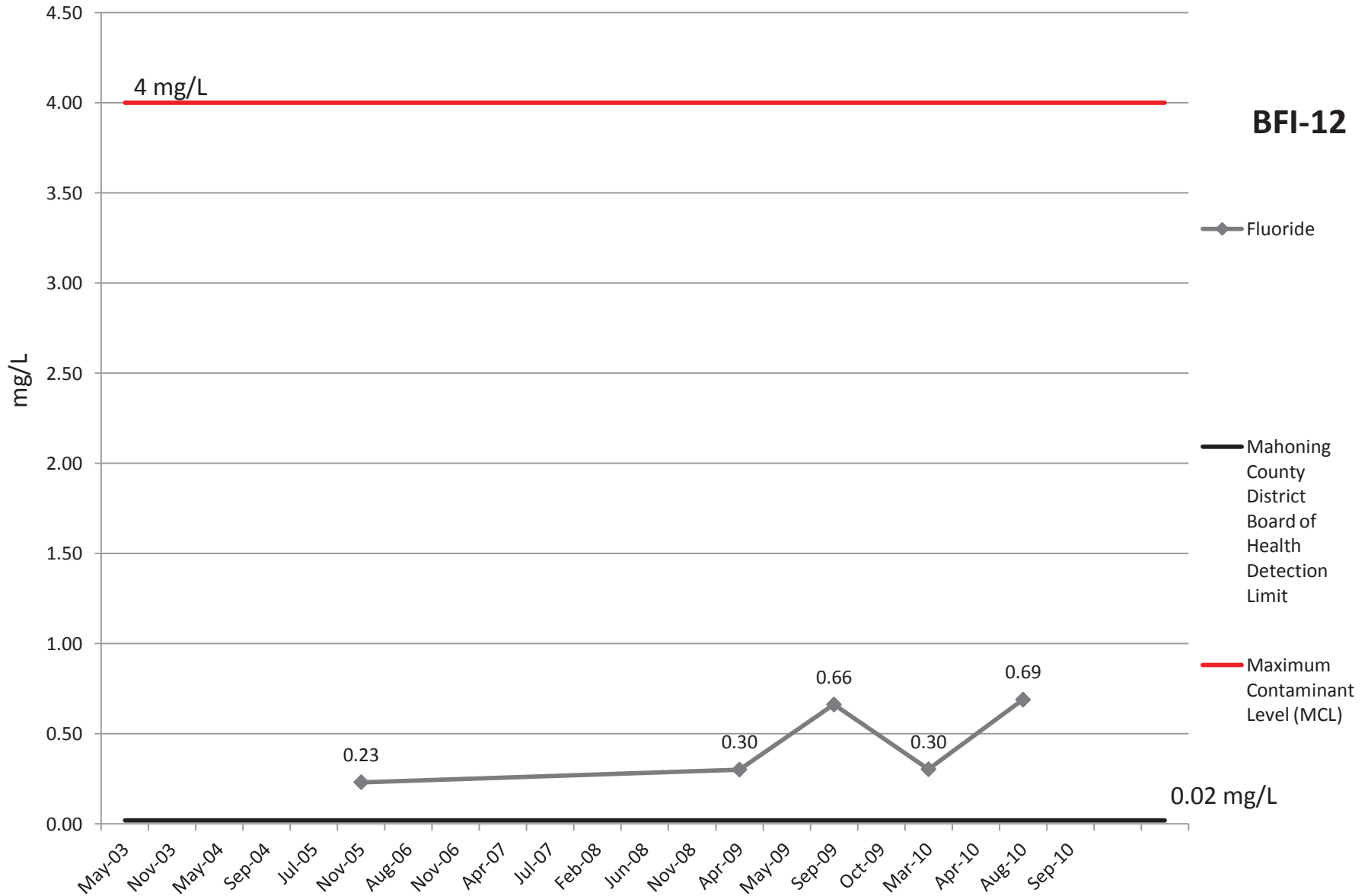
# Conductivity

**BFI-12**



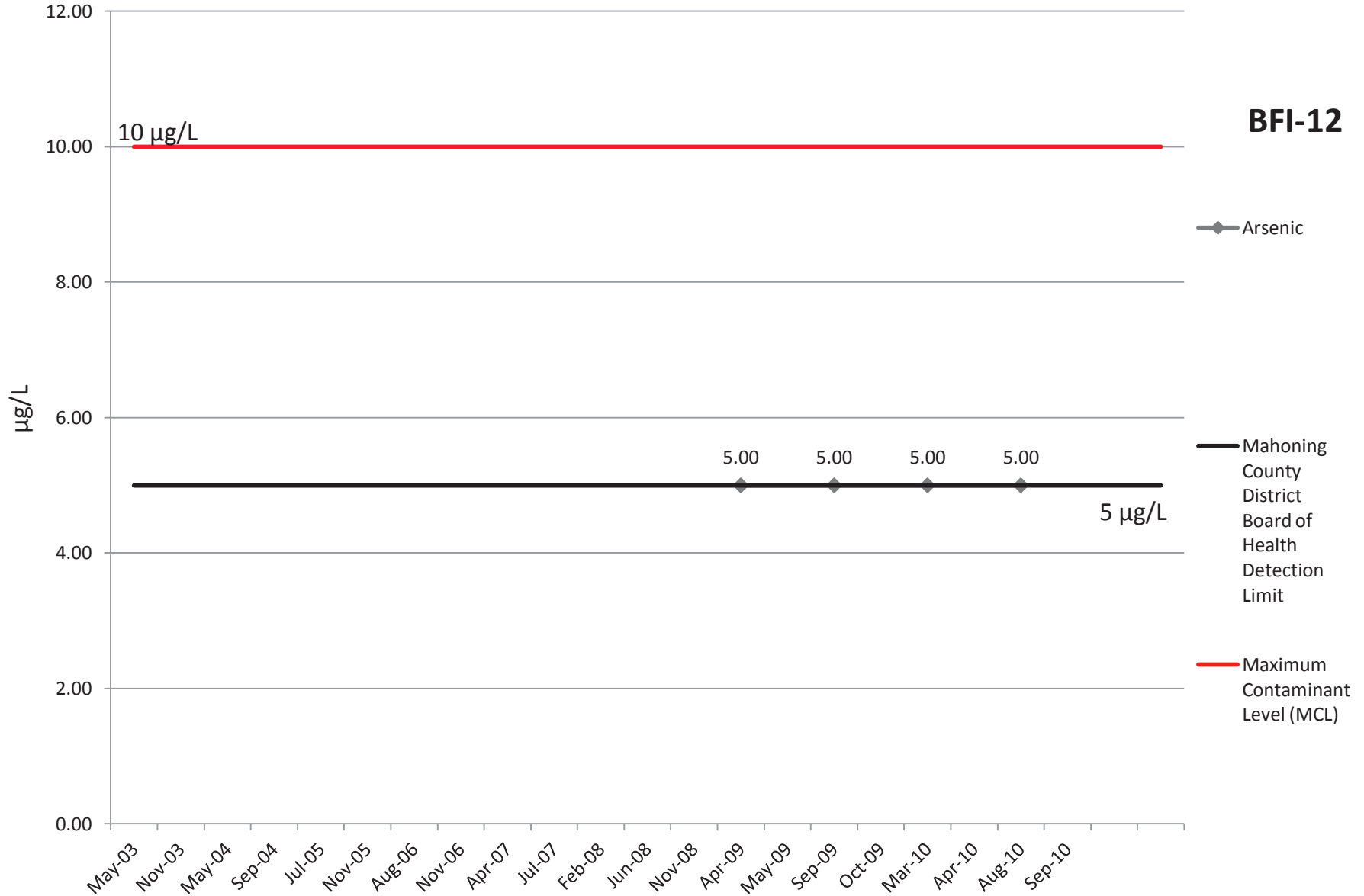
1.0 umhos/cm

# Fluoride



# Arsenic

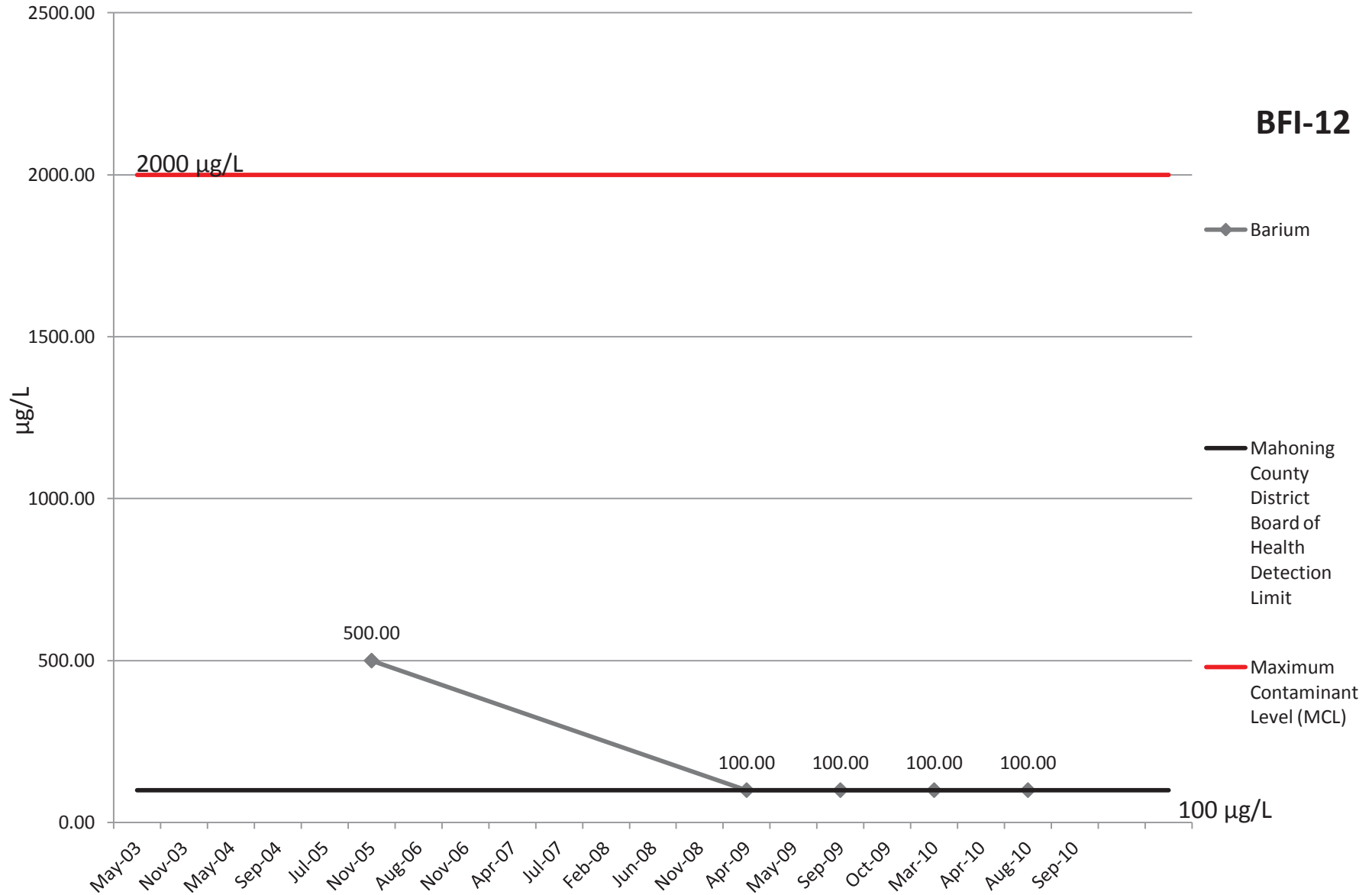
**BFI-12**



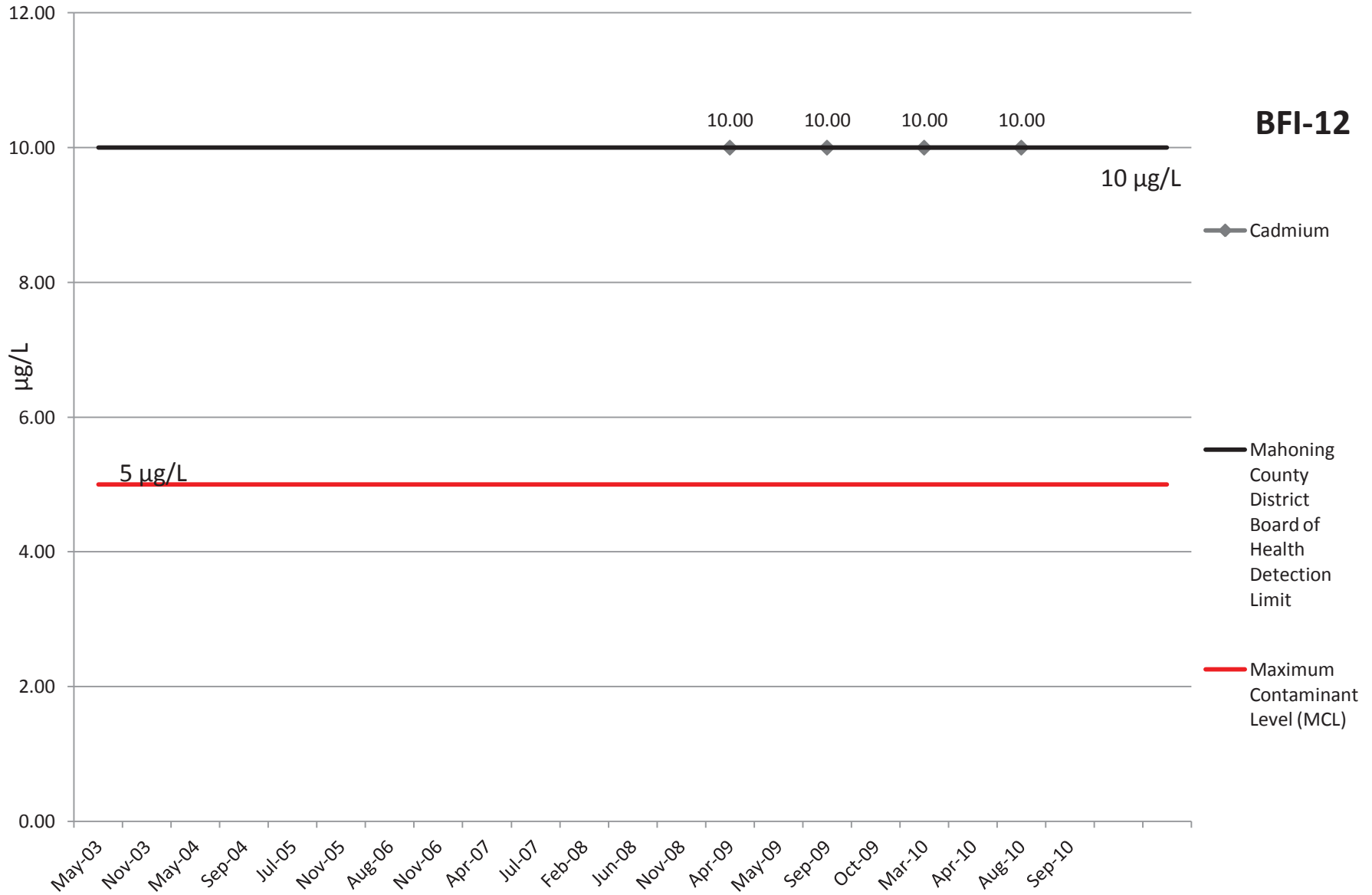


# Barium

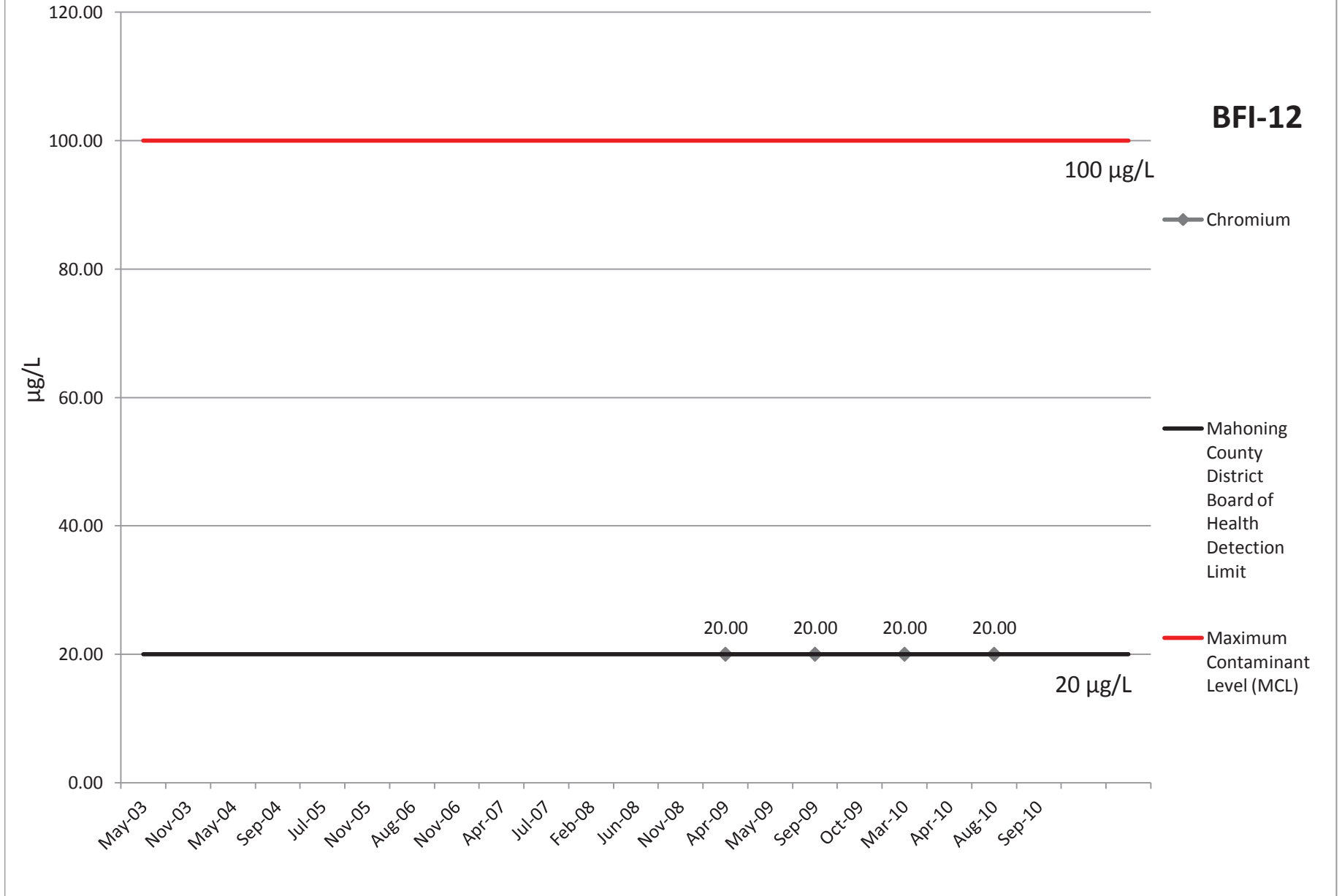
**BFI-12**



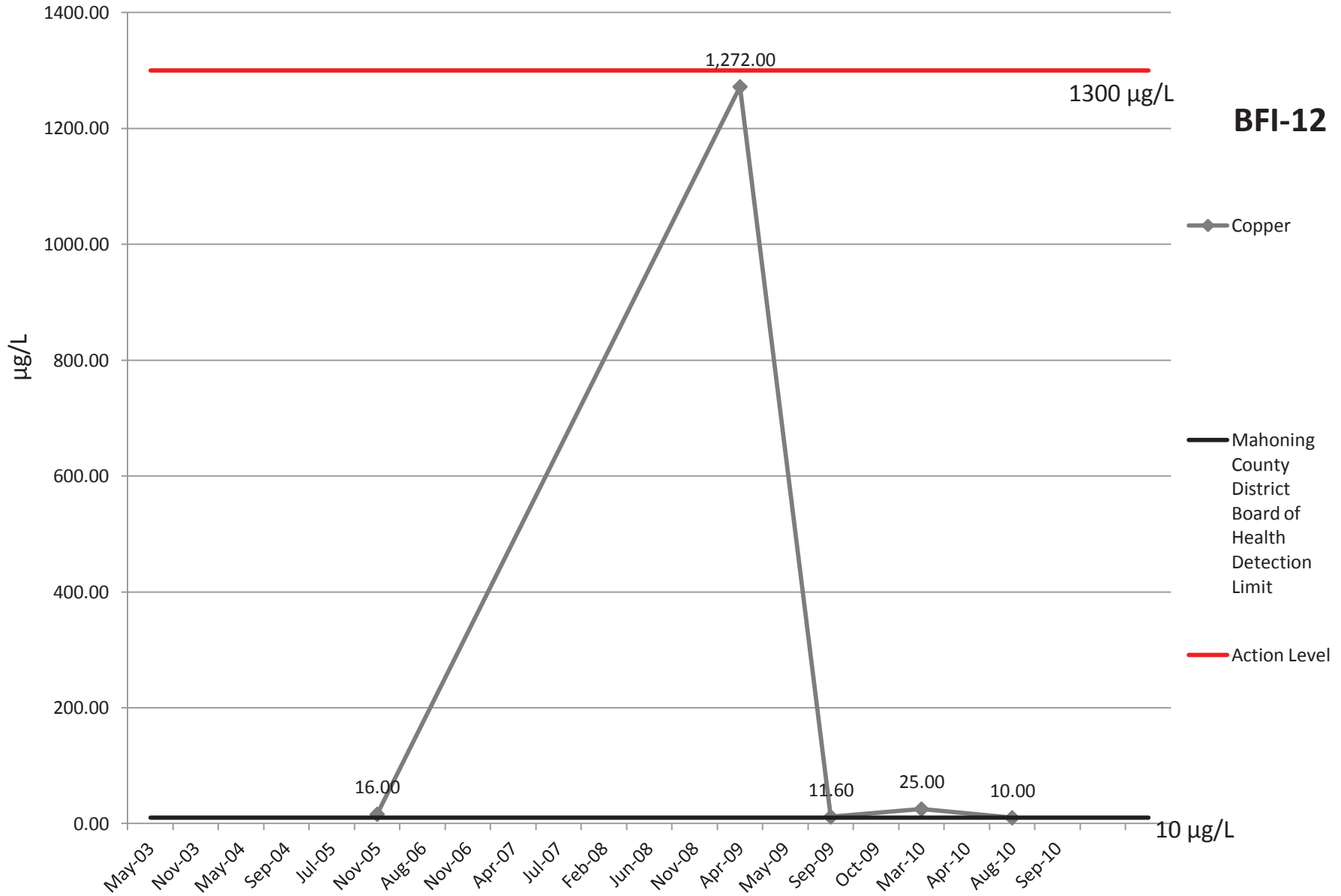
# Cadmium



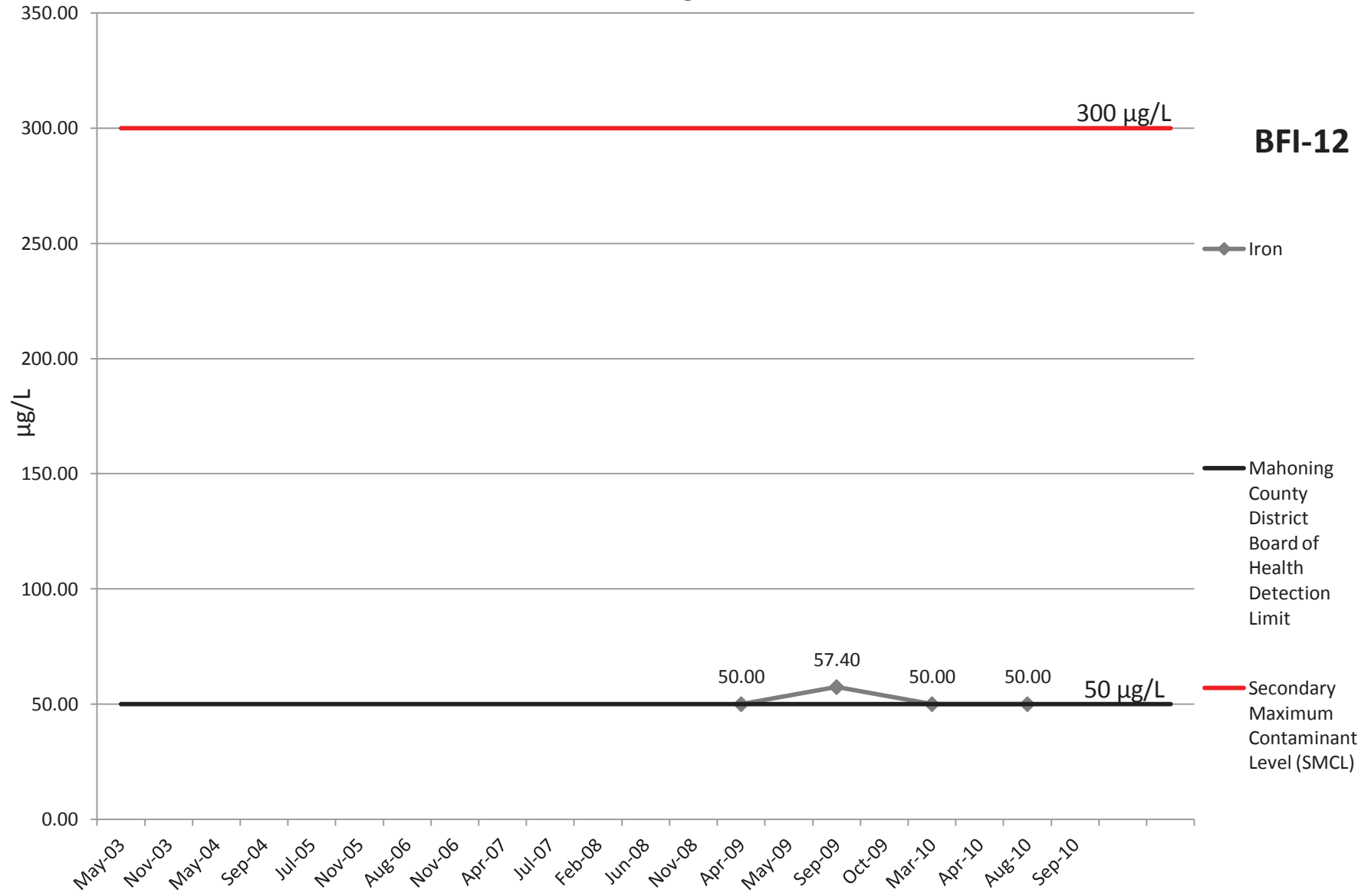
# Chromium



# Copper

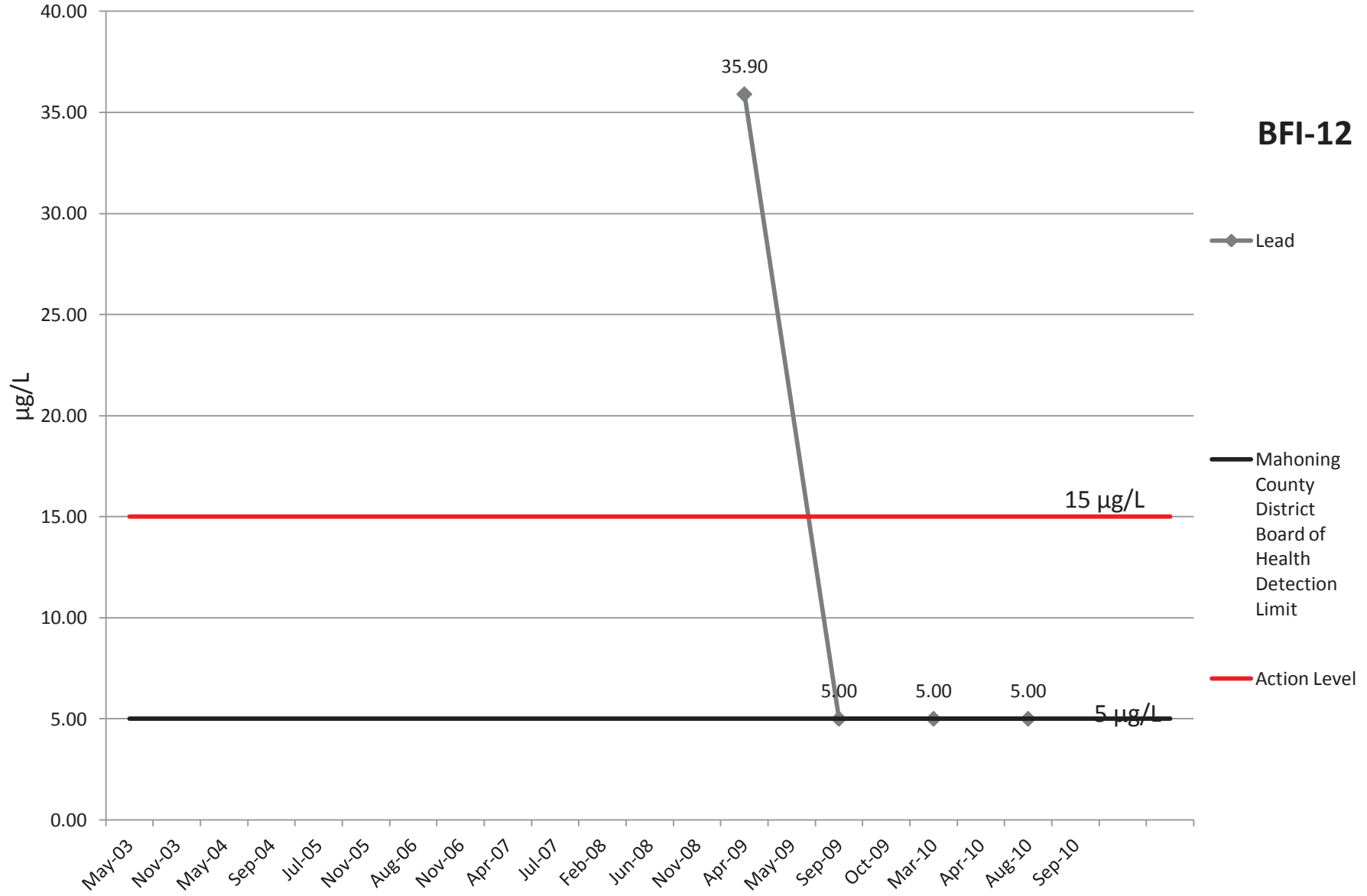


# Iron

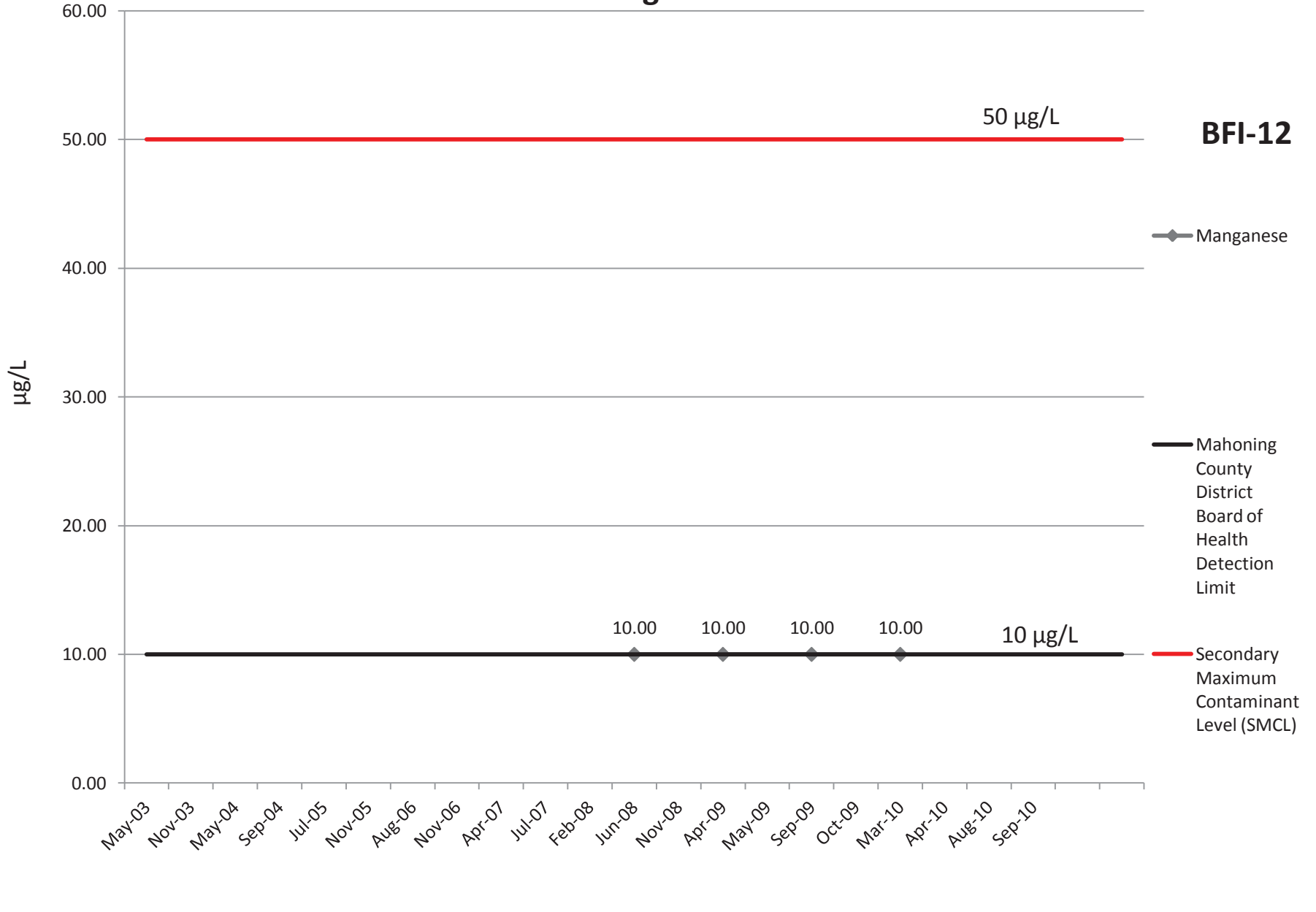


# Lead

**BFI-12**



# Manganese



**BFI-12**

◆ Manganese

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

# Mercury

**BFI-12**

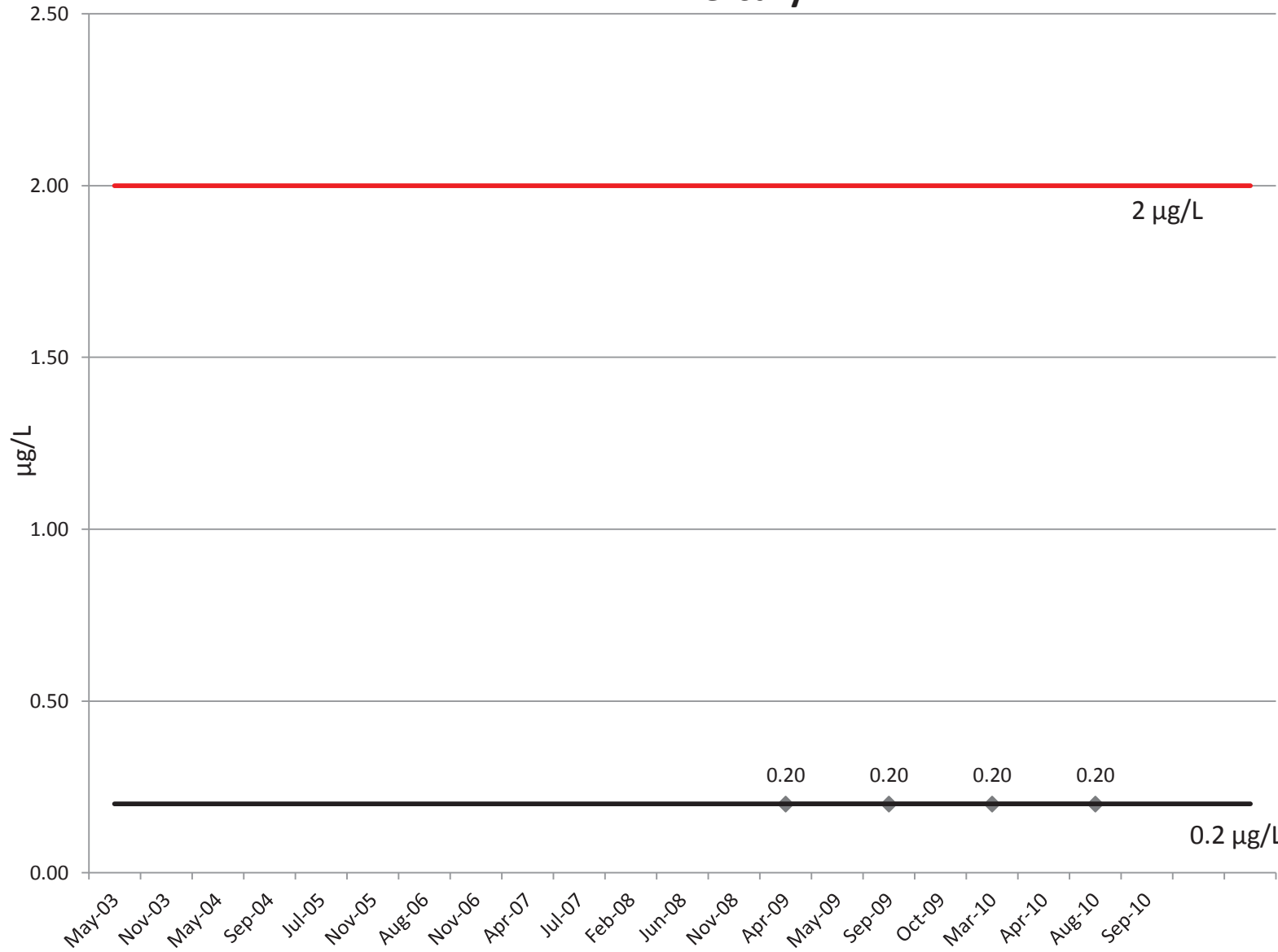
2 µg/L

Mercury

Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

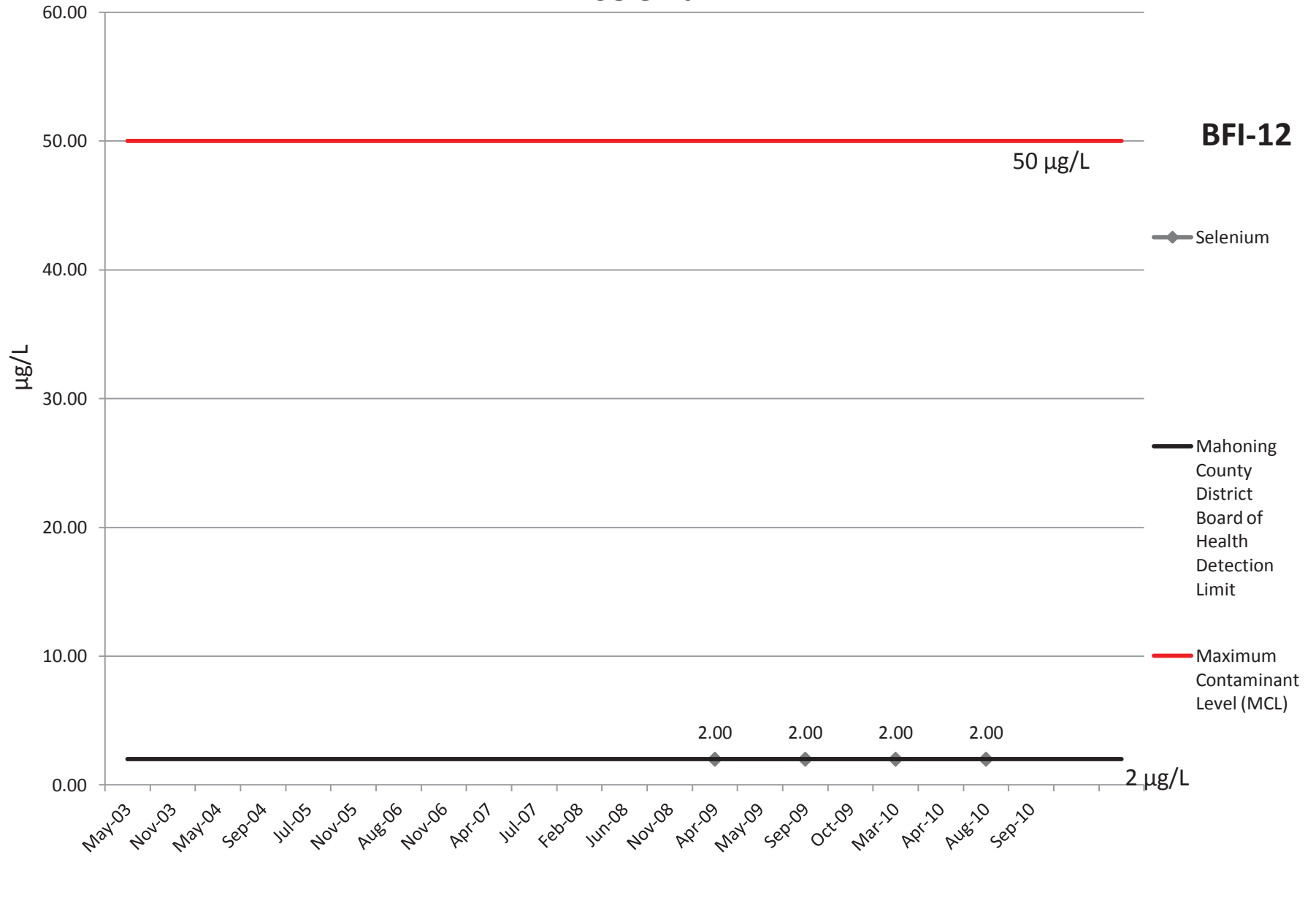
Maximum  
Contaminant  
Level (MCL)

0.2 µg/L

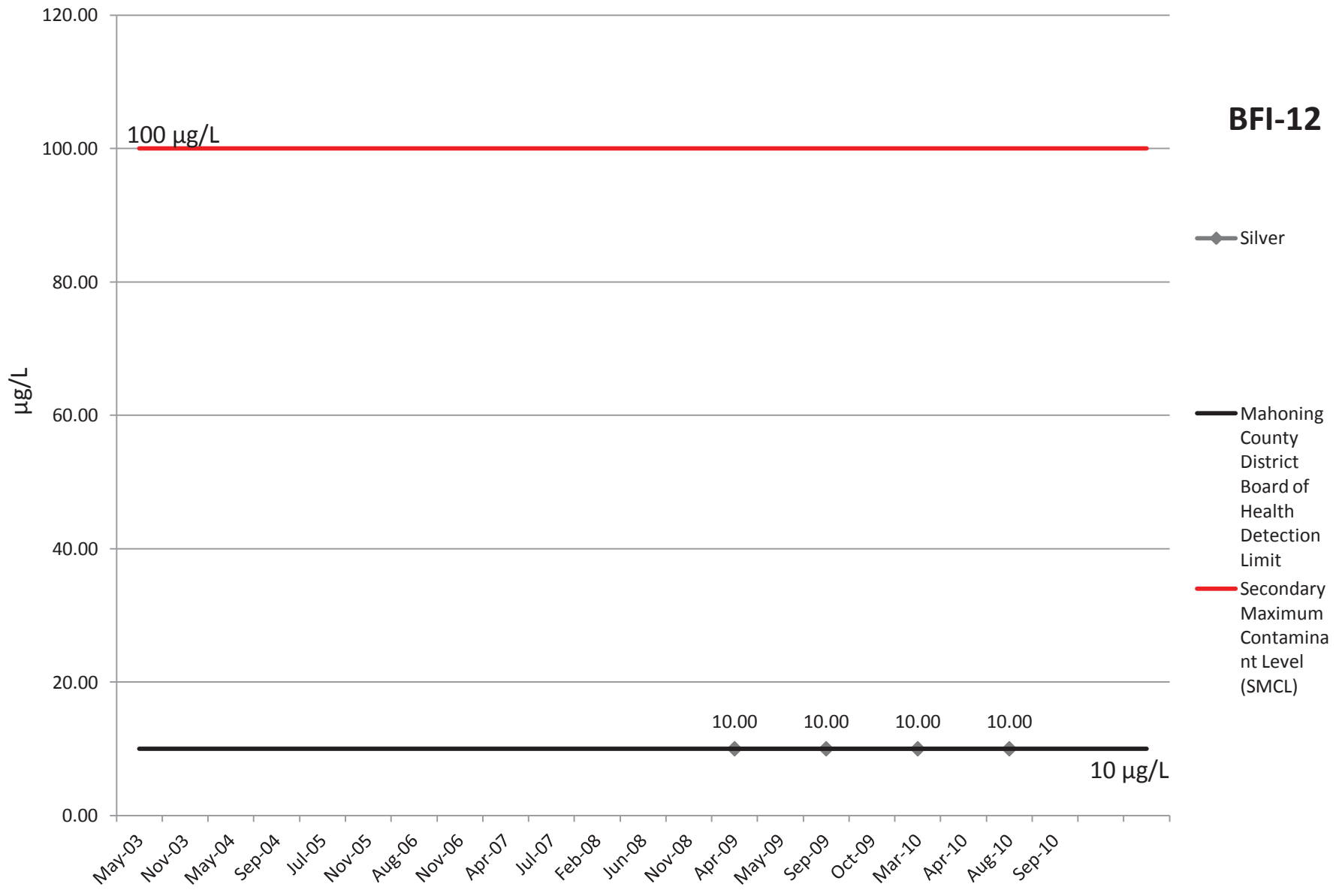




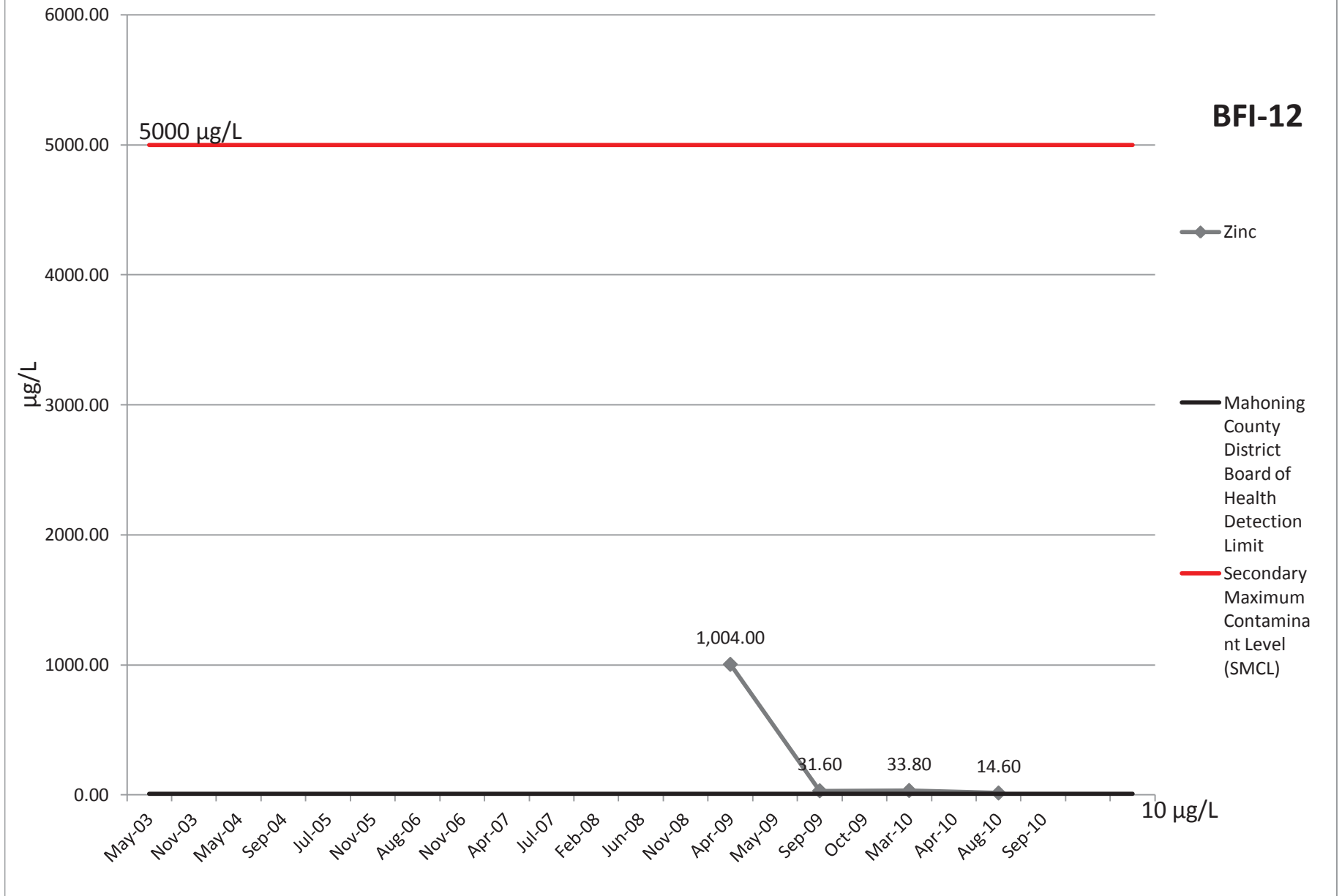
# Selenium



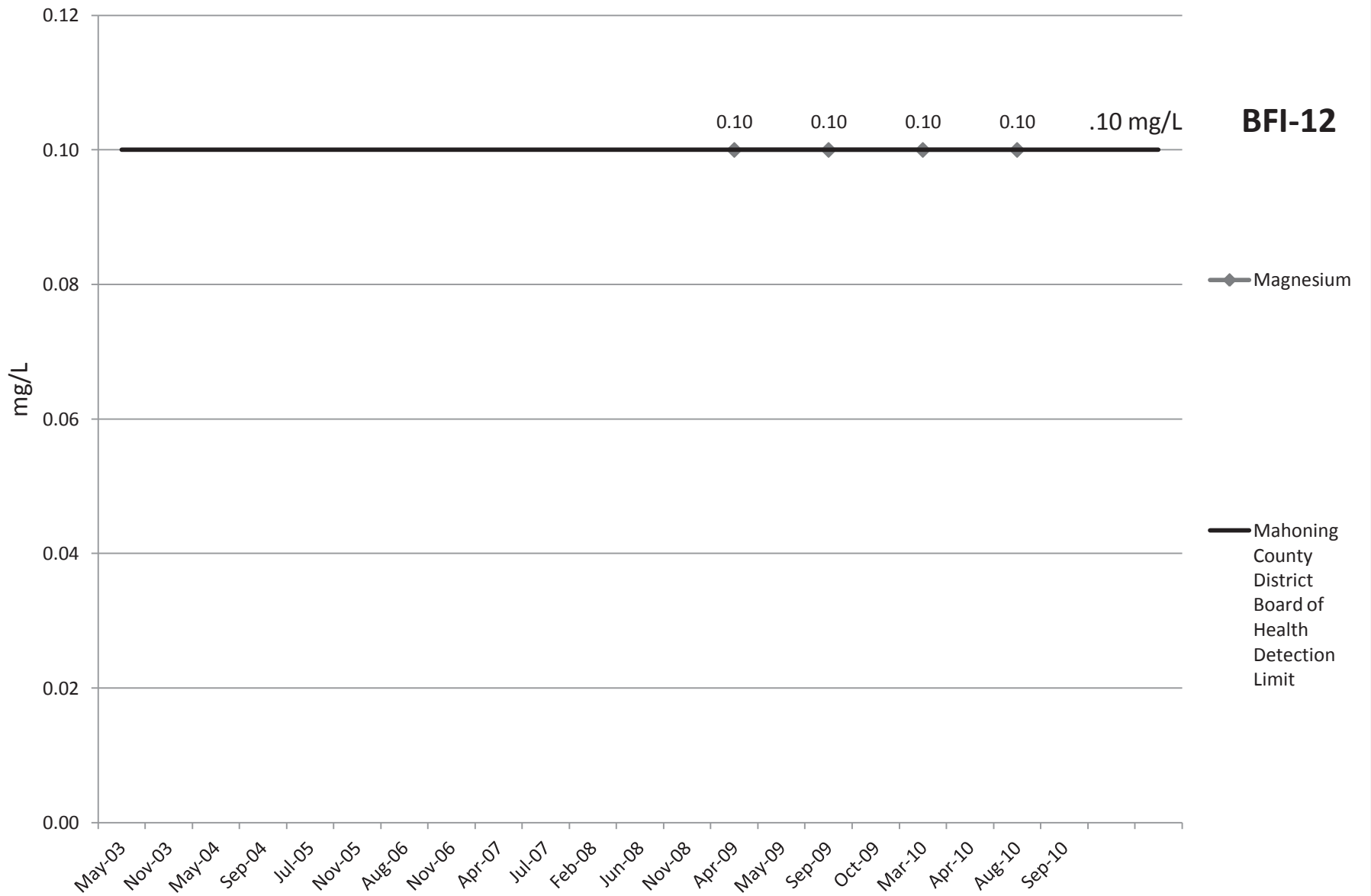
# Silver



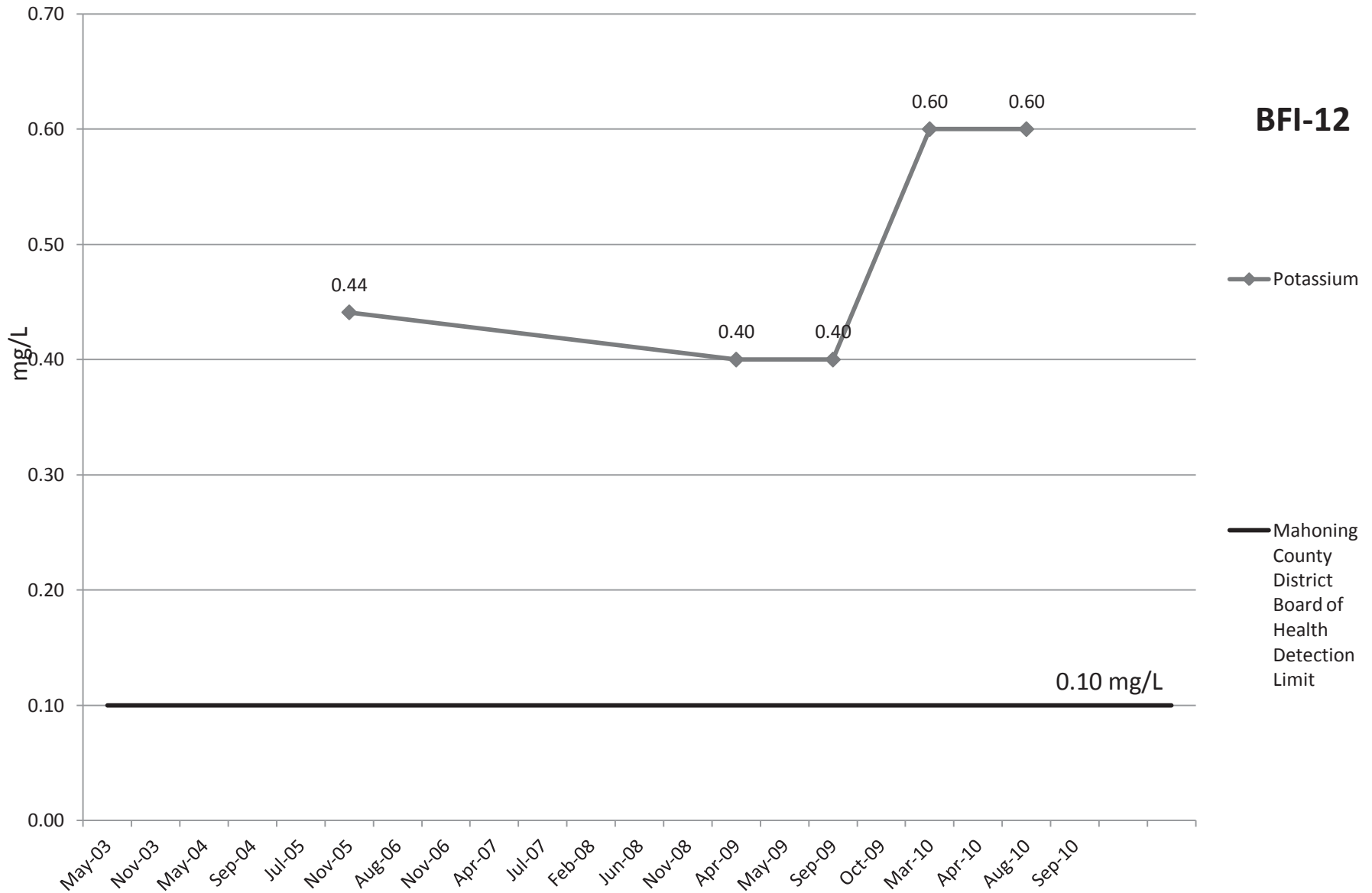
# Zinc



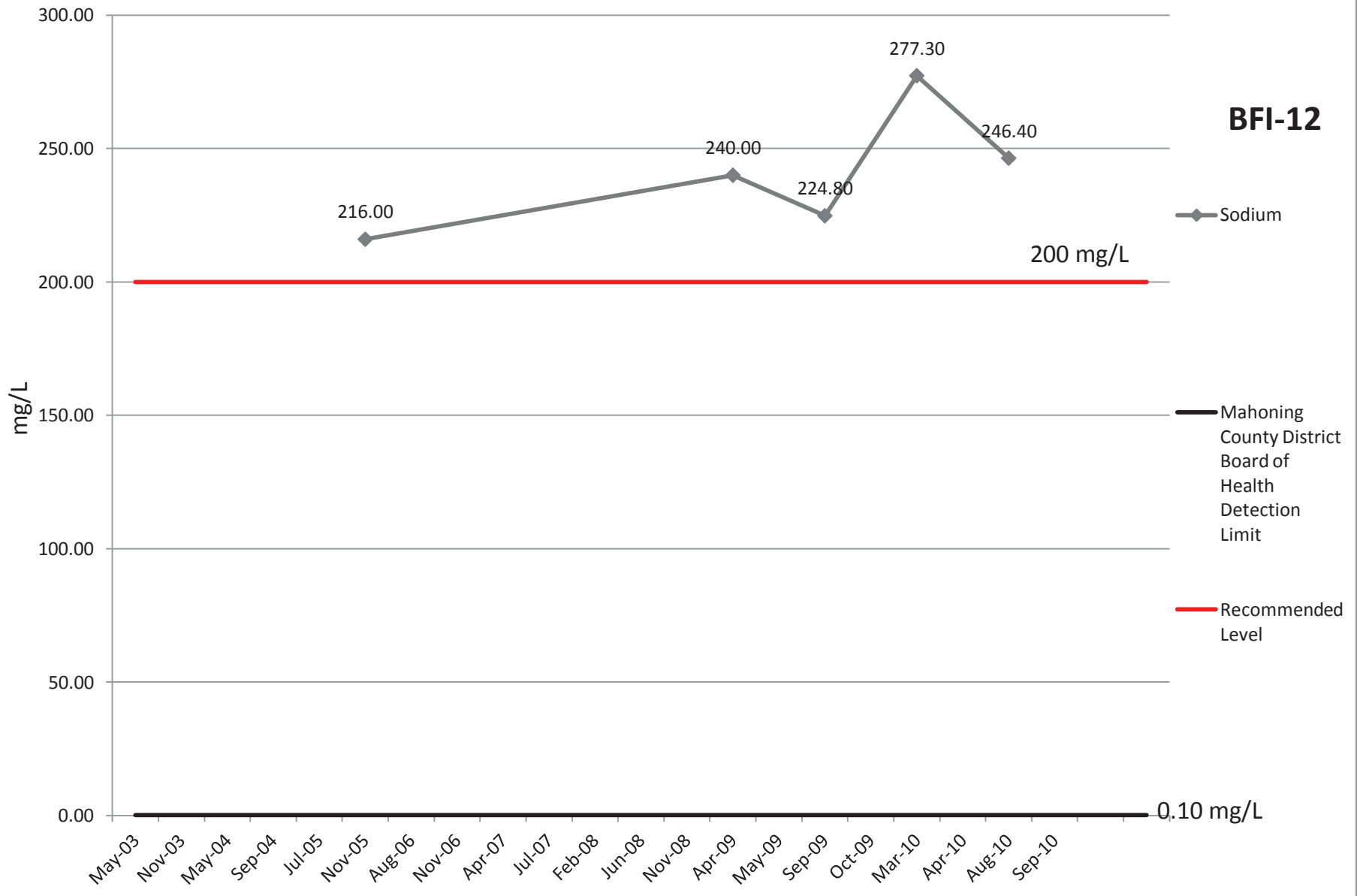
# Magnesium



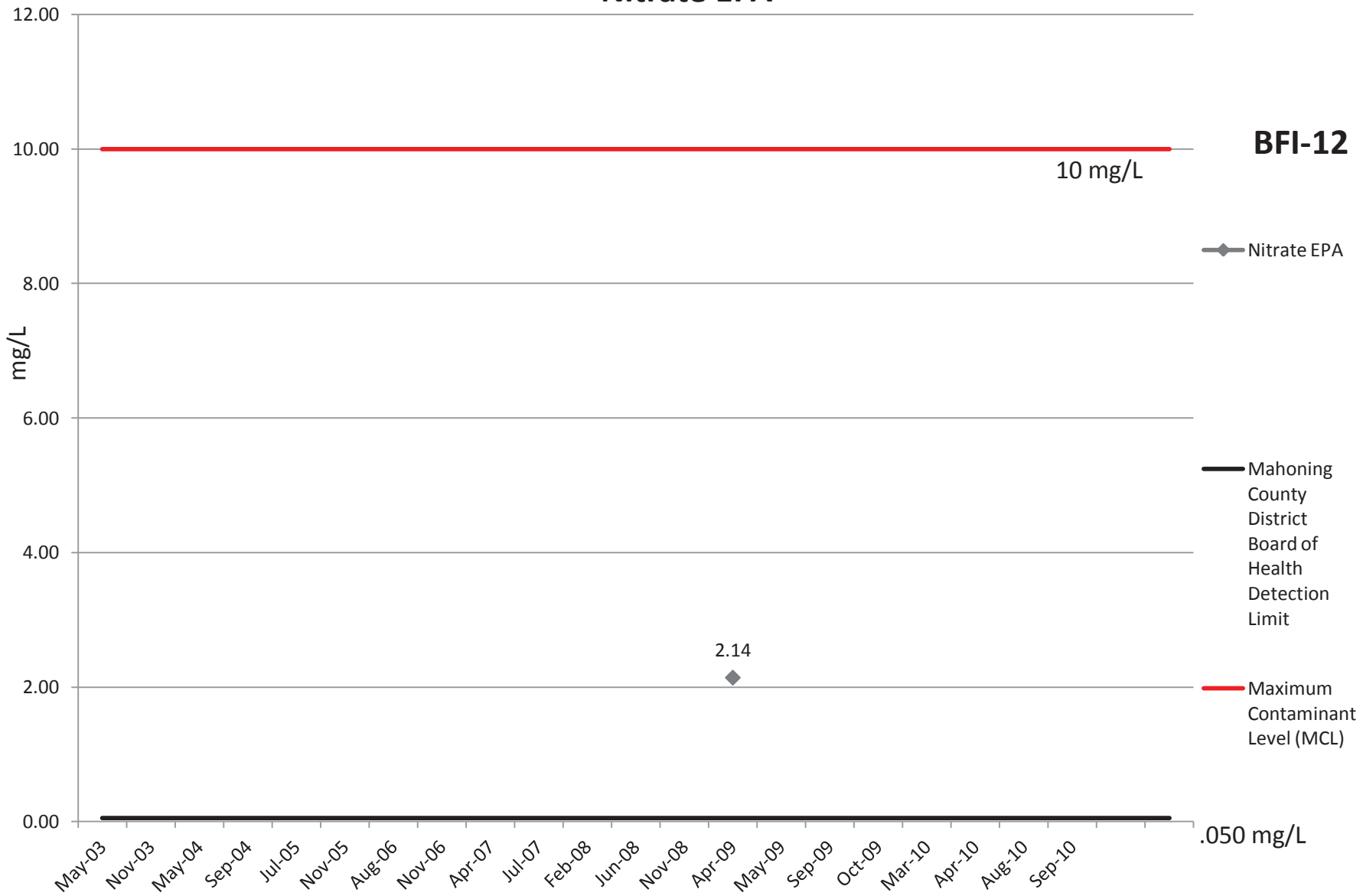
# Potassium



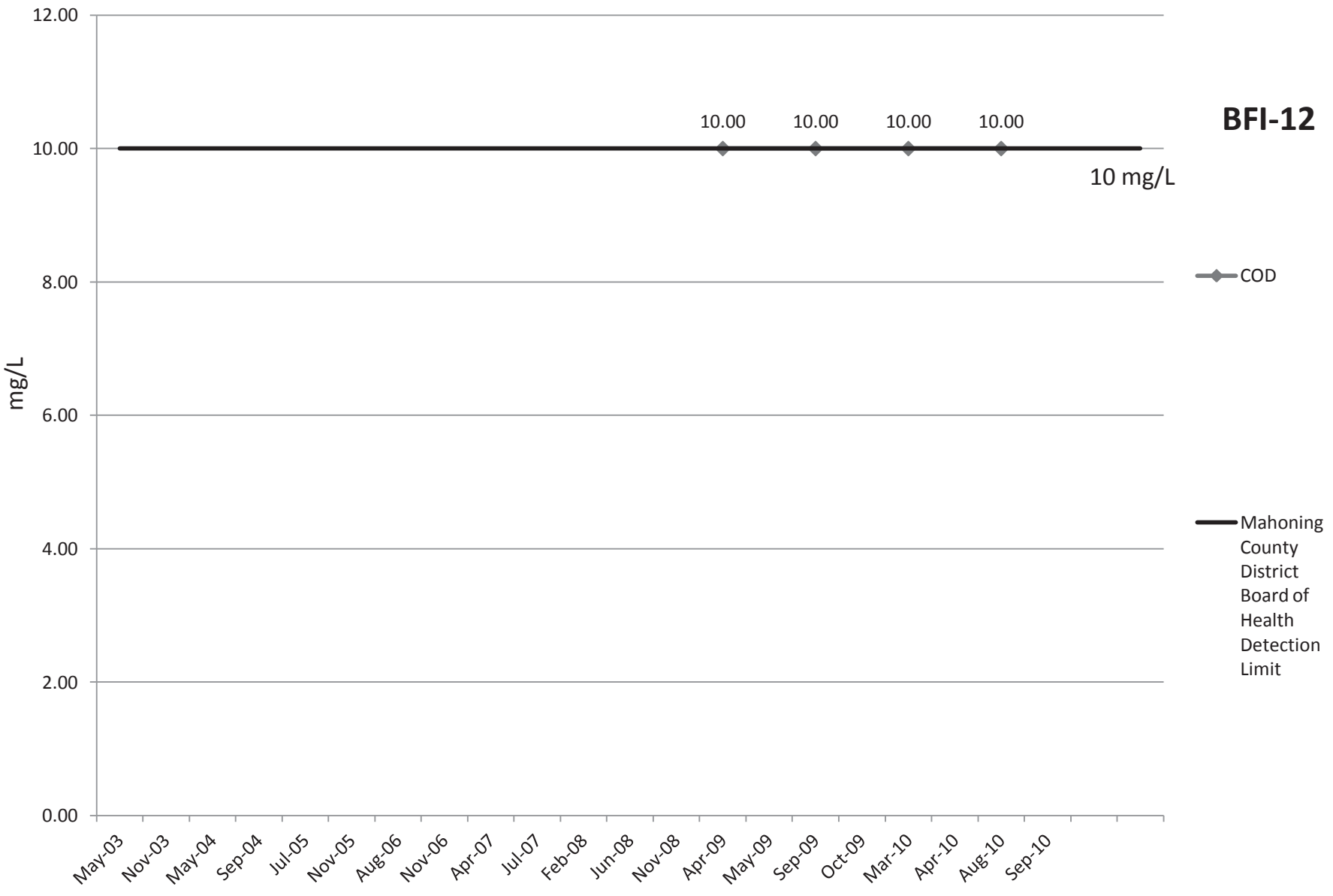
# Sodium



# Nitrate EPA



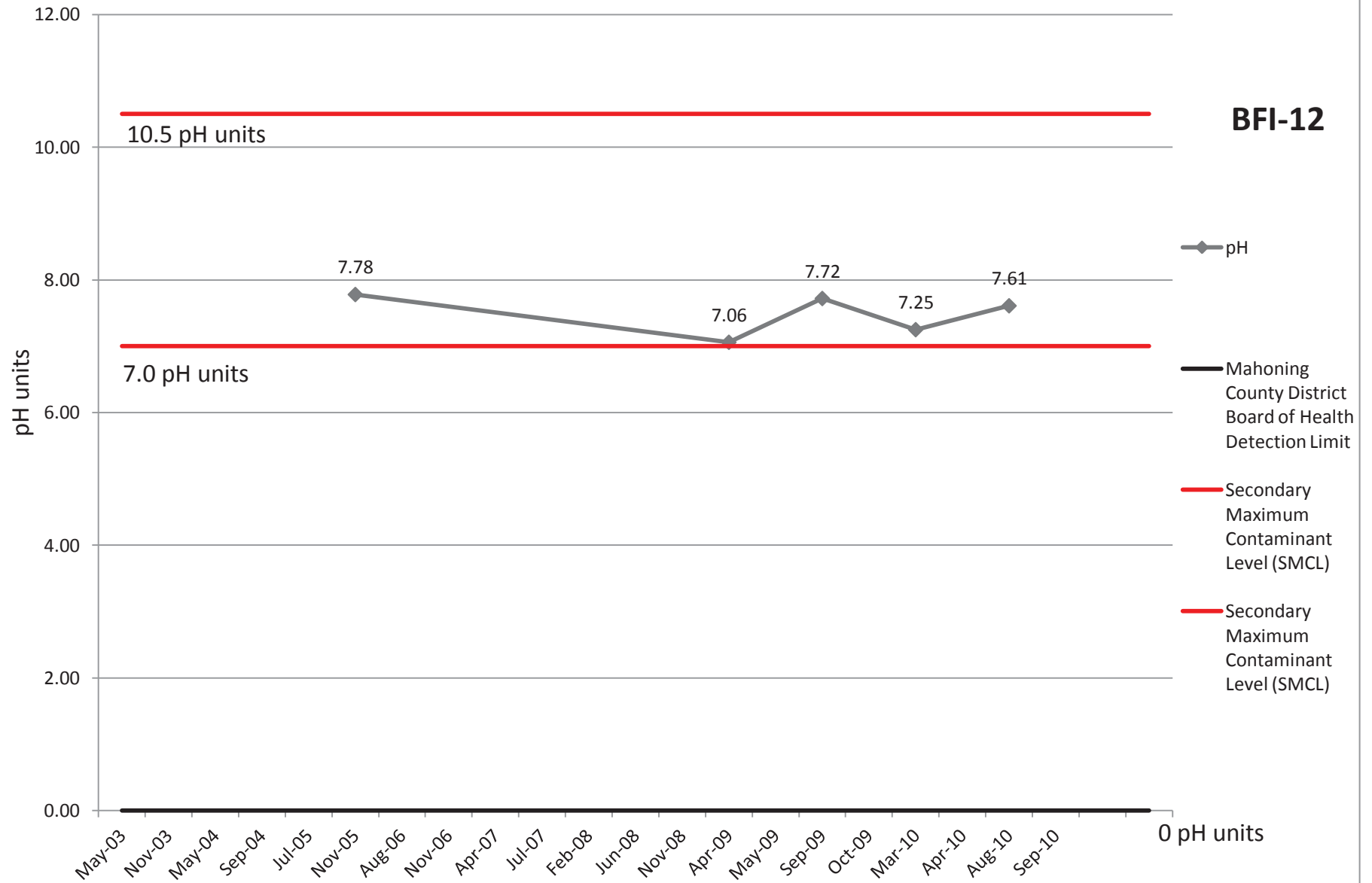
# COD





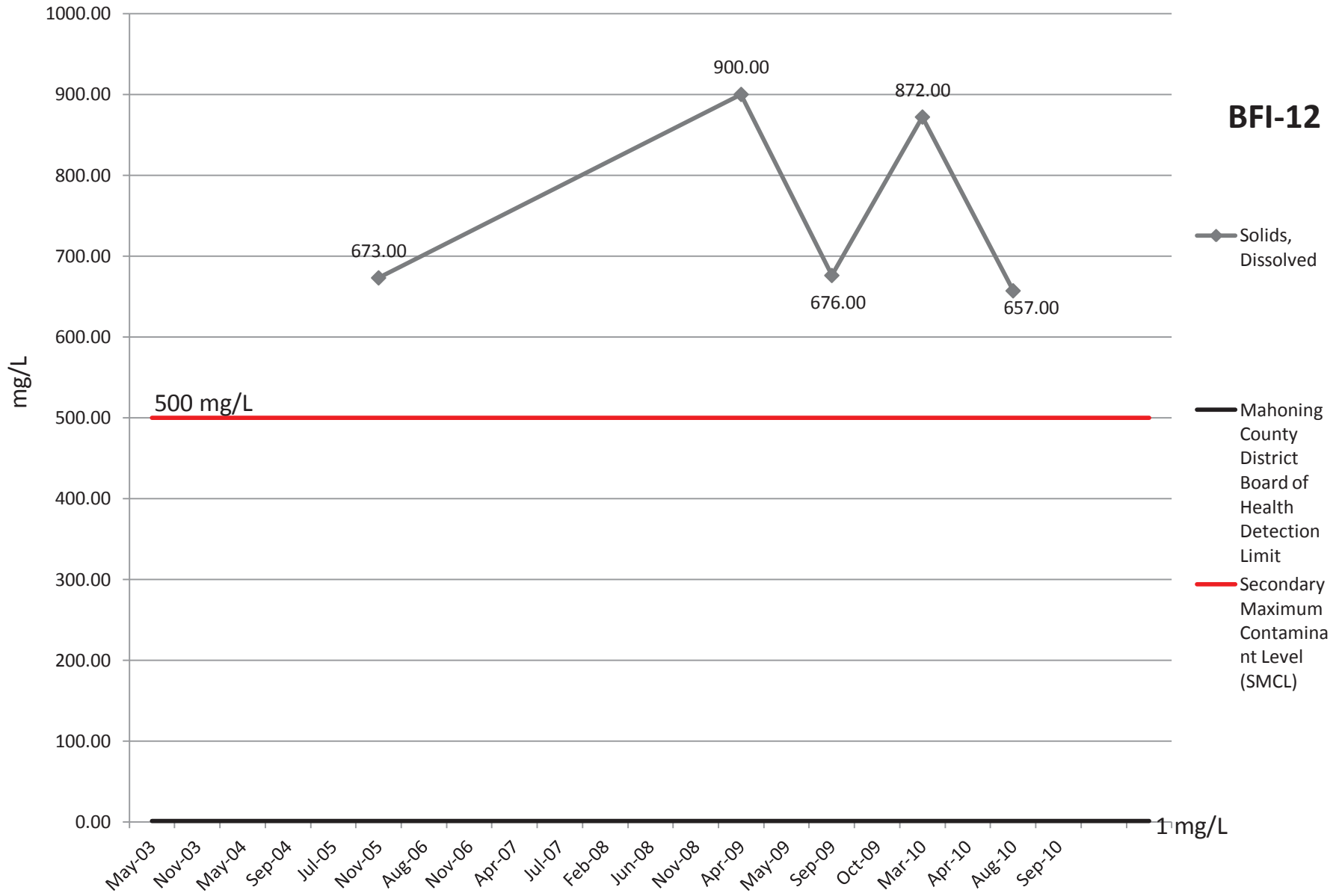
# pH

**BFI-12**

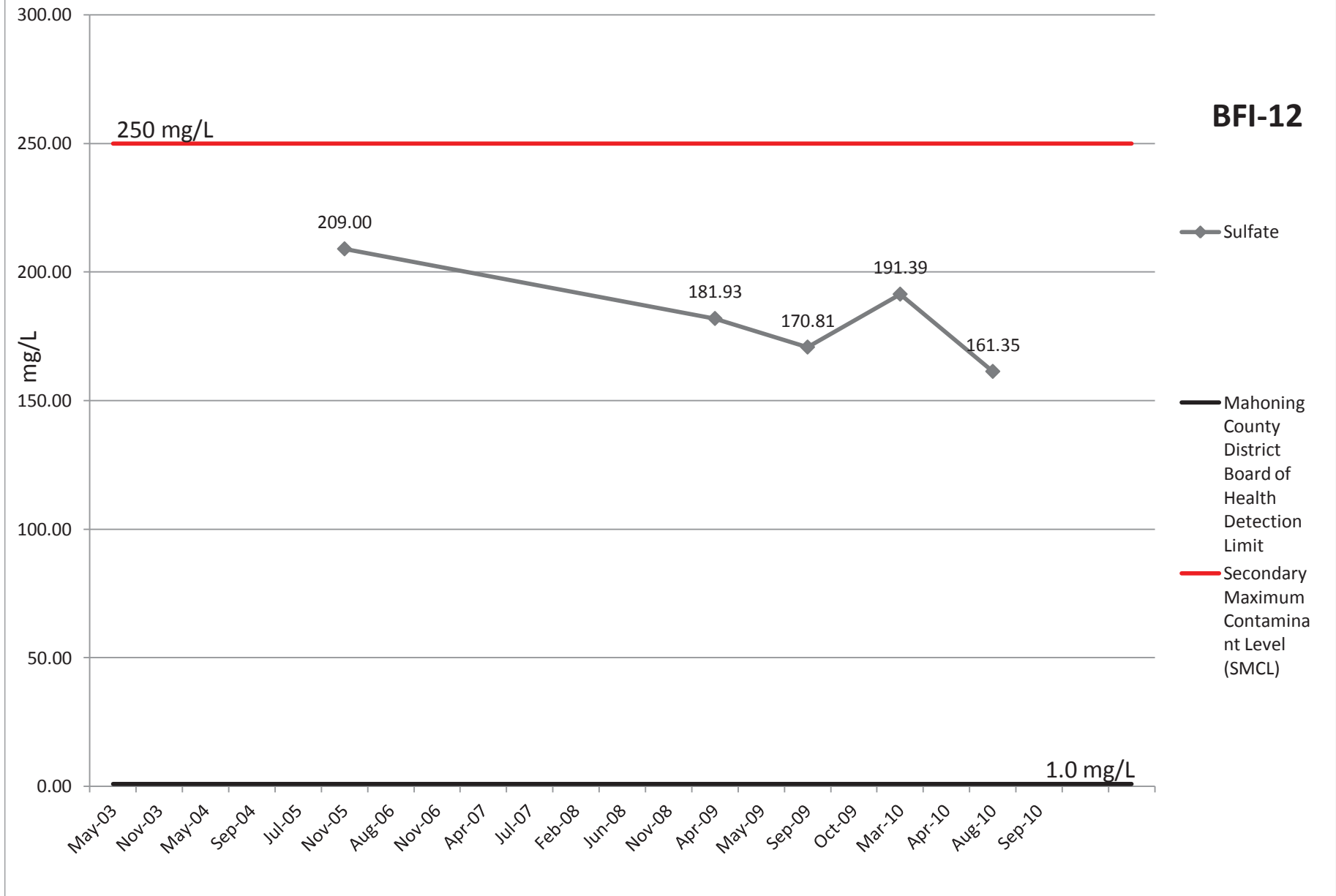


# Solids, Dissolved

**BFI-12**



# Sulfate



# Bacteria

positive (1)

**BFI-12**

Positive/Negative

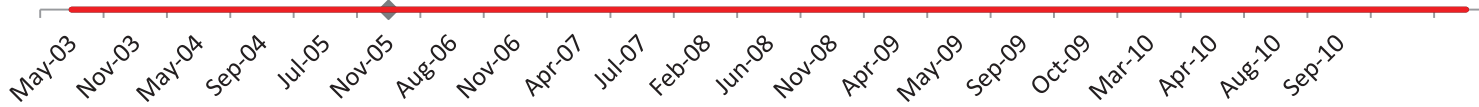
◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

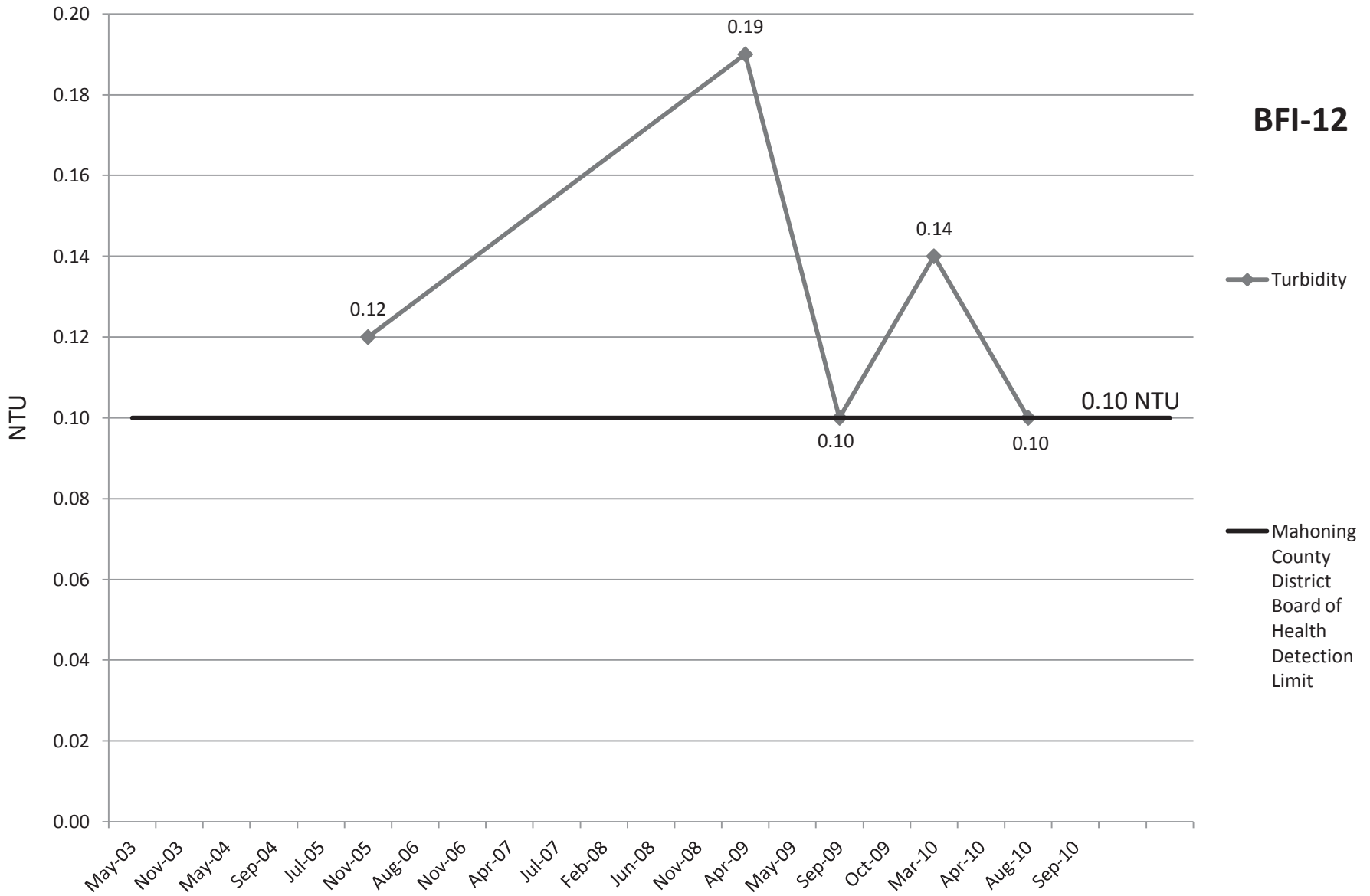
— Maximum  
Contaminant  
Level (MCL)

0.00

negative (0)

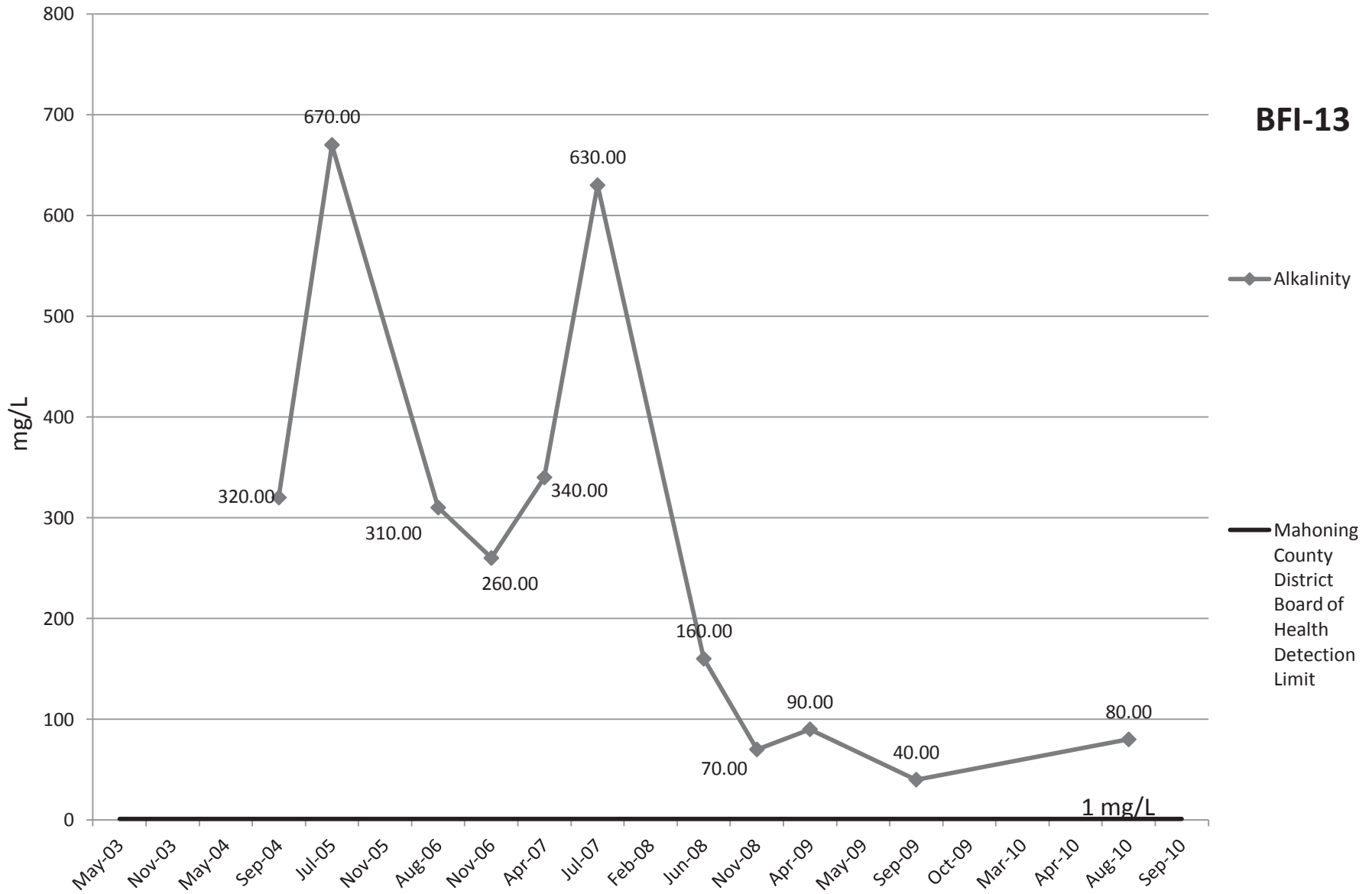


# Turbidity

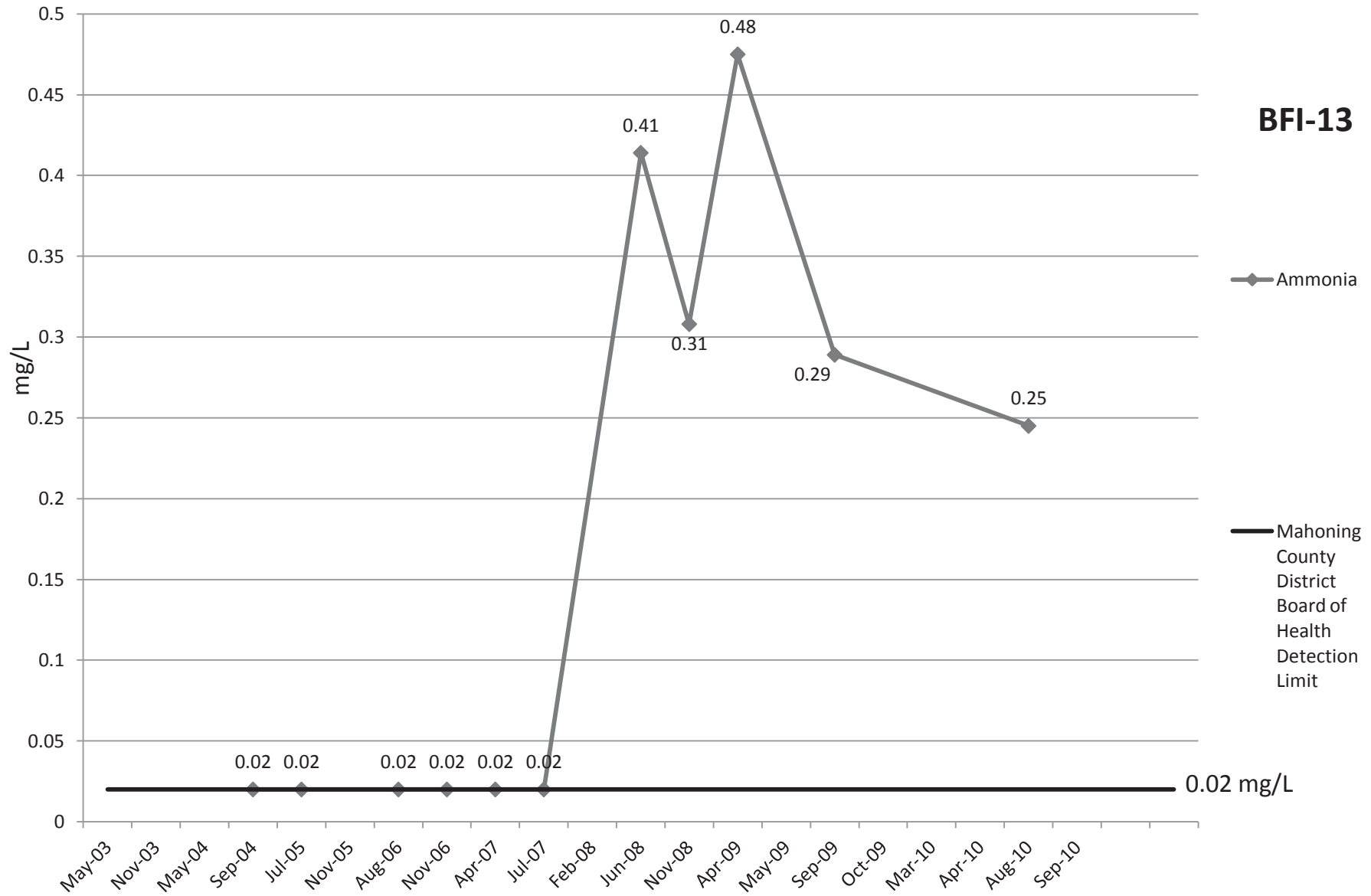


# Alkalinity

**BFI-13**

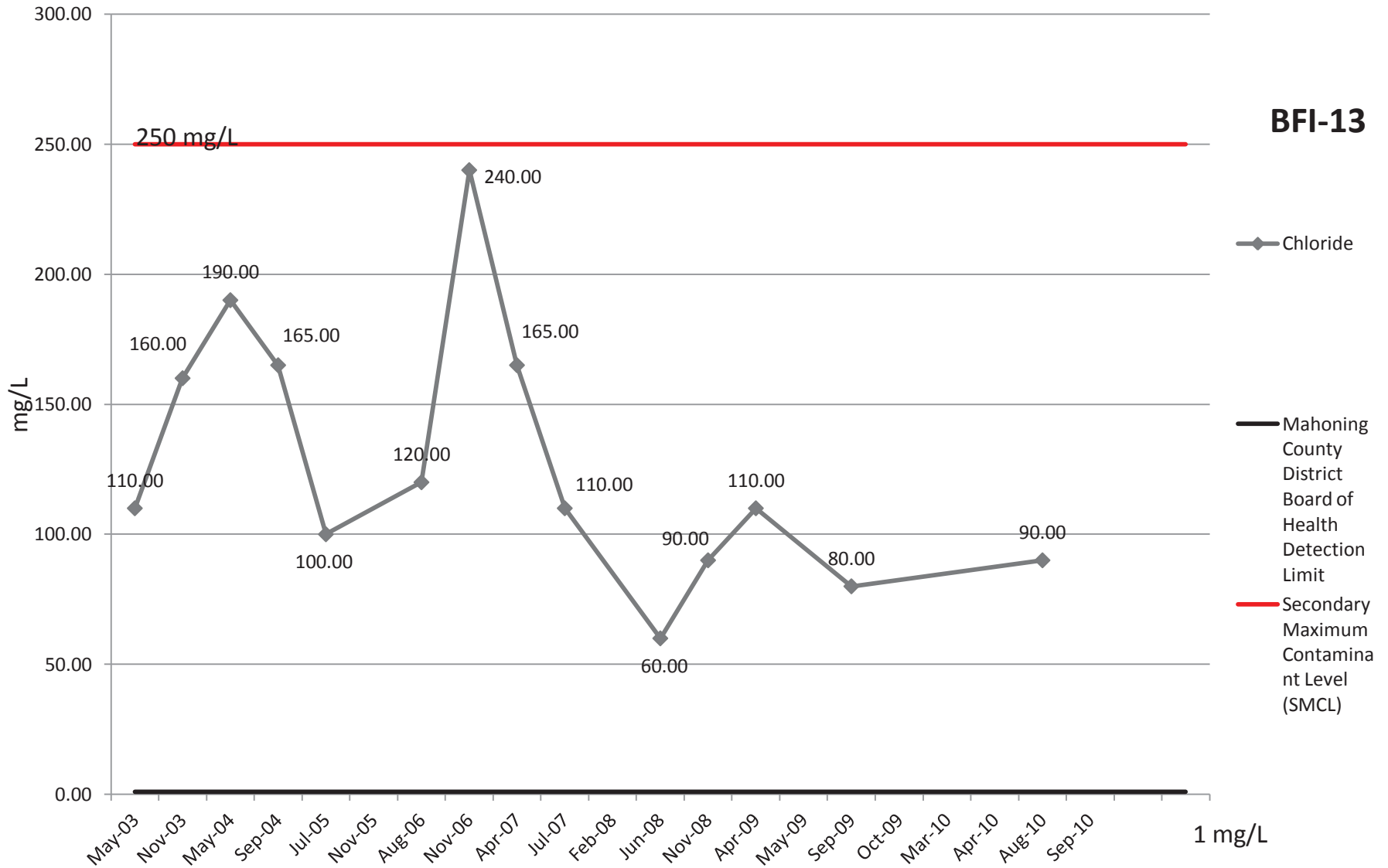


# Ammonia



# Chloride

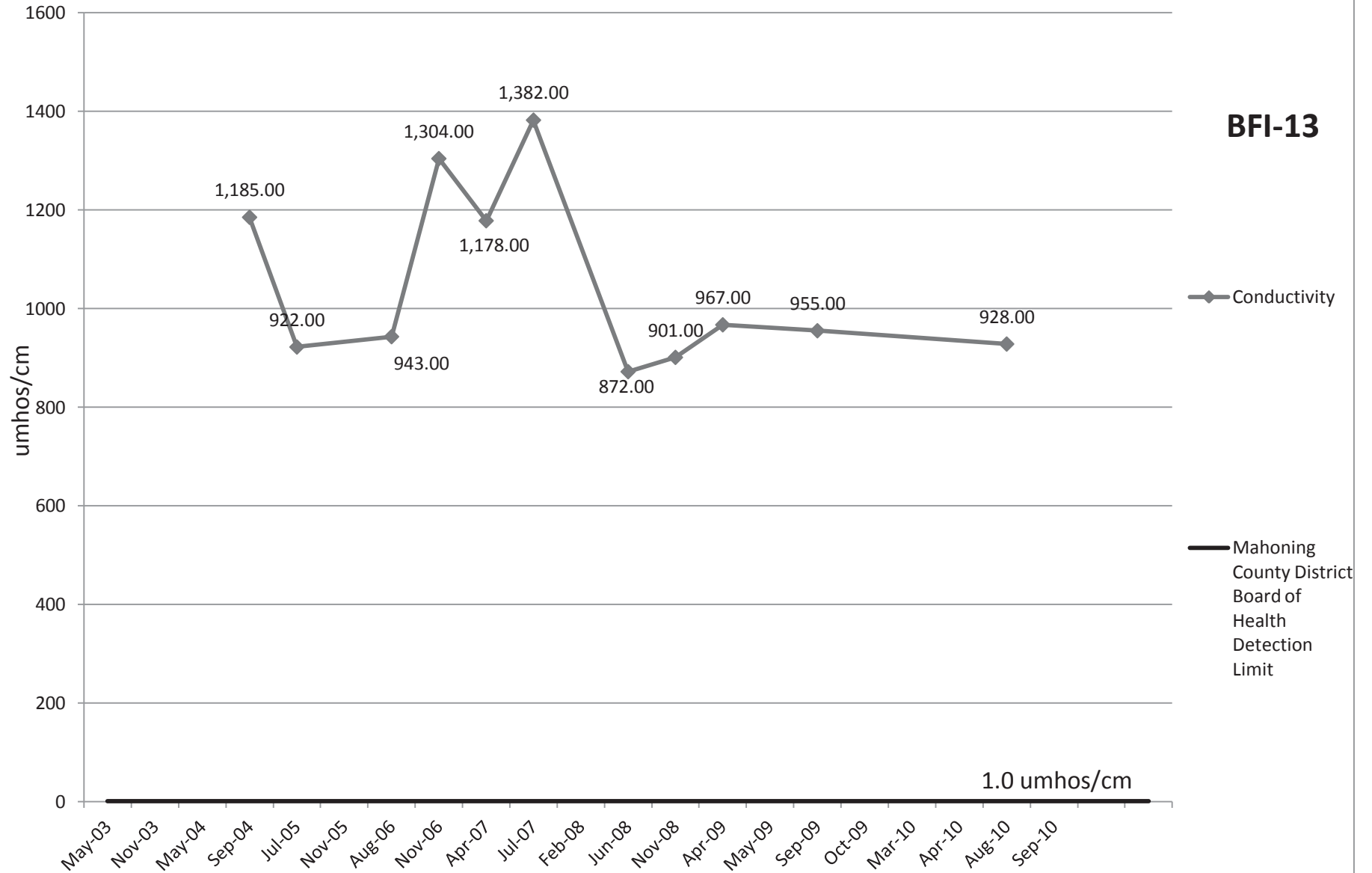
**BFI-13**



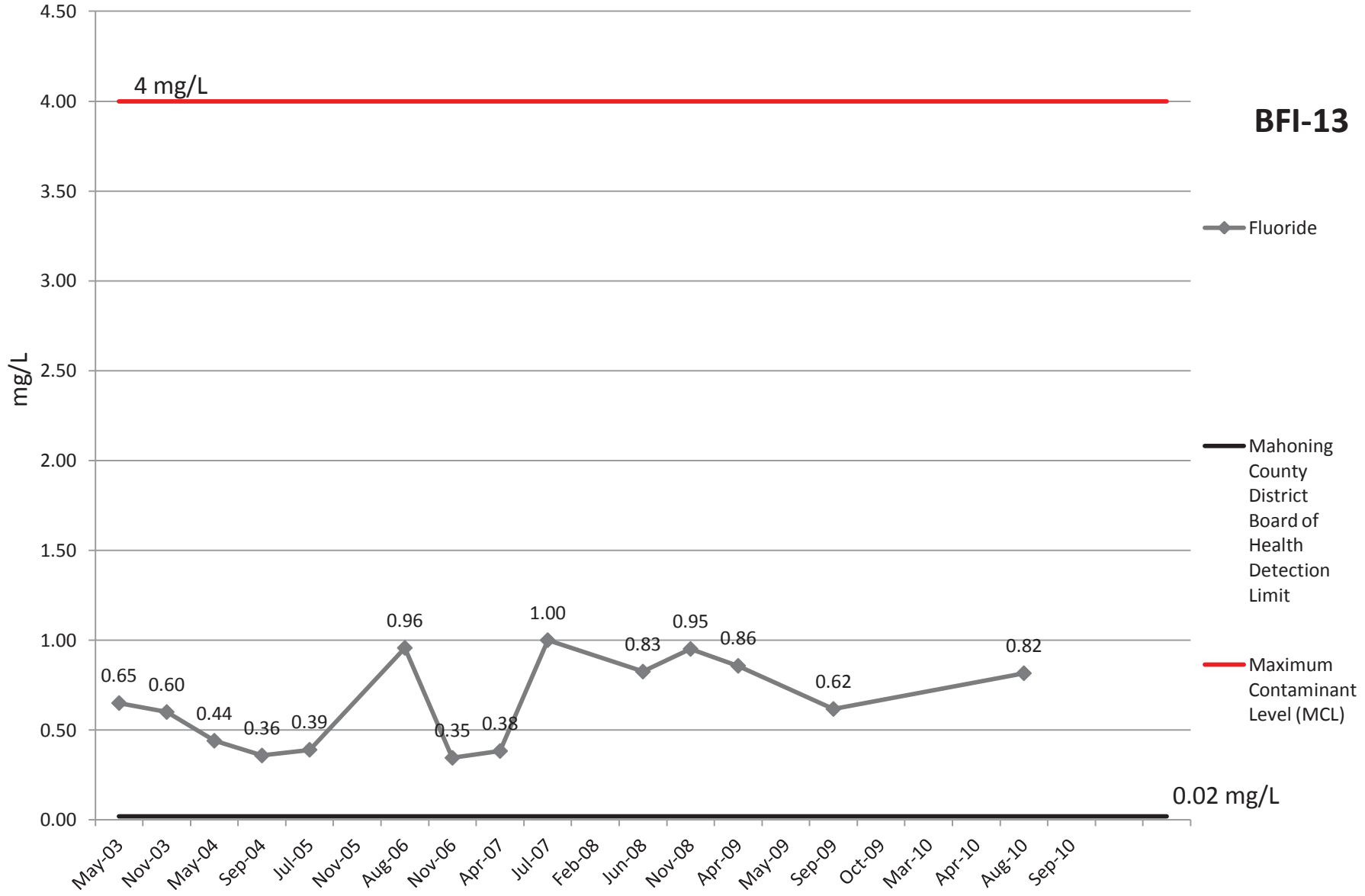


# Conductivity

**BFI-13**



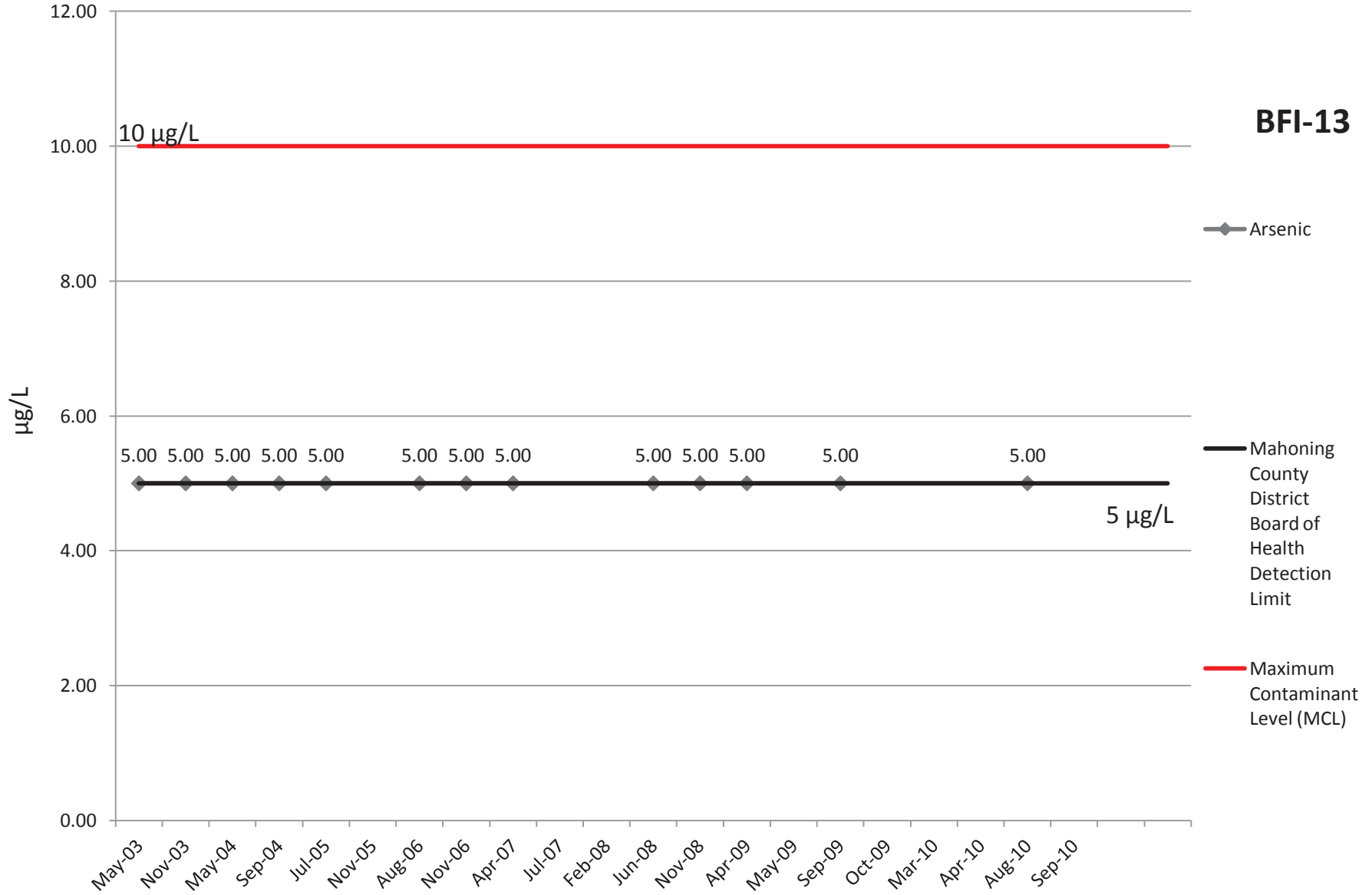
# Fluoride



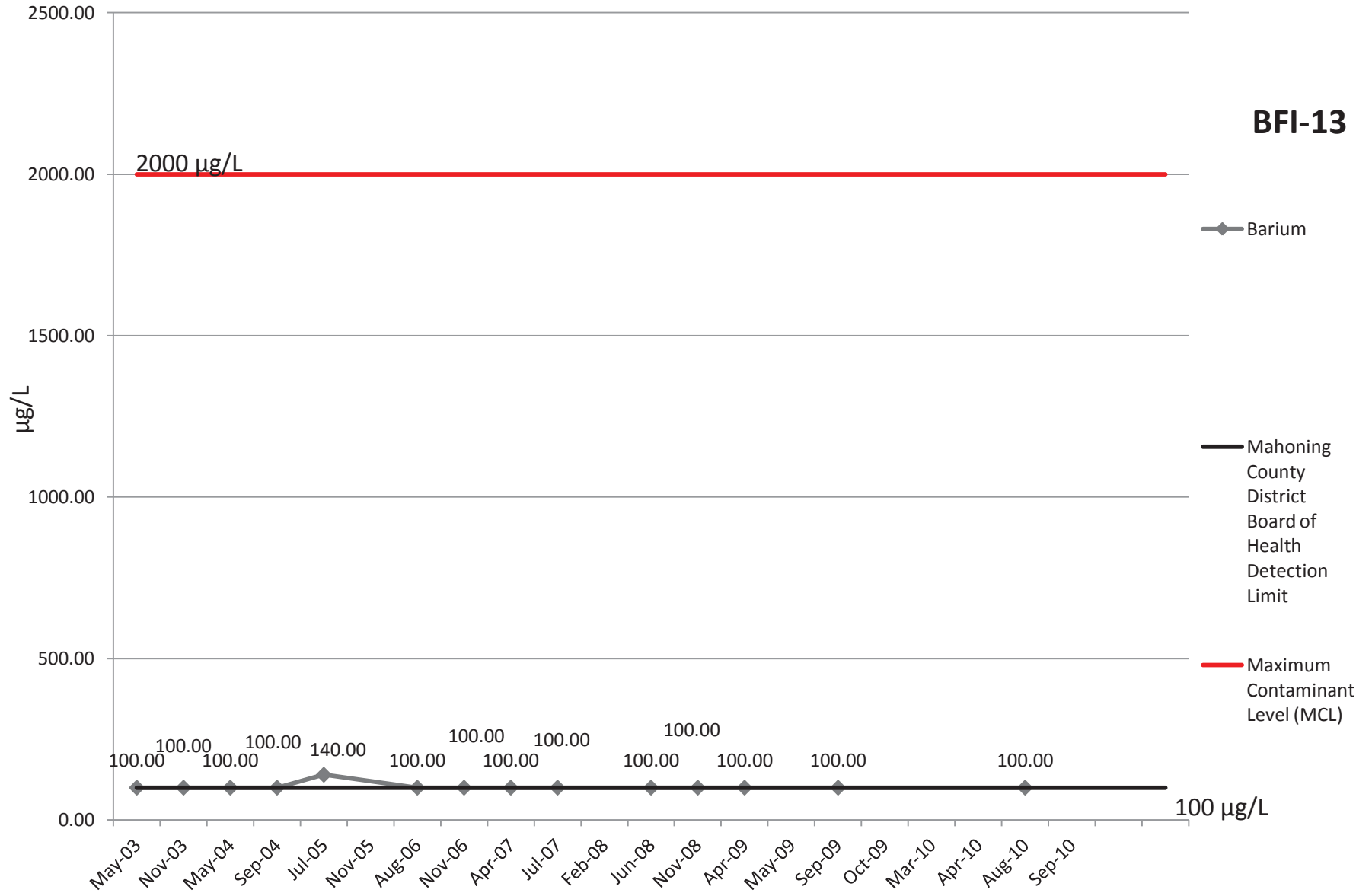
0.02 mg/L

# Arsenic

**BFI-13**

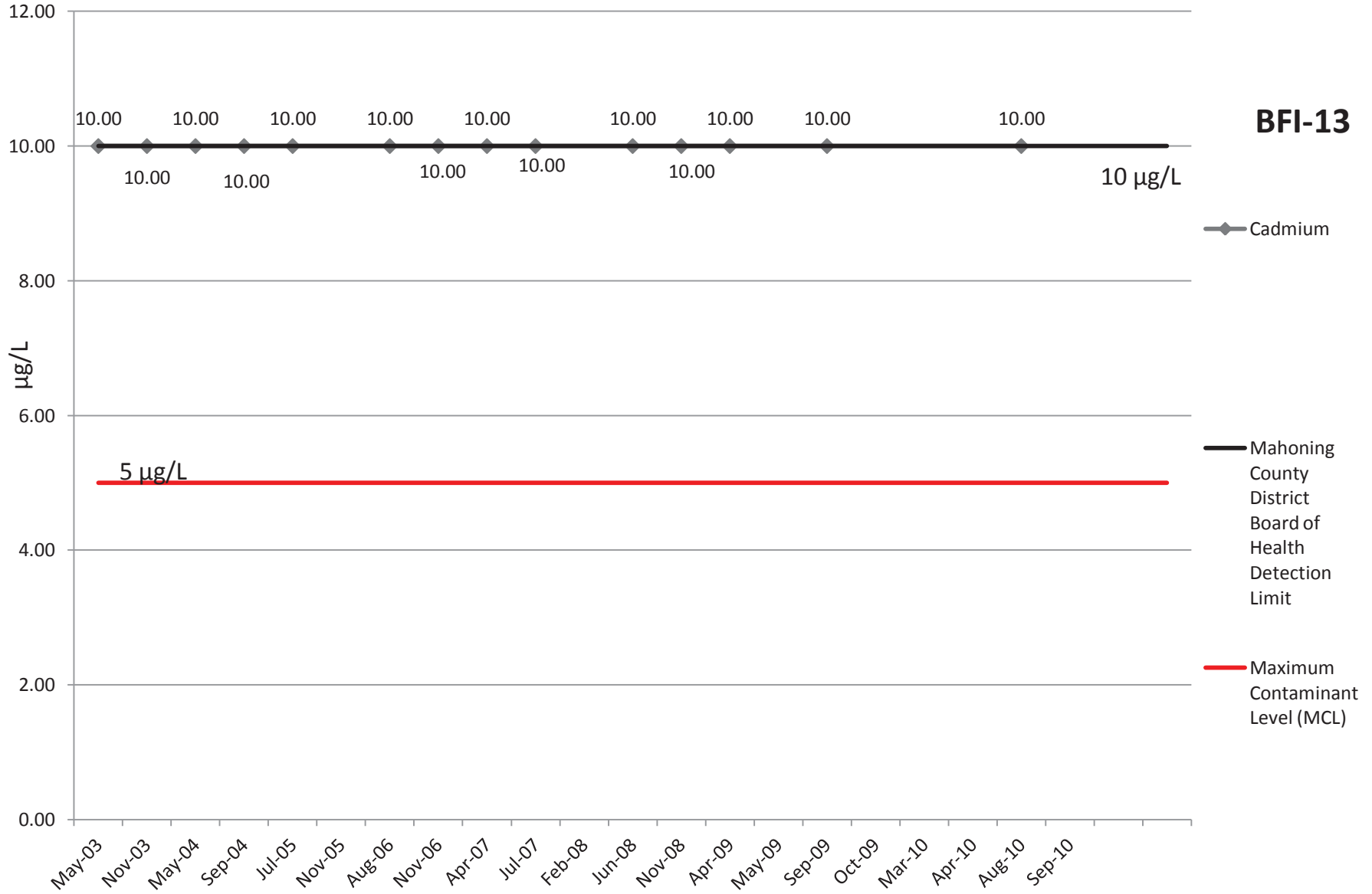


# Barium

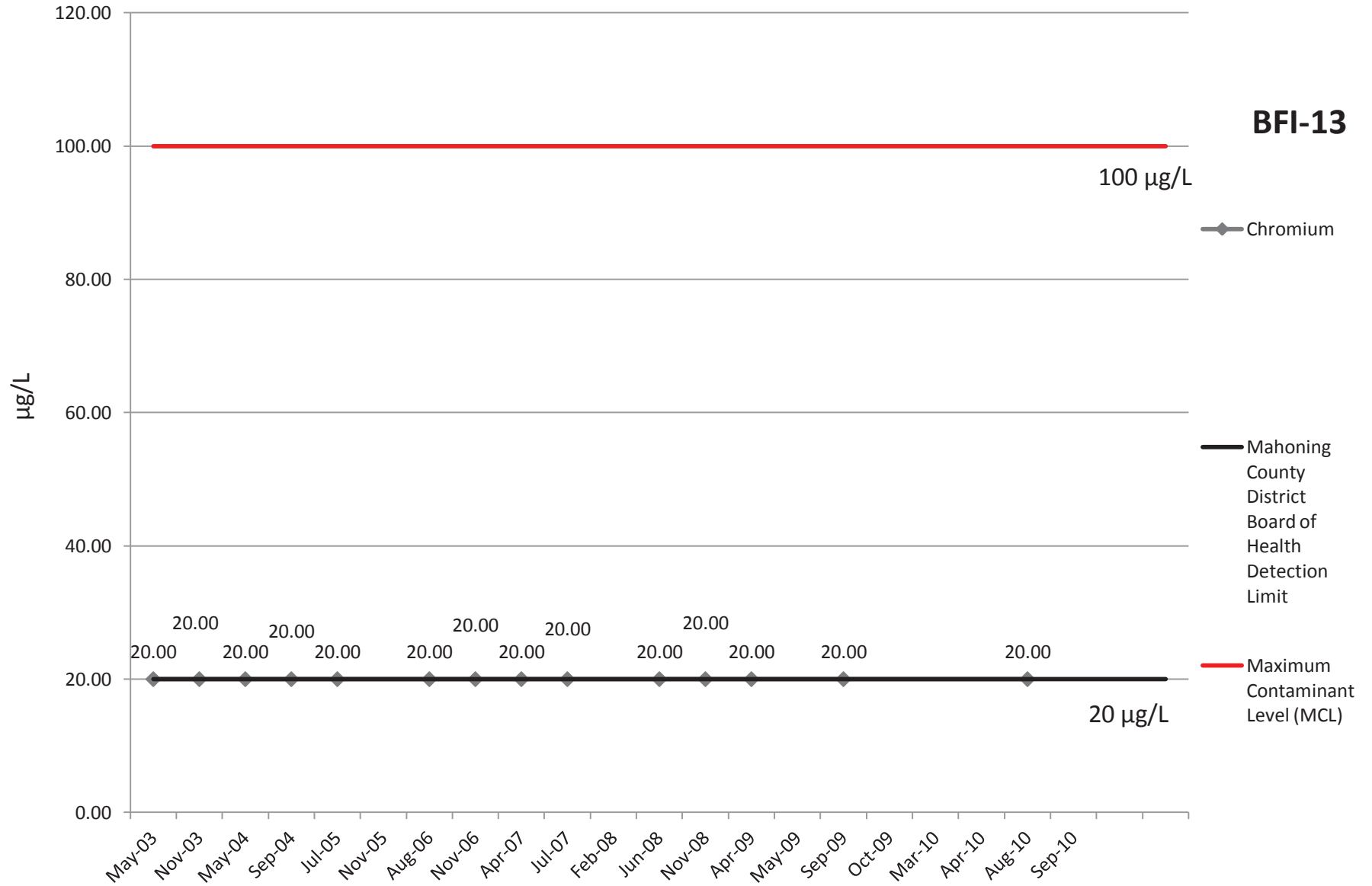


# Cadmium

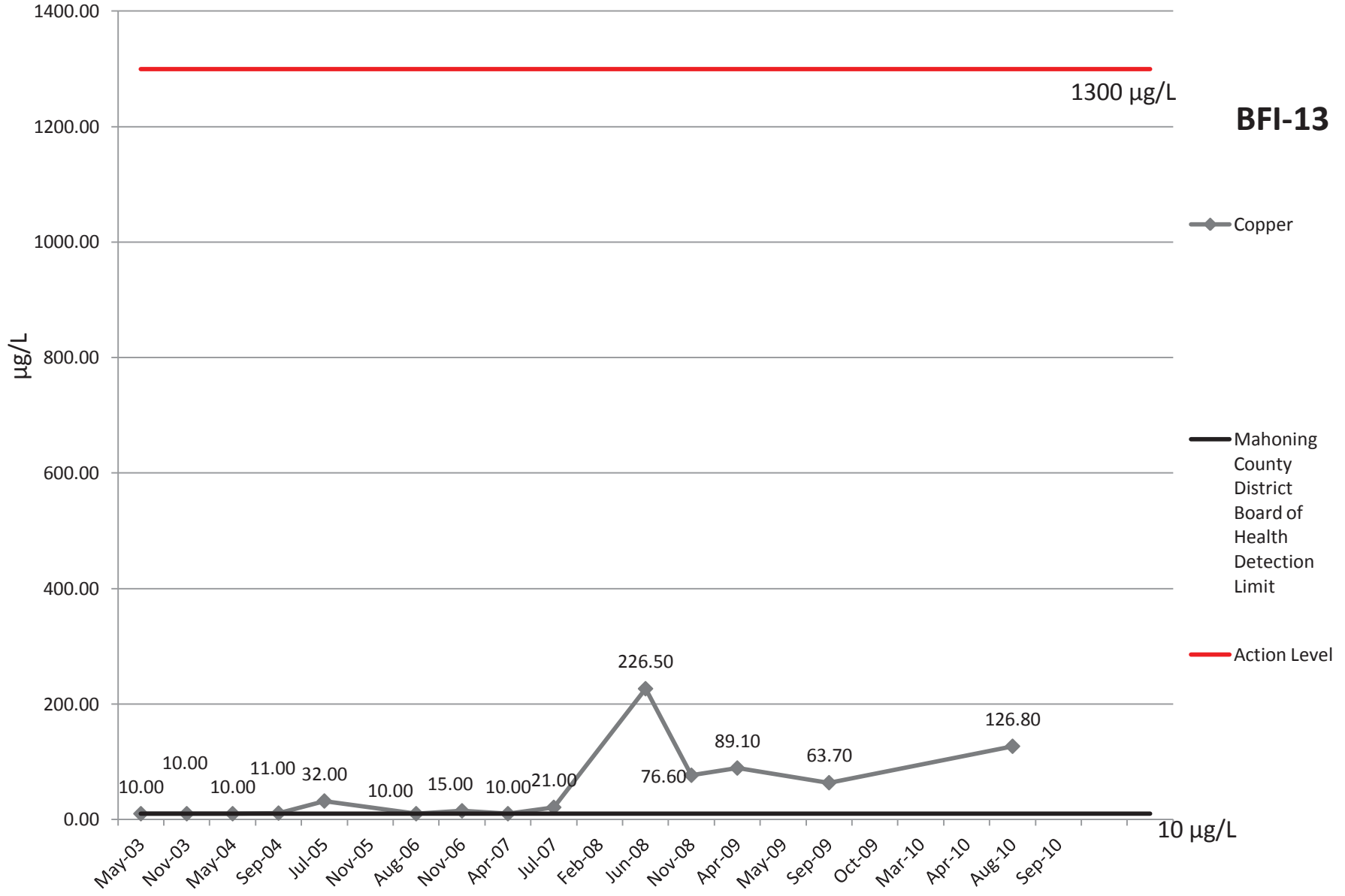
**BFI-13**



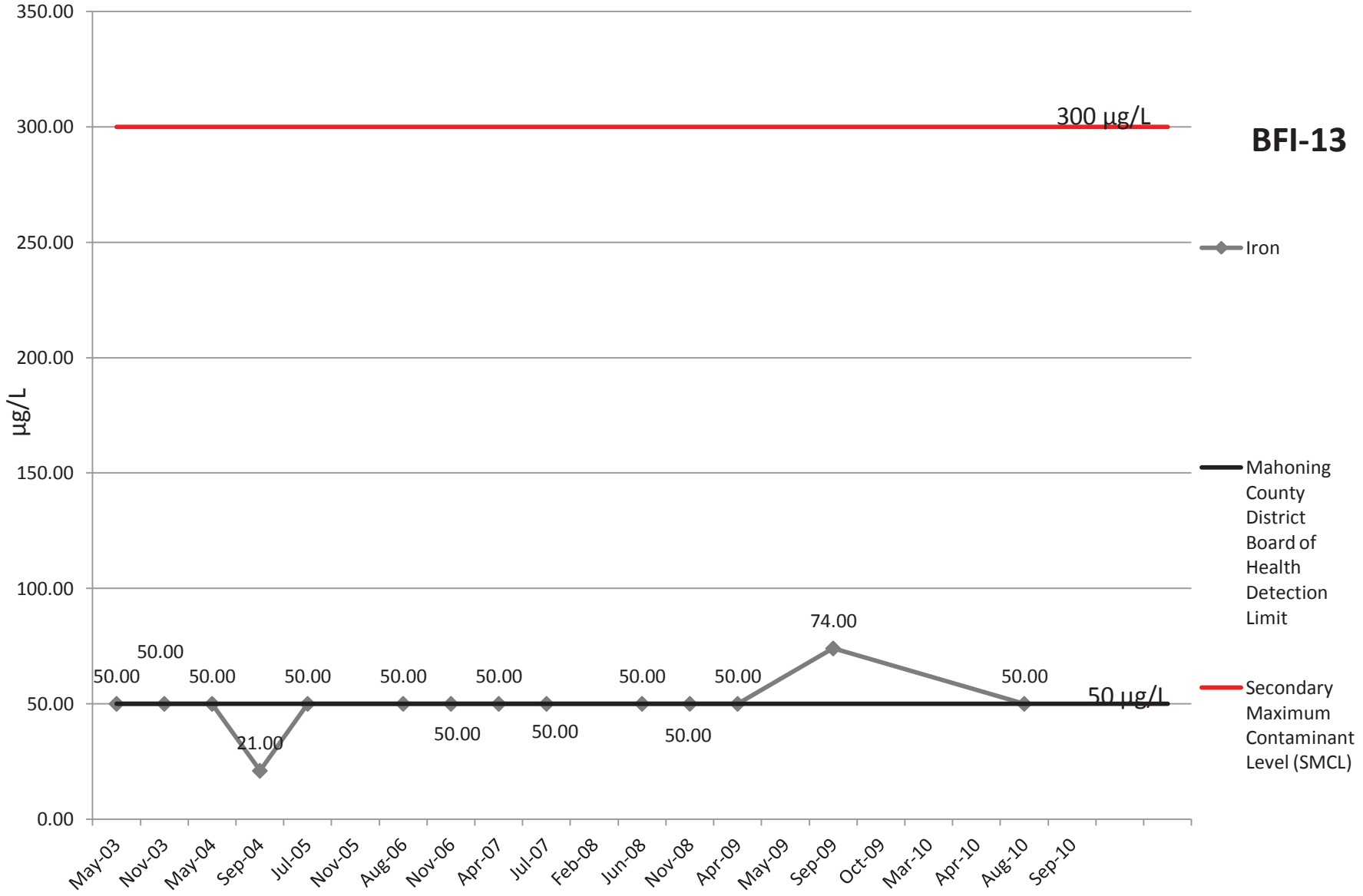
# Chromium



# Copper



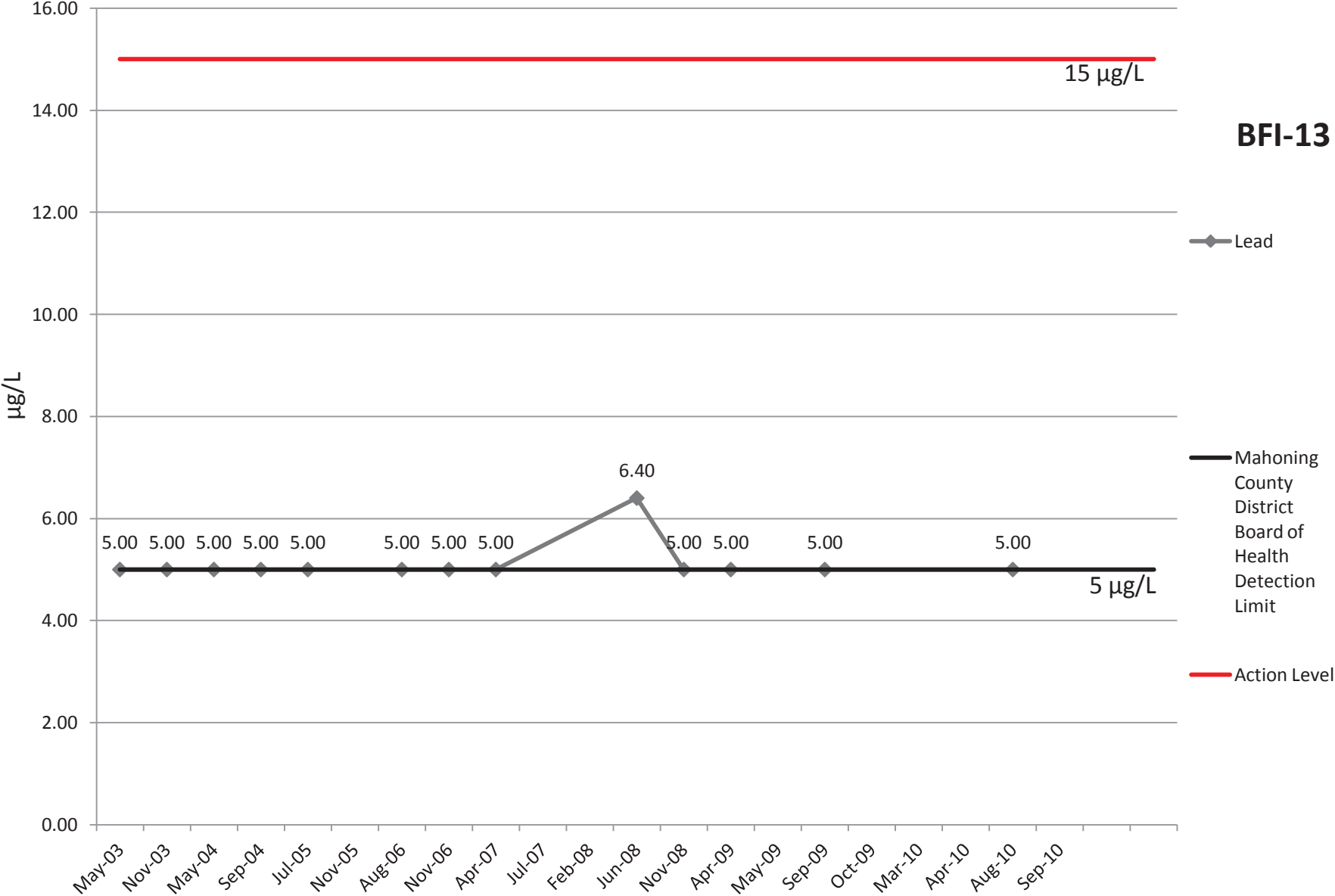
# Iron



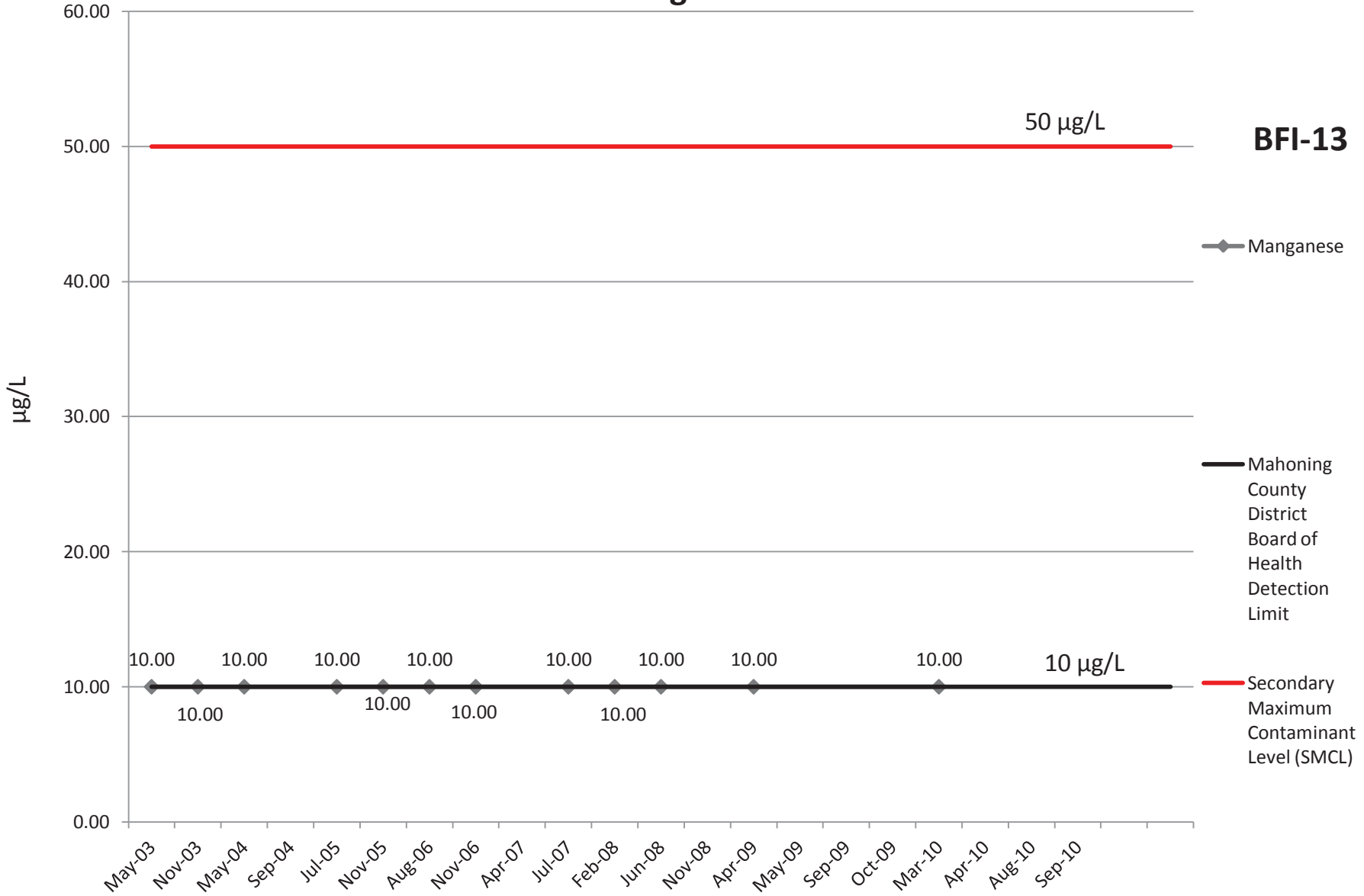


# Lead

**BFI-13**



# Manganese



**BFI-13**

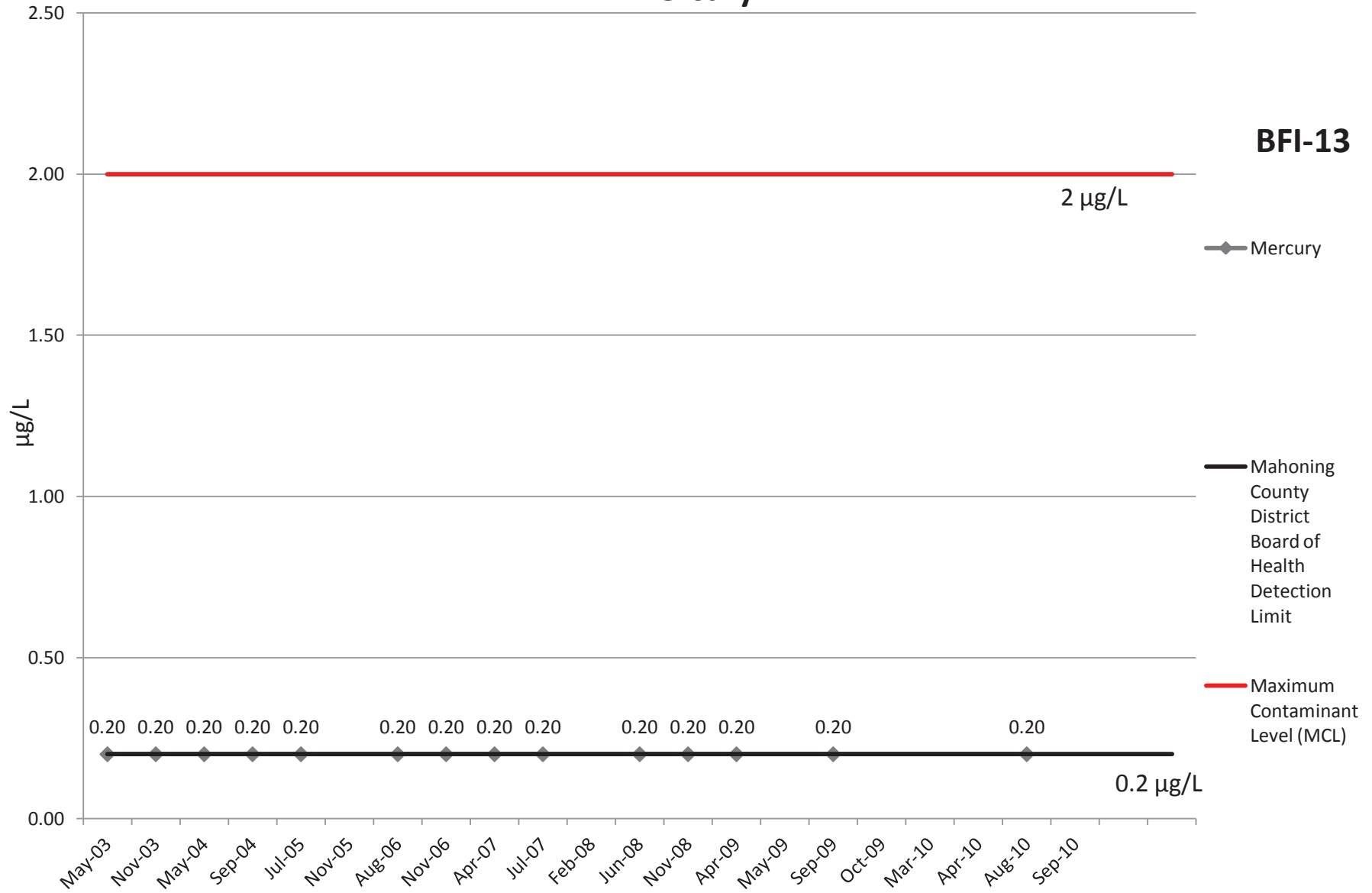
◆ Manganese

— Mahoning County District Board of Health Detection Limit

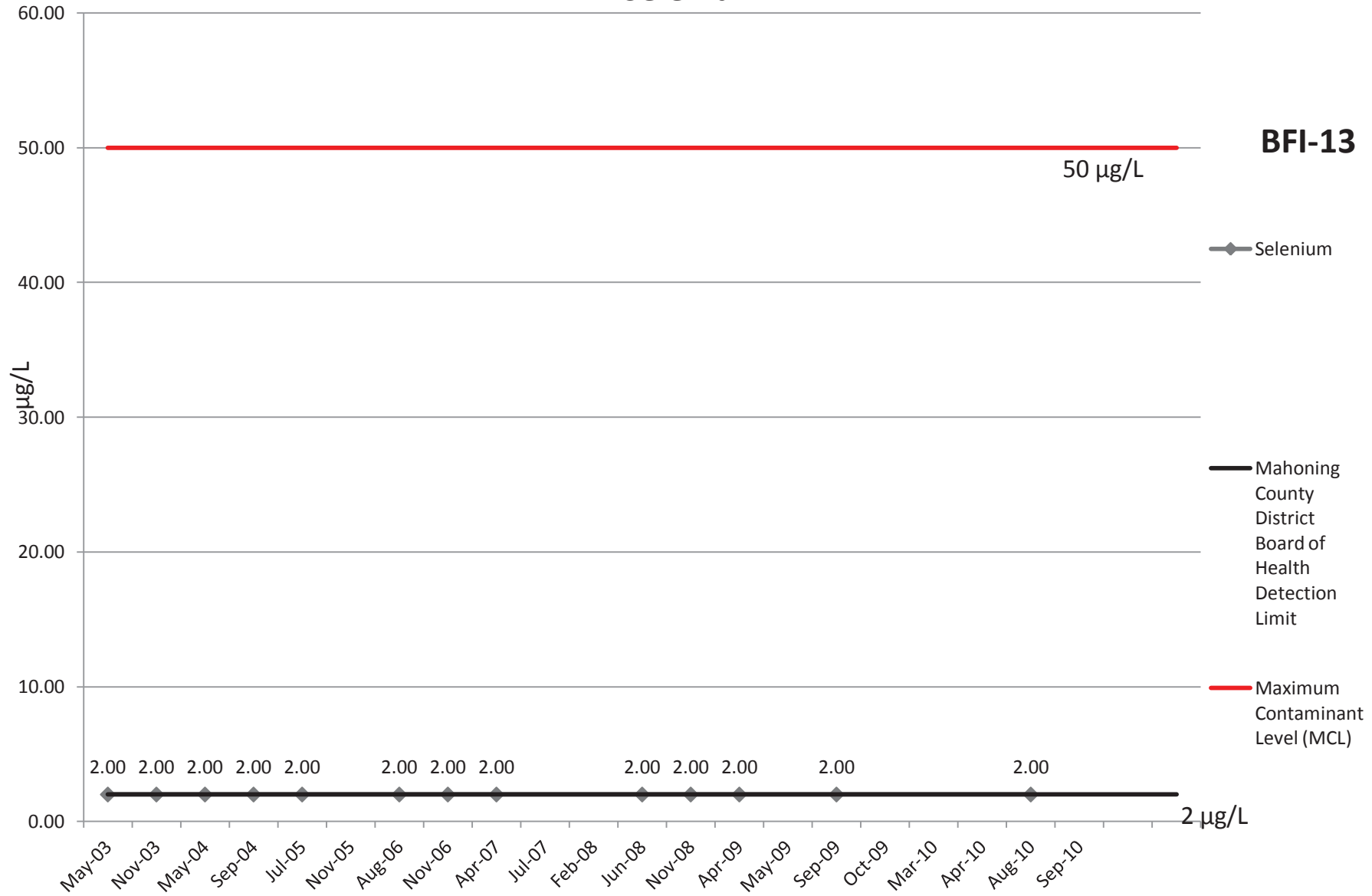
— Secondary Maximum Contaminant Level (SMCL)

# Mercury

**BFI-13**

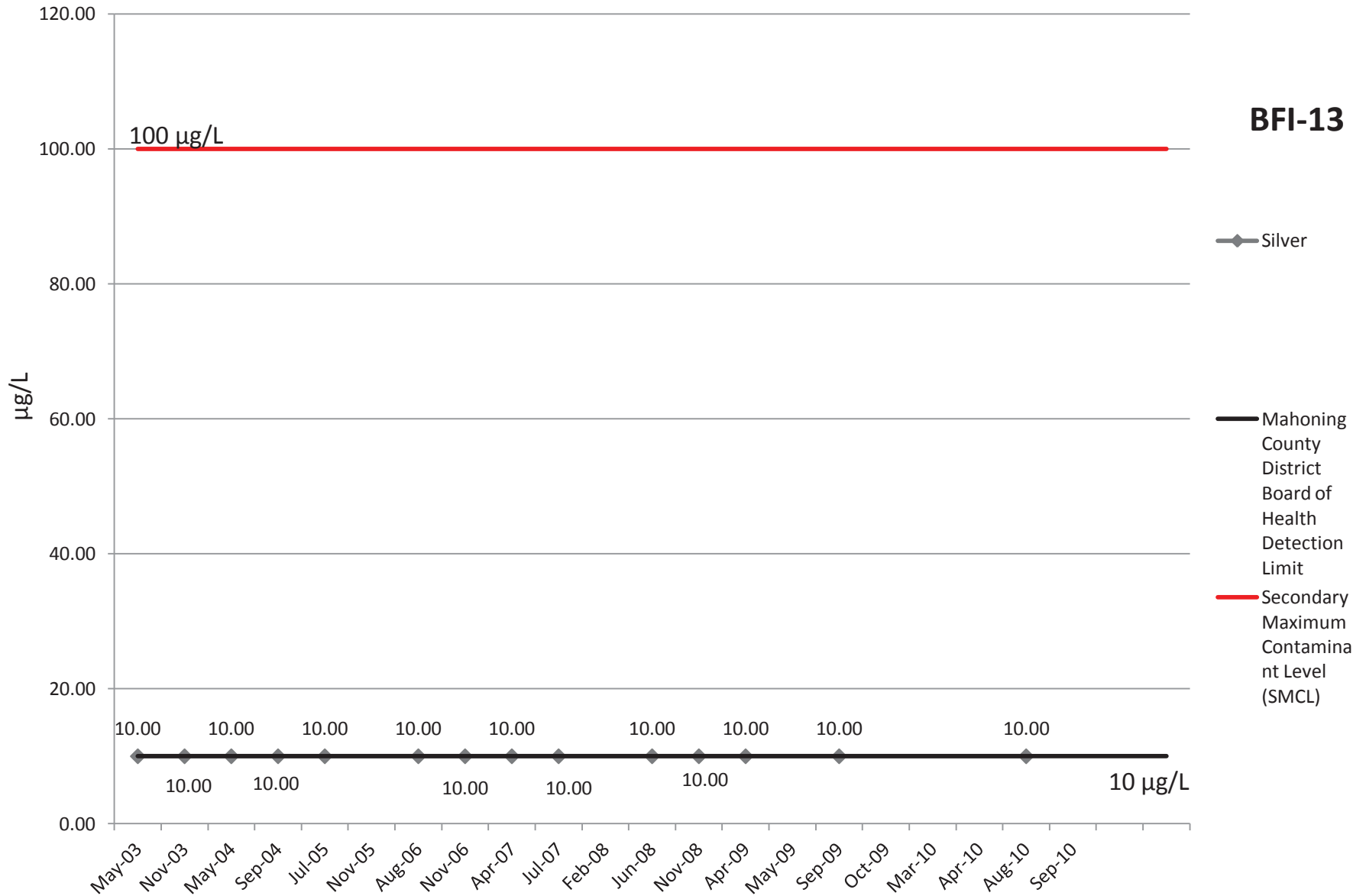


# Selenium



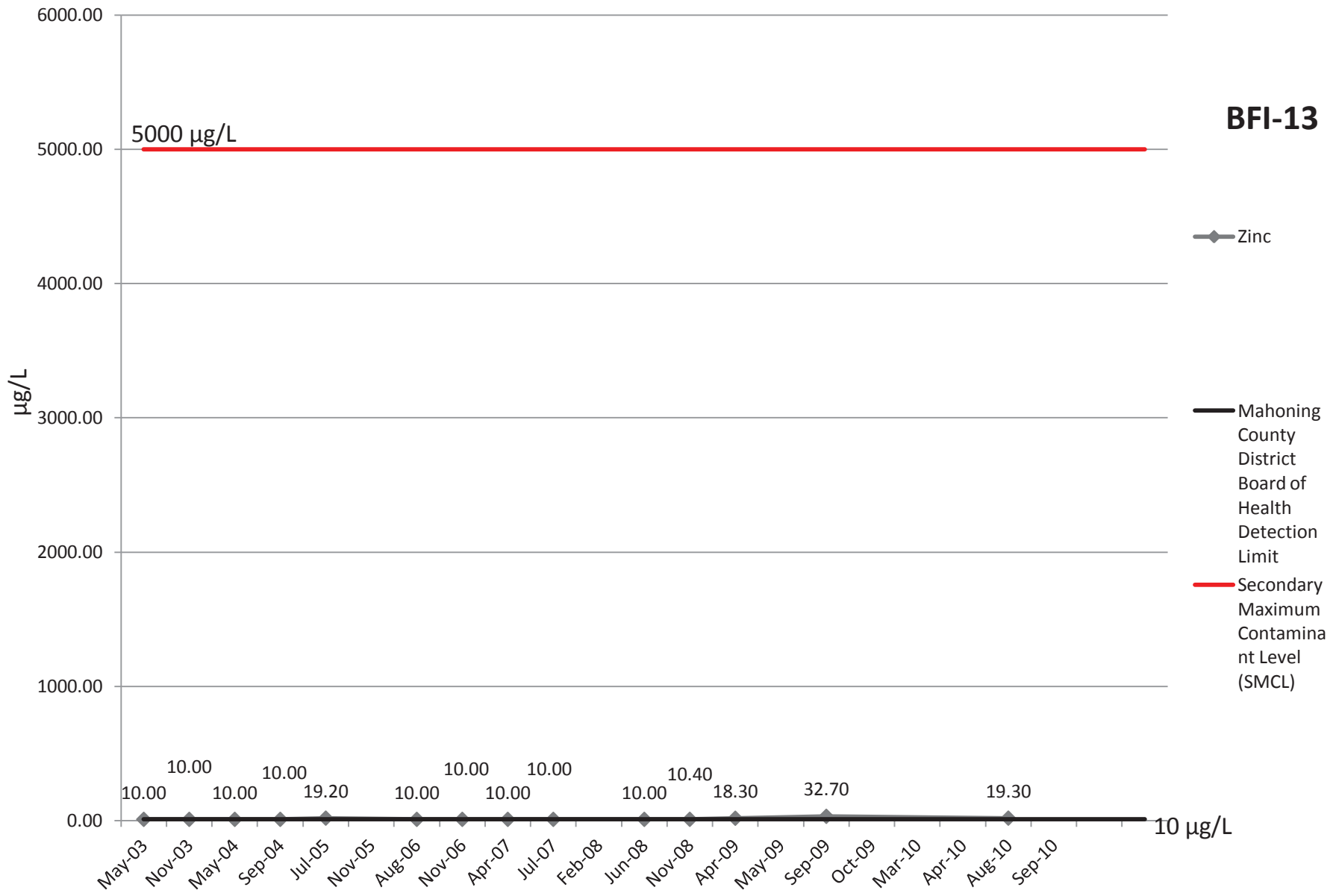
# Silver

**BFI-13**

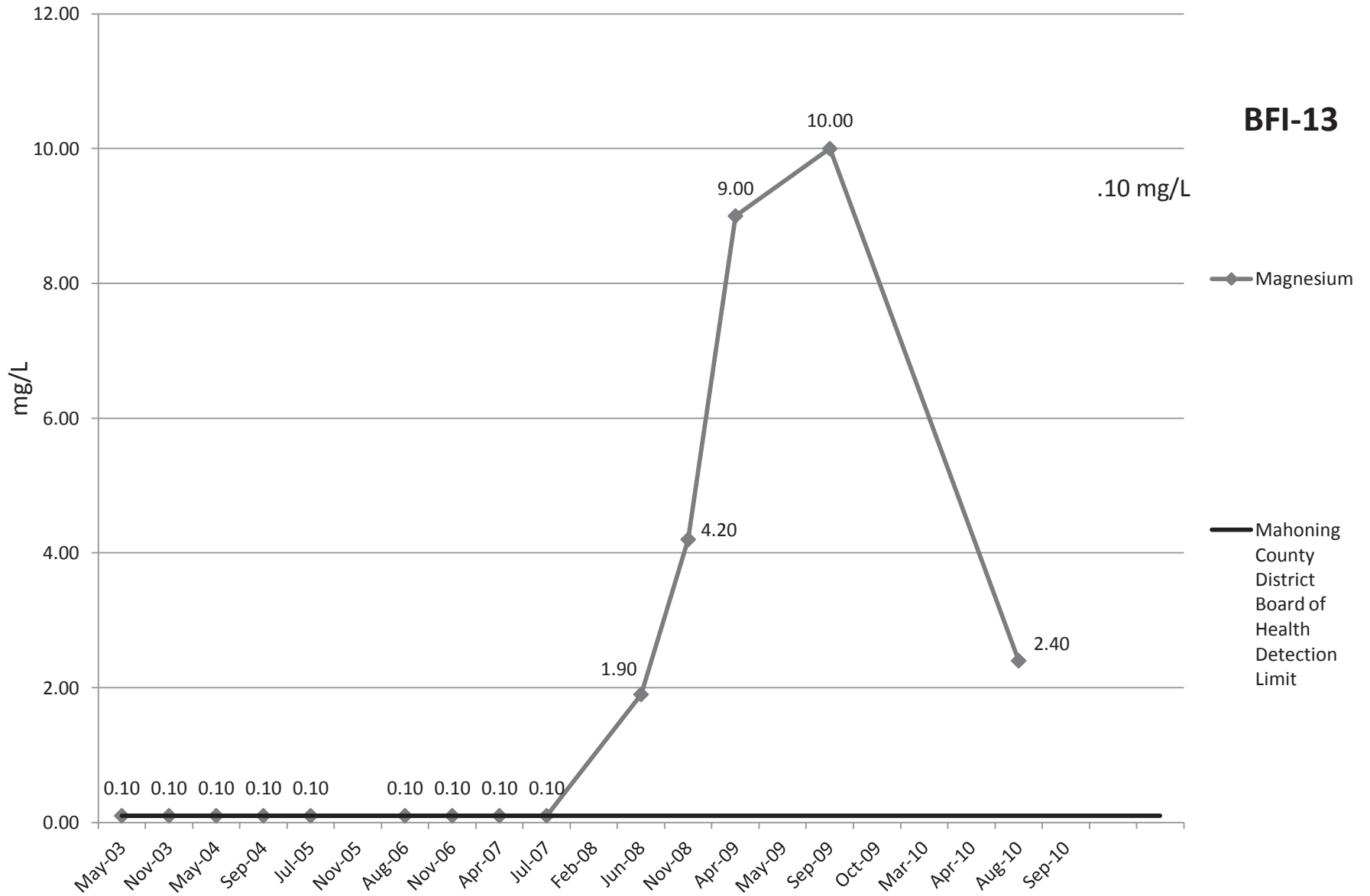


# Zinc

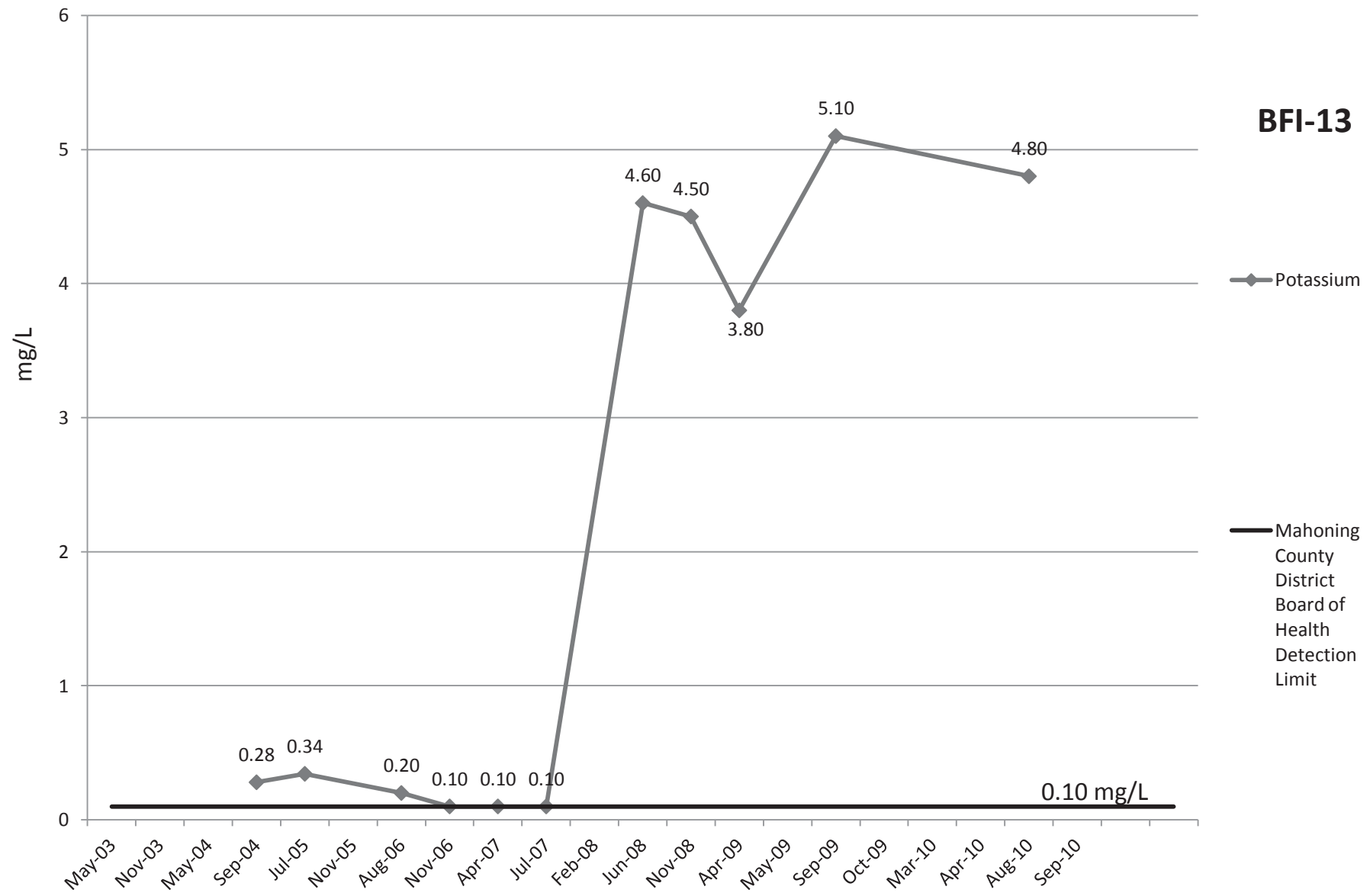
**BFI-13**



# Magnesium



# Potassium



**BFI-13**

◆ Potassium

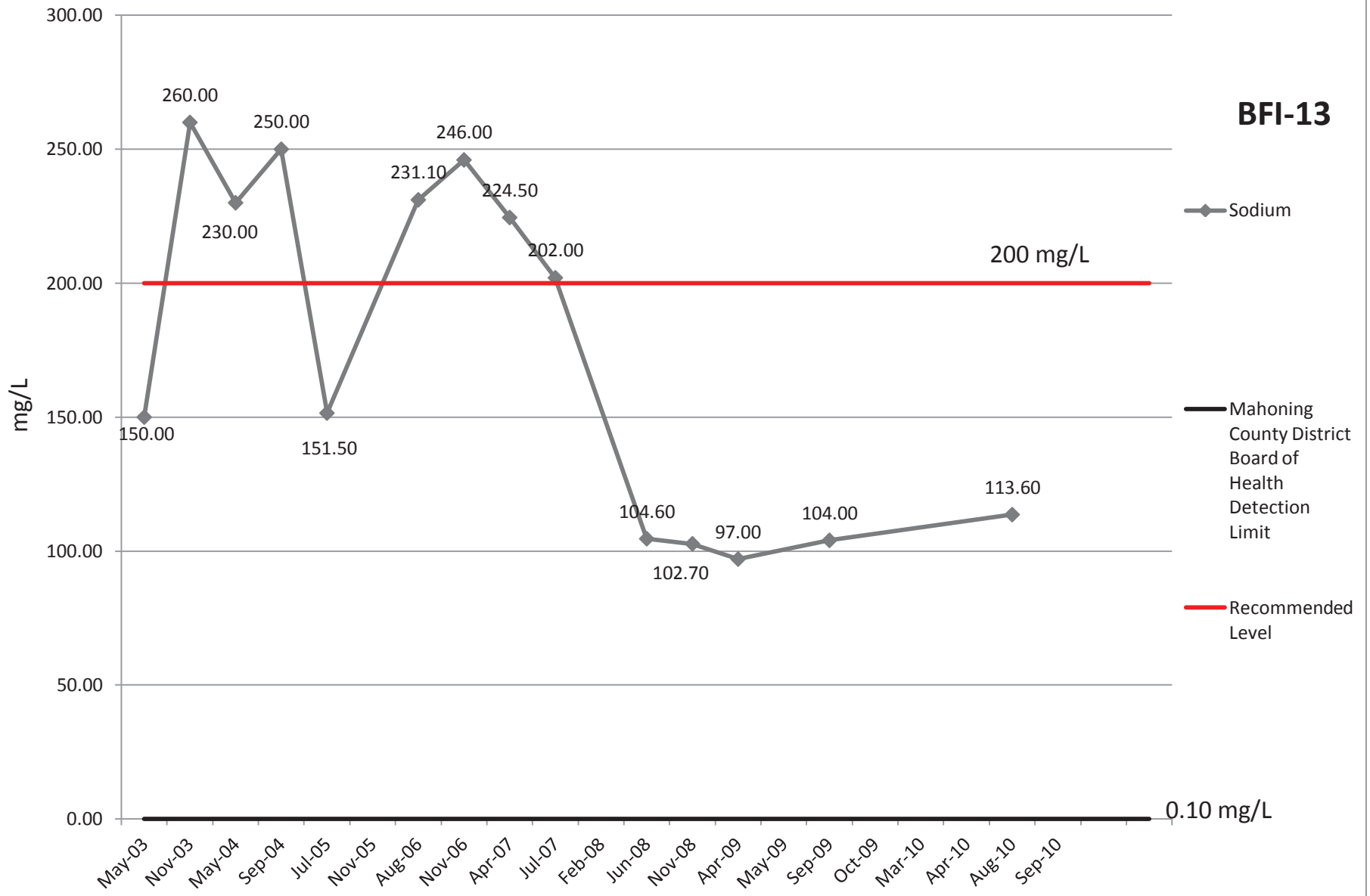
— Mahoning County District Board of Health Detection Limit

0.10 mg/L

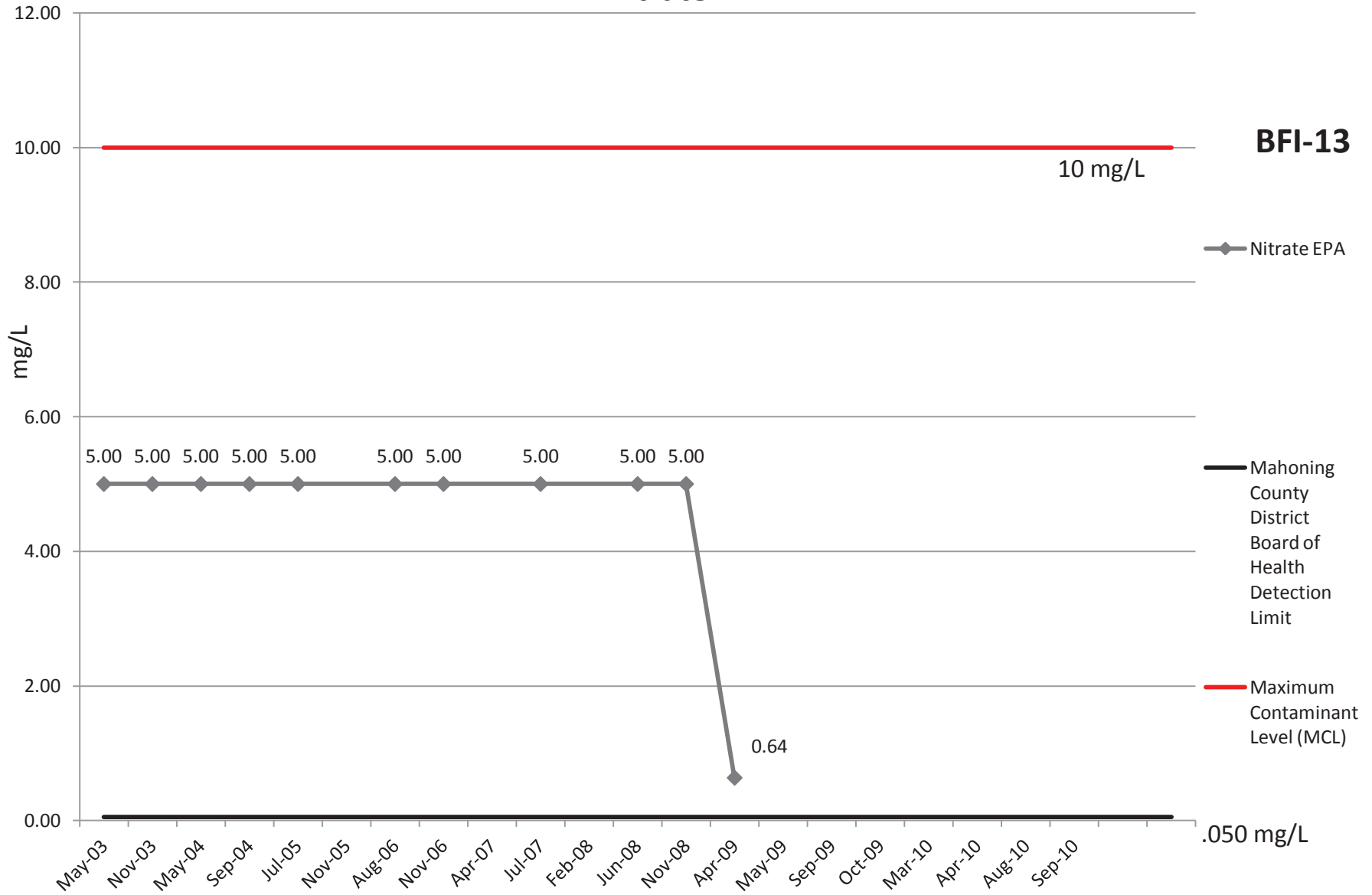


# Sodium

**BFI-13**

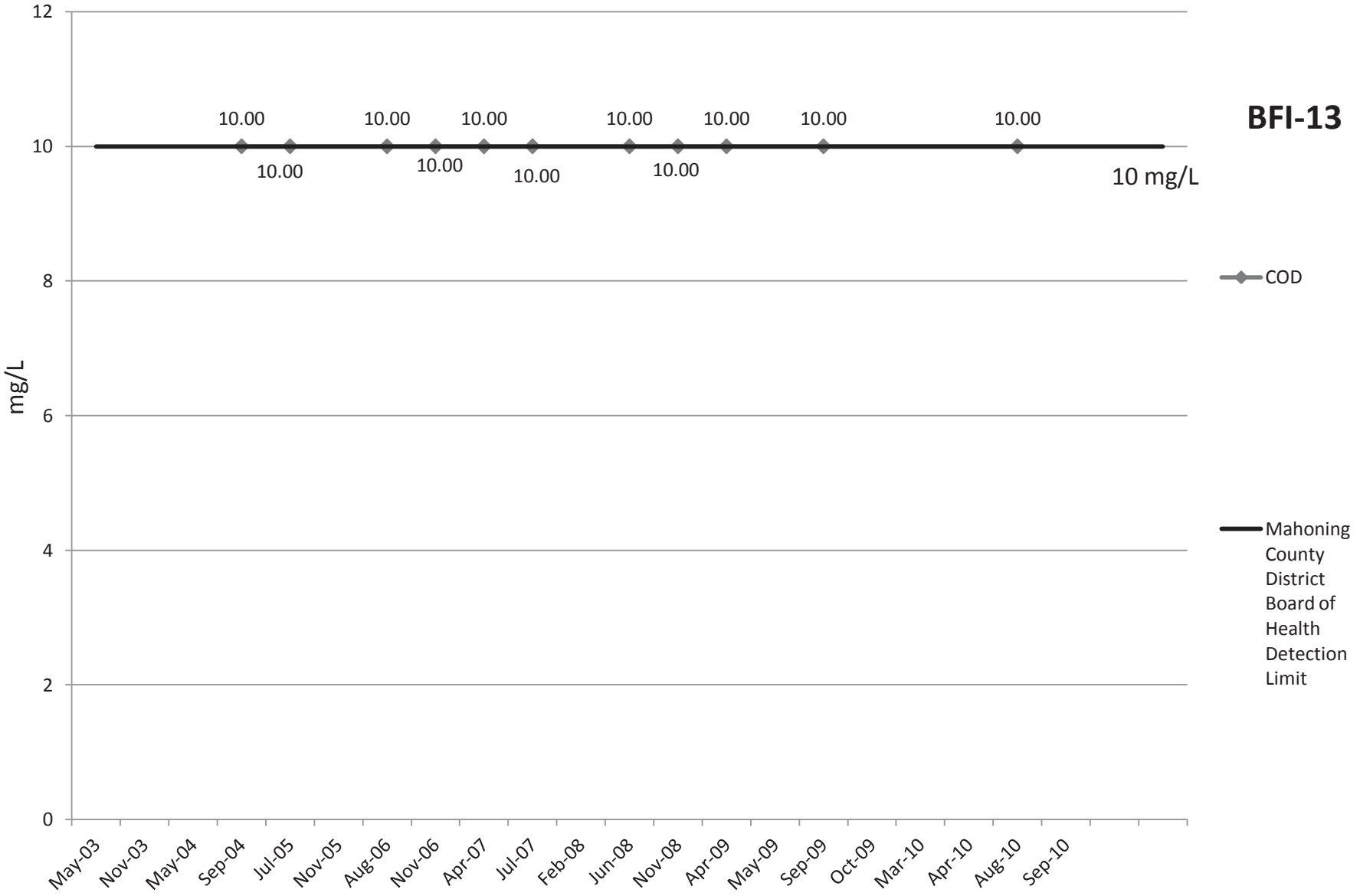


# Nitrate EPA



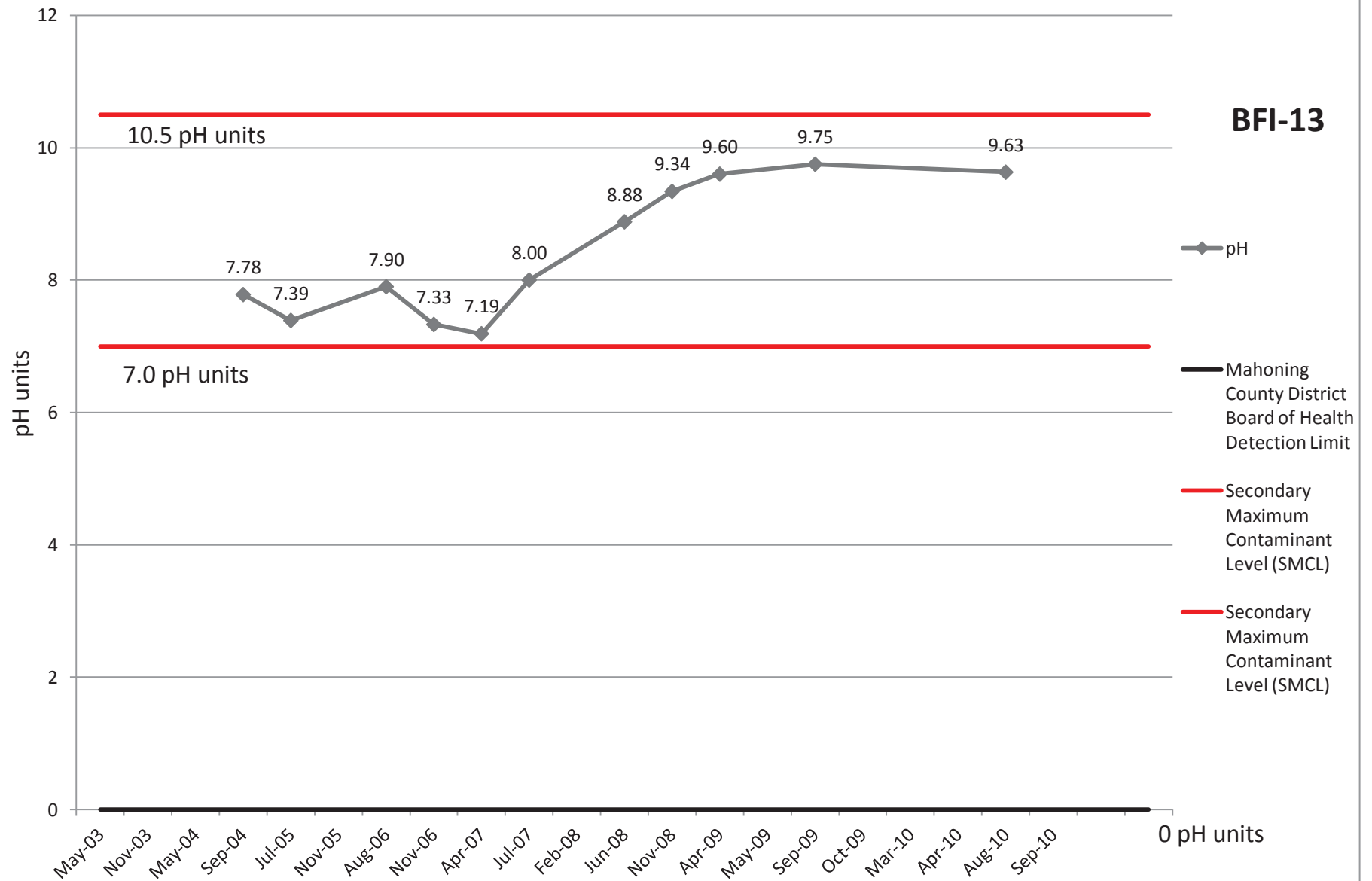
# COD

**BFI-13**



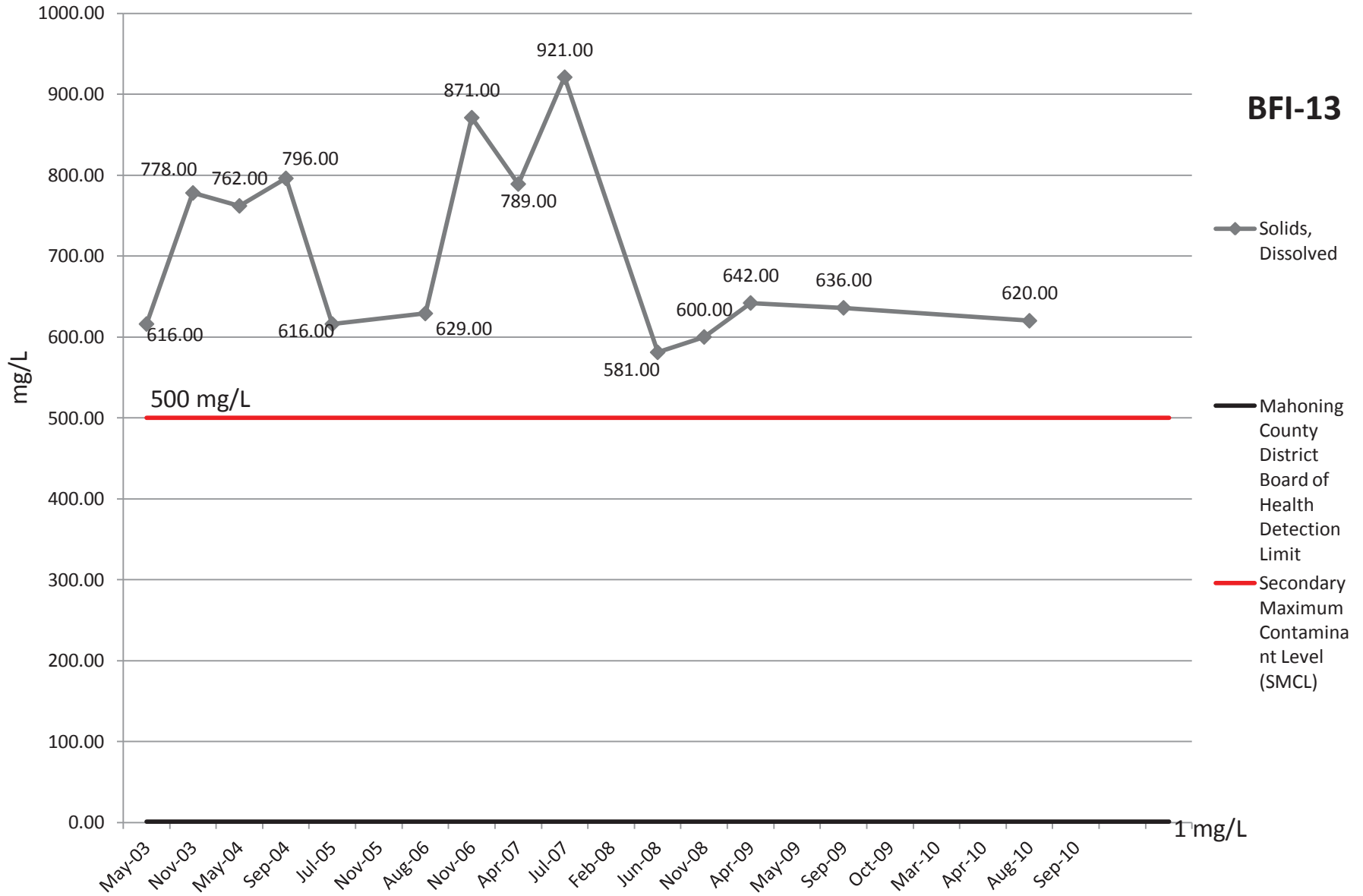
# pH

**BFI-13**



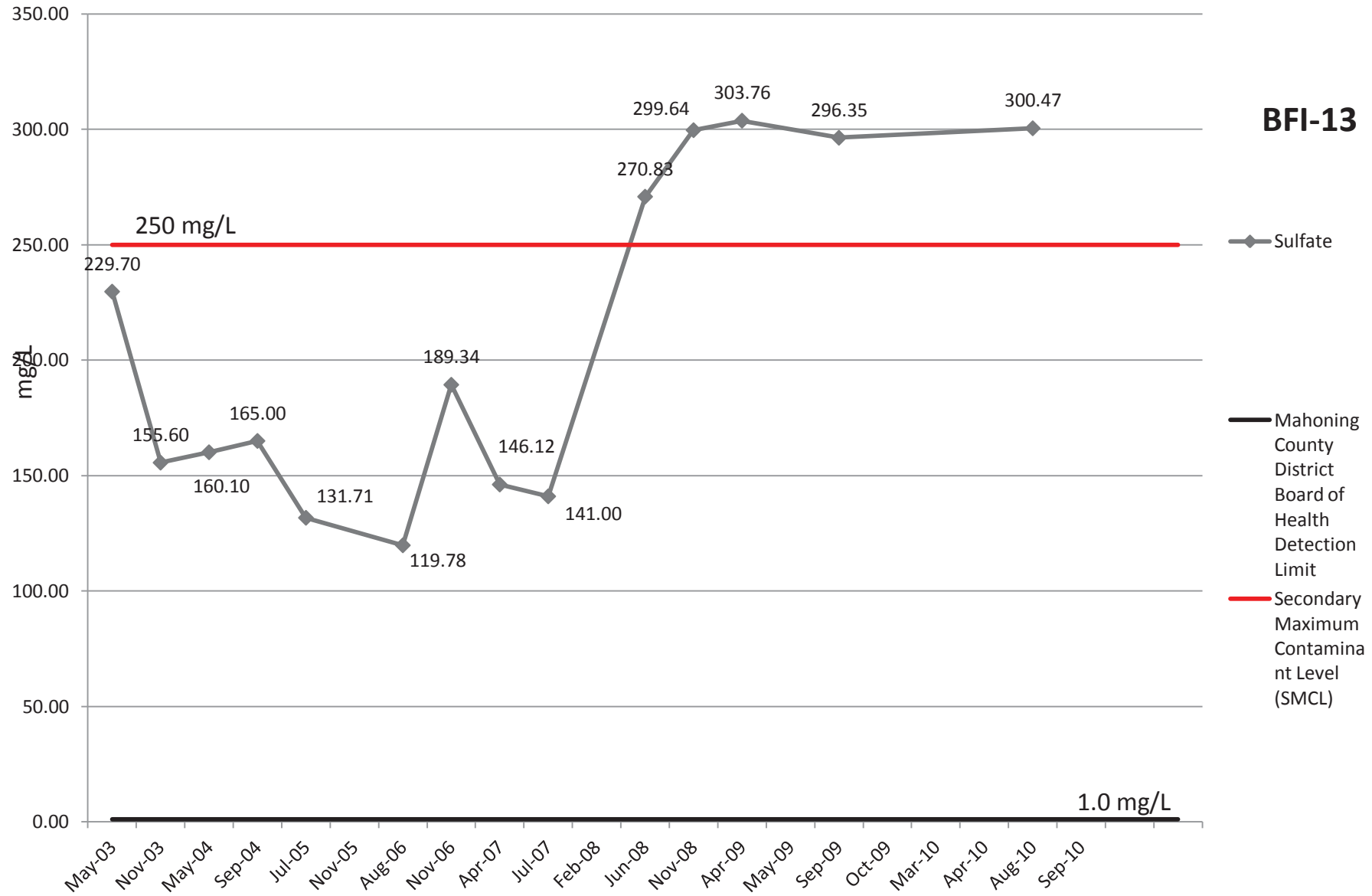
# Solids, Dissolved

**BFI-13**



# Sulfate

**BFI-13**



# Bacteria

positive (1)

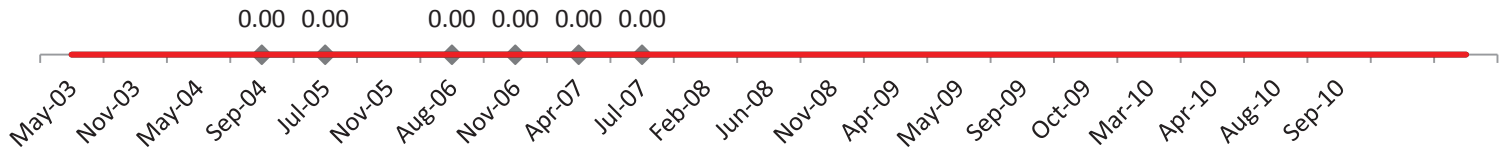
**BFI-13**

Positive/Negative

◆ Bacteria

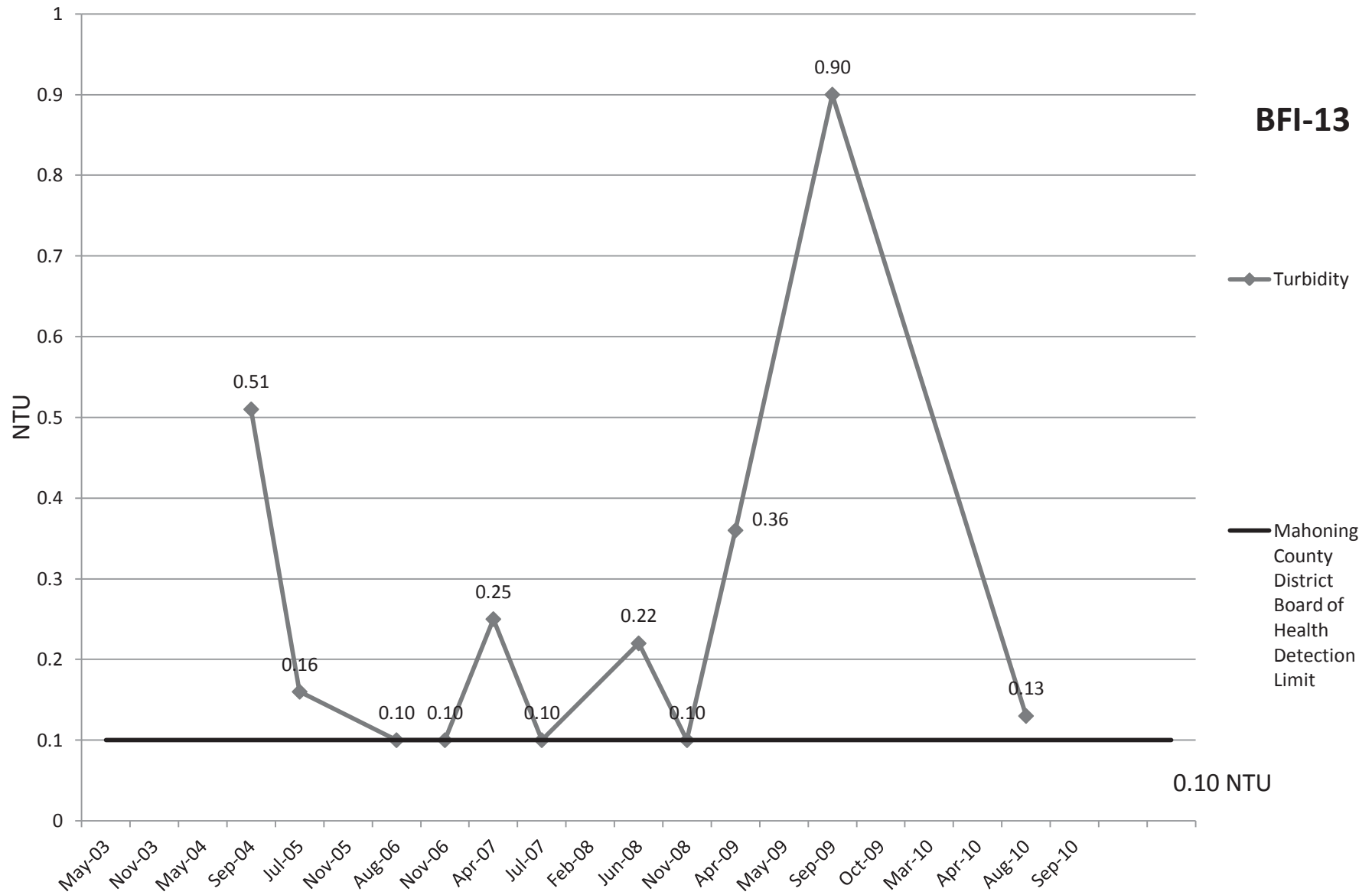
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)



negative (0)

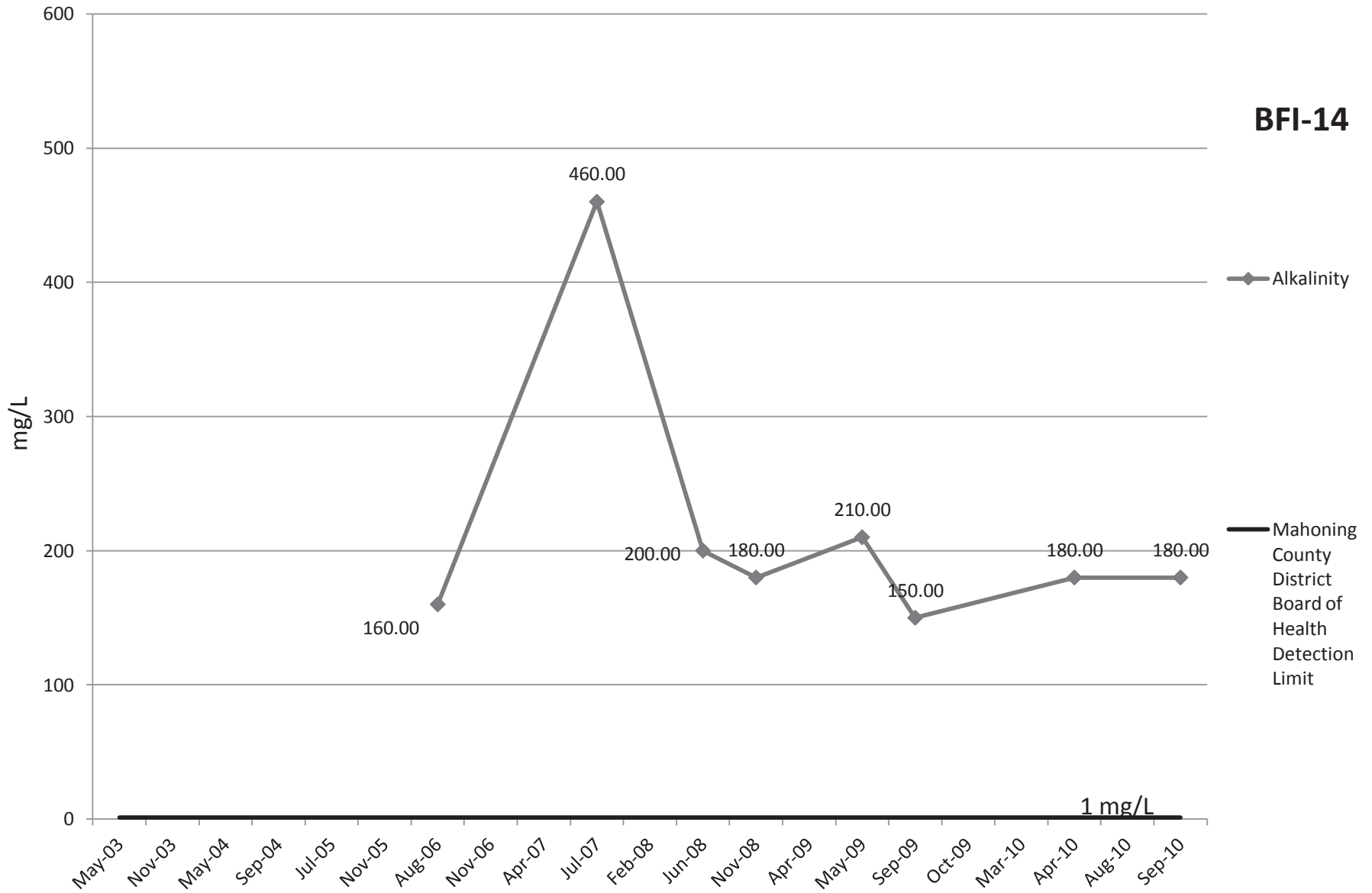
# Turbidity





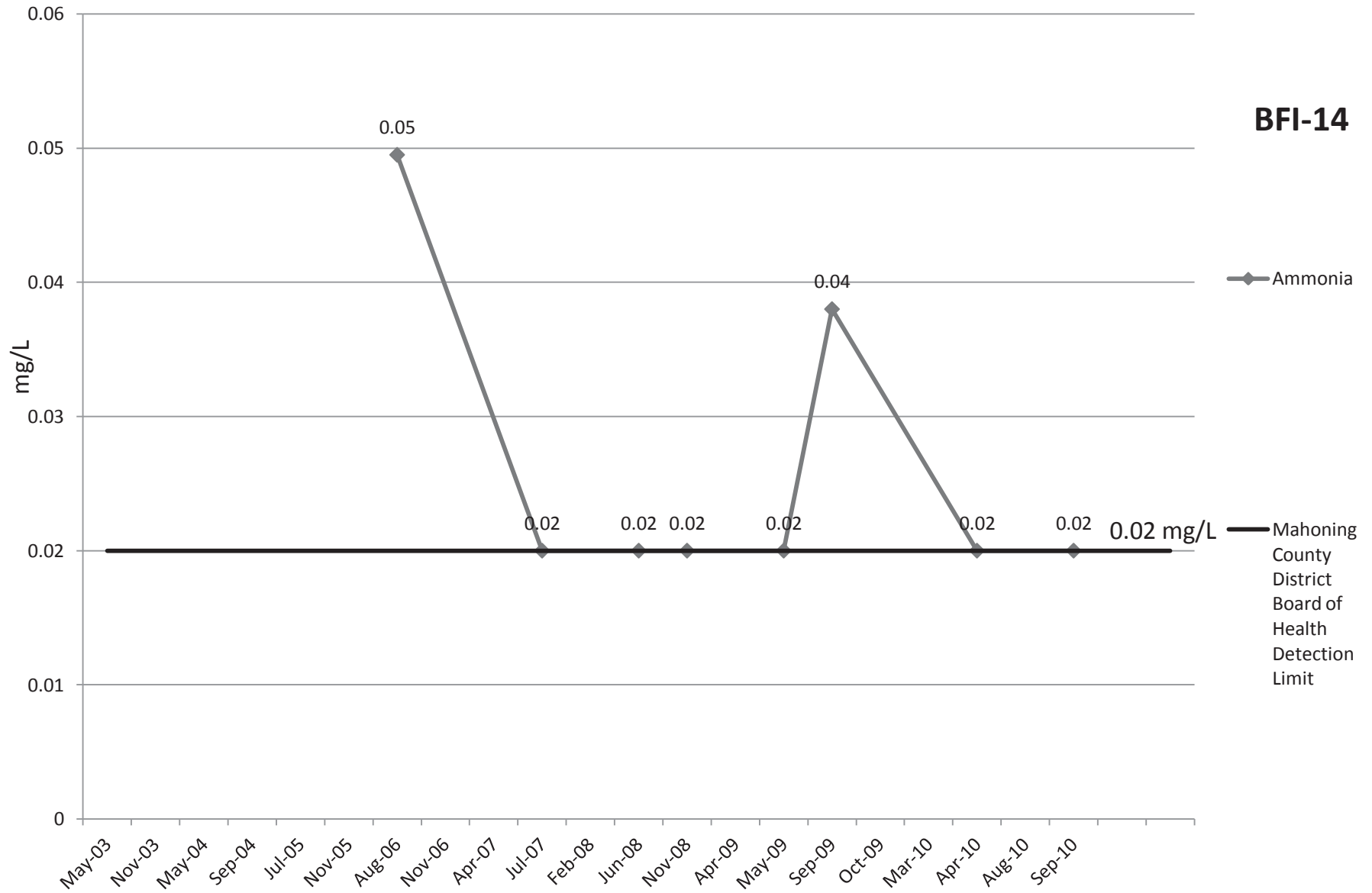
# Alkalinity

**BFI-14**

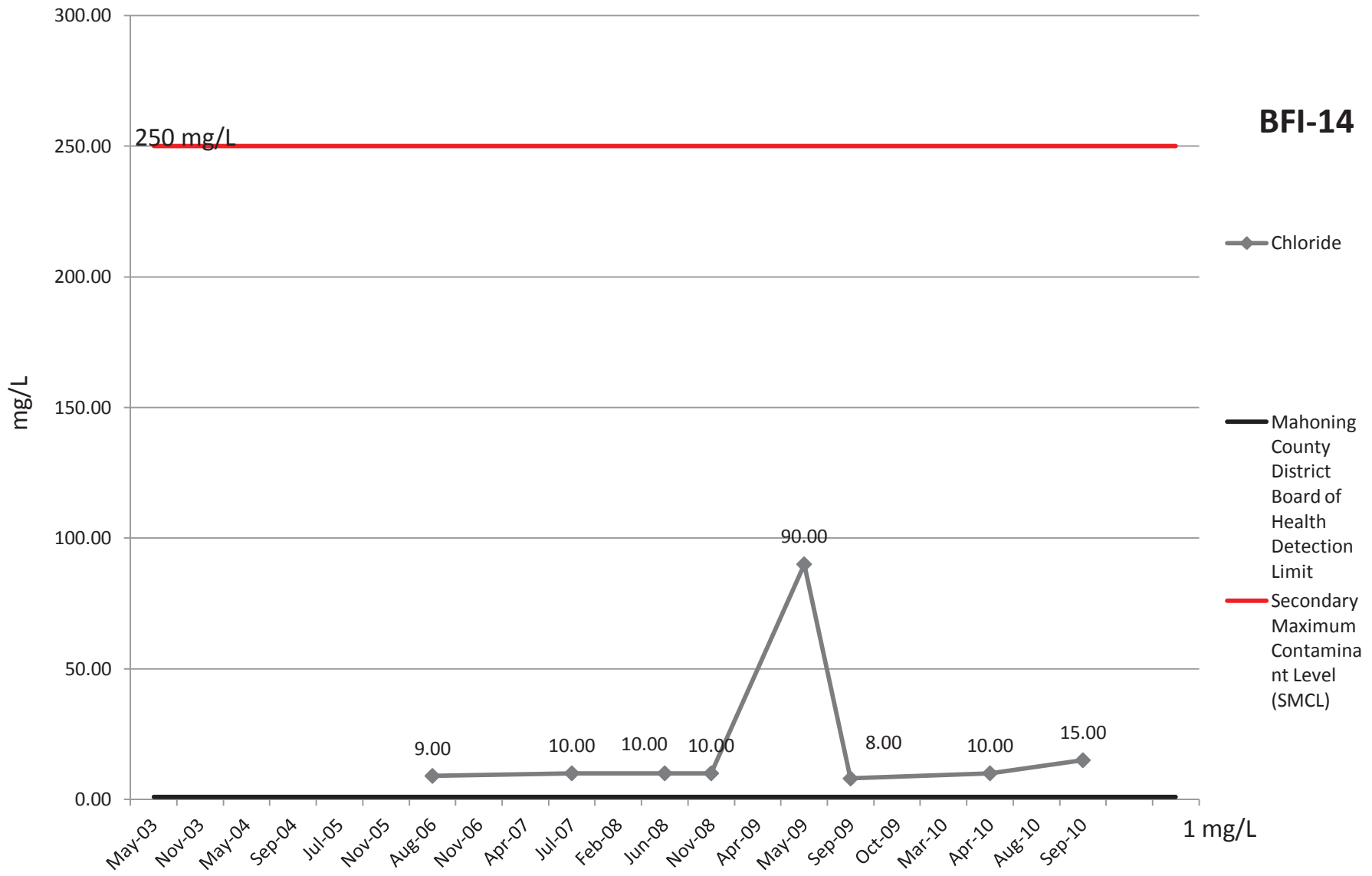


# Ammonia

**BFI-14**

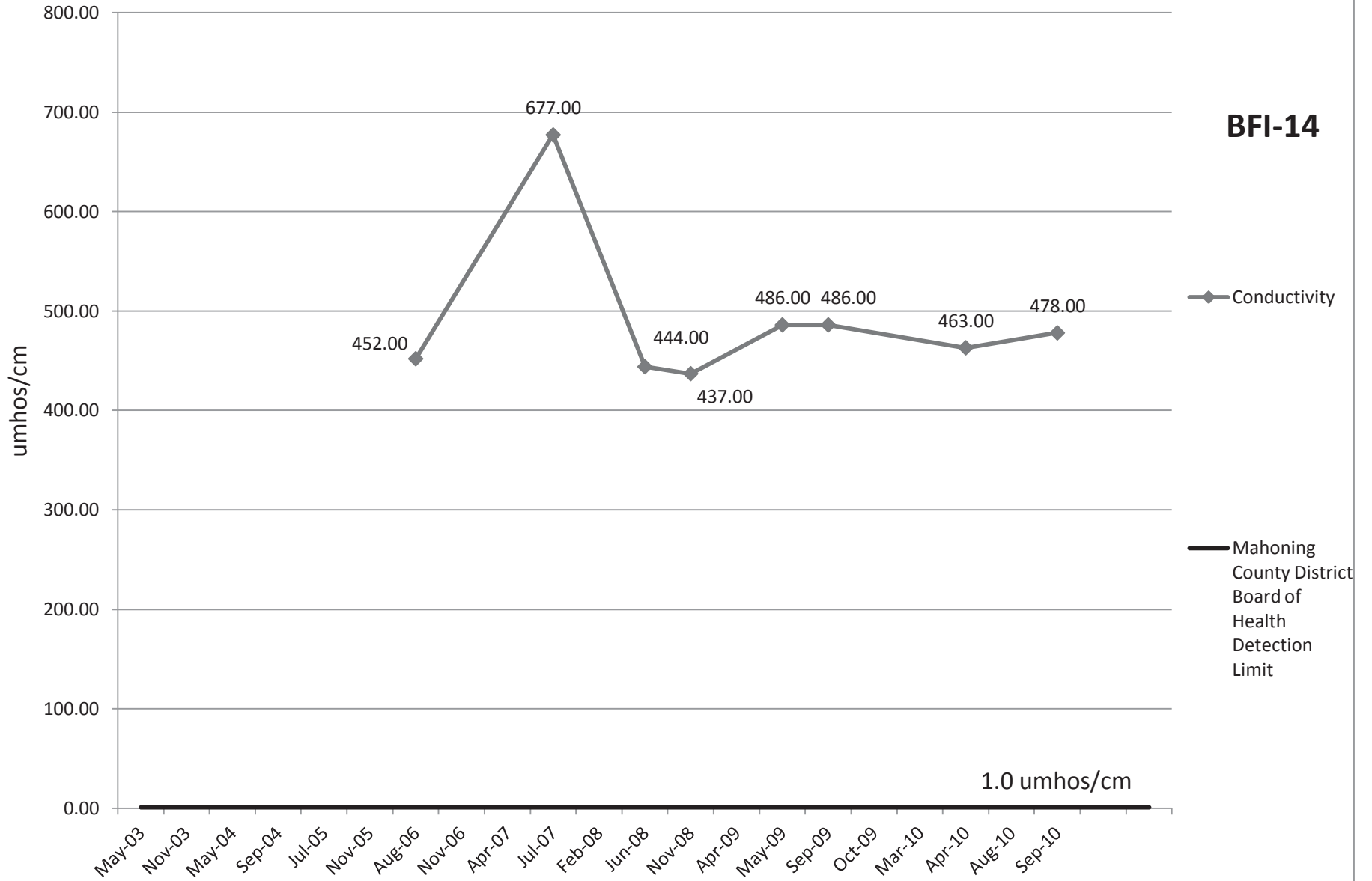


# Chloride

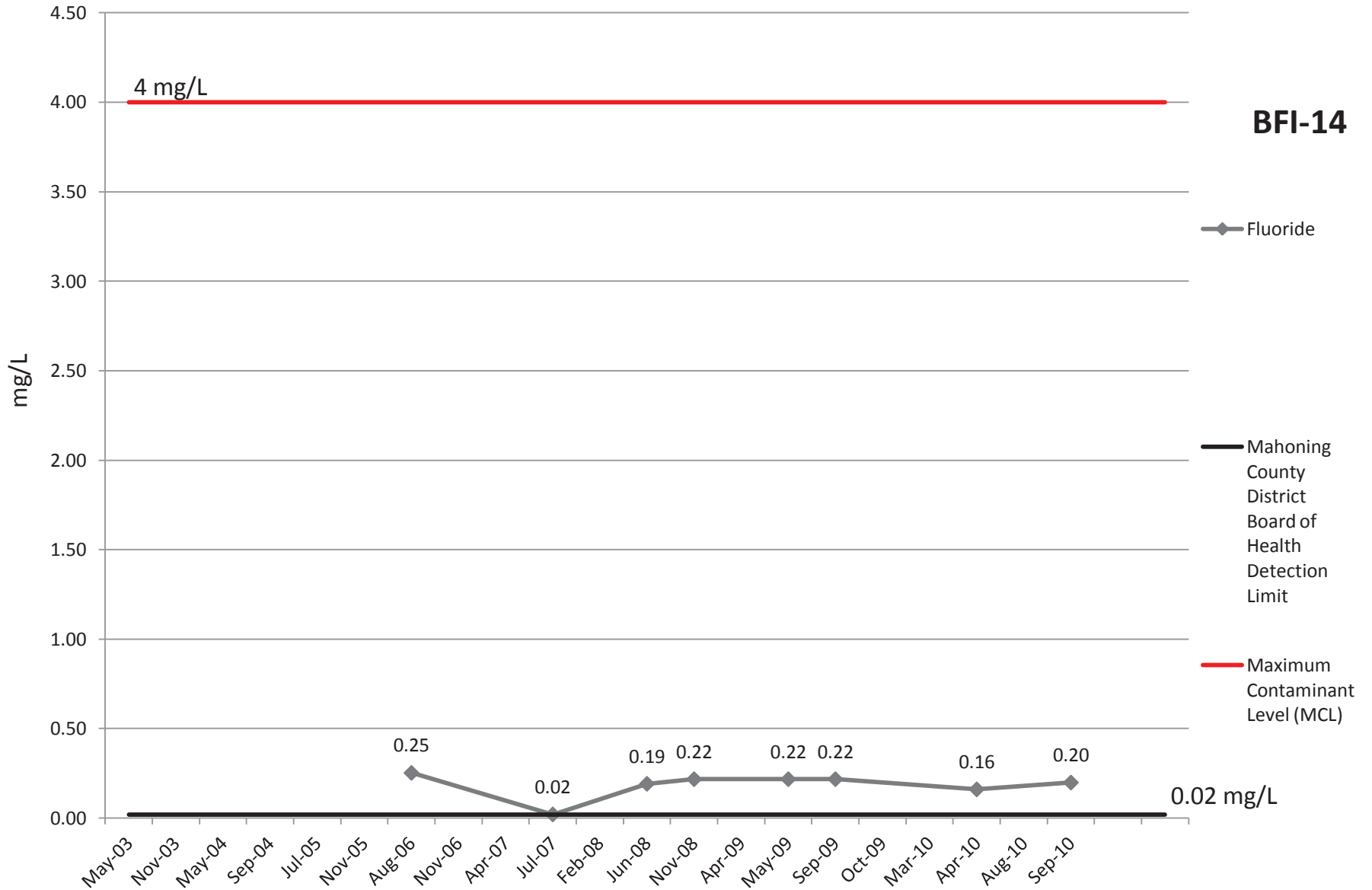


# Conductivity

**BFI-14**

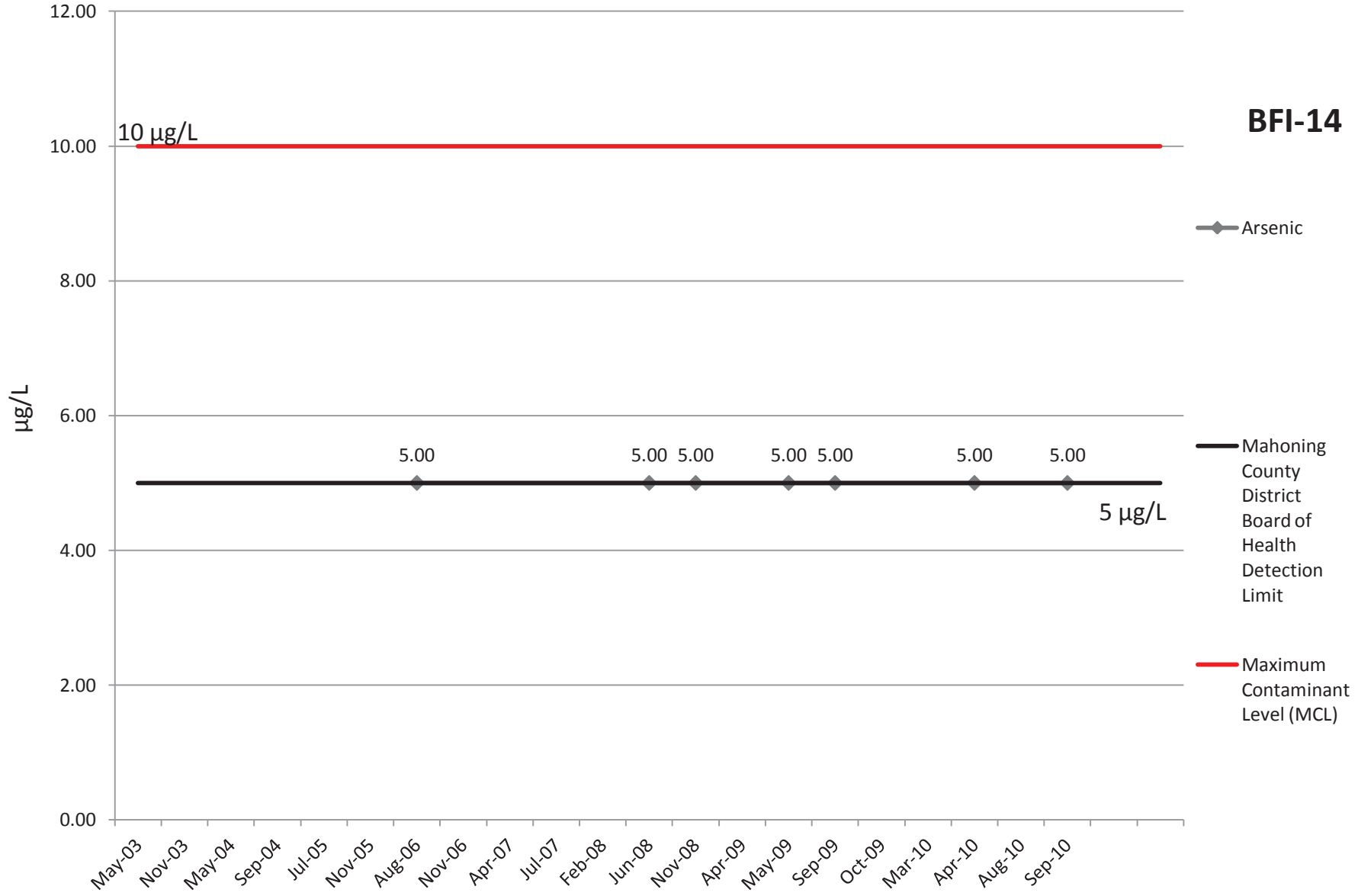


# Fluoride



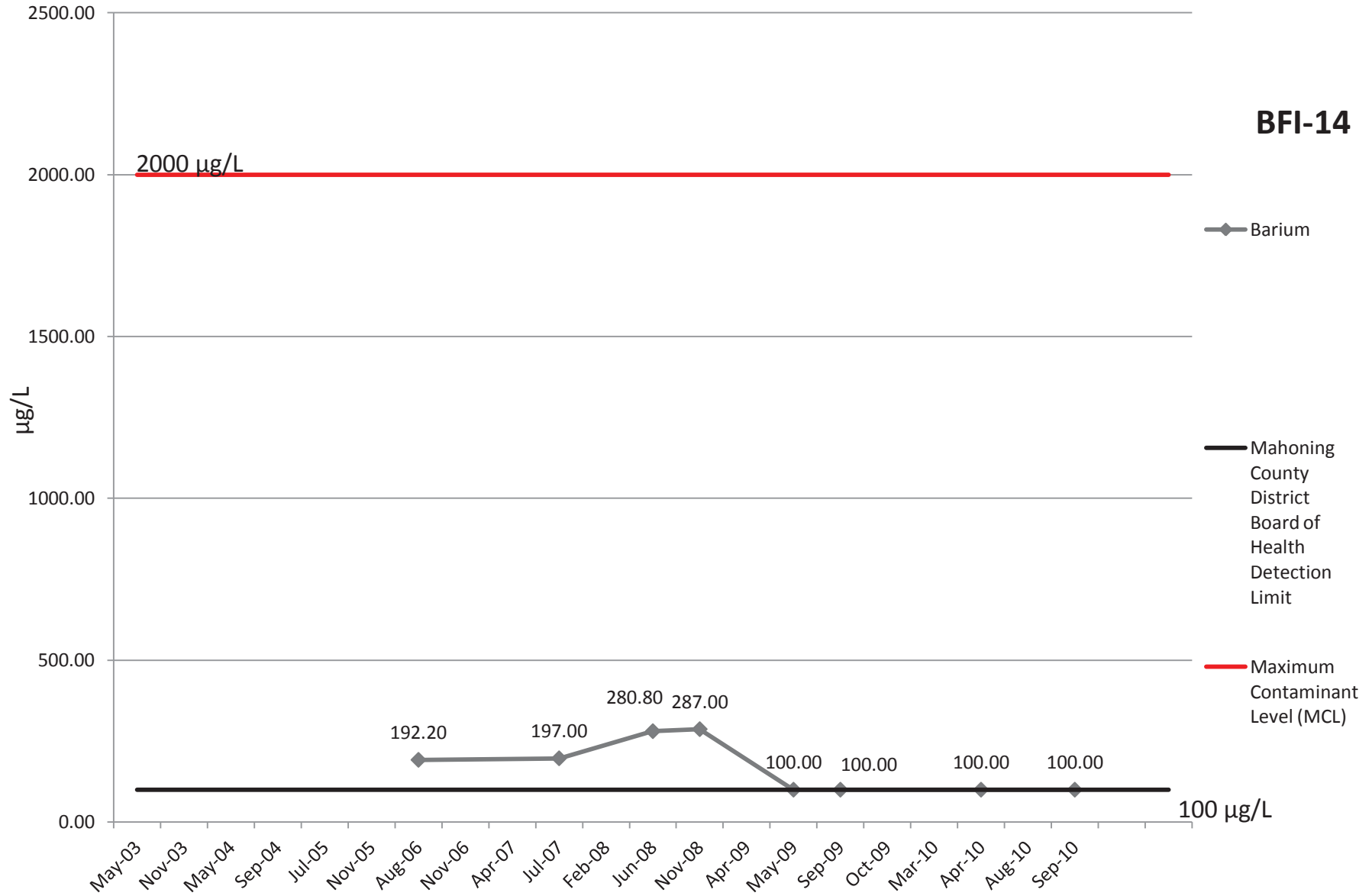
# Arsenic

**BFI-14**

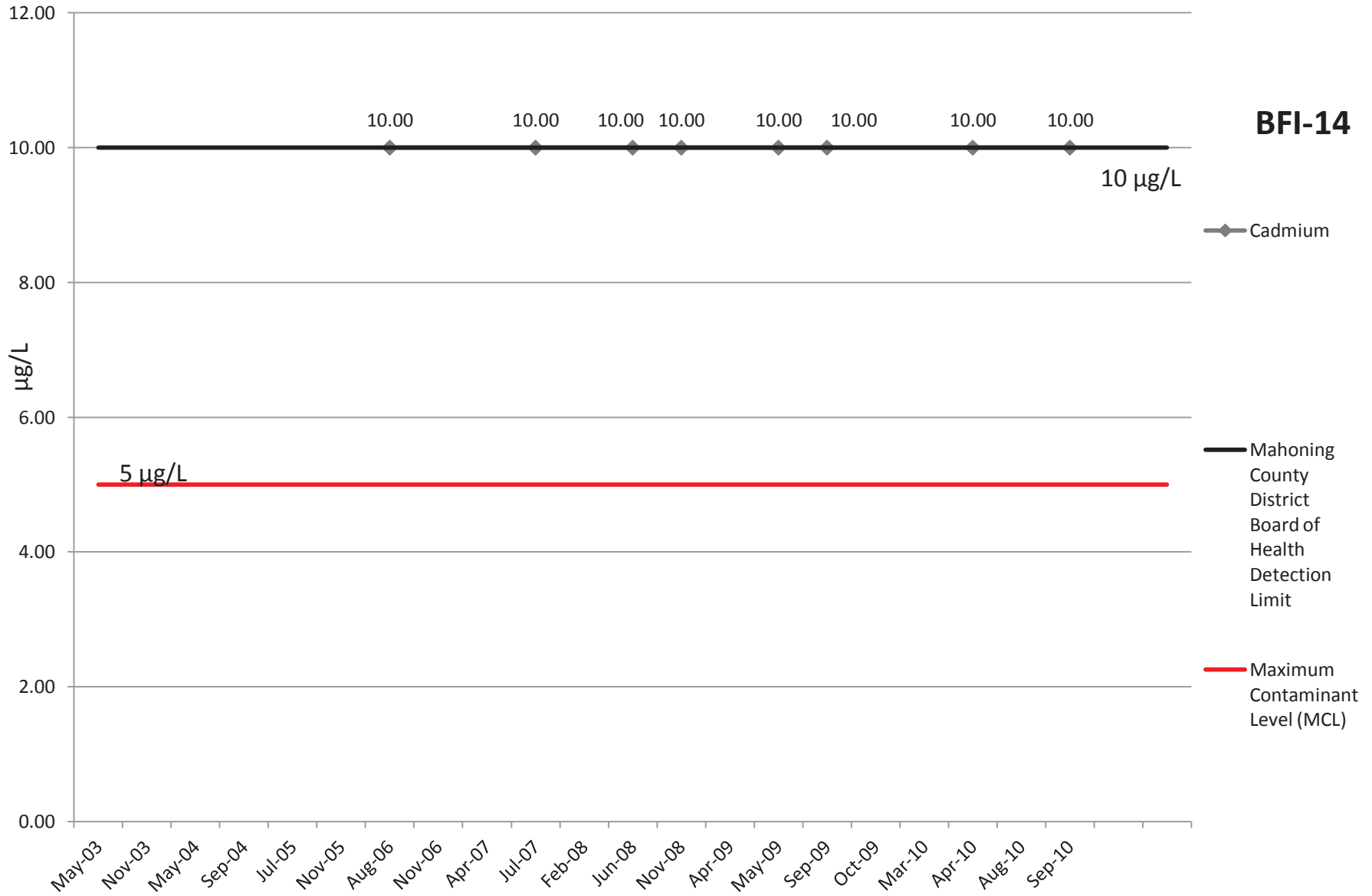


# Barium

**BFI-14**



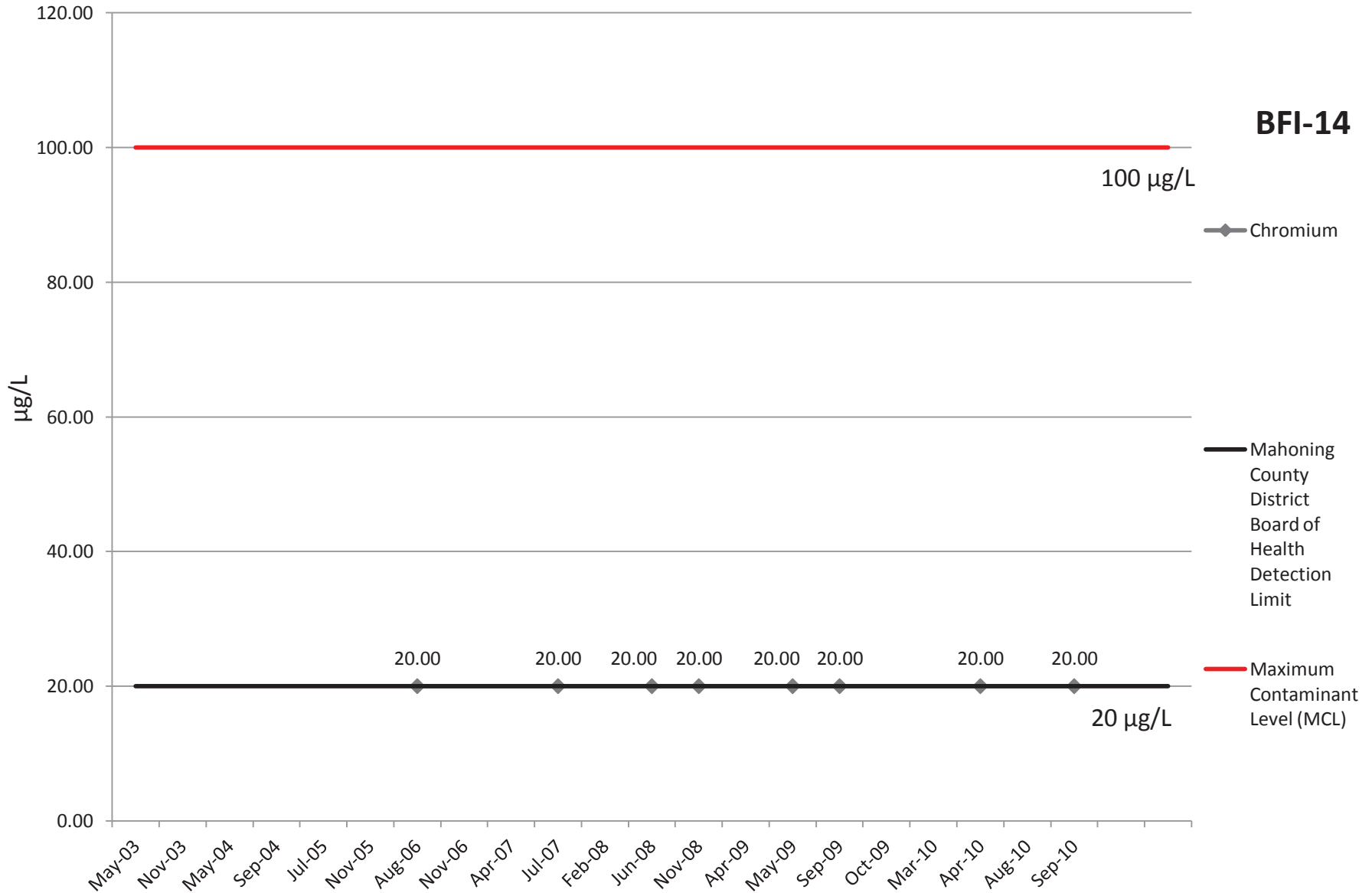
# Cadmium



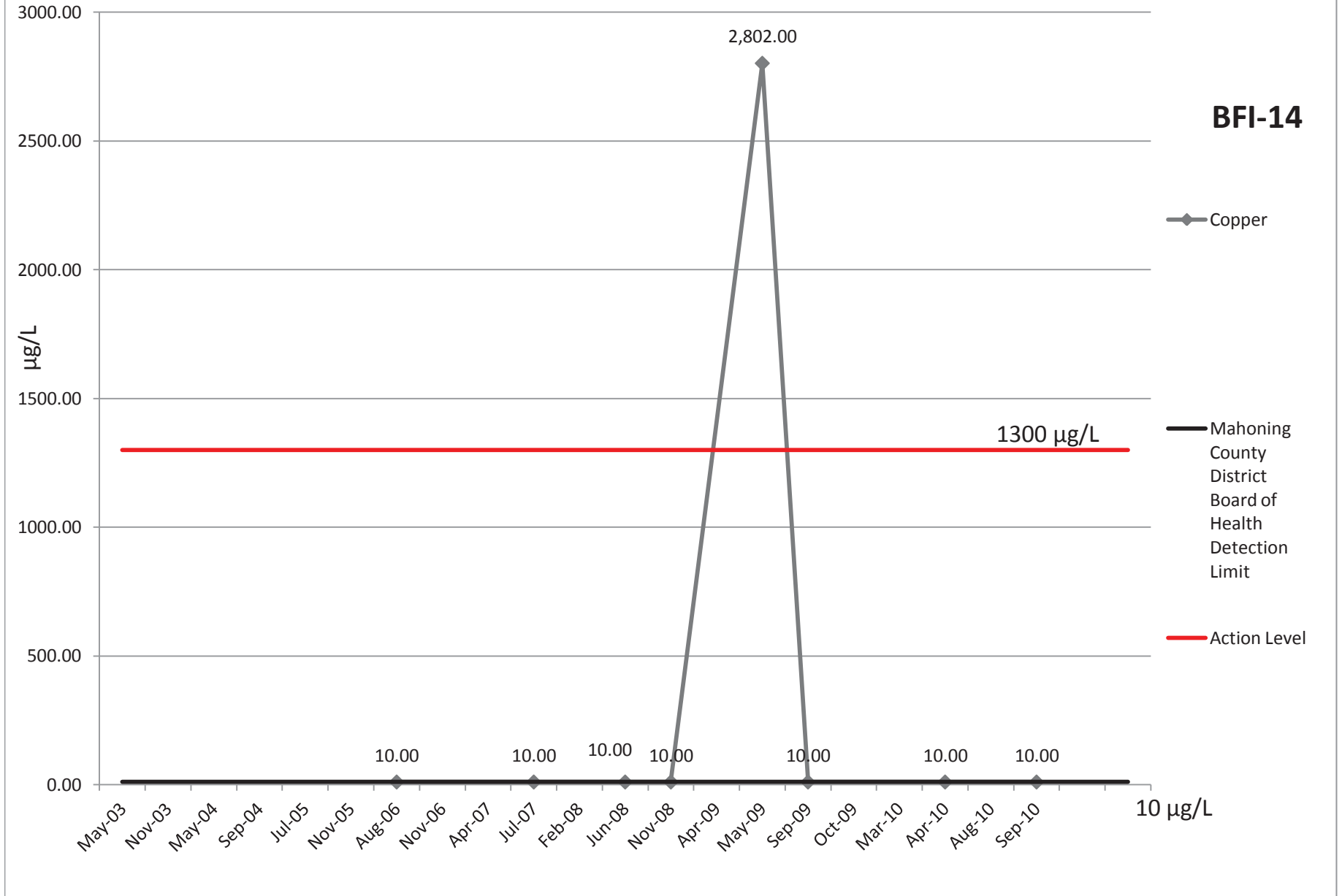


# Chromium

**BFI-14**

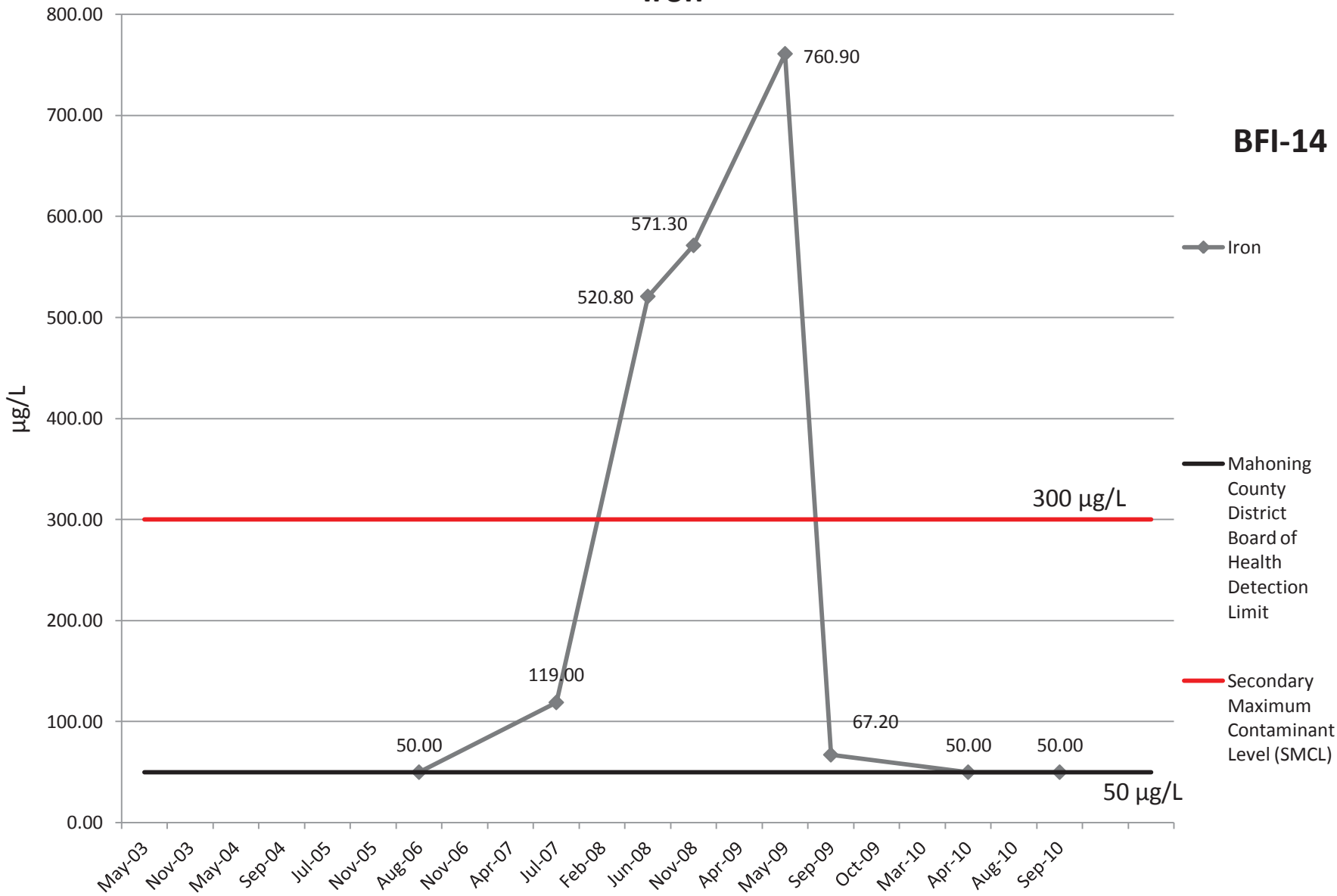


# Copper

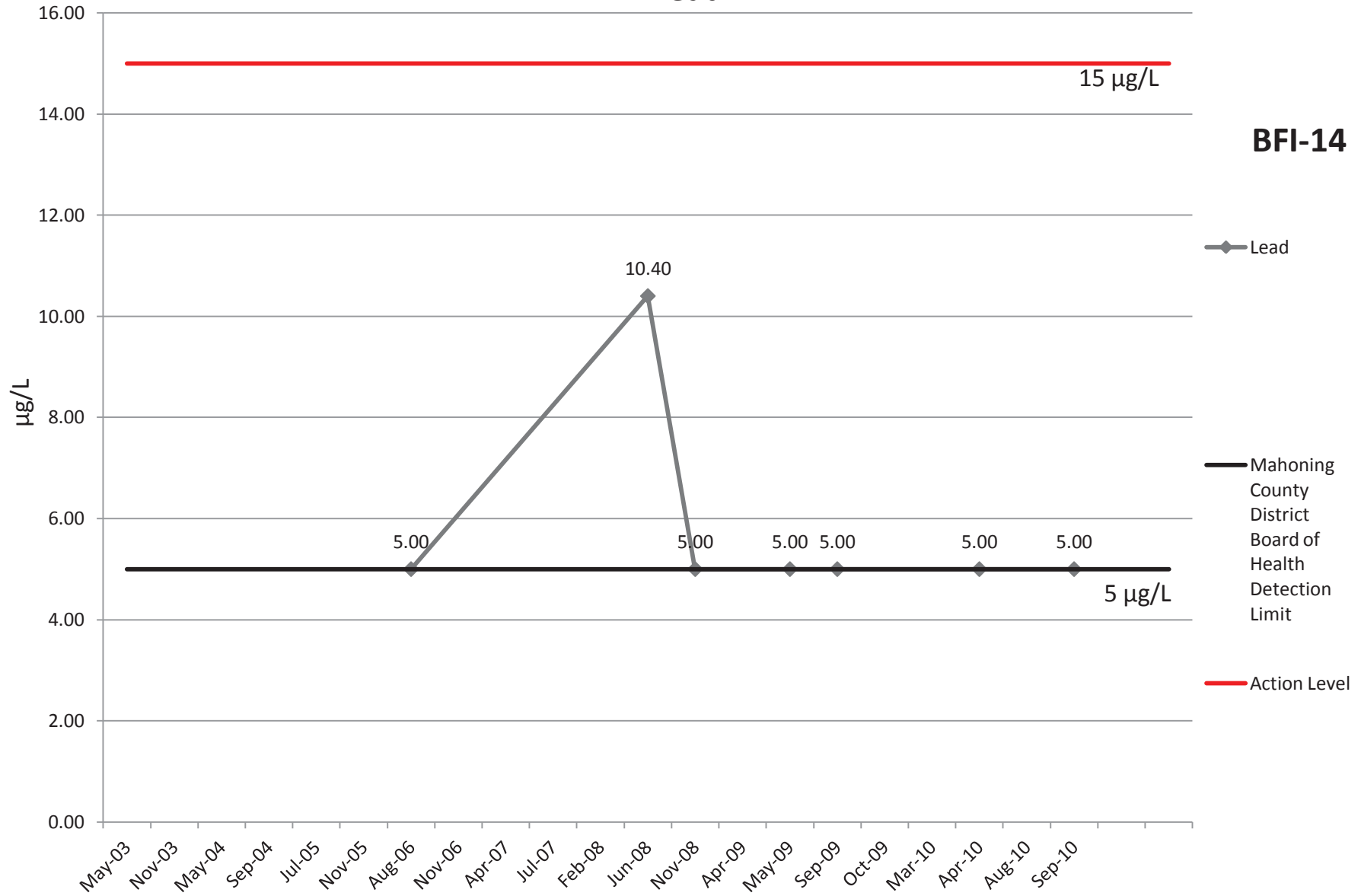


# Iron

**BFI-14**

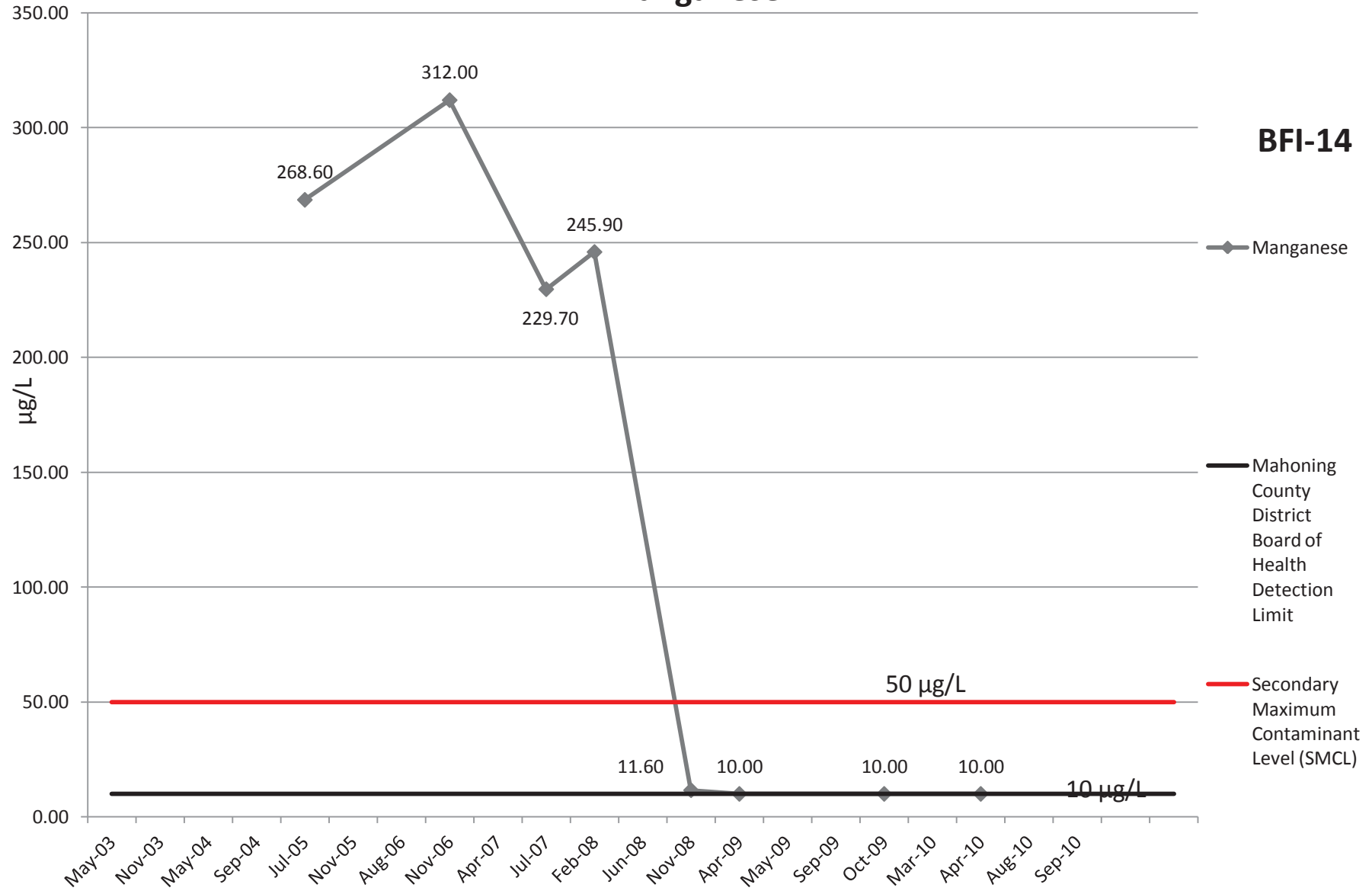


# Lead



# Manganese

**BFI-14**



# Mercury

**BFI-14**

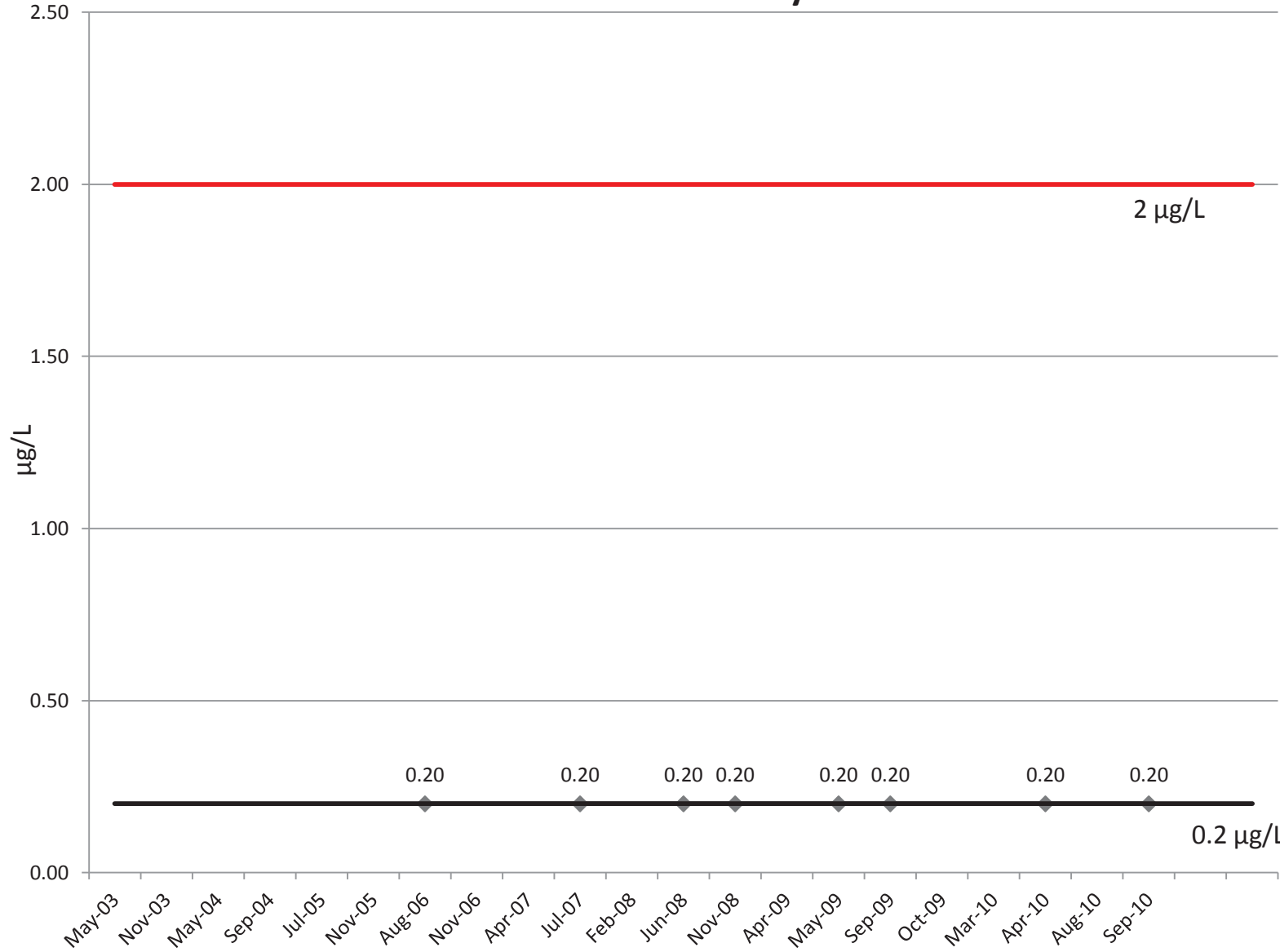
2 µg/L

Mercury

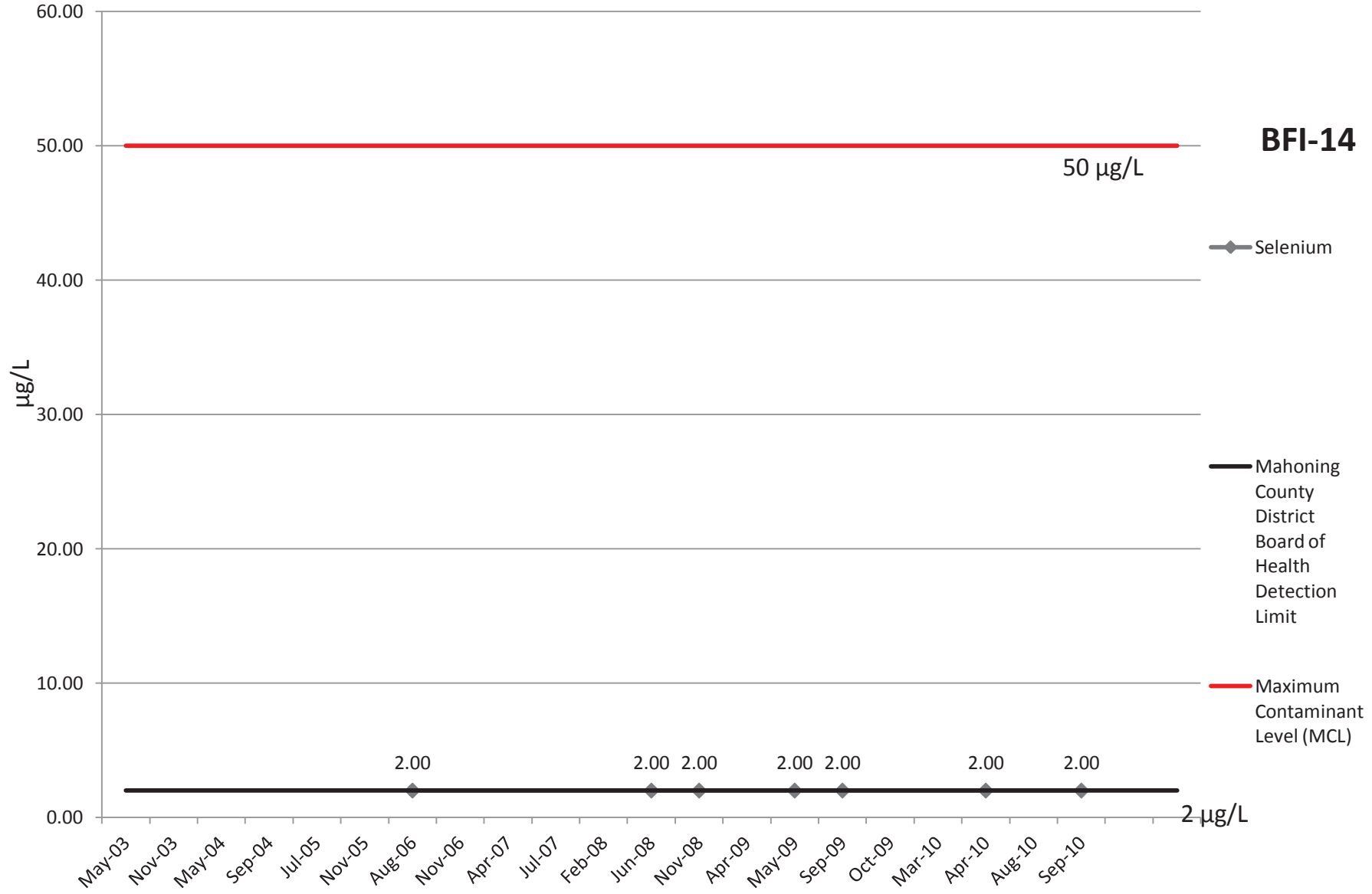
Mahoning County District Board of Health Detection Limit

Maximum Contaminant Level (MCL)

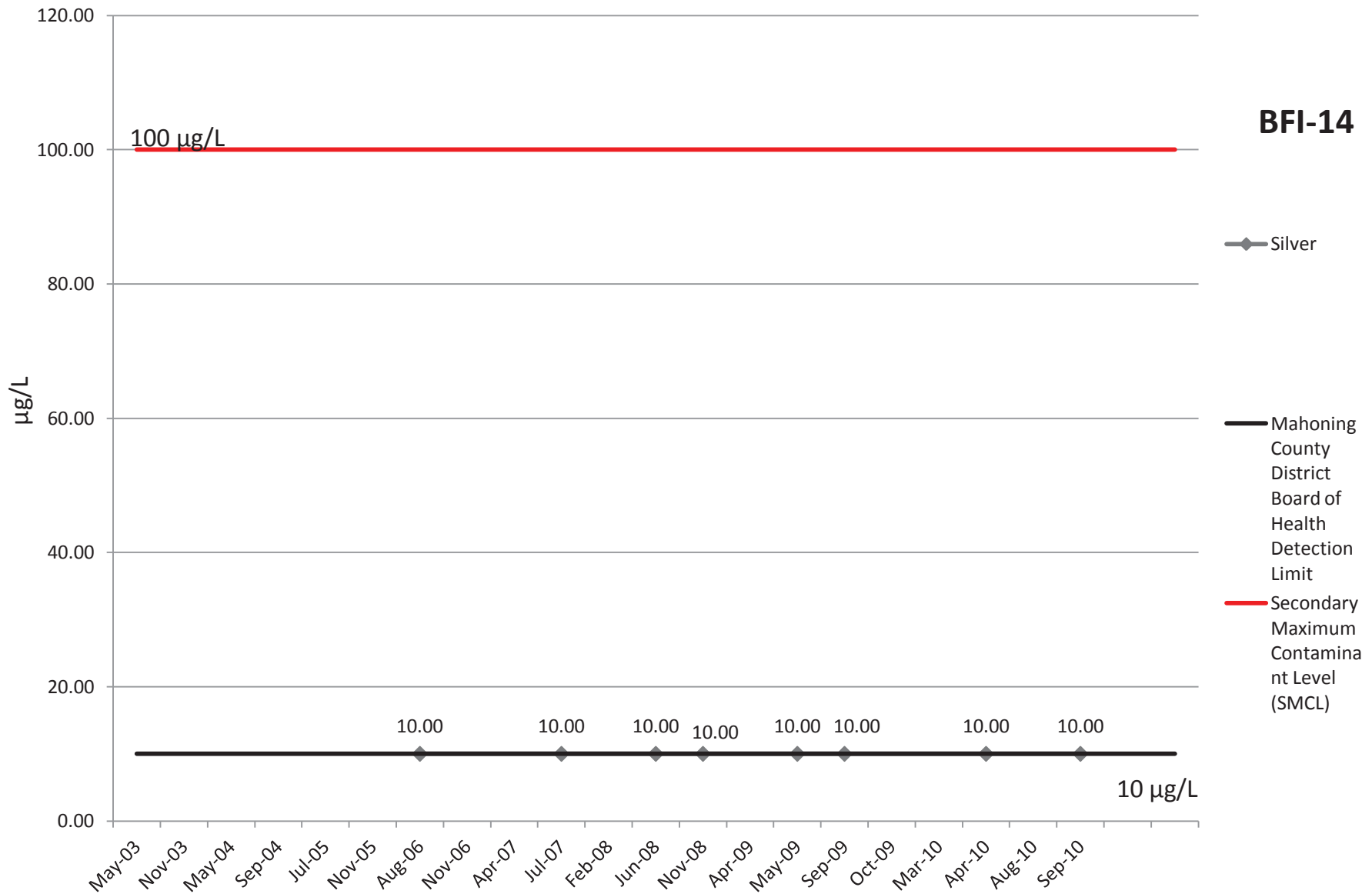
0.2 µg/L



# Selenium



# Silver



**BFI-14**

◆ Silver

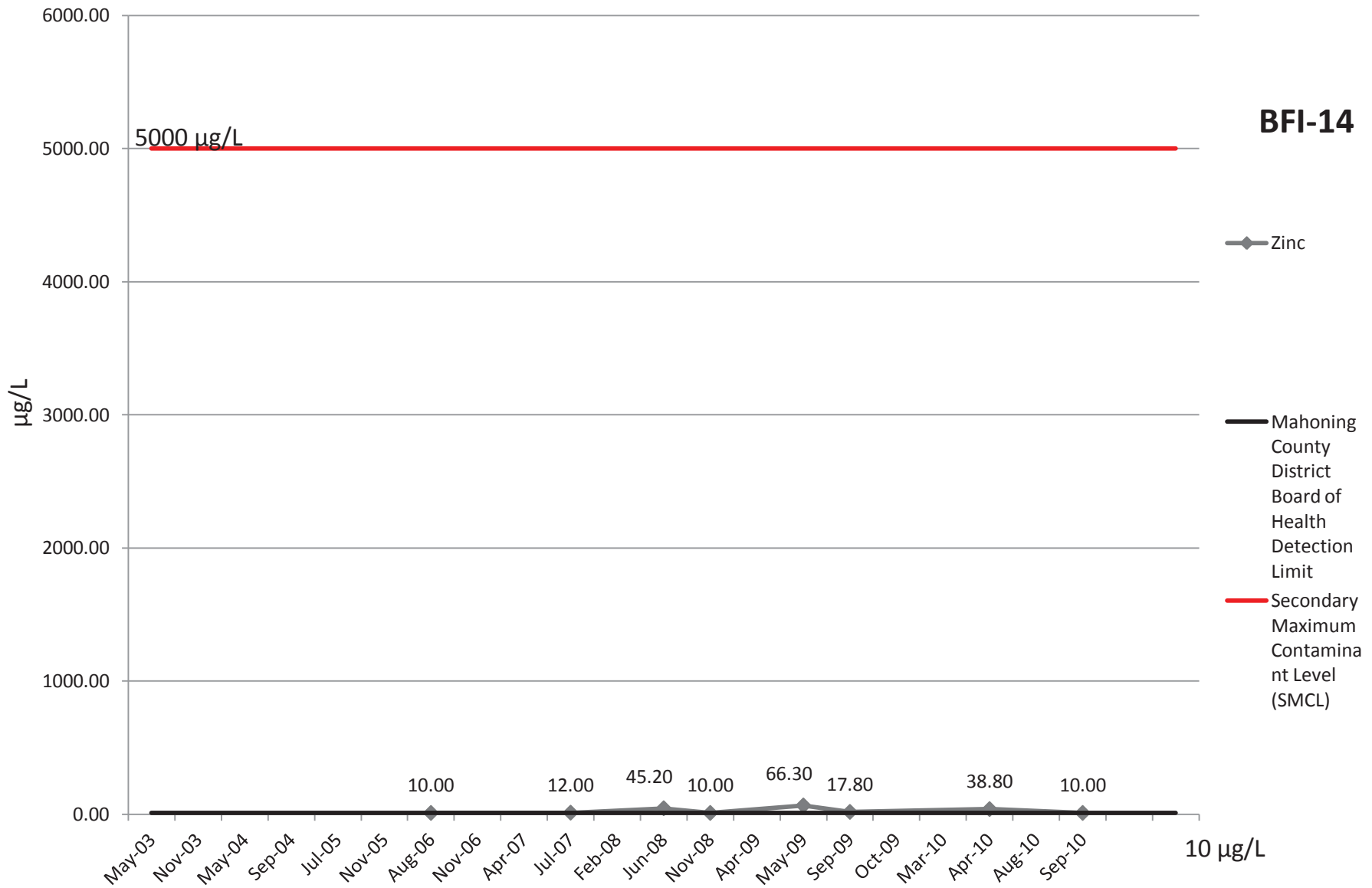
— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

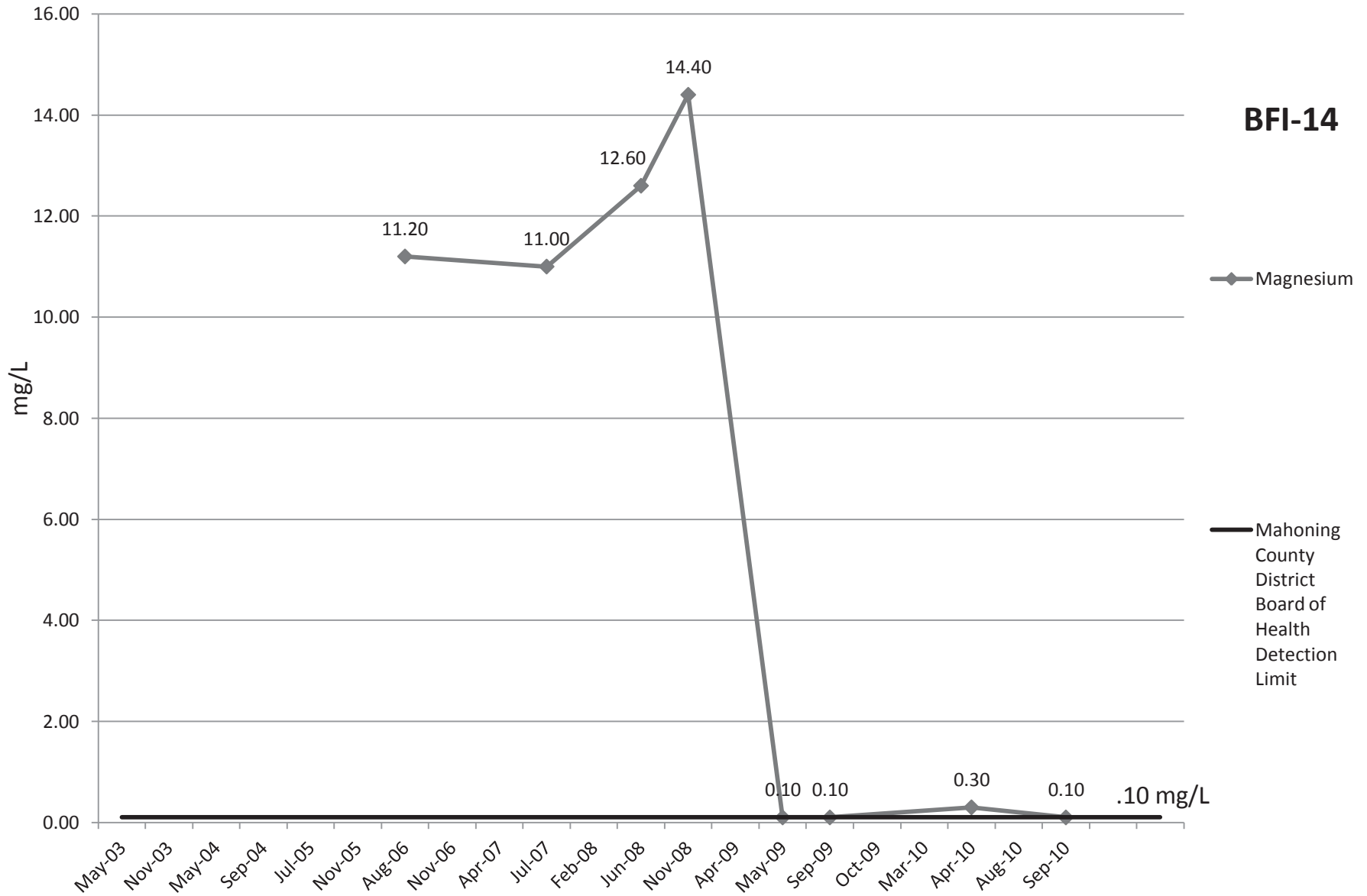
10 µg/L



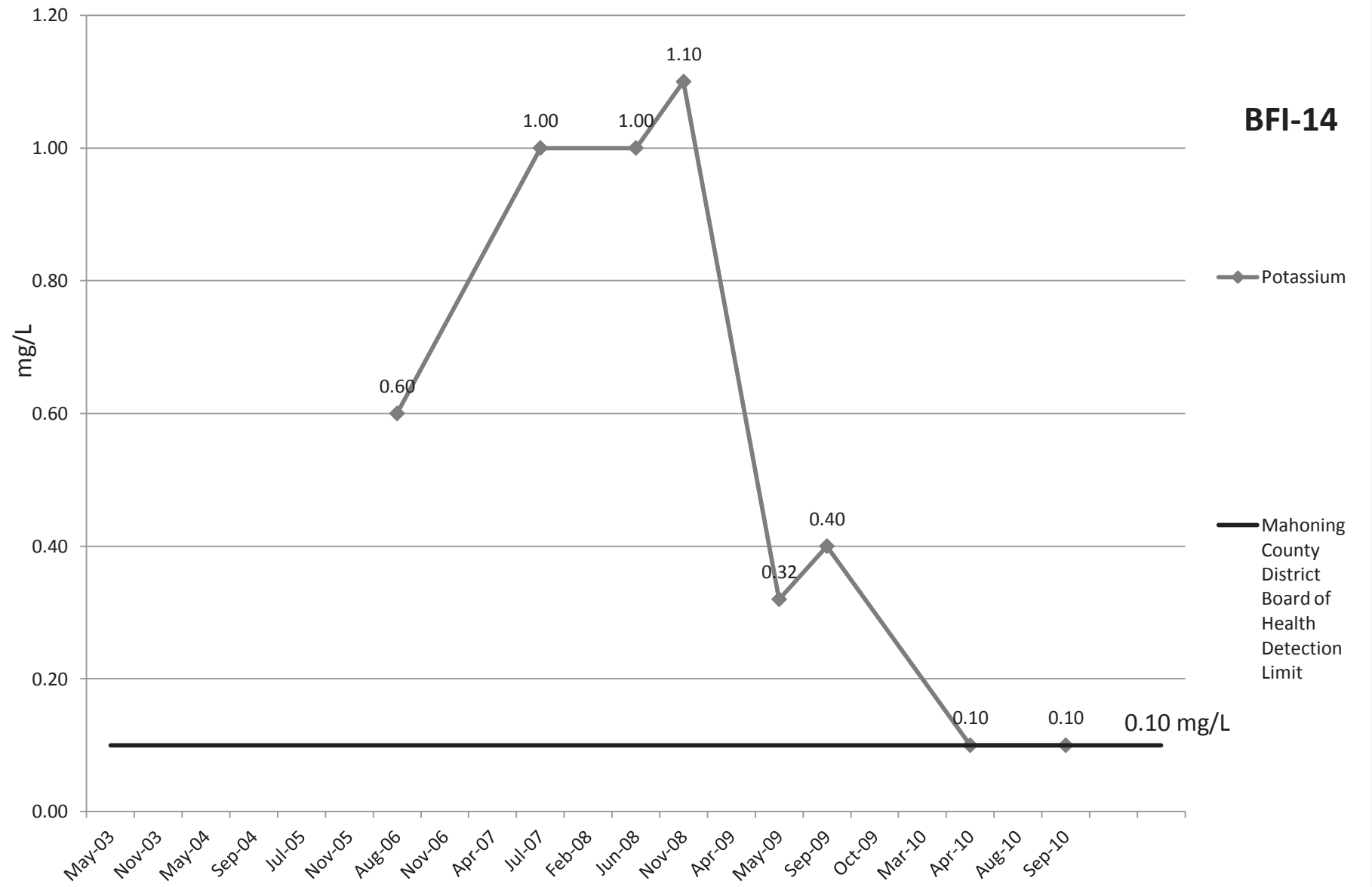
# Zinc



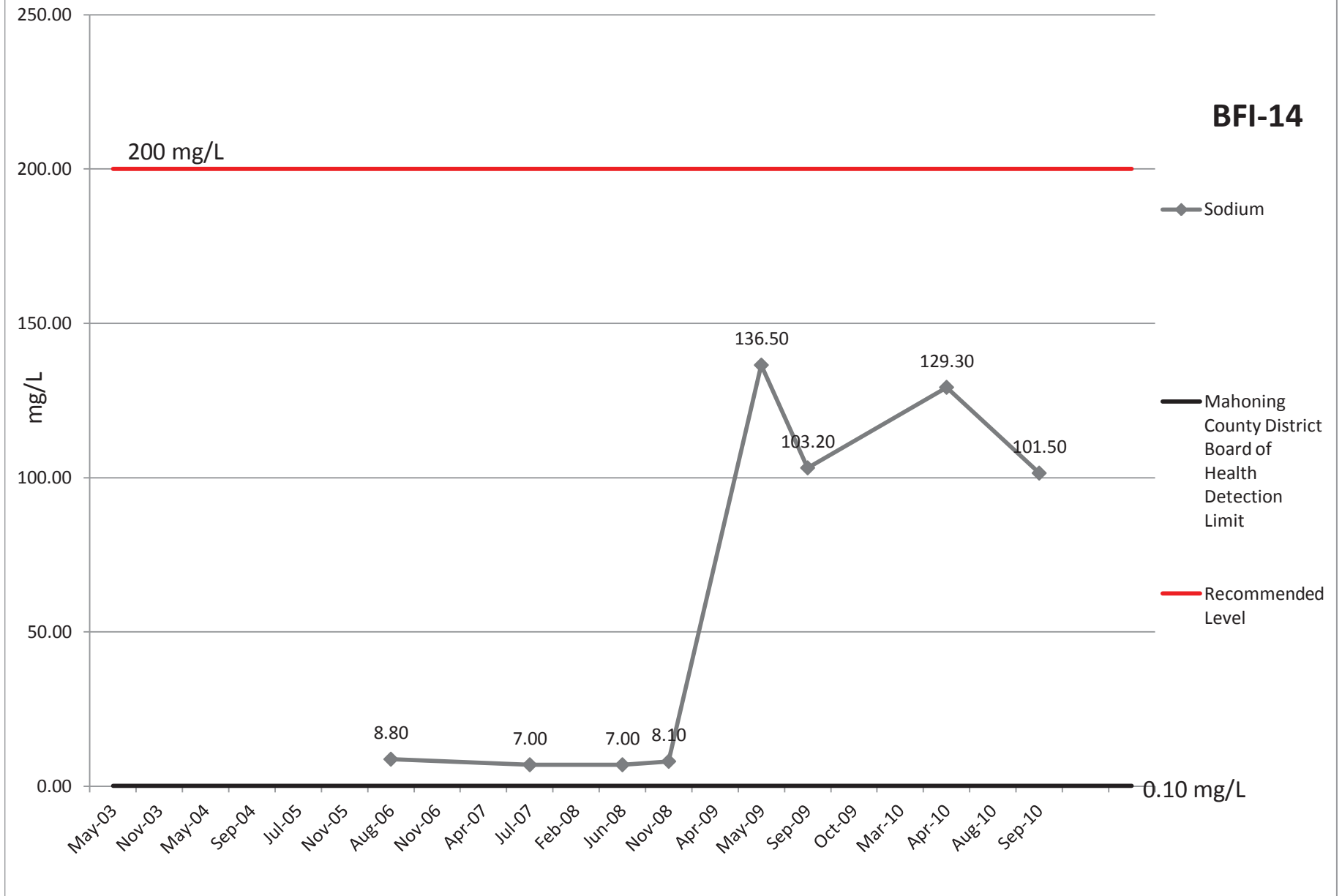
# Magnesium



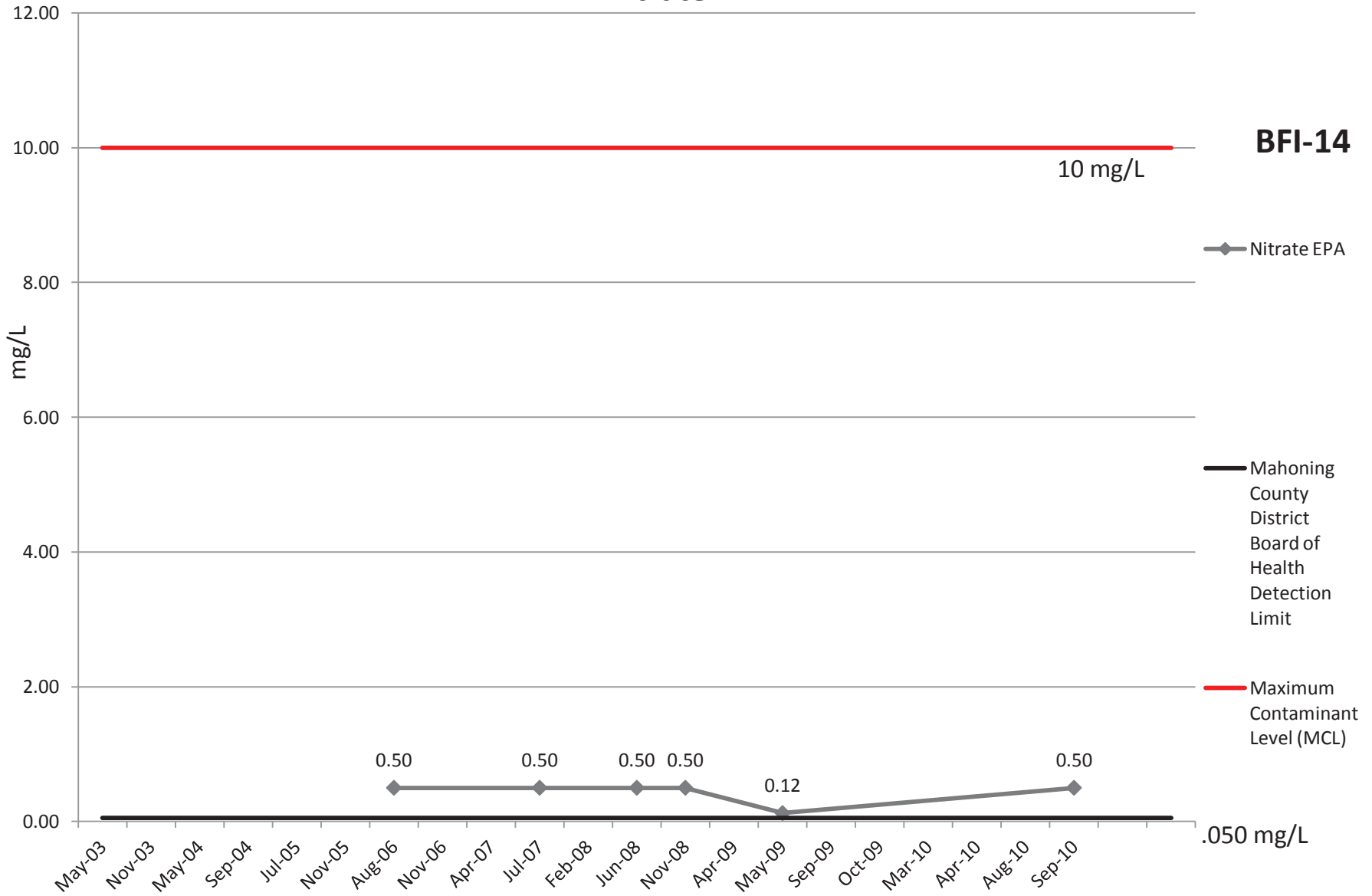
# Potassium



# Sodium

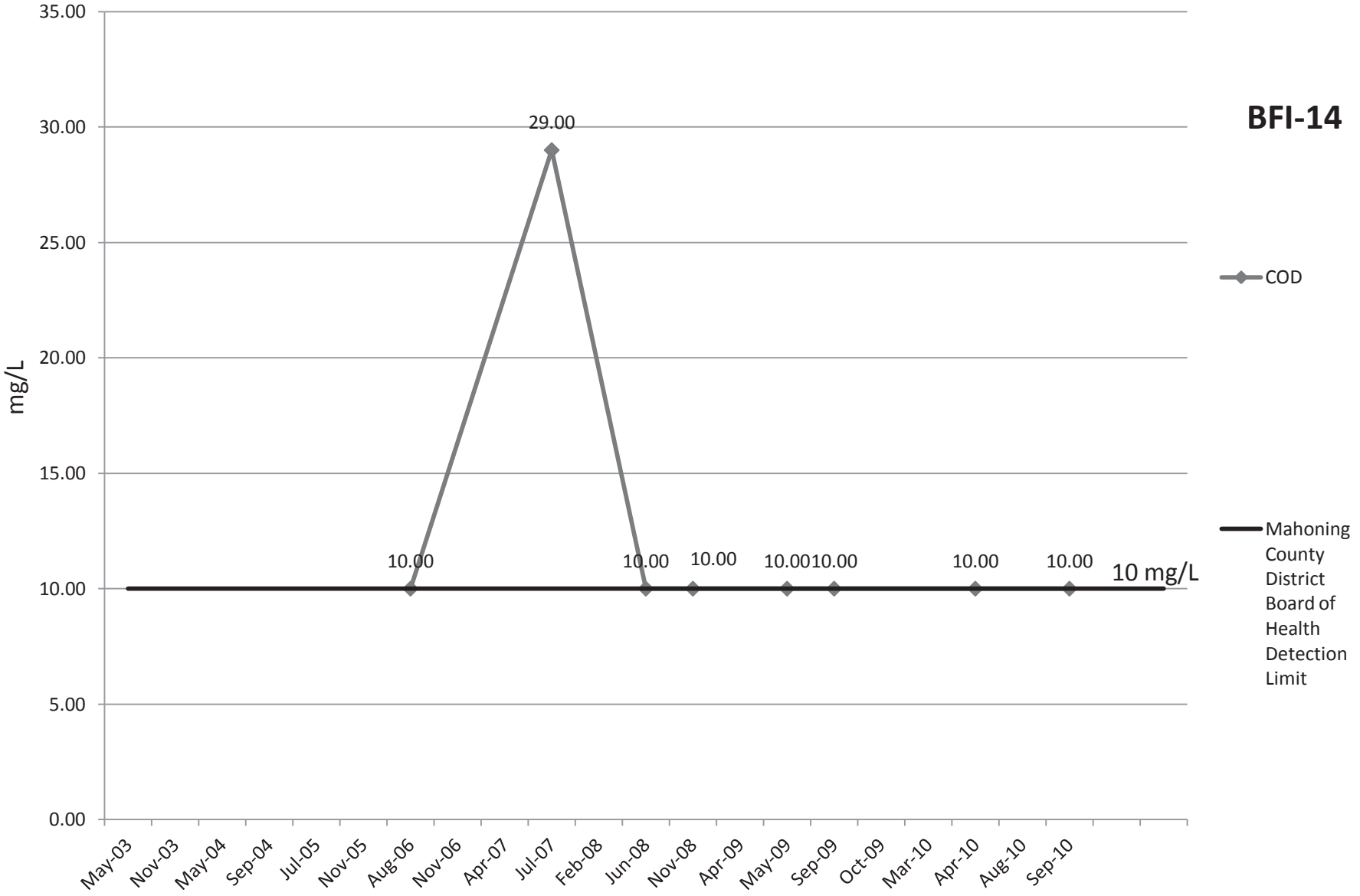


# Nitrate EPA



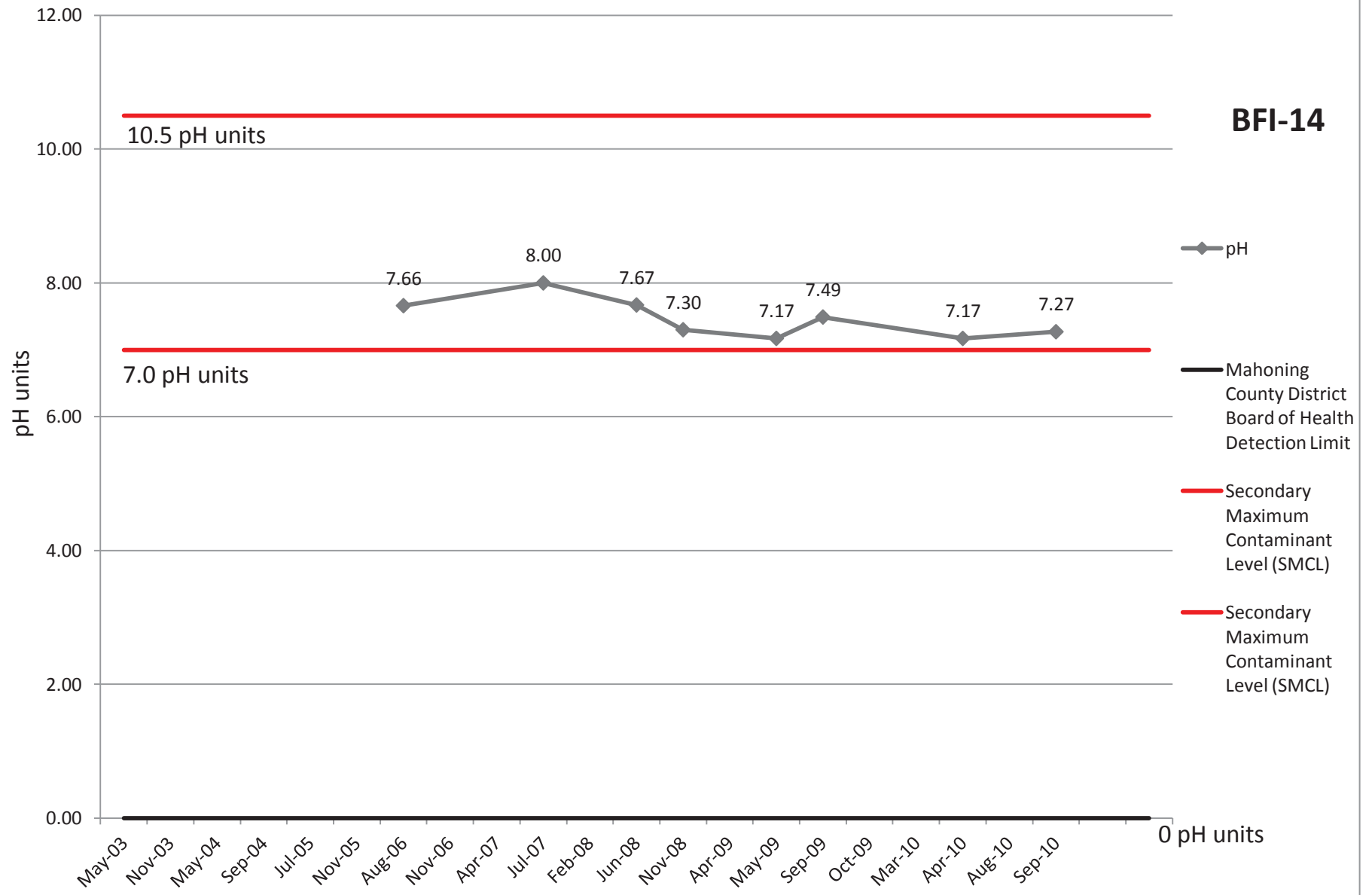
# COD

**BFI-14**



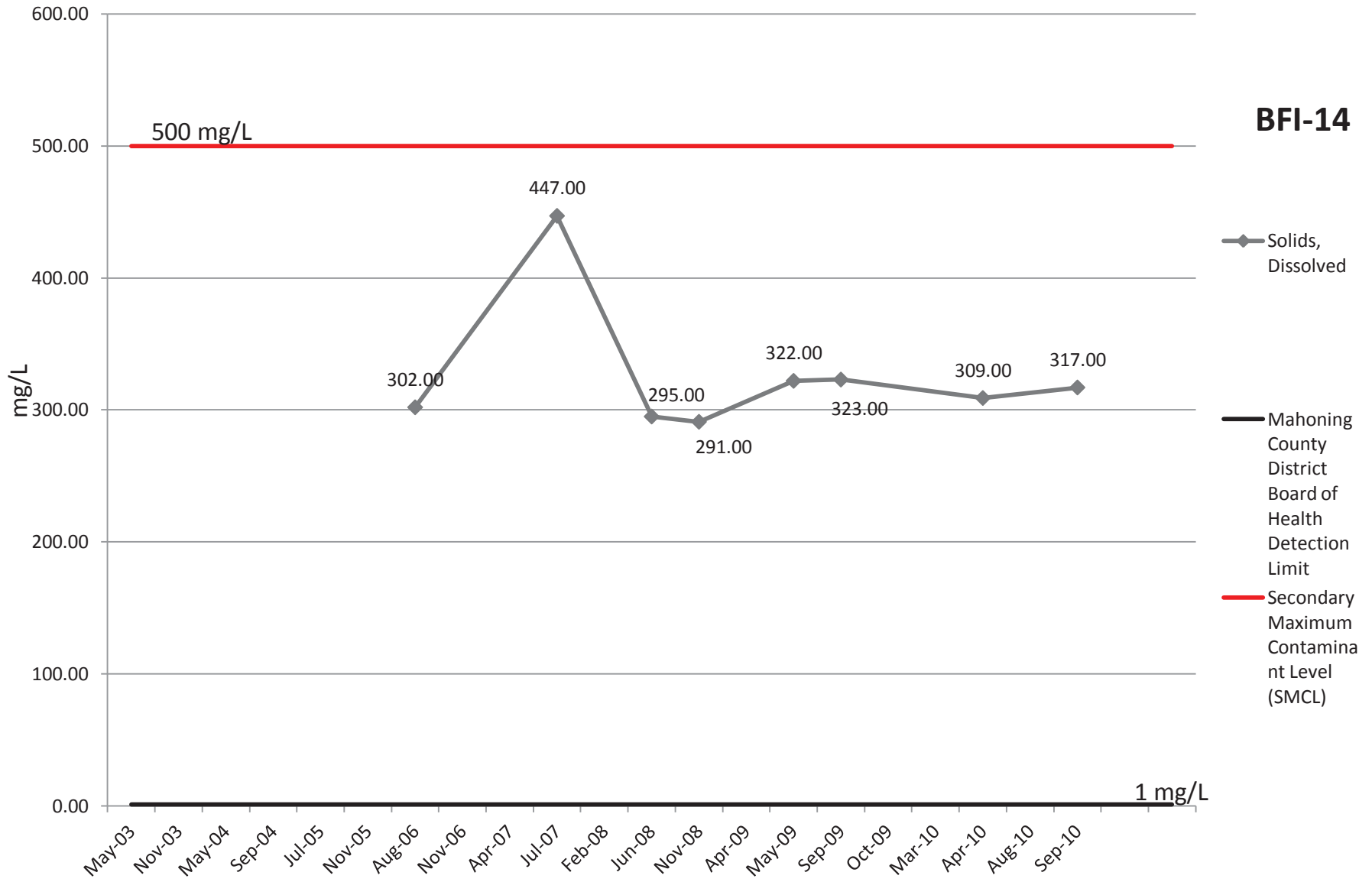
# pH

**BFI-14**



# Solids, Dissolved

**BFI-14**





# Sulfate



# Bacteria

**BFI-14**

Positive/Negative

◆ Bacteria

1.00

1.00

positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

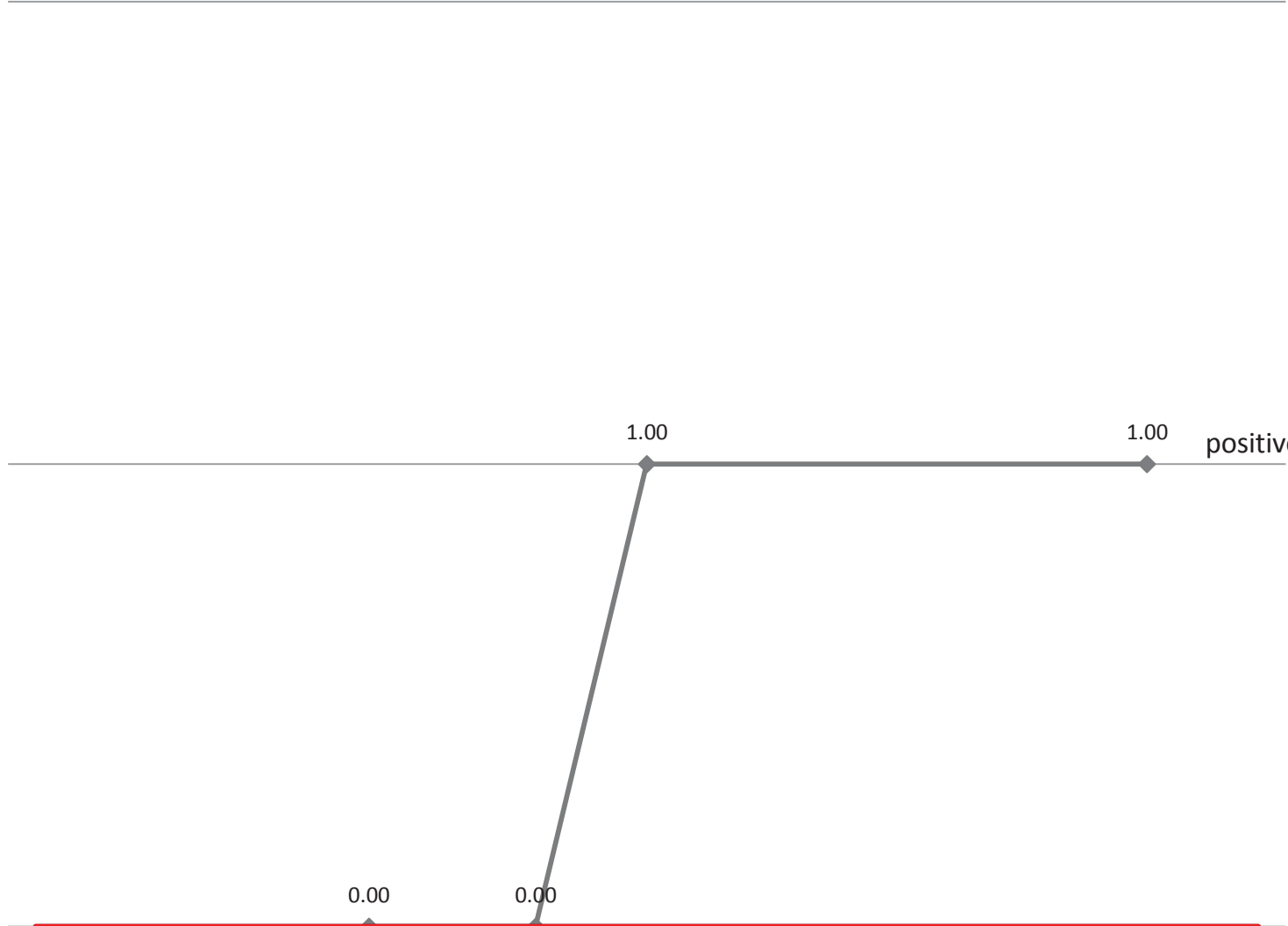
— Maximum  
Contaminant  
Level (MCL)

0.00

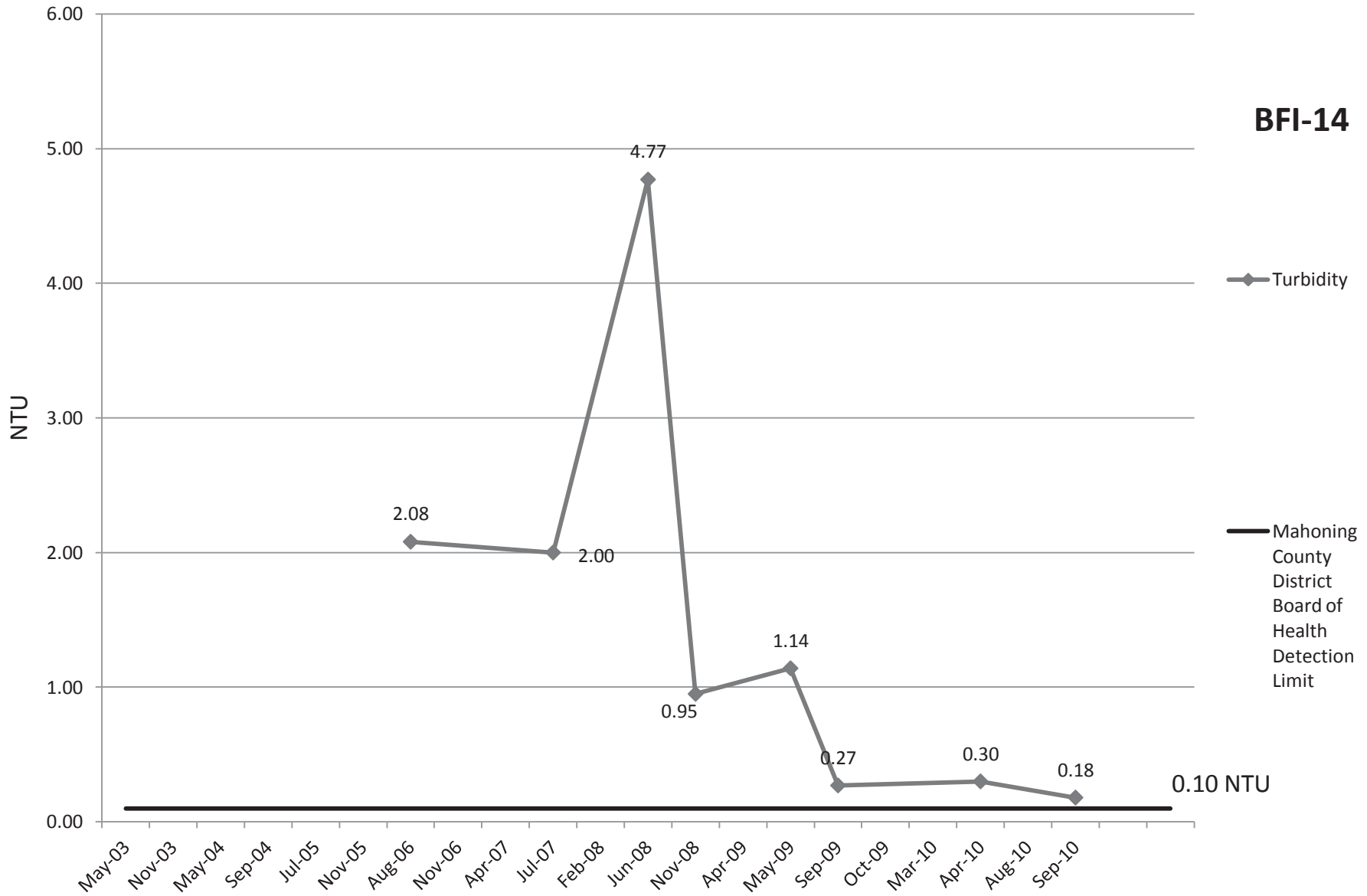
0.00

negative (0)

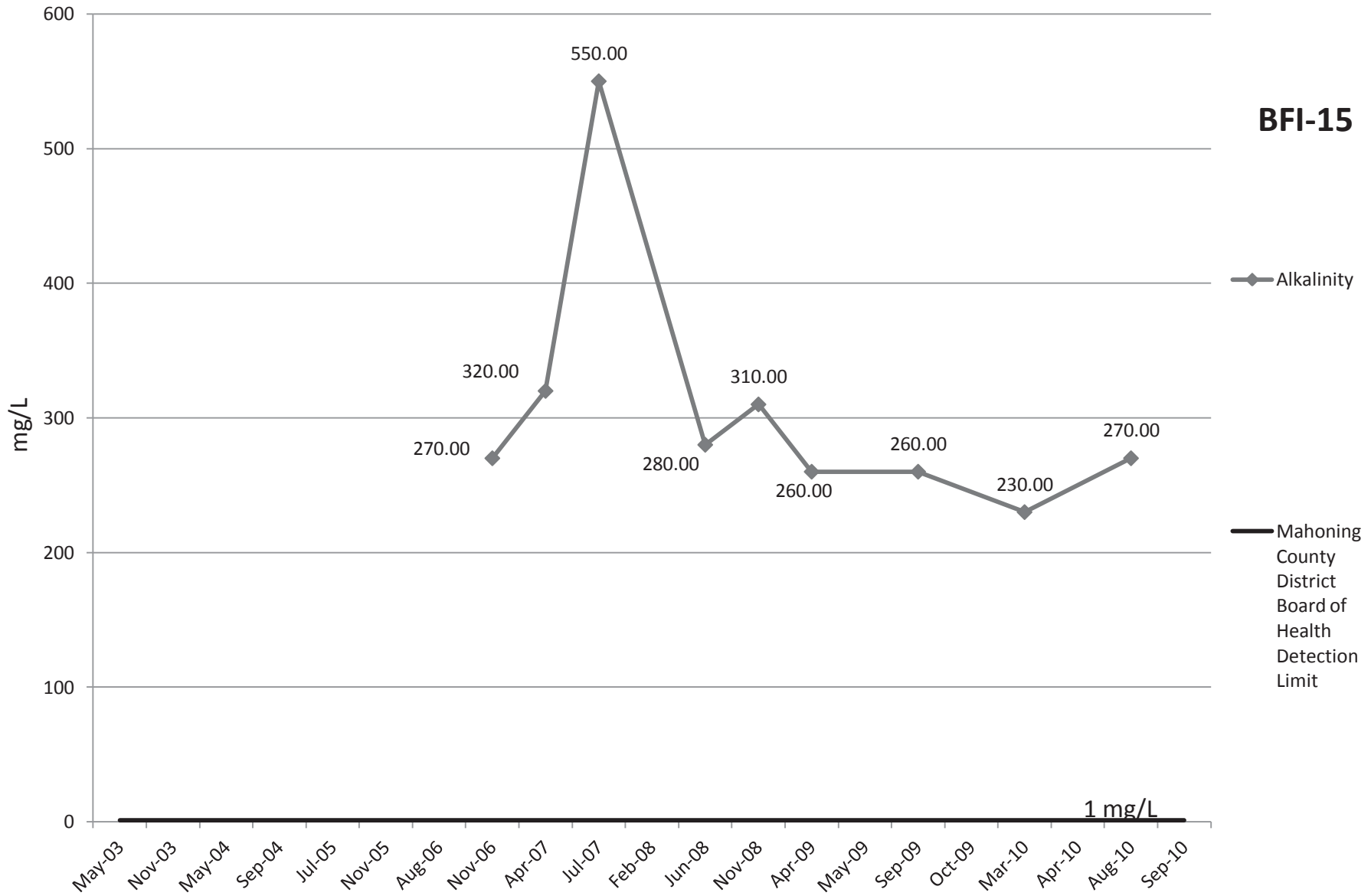
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



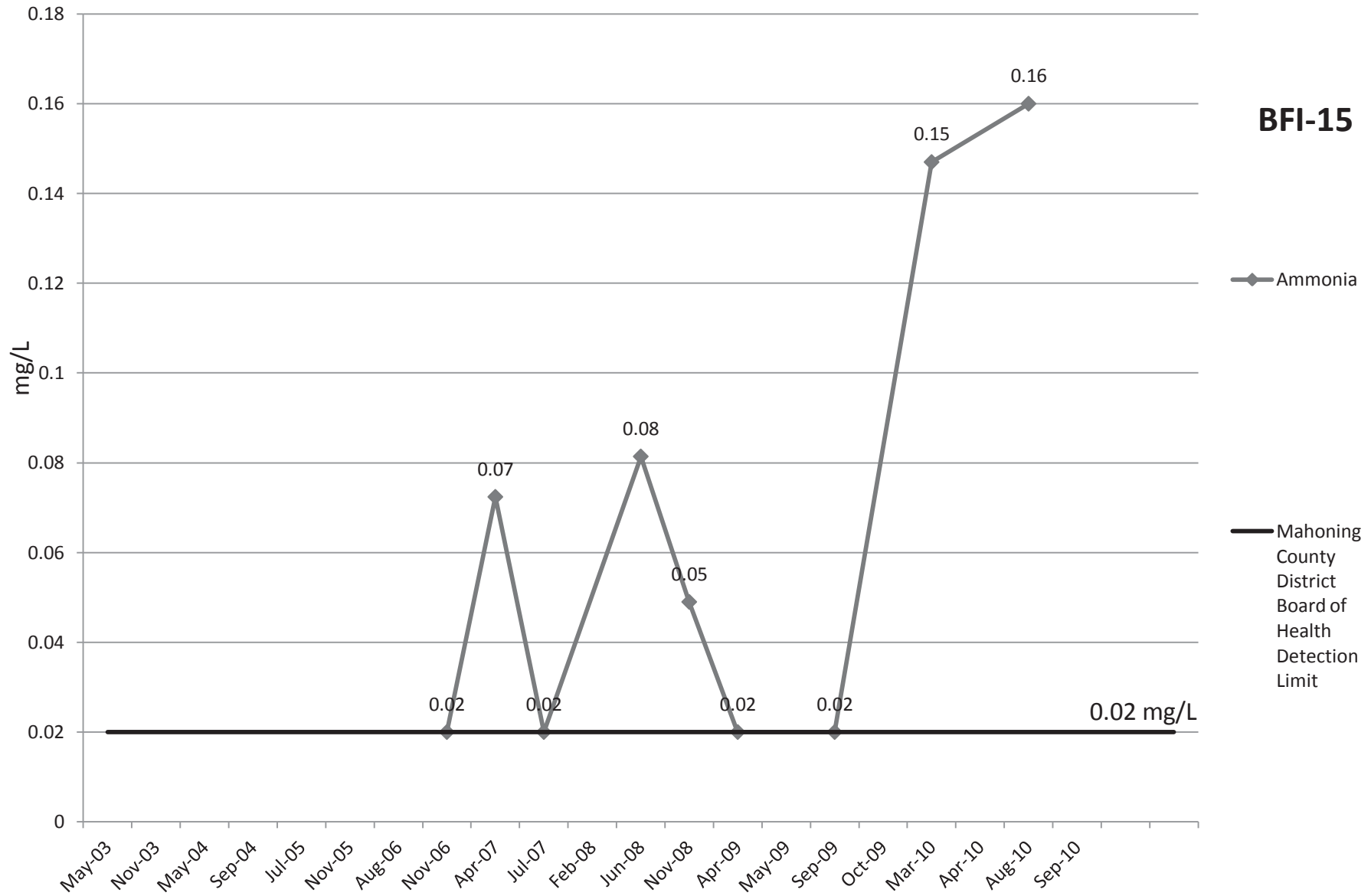
# Turbidity



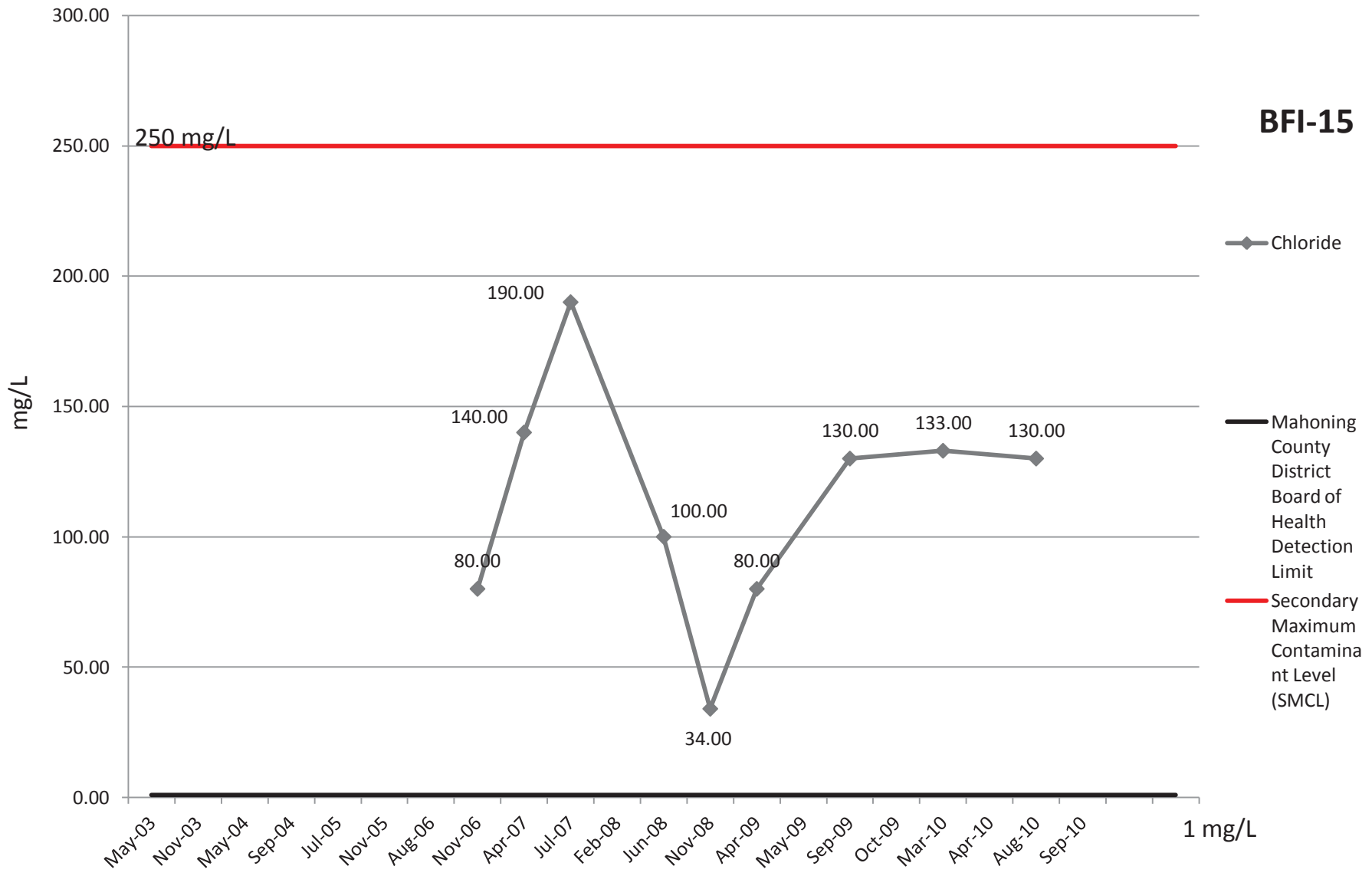
# Alkalinity



# Ammonia

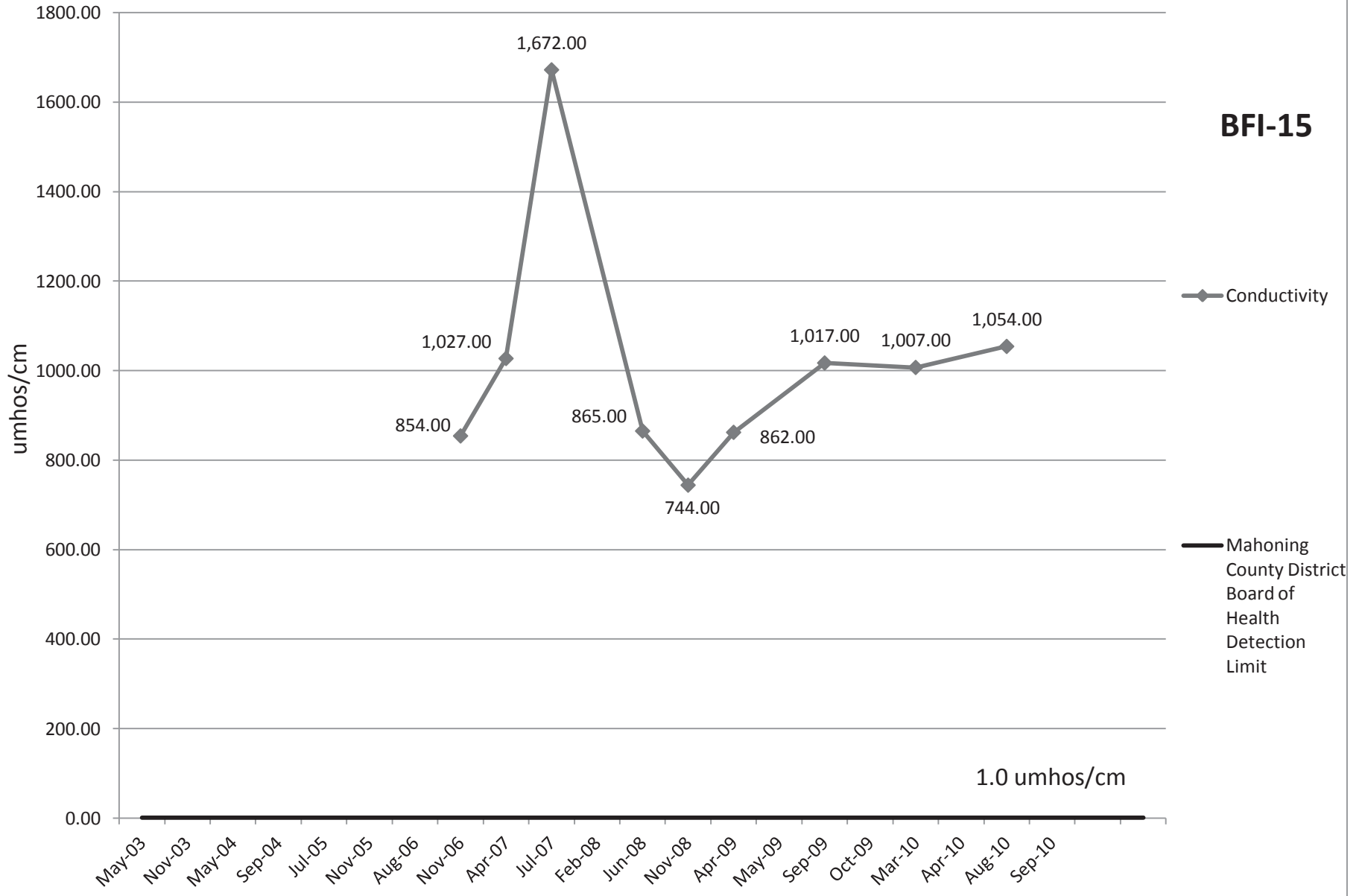


# Chloride

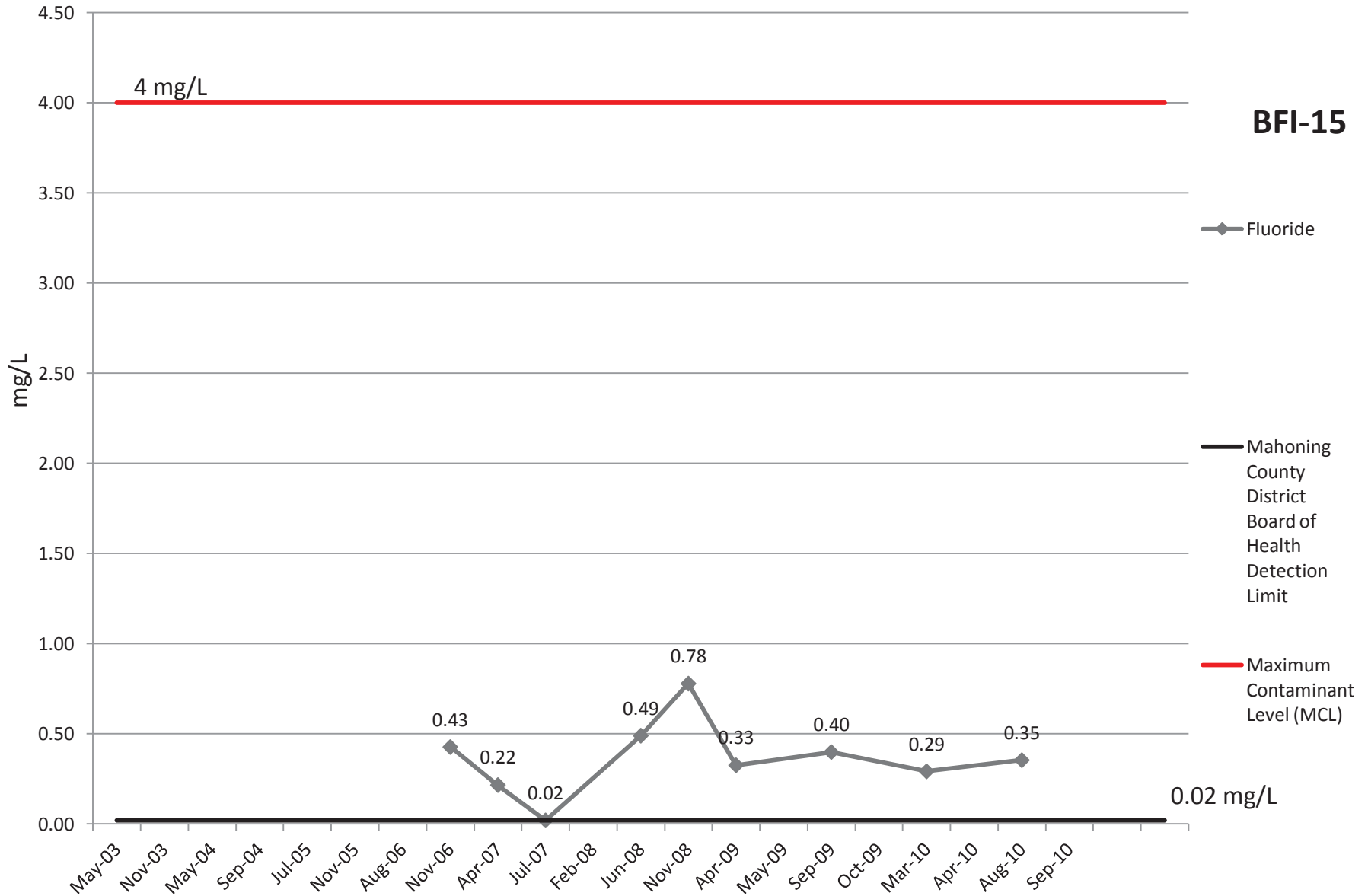


# Conductivity

**BFI-15**



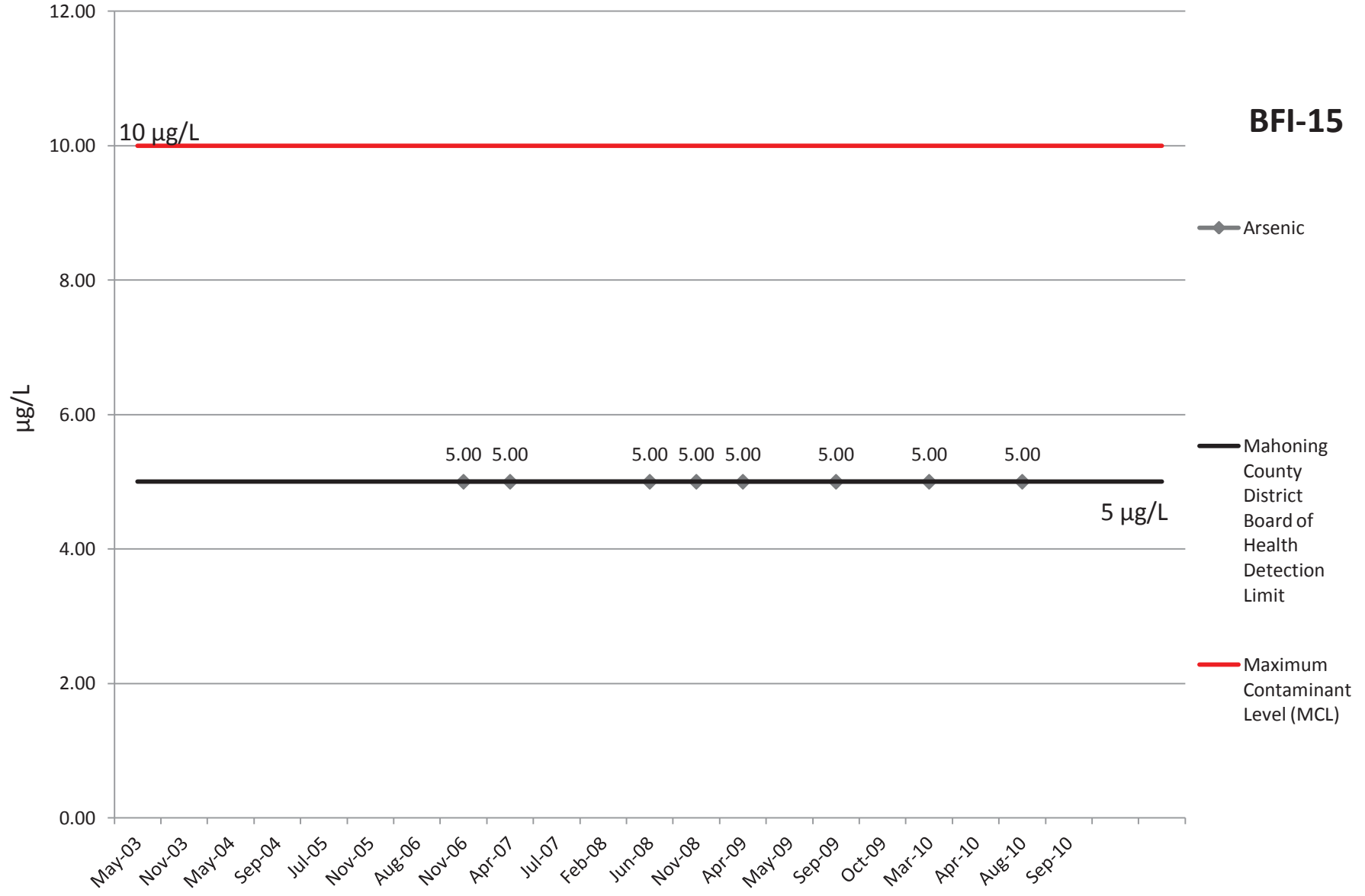
# Fluoride





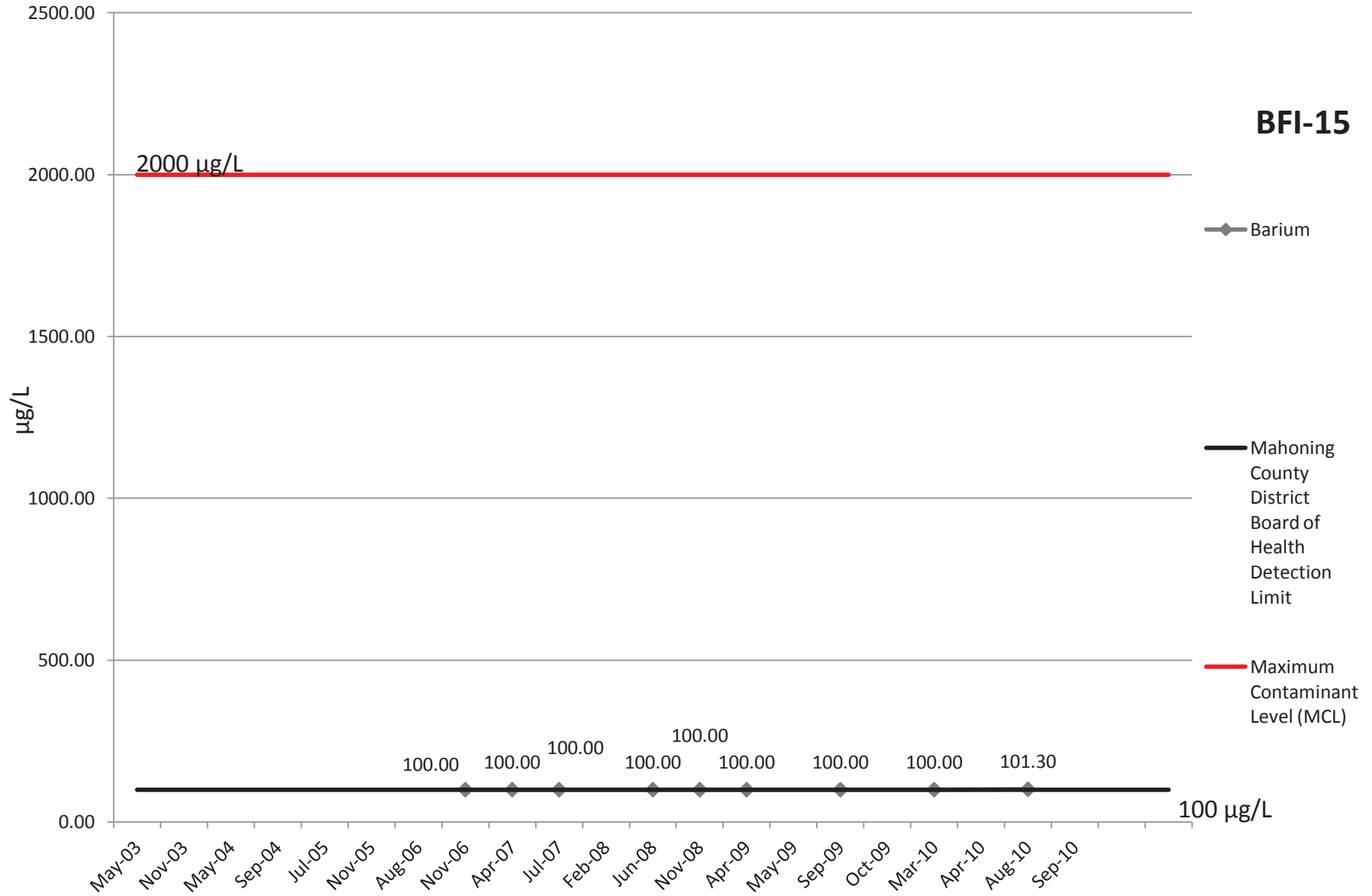
# Arsenic

**BFI-15**

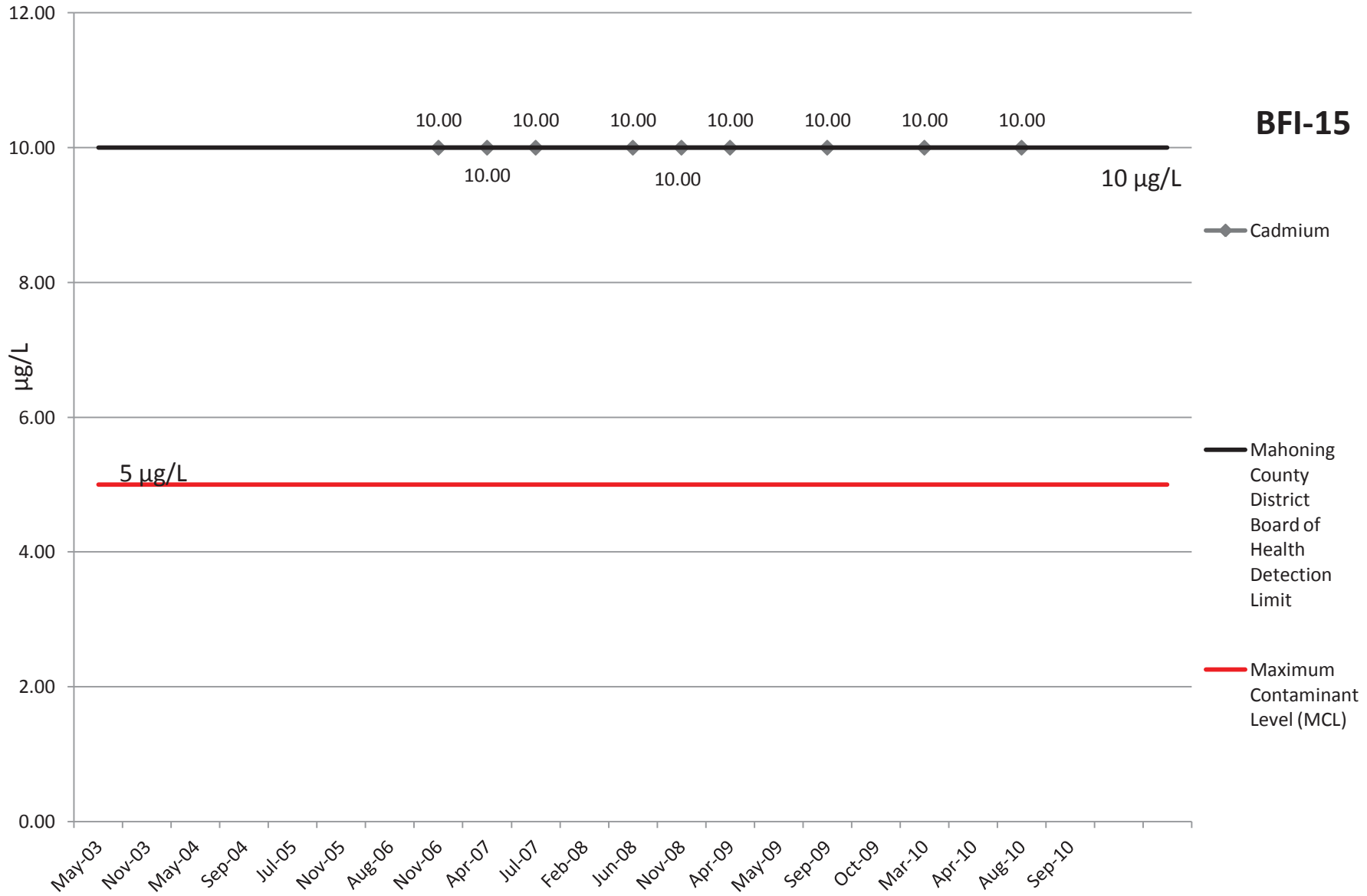


# Barium

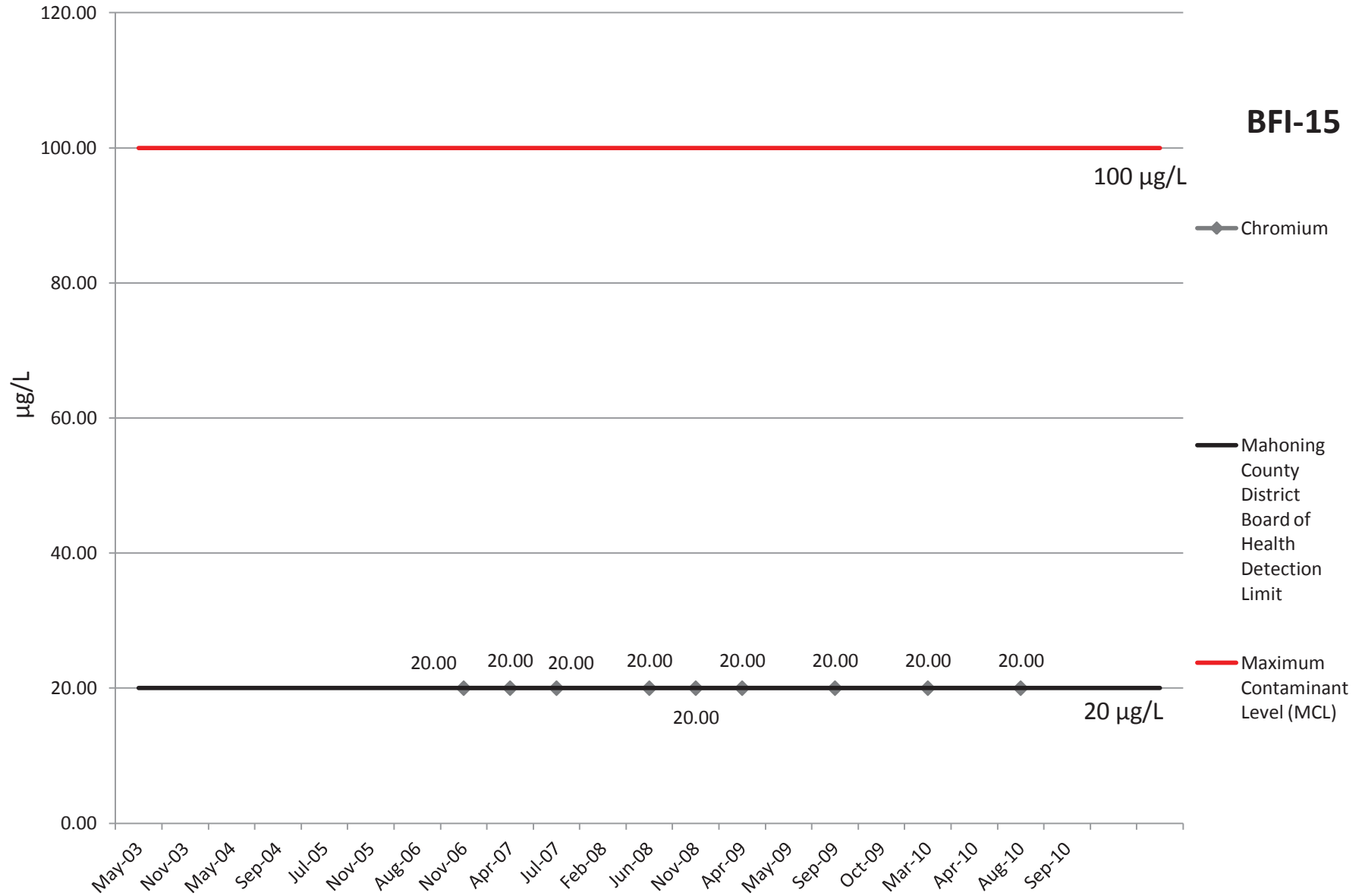
**BFI-15**



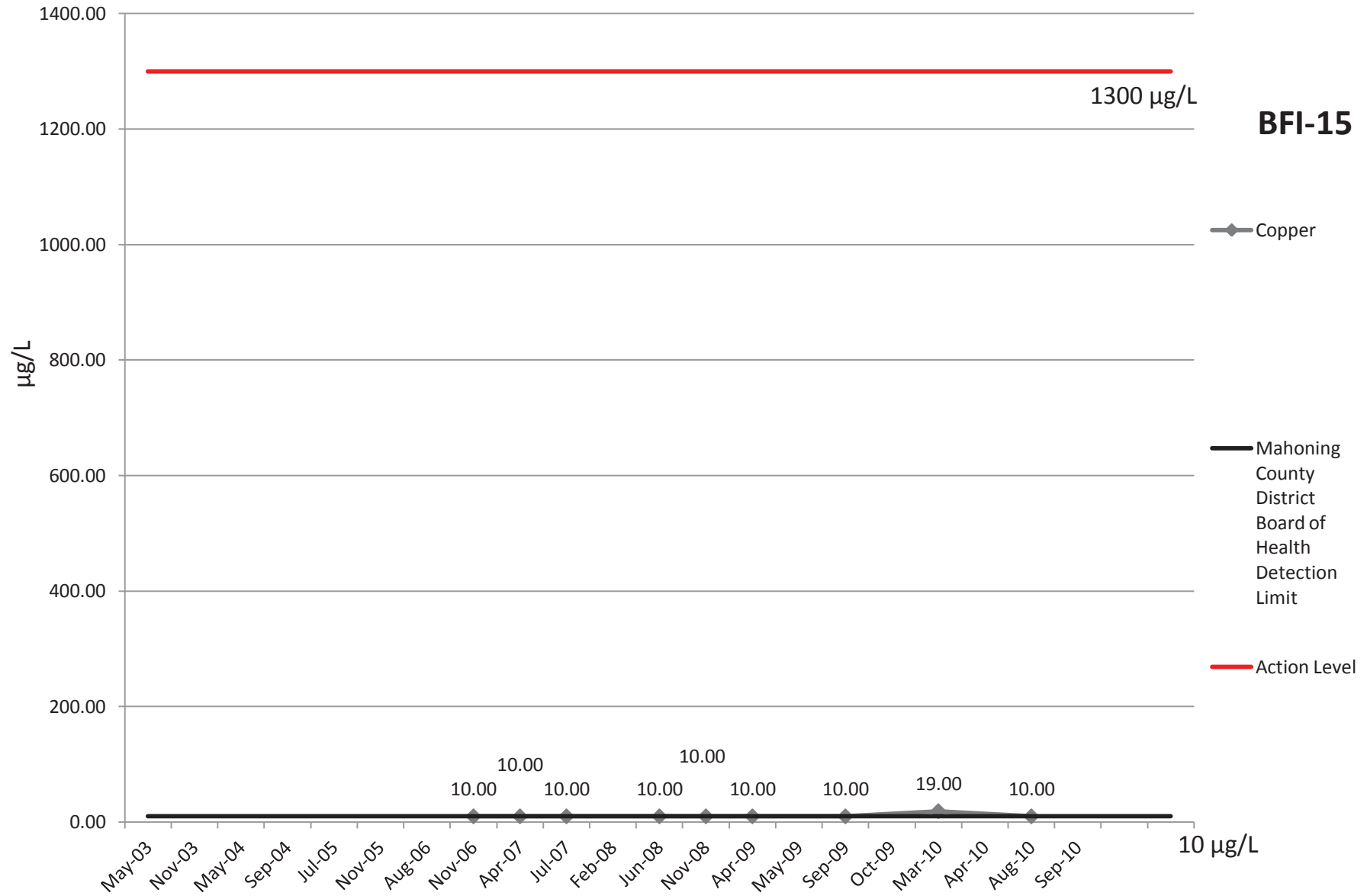
# Cadmium



# Chromium

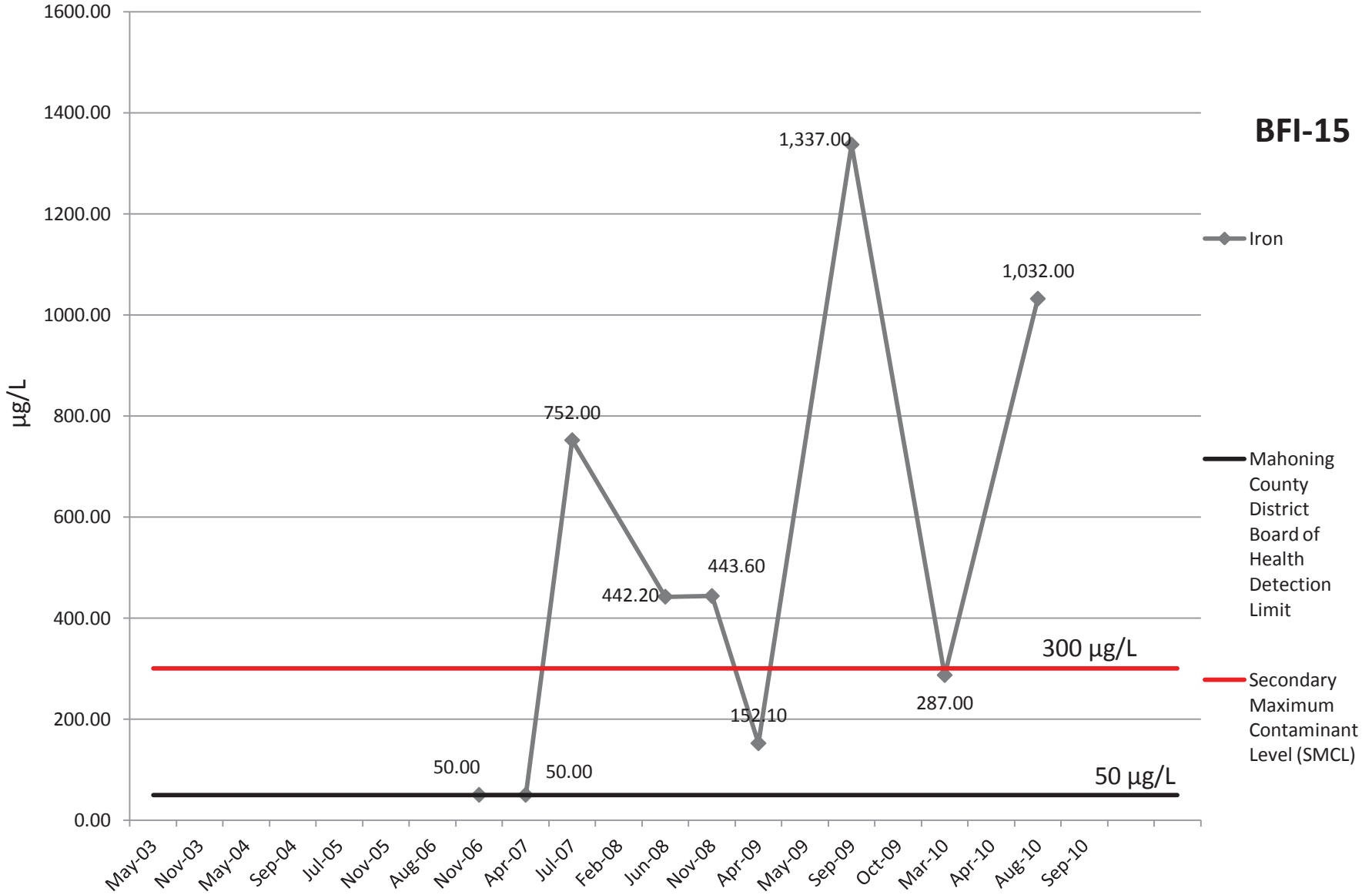


# Copper

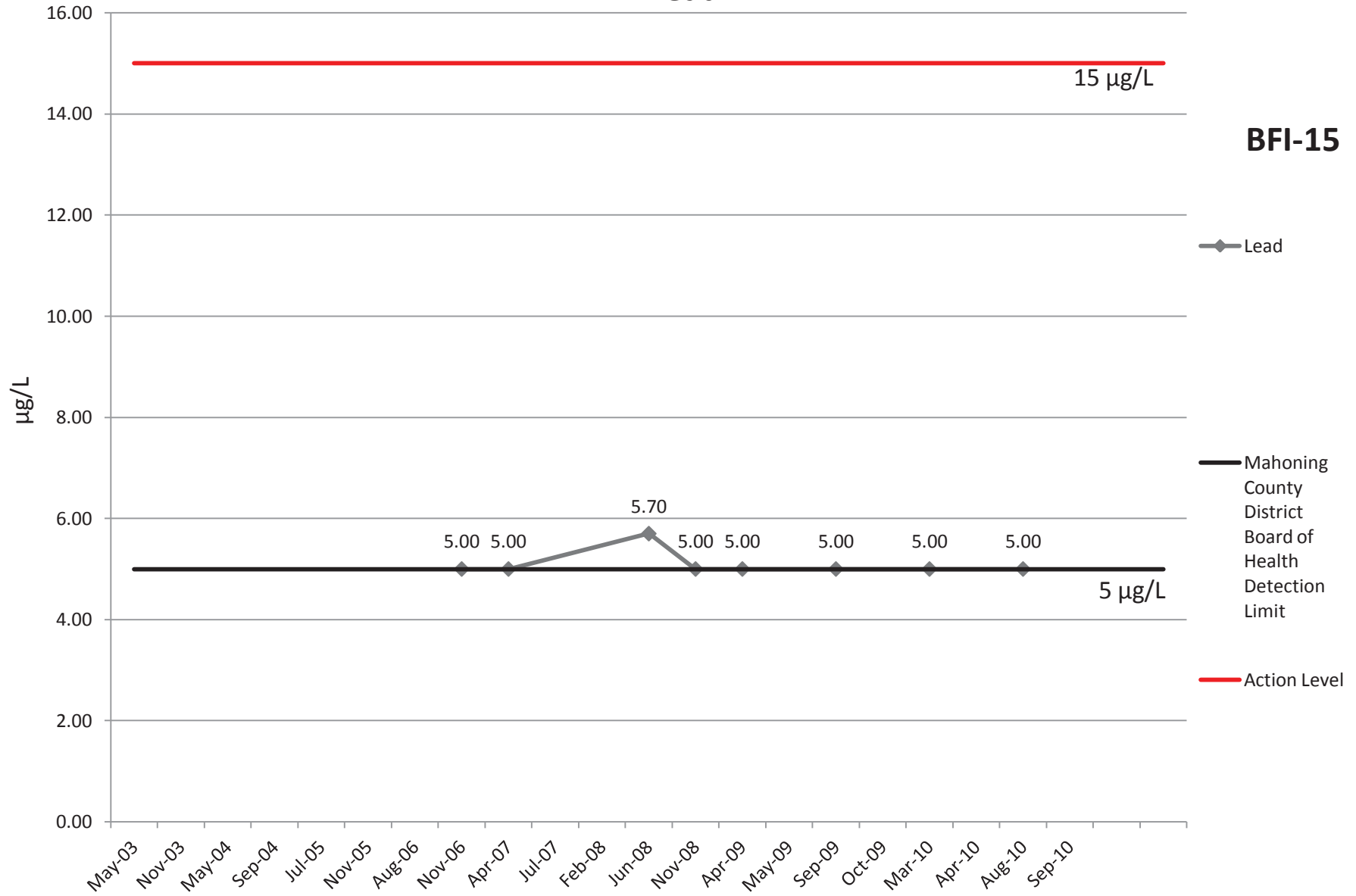


# Iron

**BFI-15**

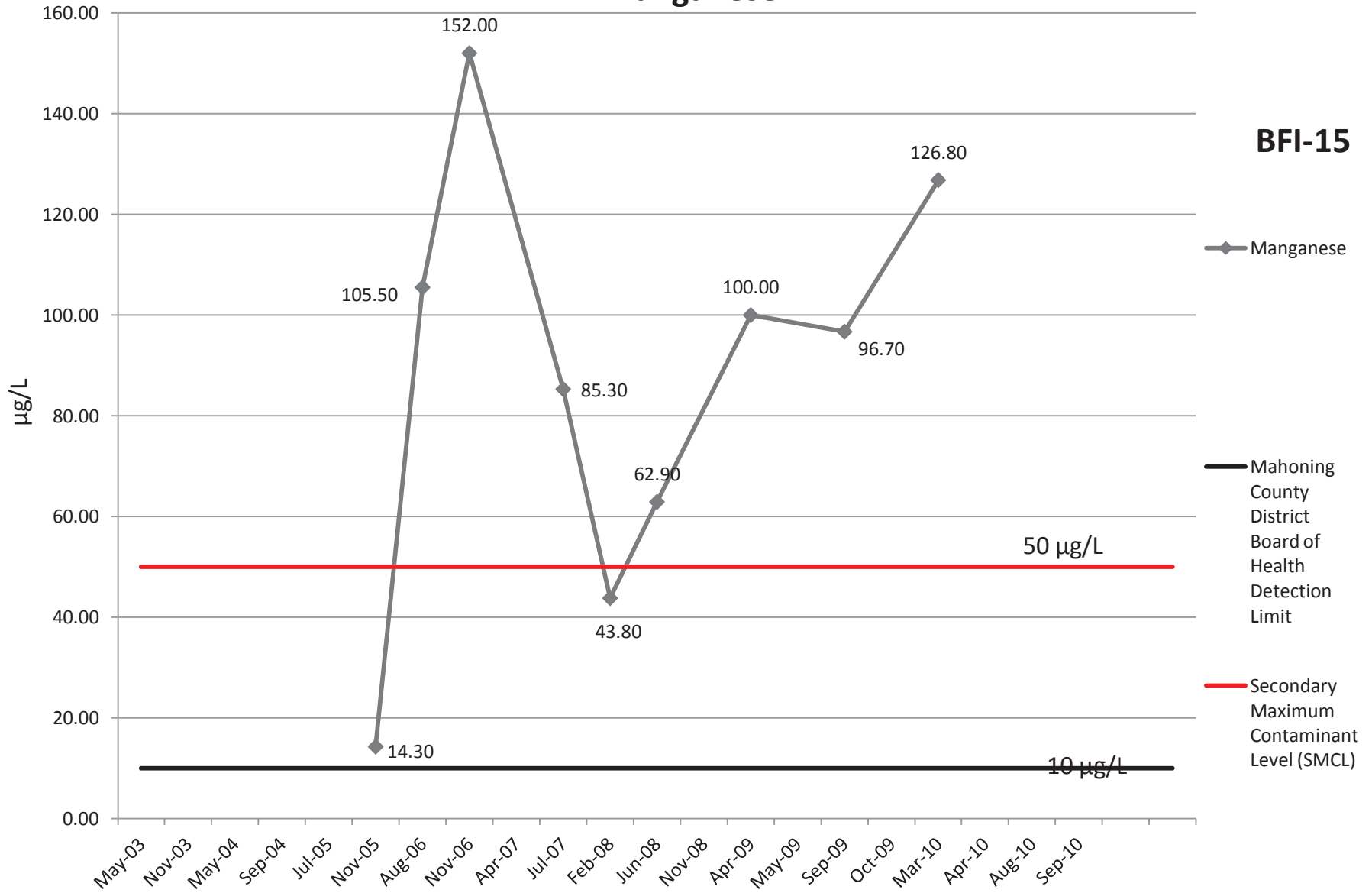


# Lead



# Manganese

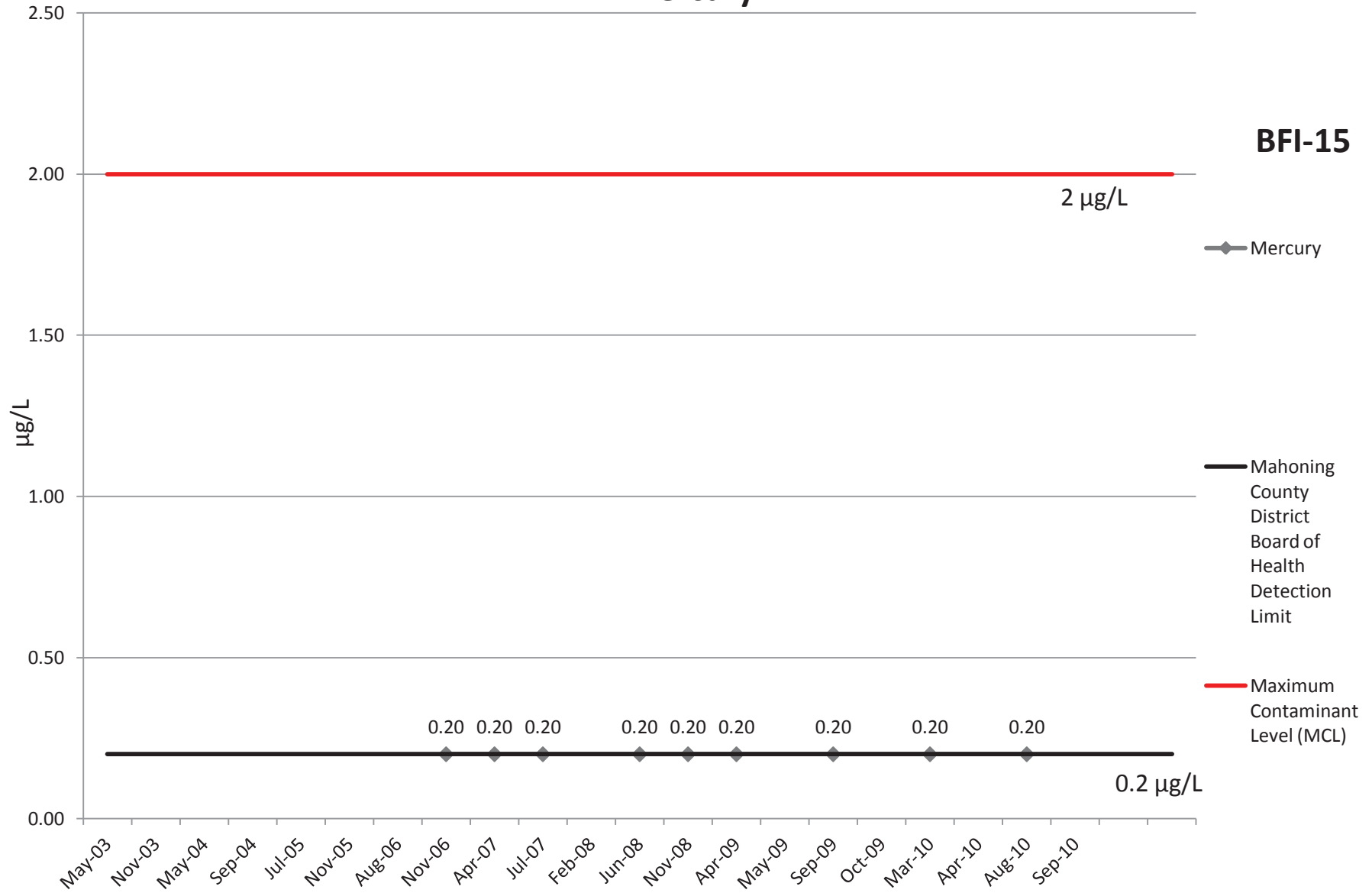
**BFI-15**



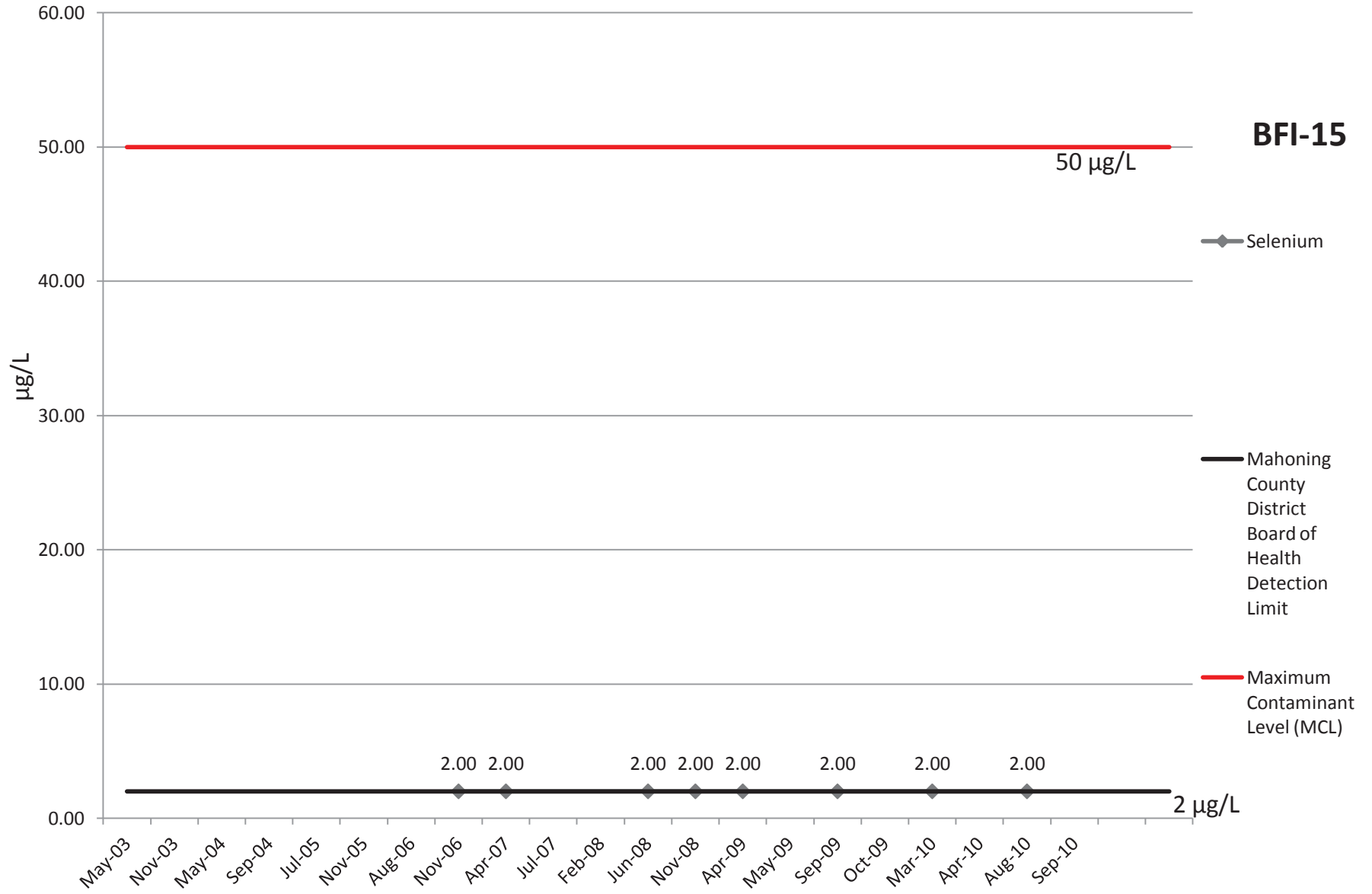


# Mercury

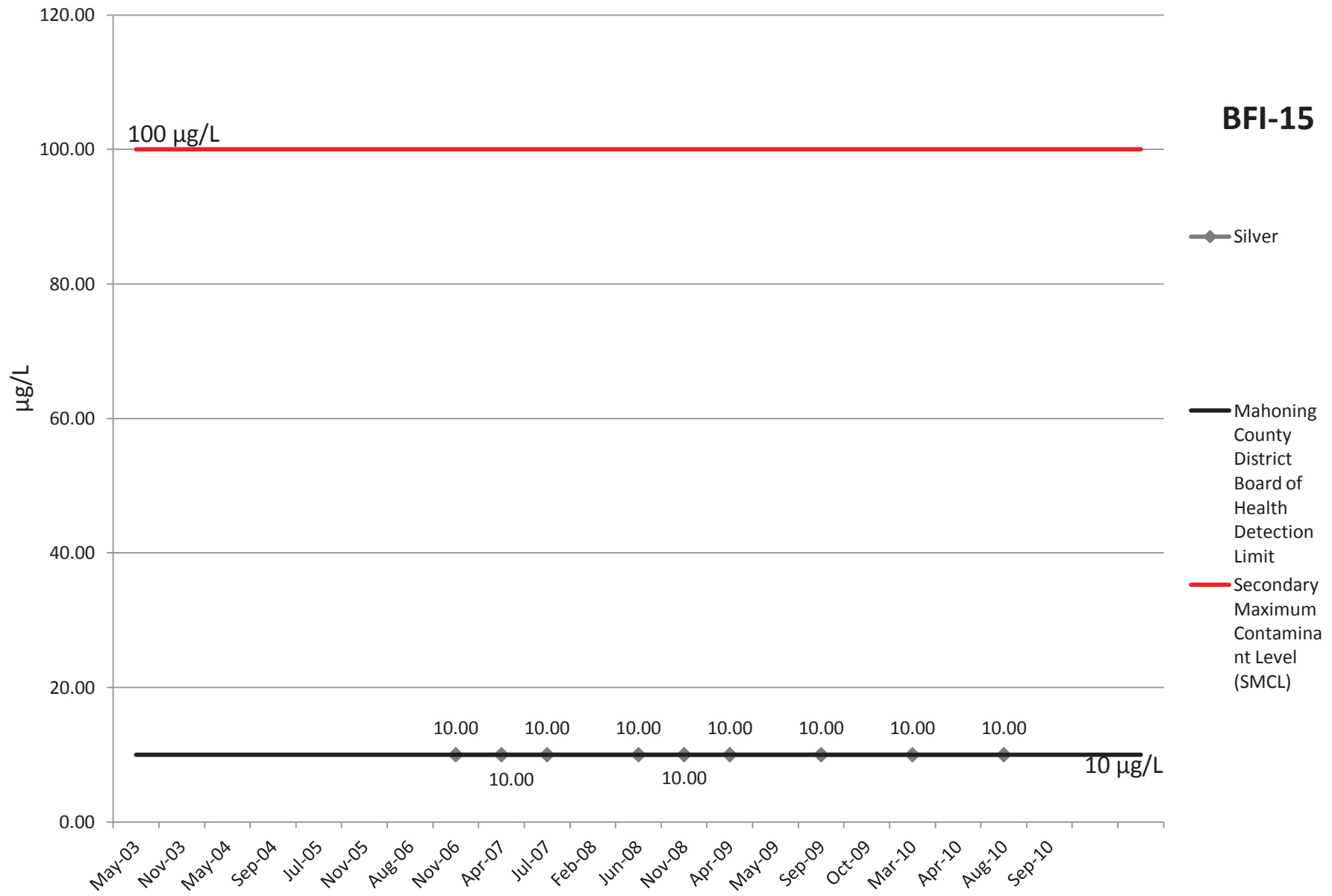
**BFI-15**



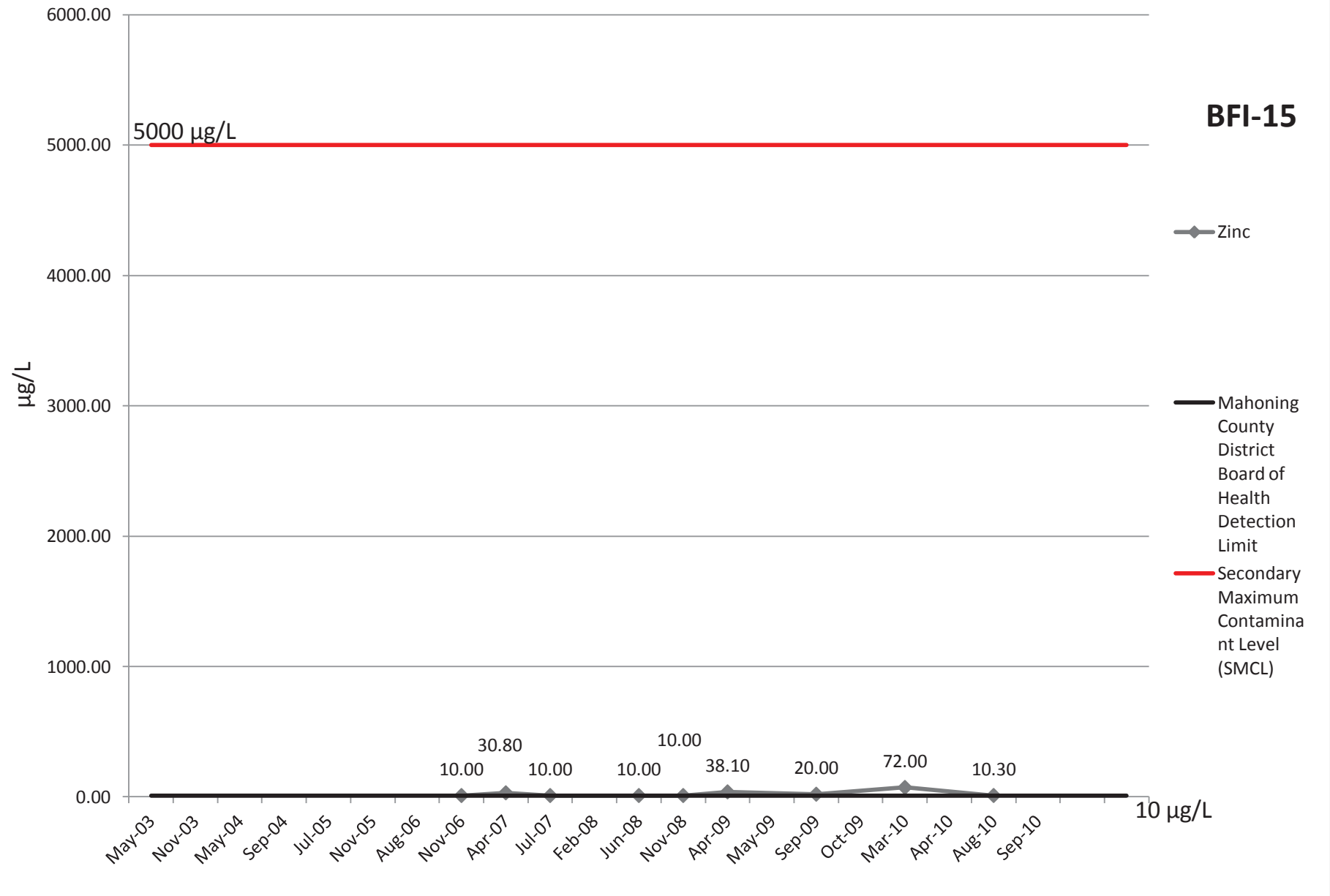
# Selenium



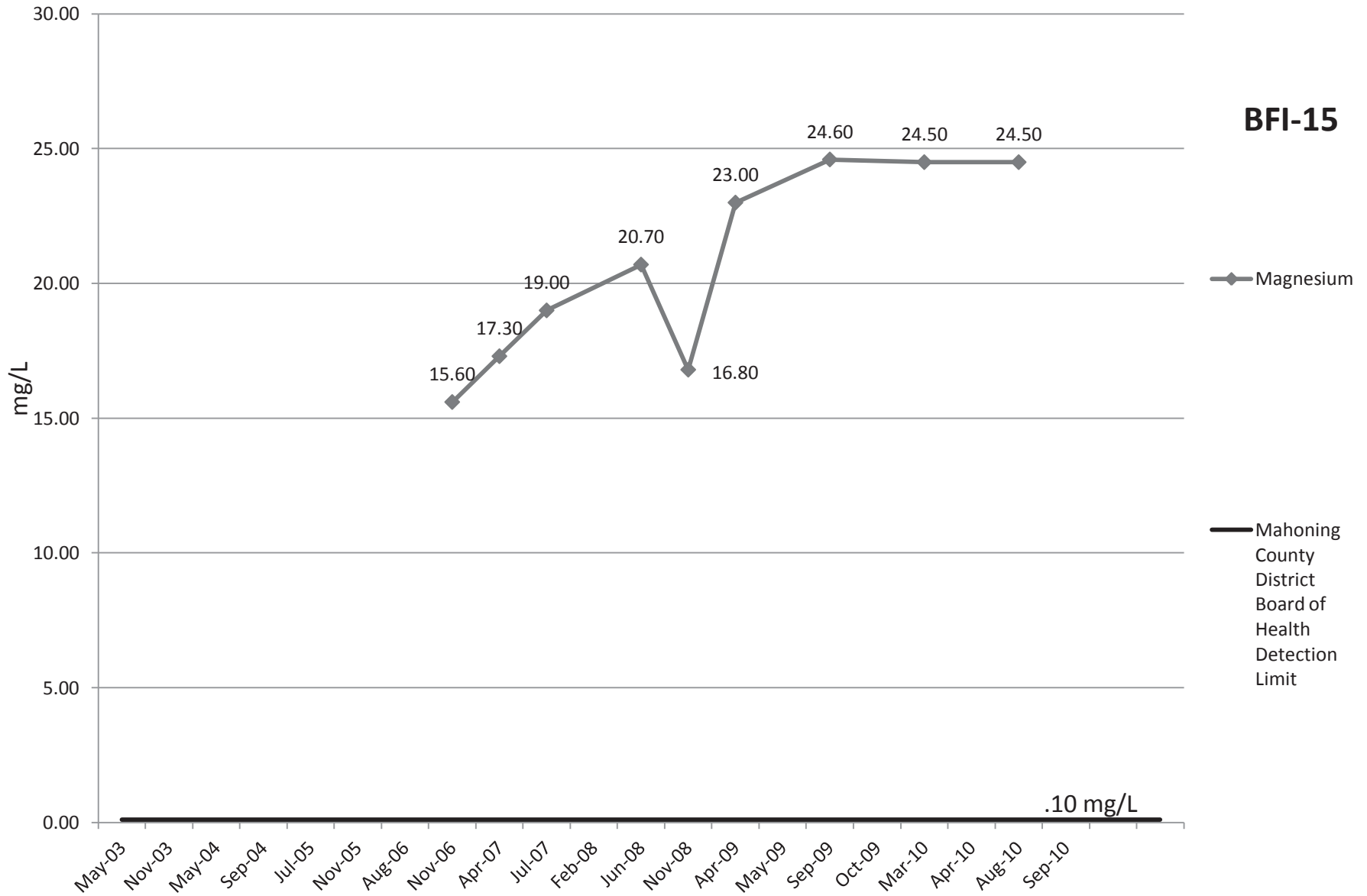
# Silver



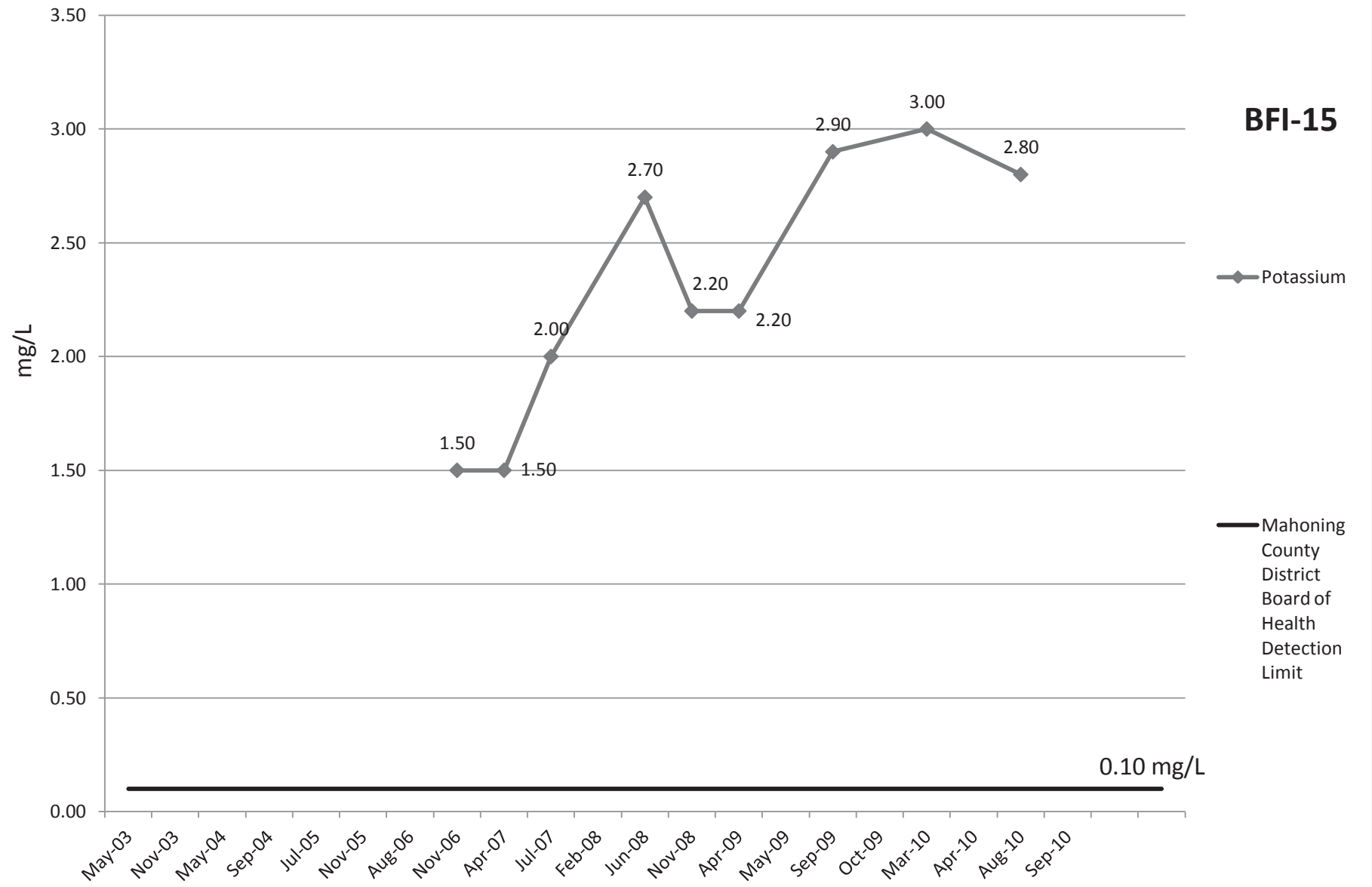
# Zinc



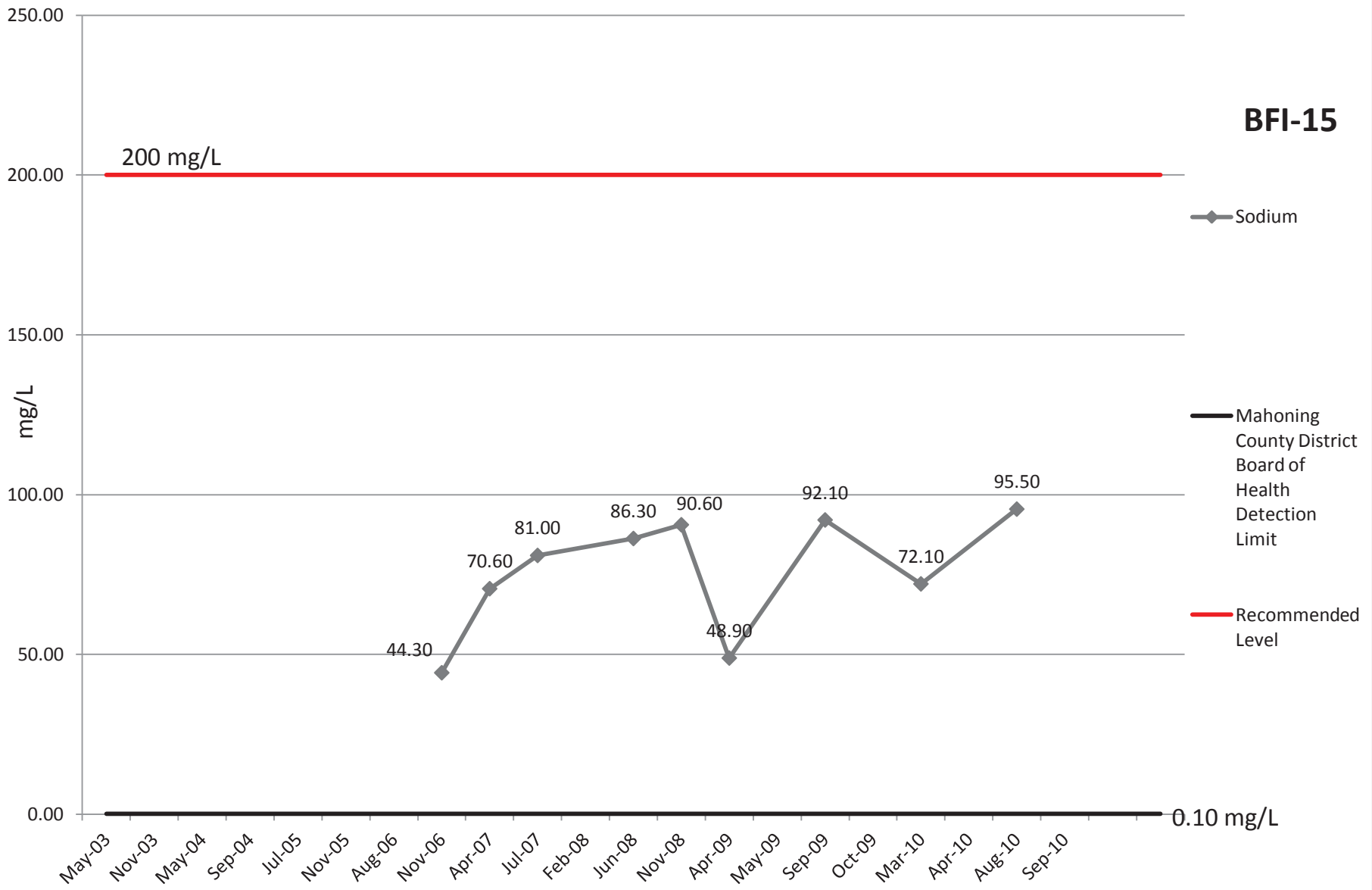
# Magnesium



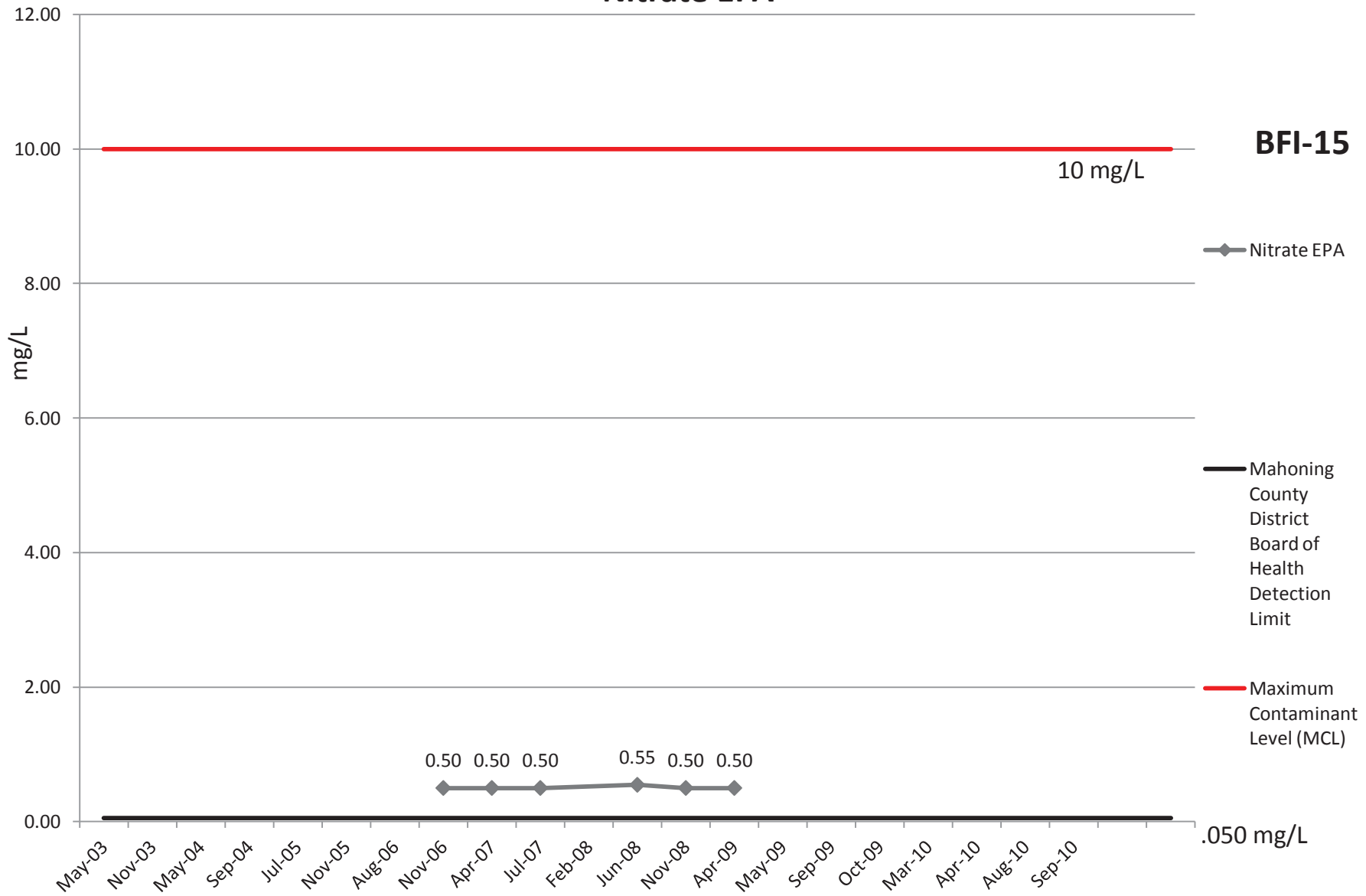
# Potassium



# Sodium



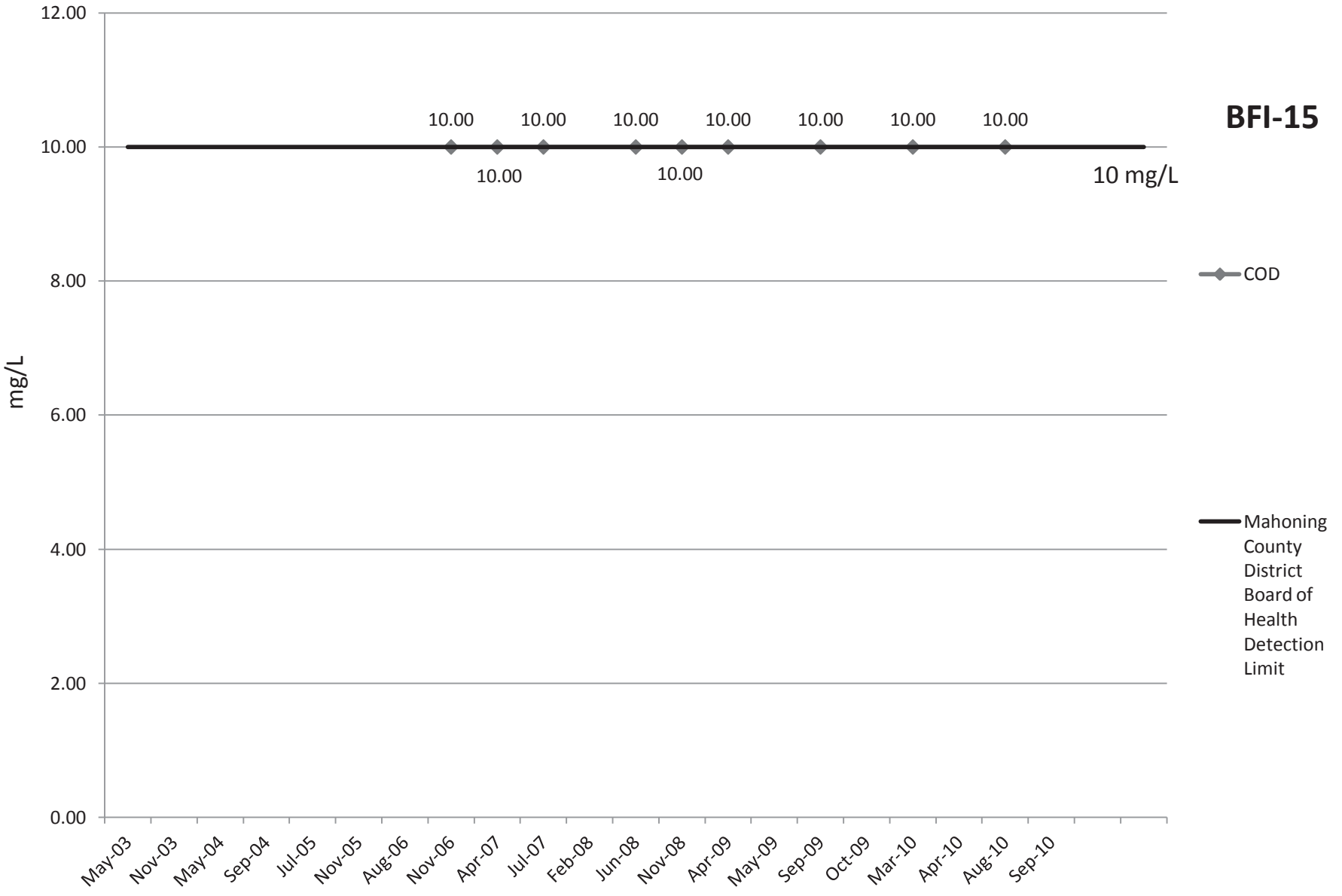
# Nitrate EPA



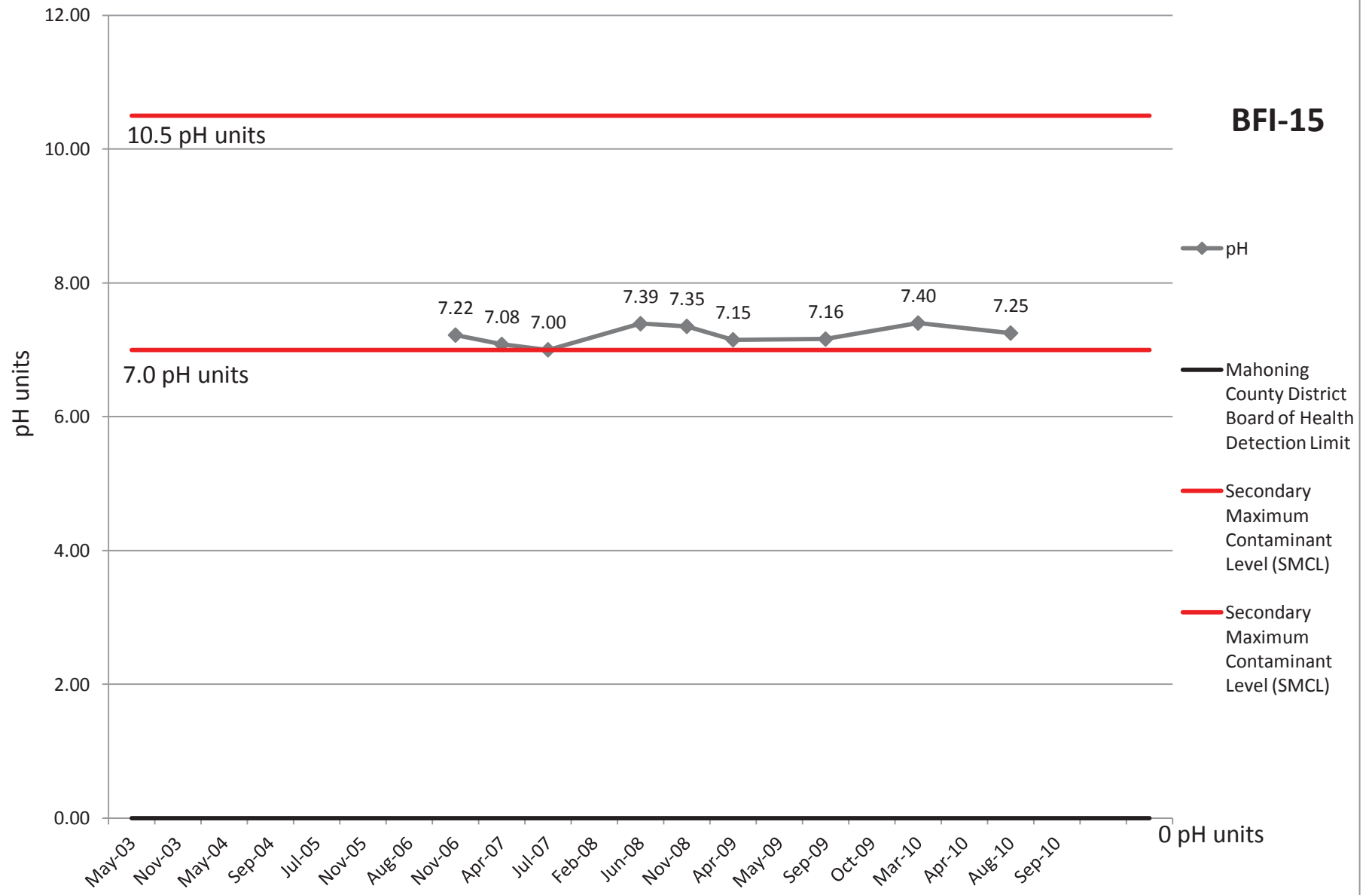


# COD

**BFI-15**

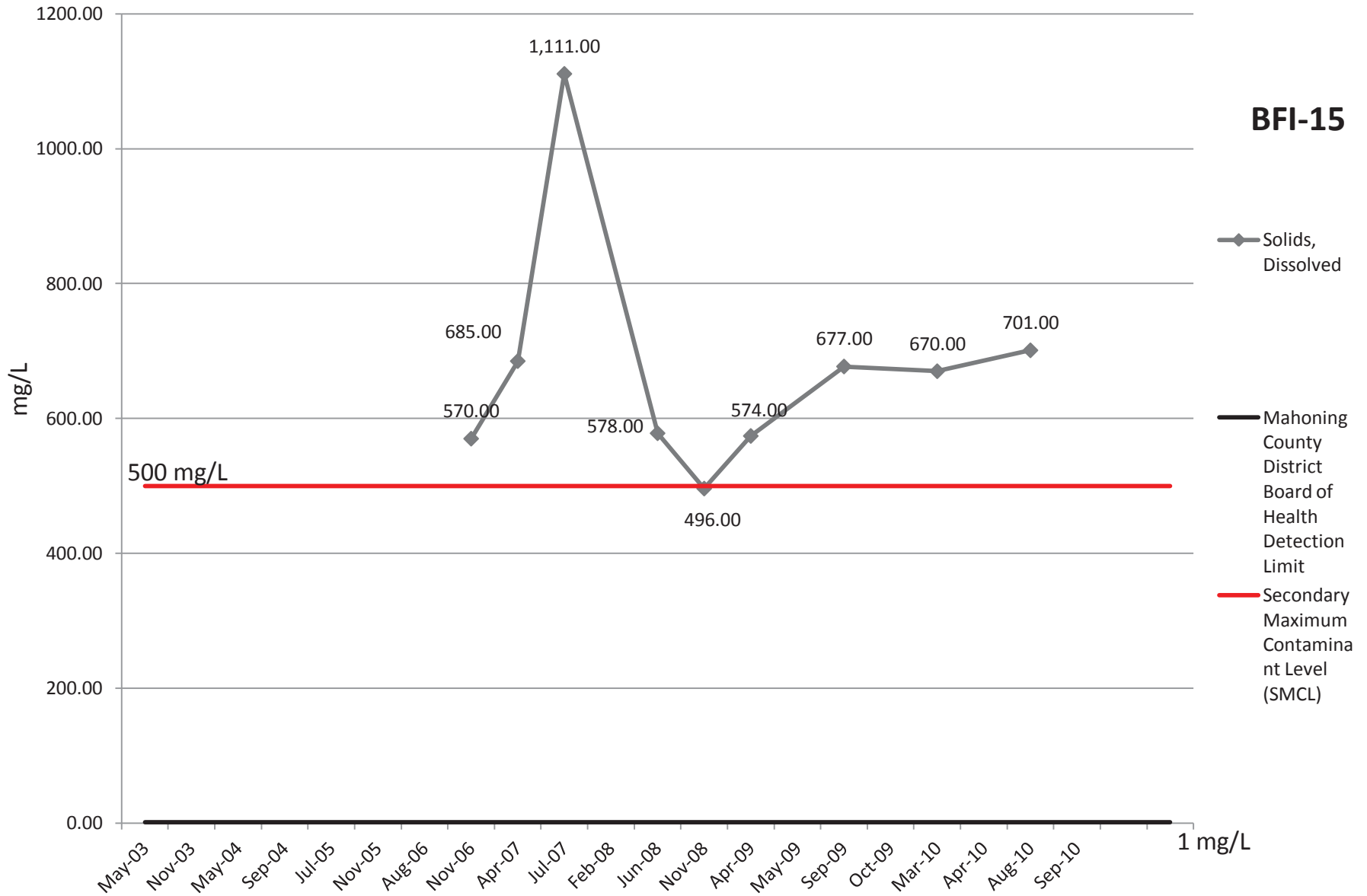


# pH

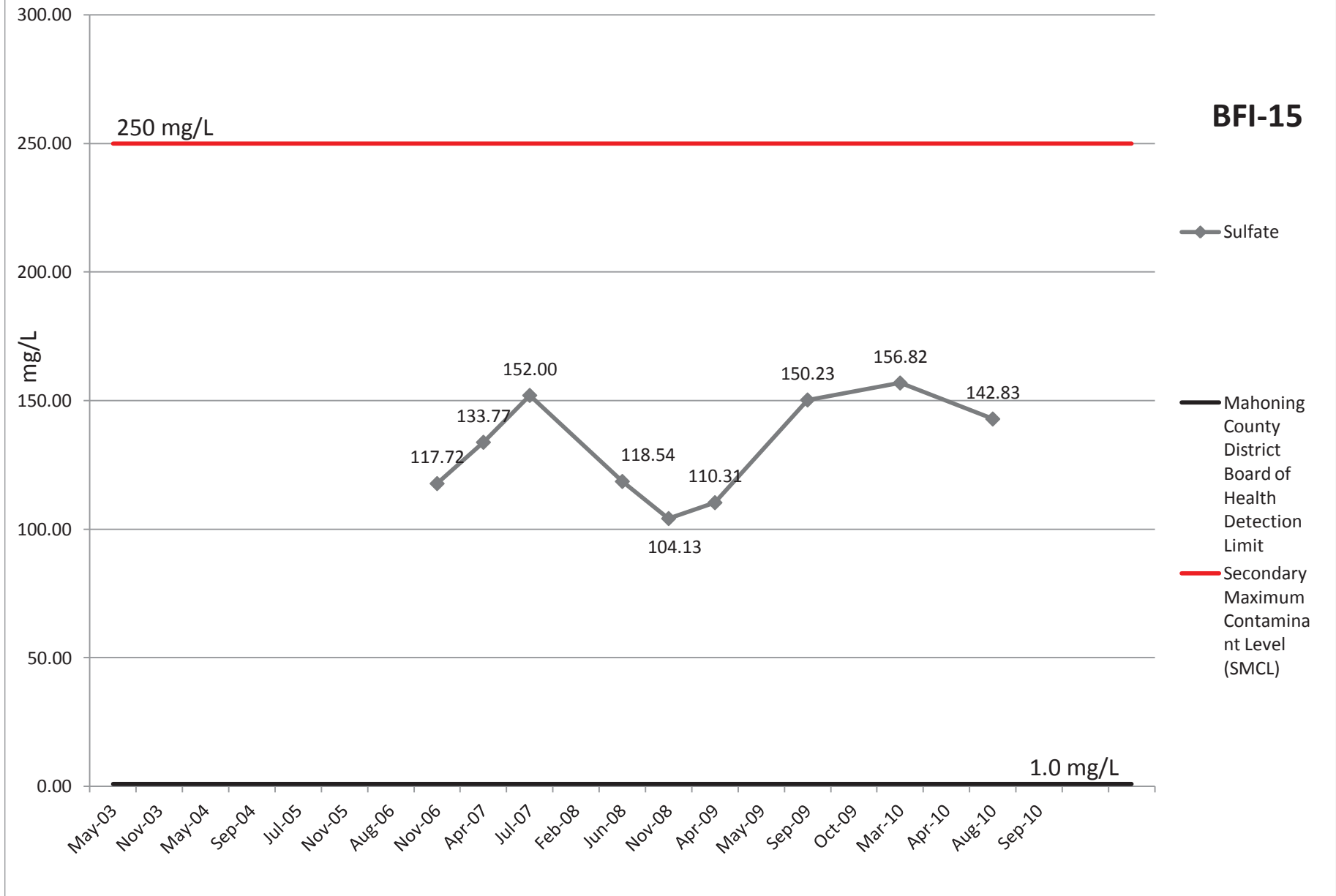


# Solids, Dissolved

**BFI-15**



# Sulfate



# Bacteria

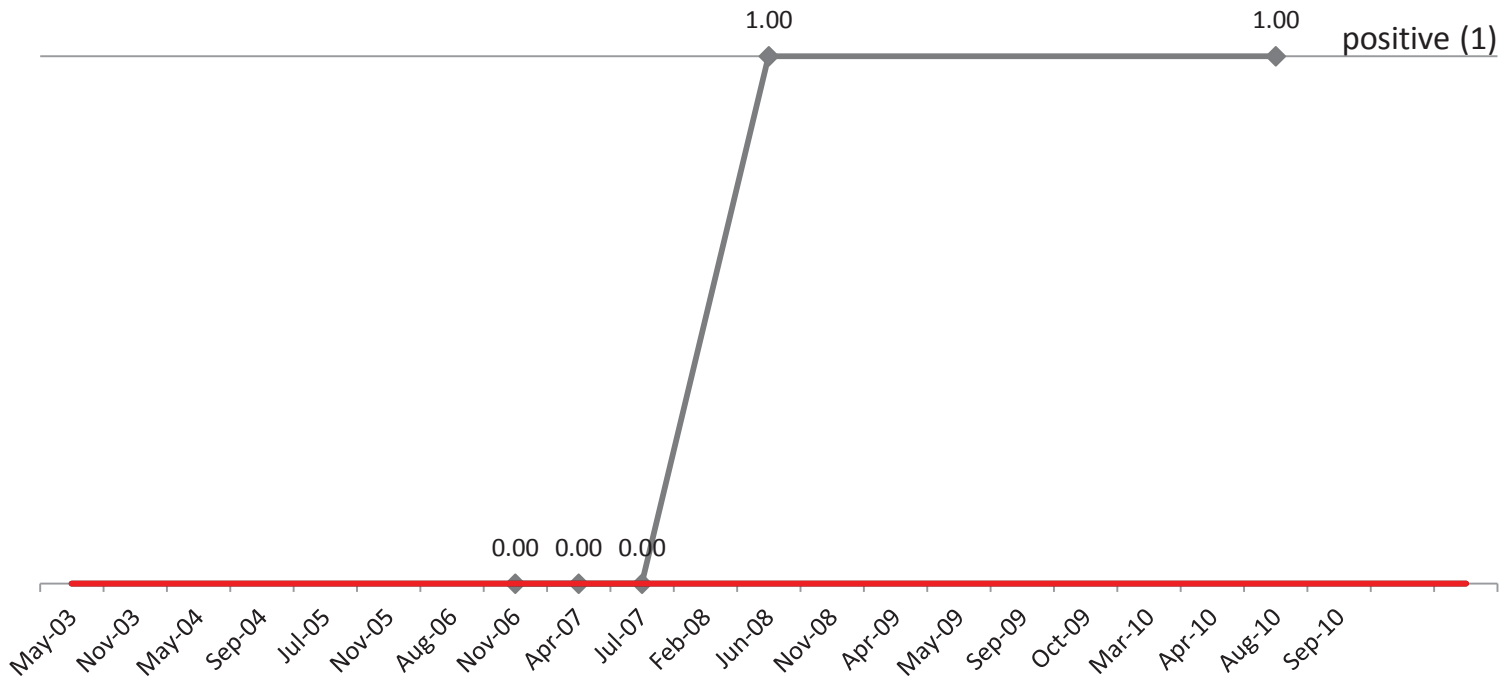
## BFI-15

Positive/Negative

◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

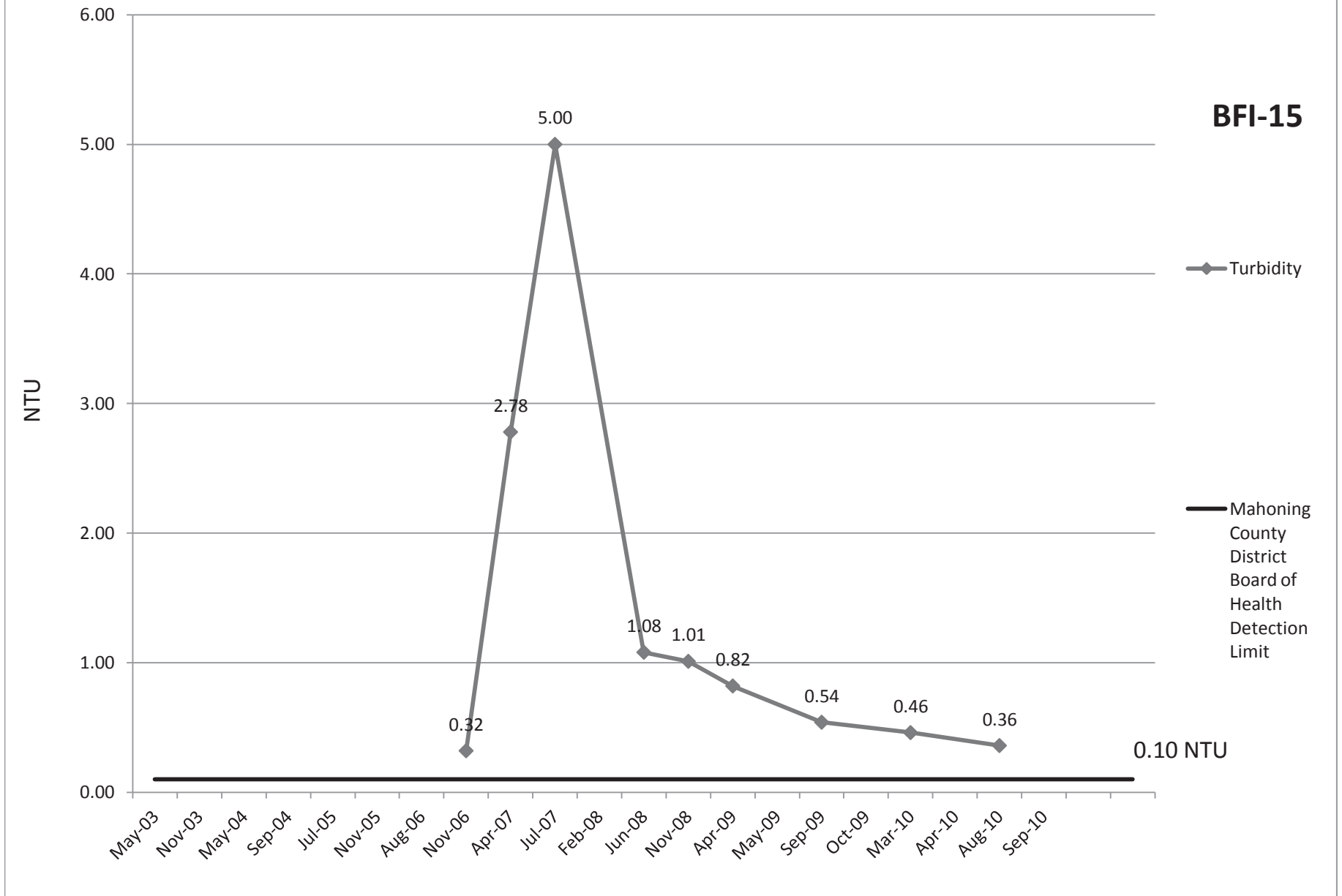
— Maximum  
Contaminant  
Level (MCL)



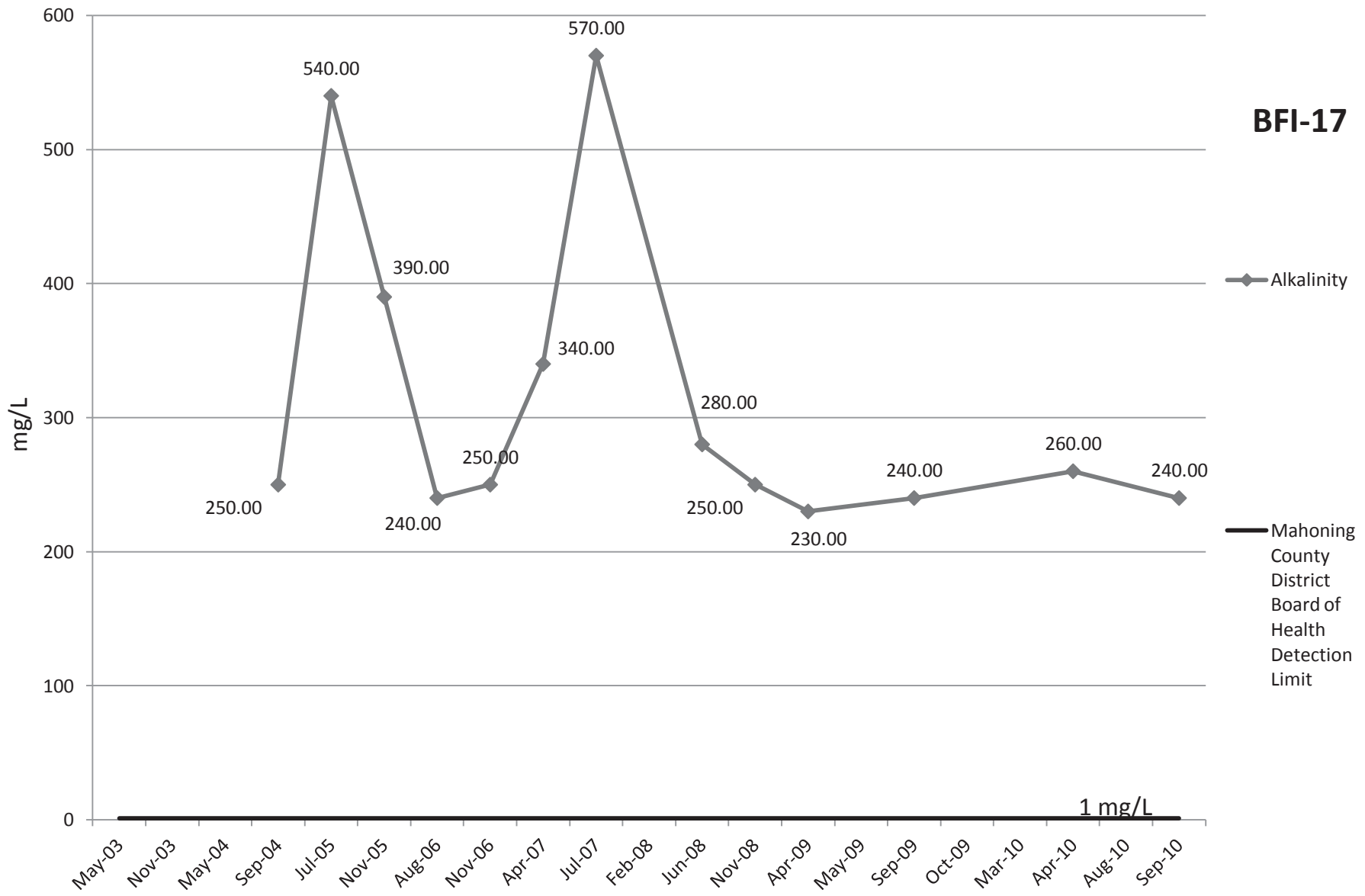
negative (0)

positive (1)

# Turbidity

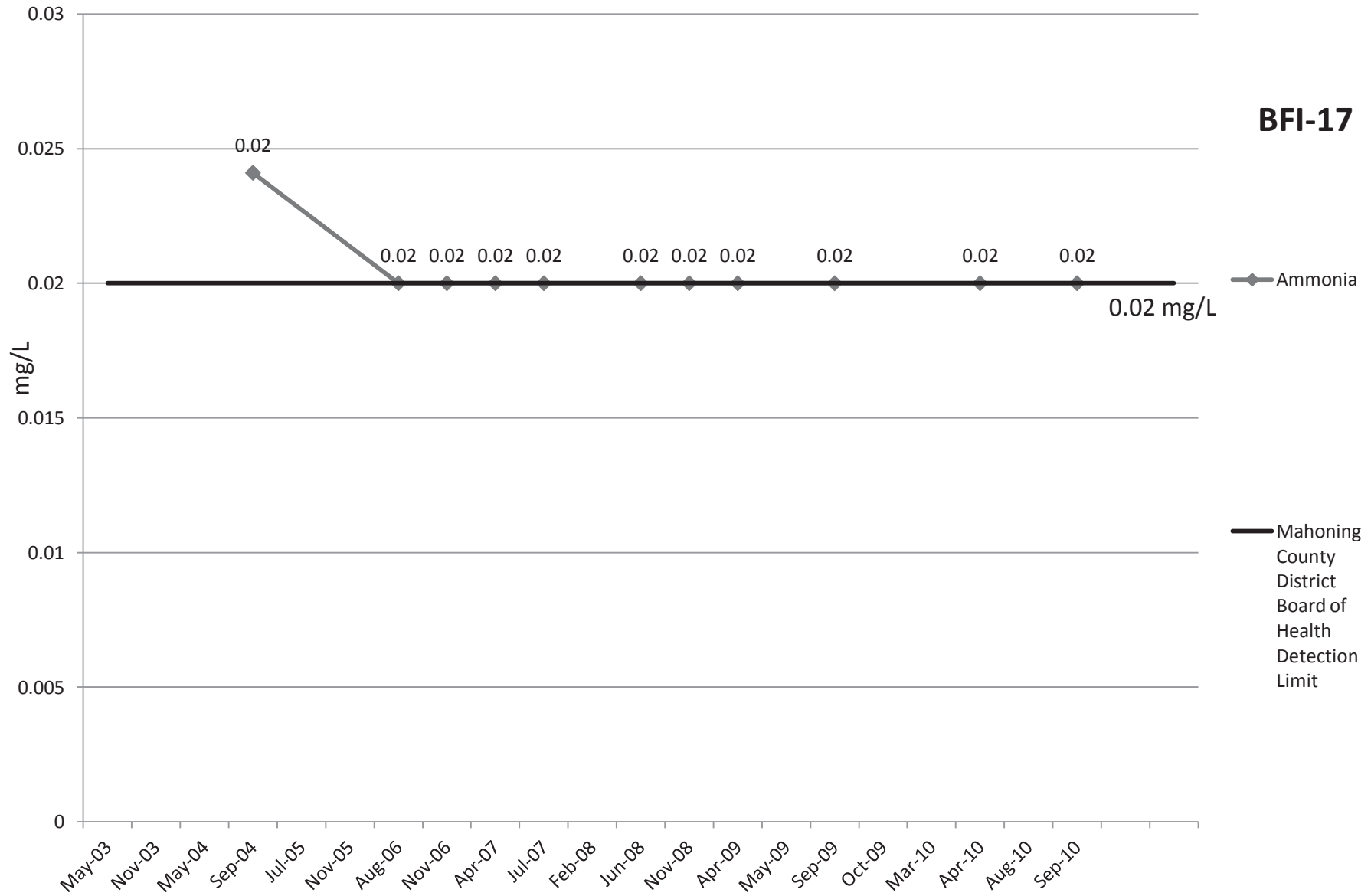


# Alkalinity



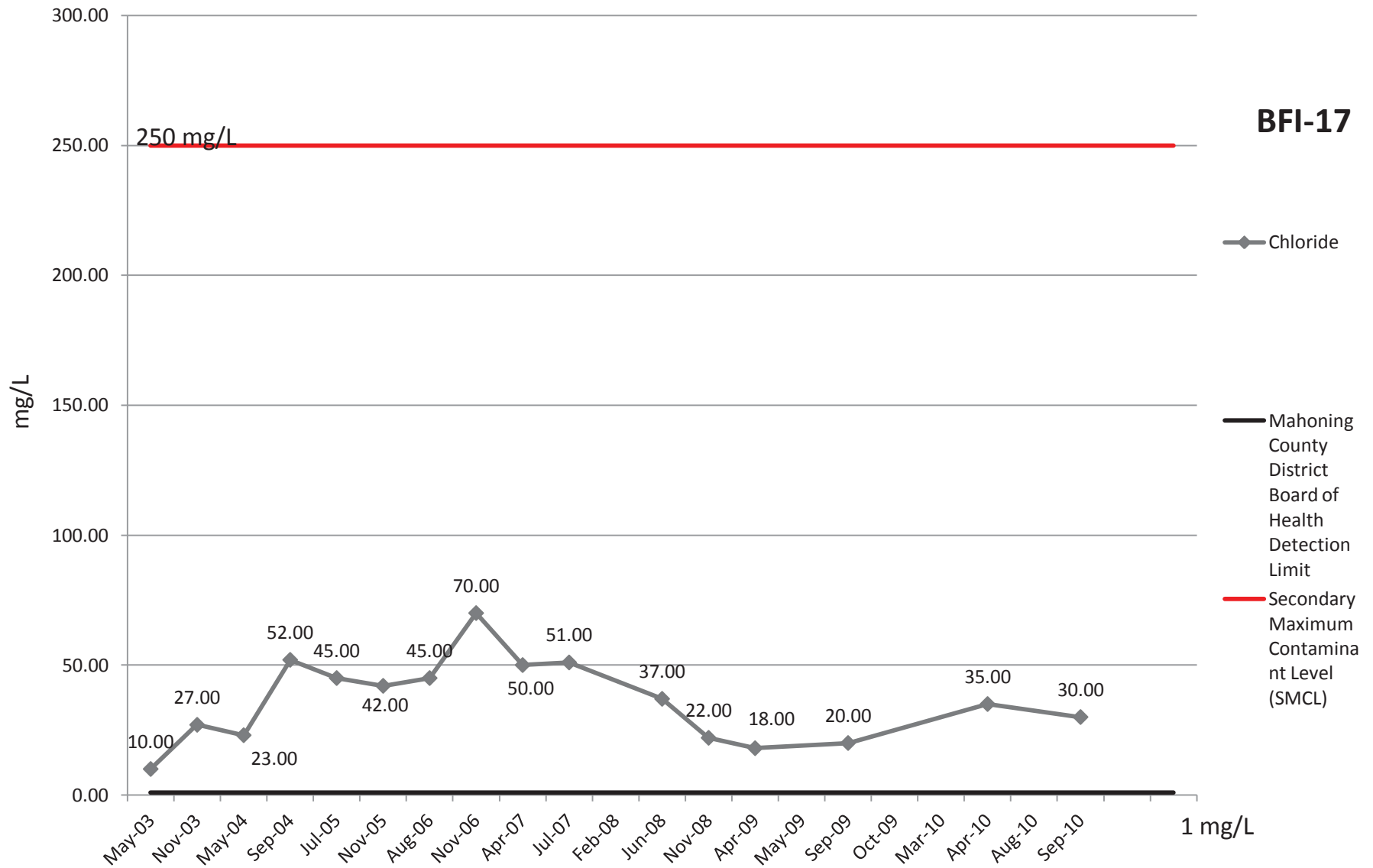
# Ammonia

**BFI-17**



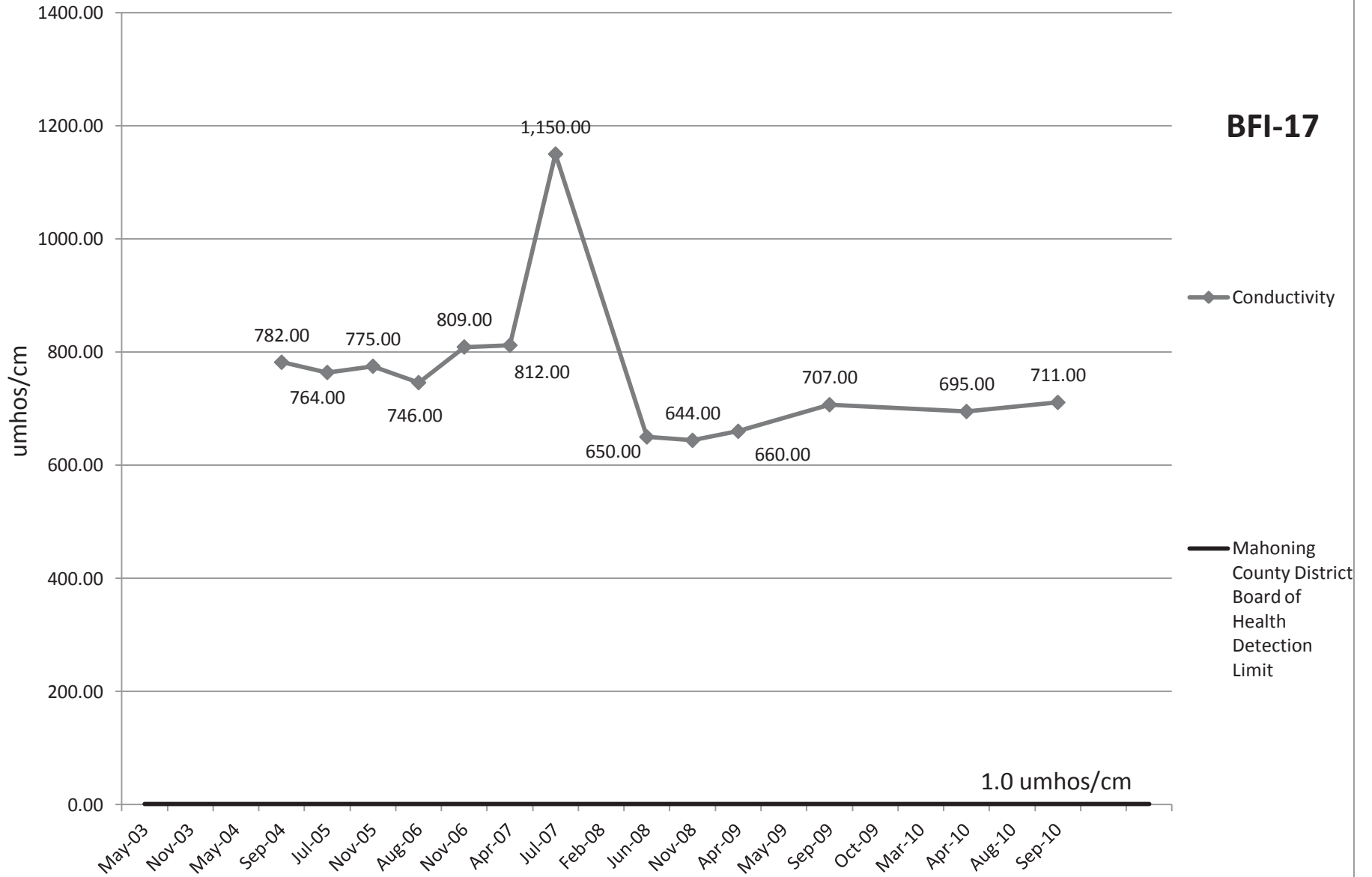


# Chloride

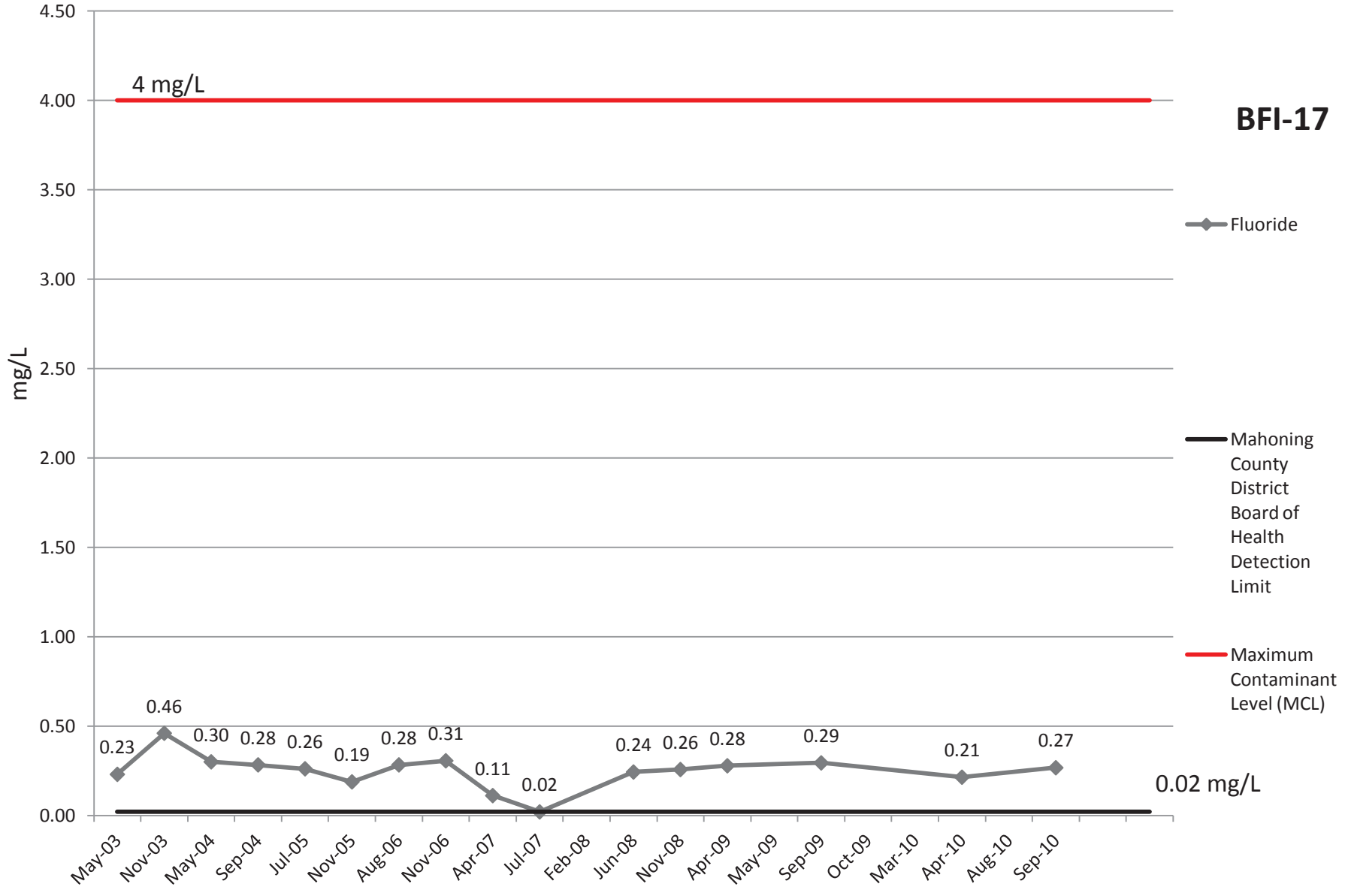


# Conductivity

**BFI-17**

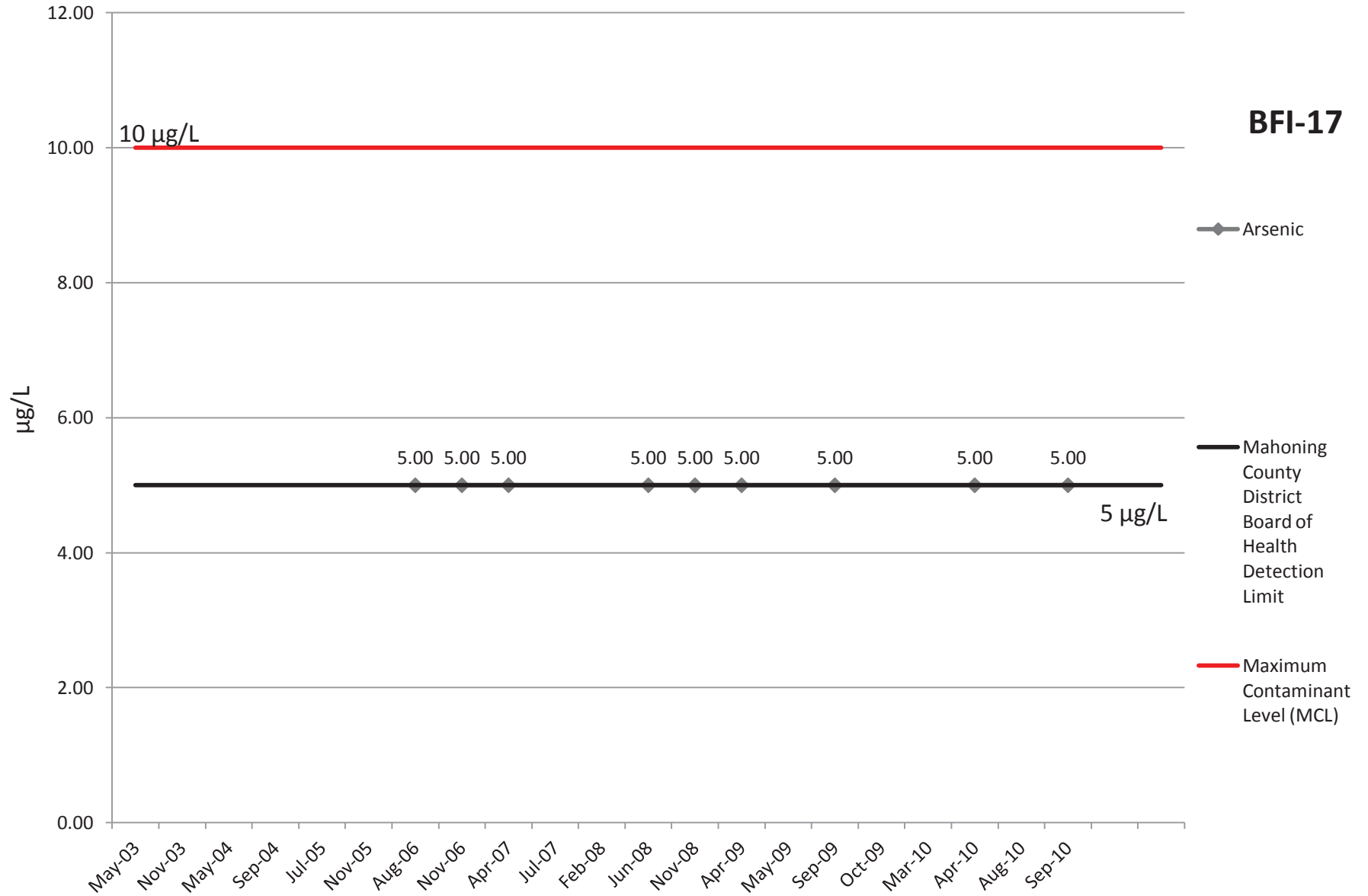


# Fluoride



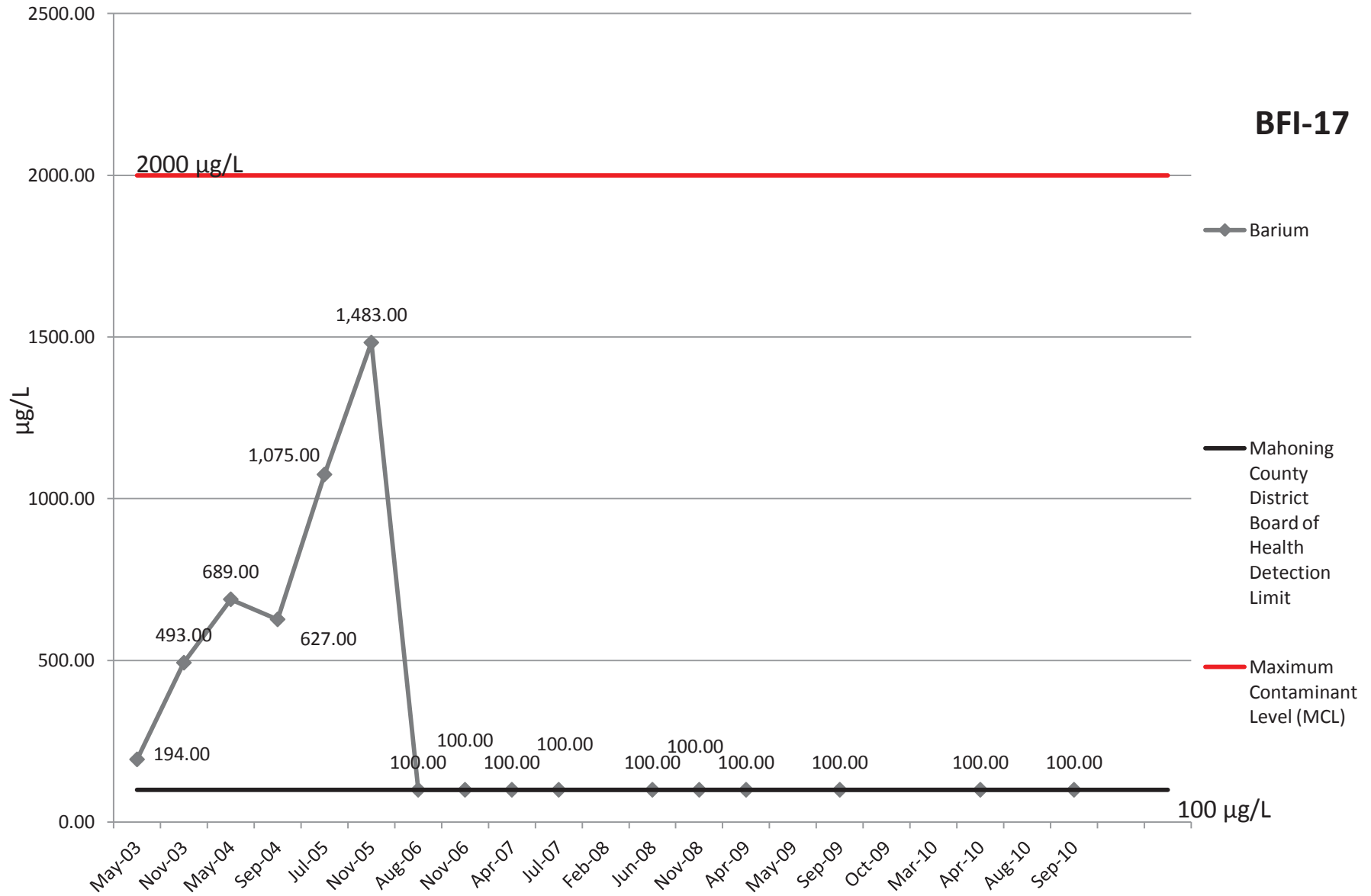
# Arsenic

**BFI-17**



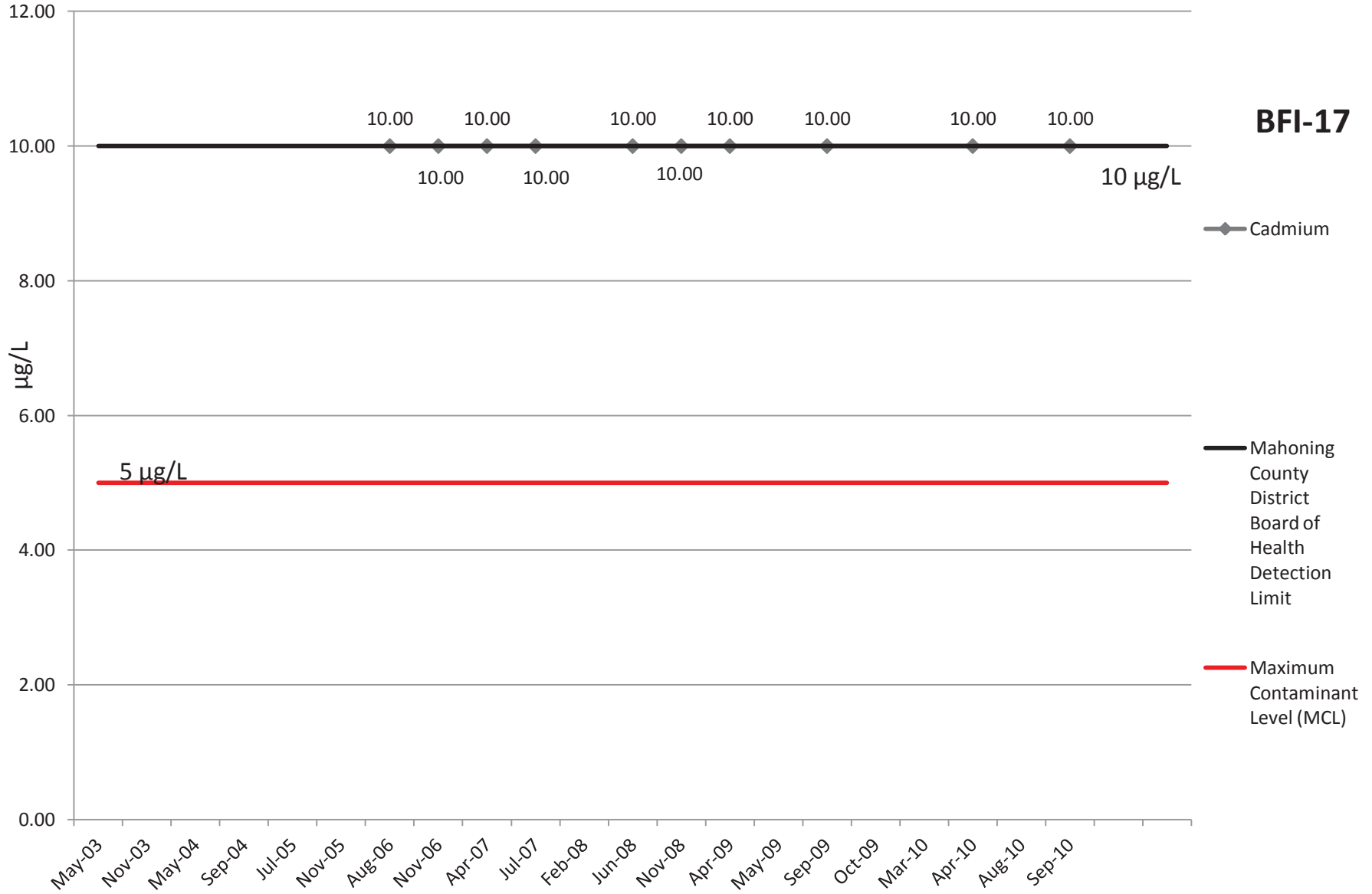
# Barium

**BFI-17**



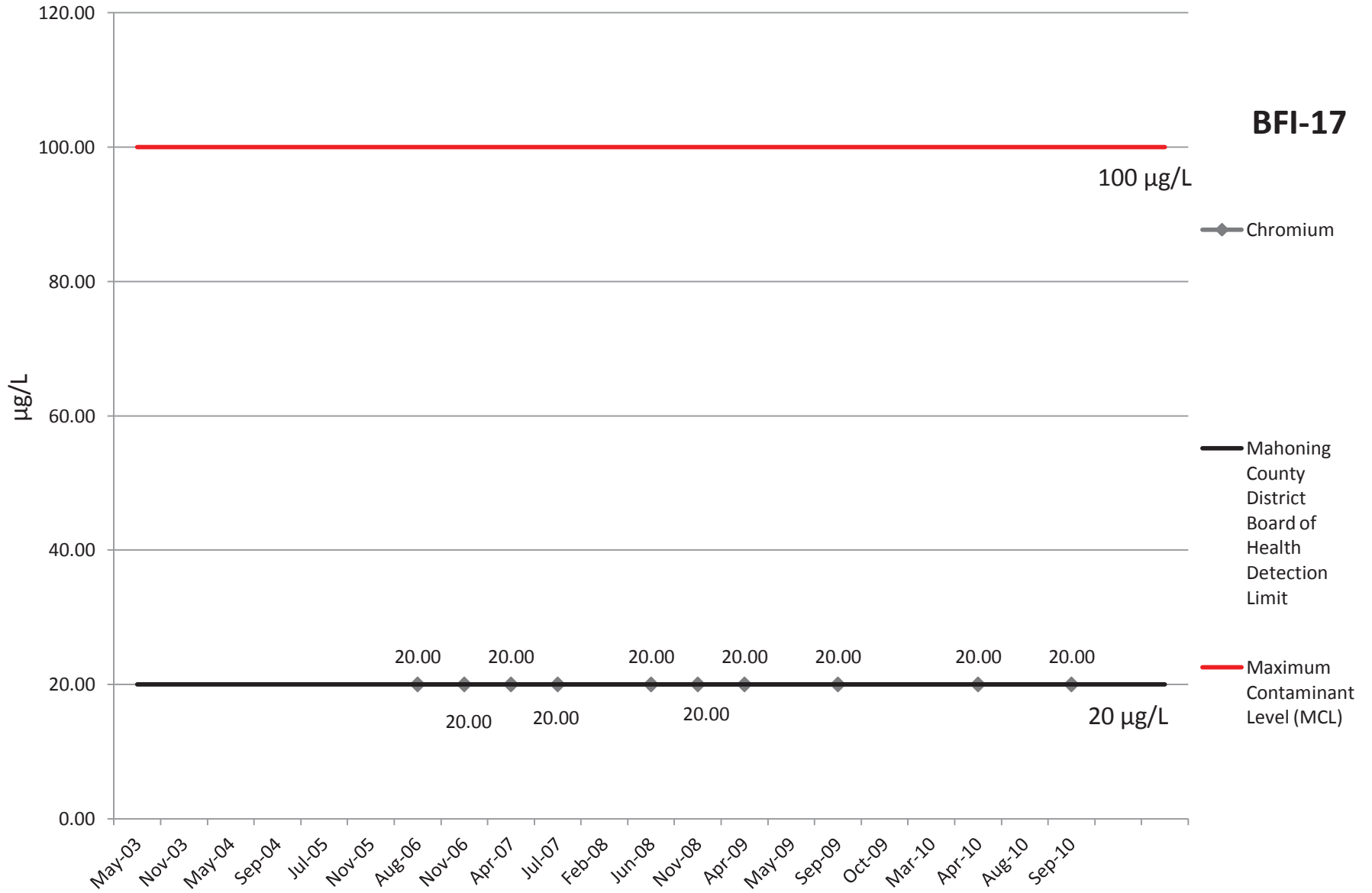
# Cadmium

**BFI-17**

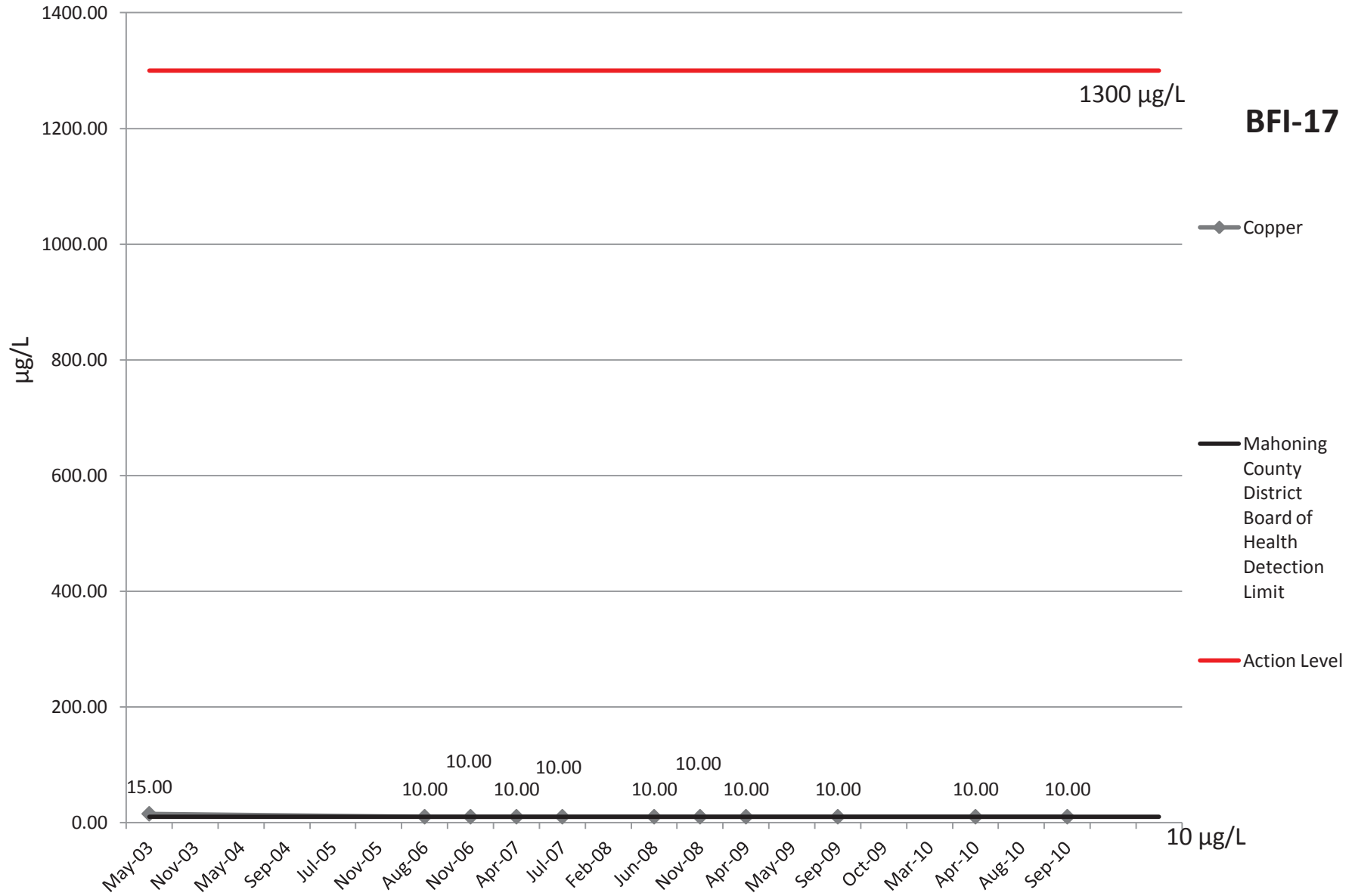


# Chromium

**BFI-17**



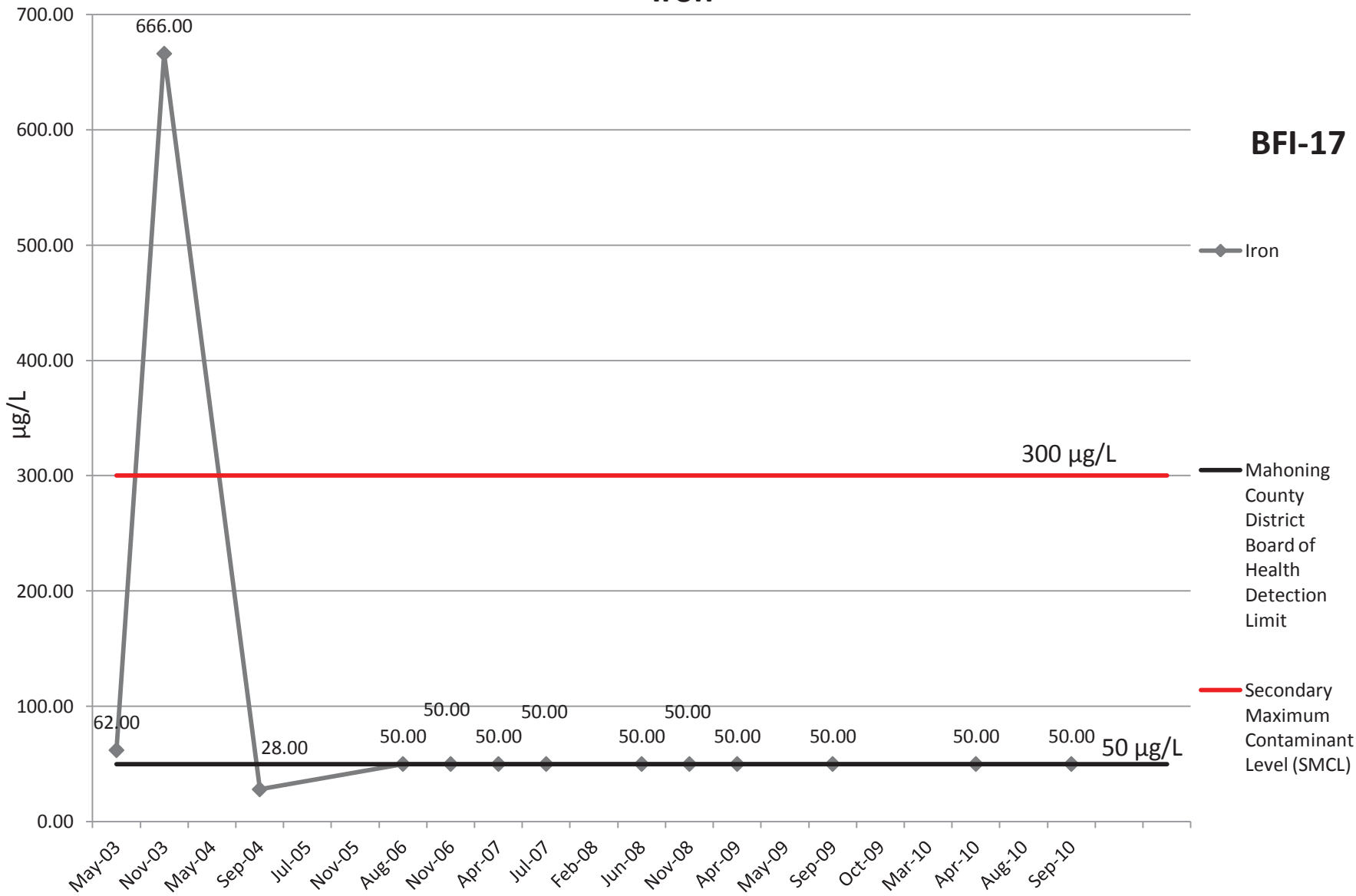
# Copper





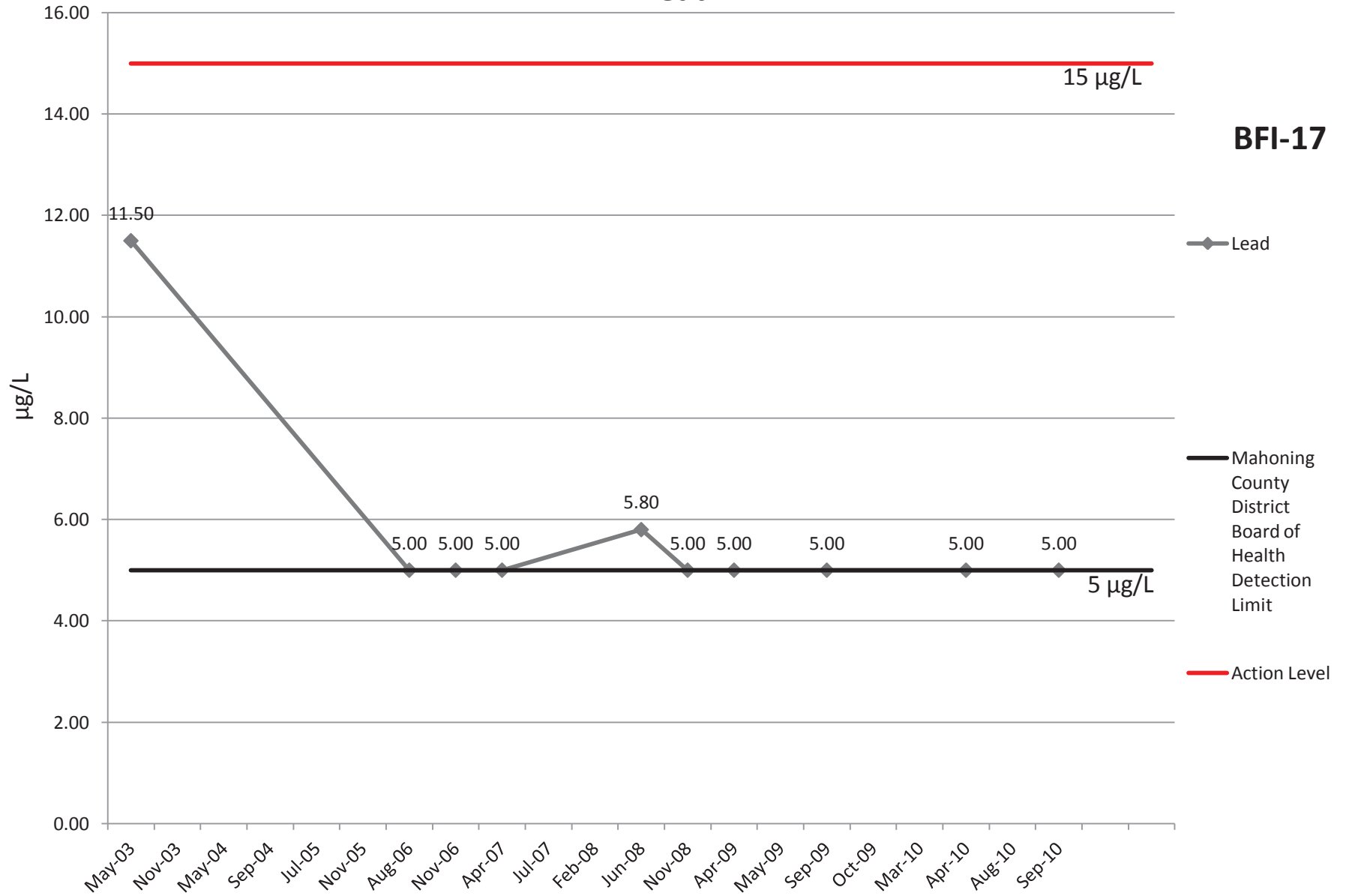
# Iron

**BFI-17**

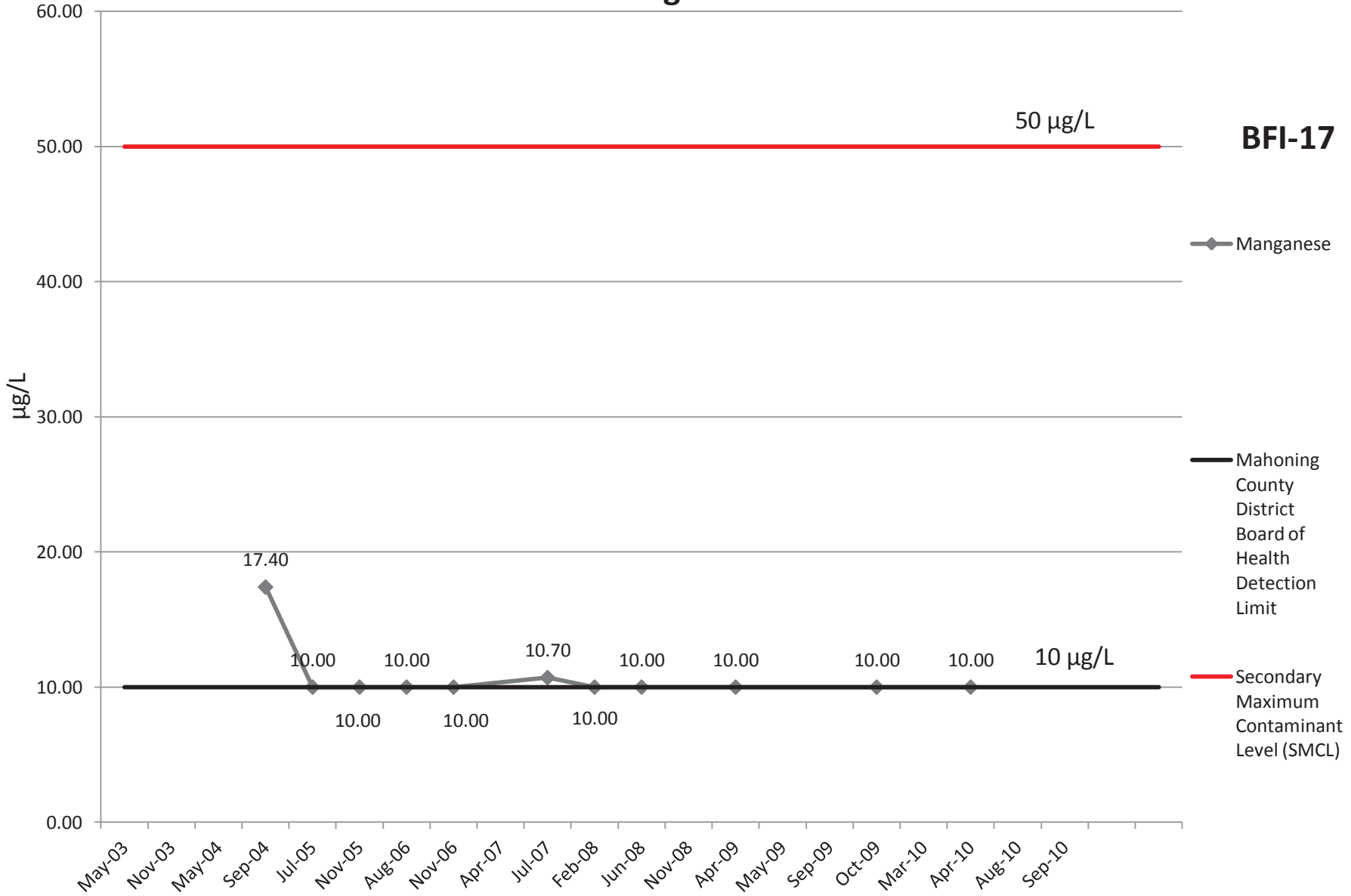


# Lead

**BFI-17**

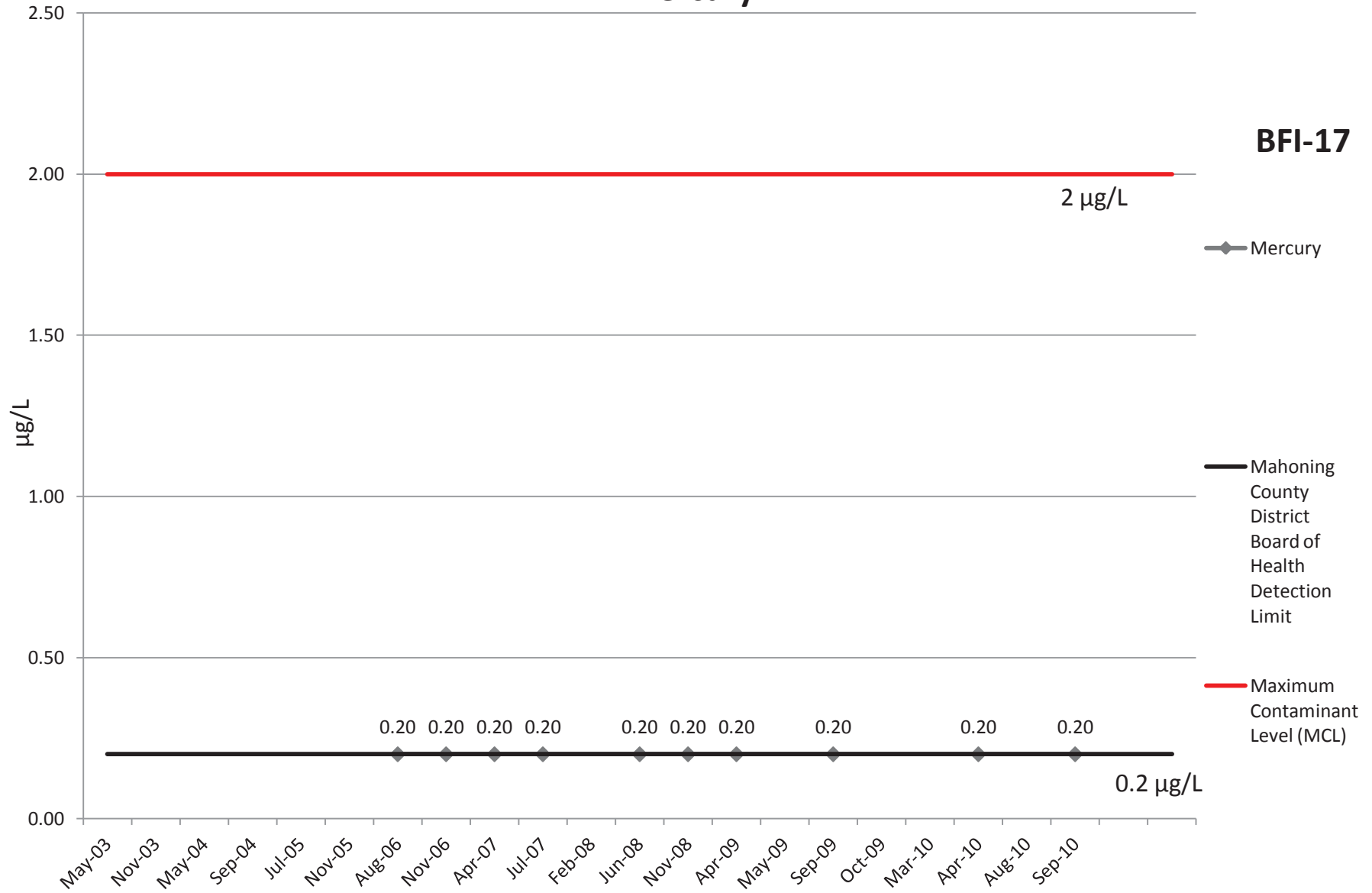


# Manganese

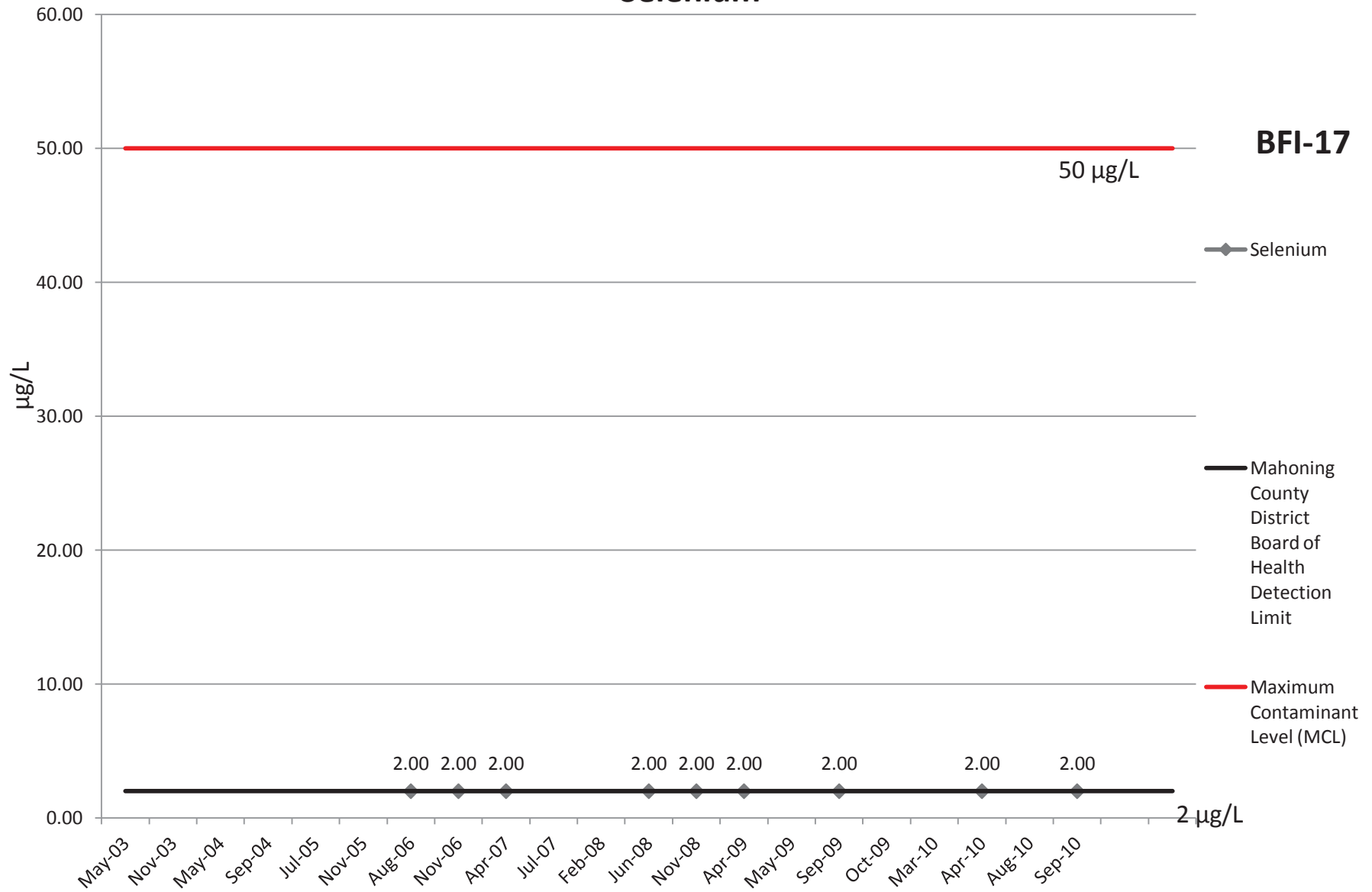


# Mercury

**BFI-17**

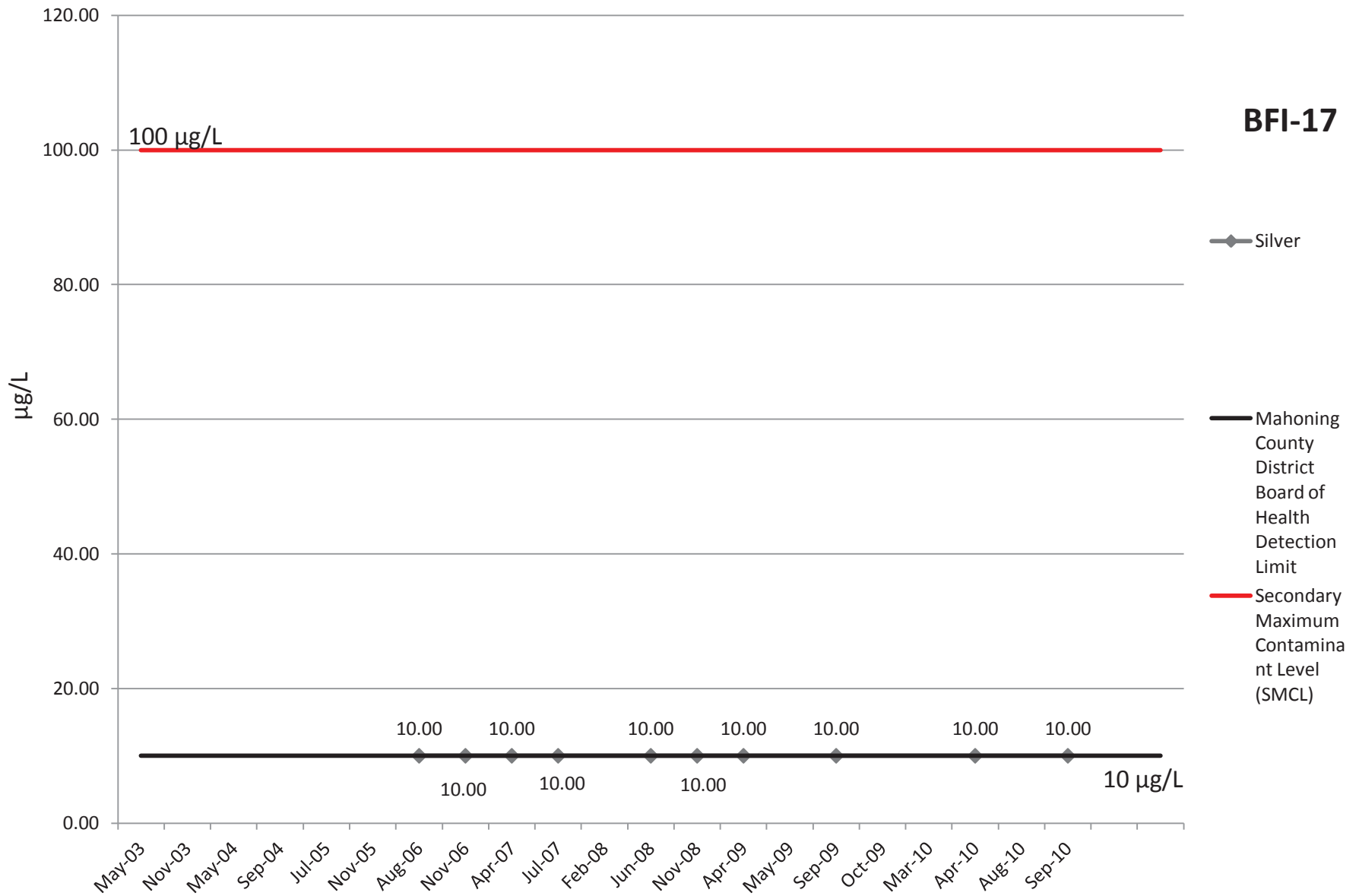


# Selenium

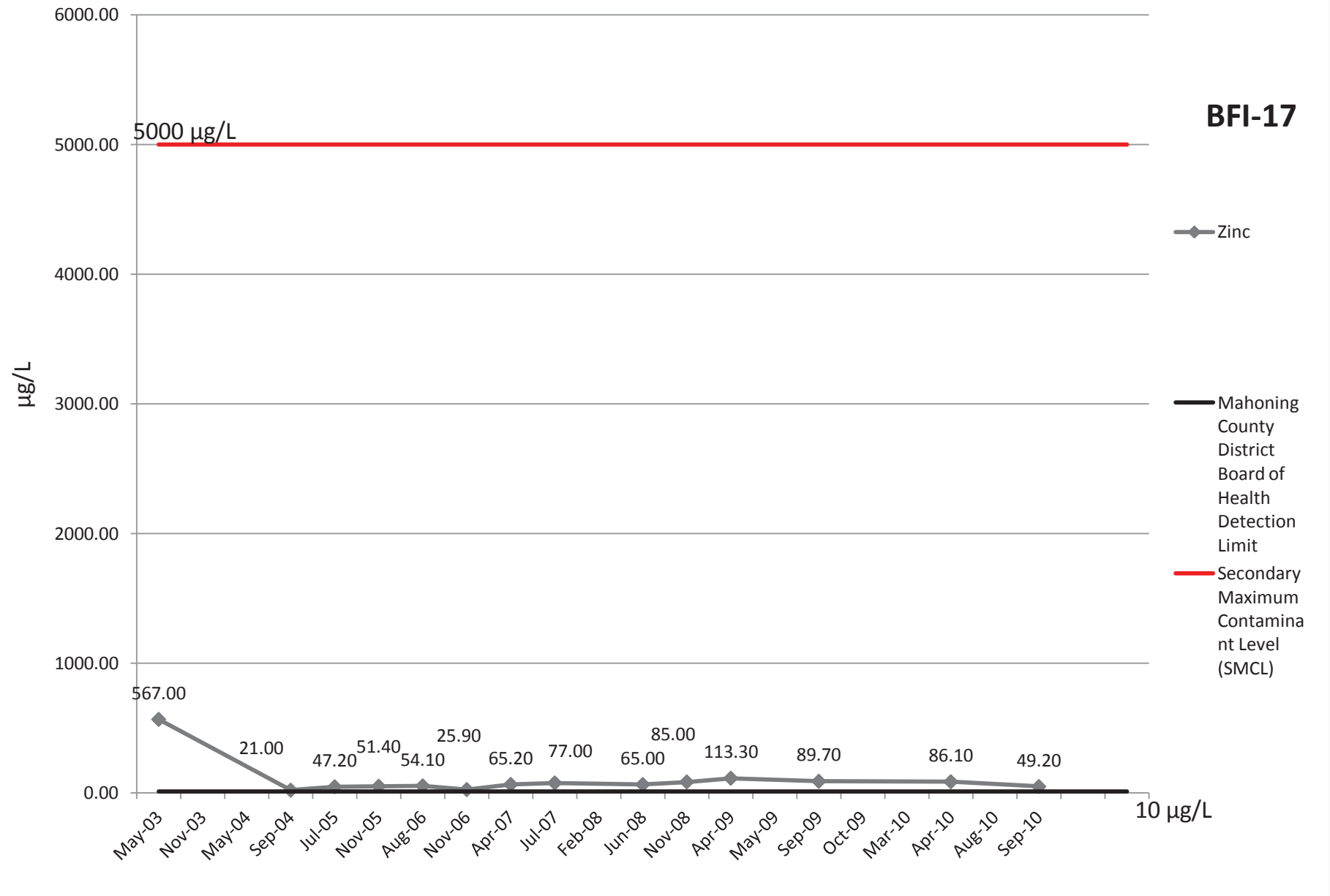


# Silver

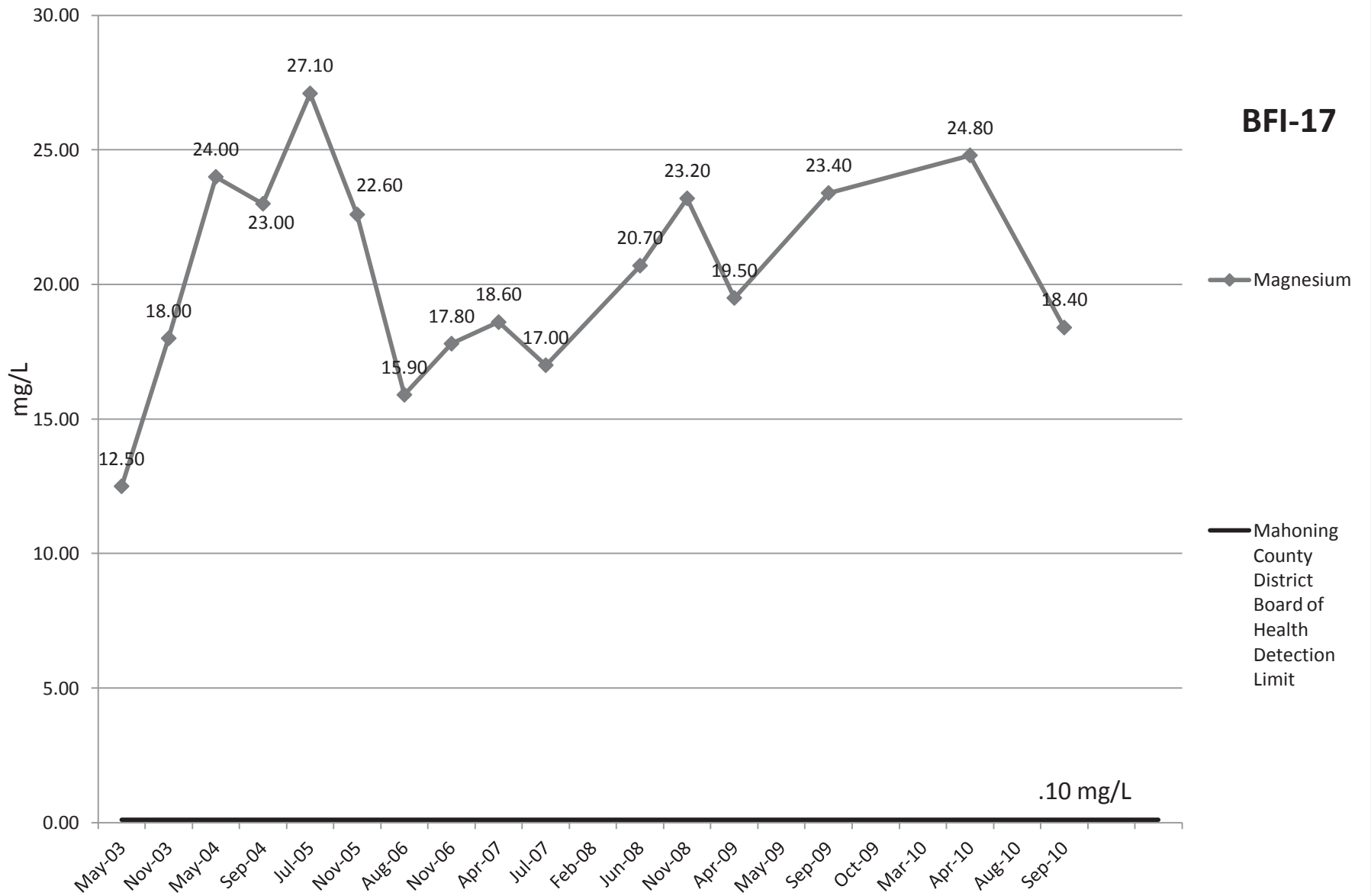
**BFI-17**



# Zinc

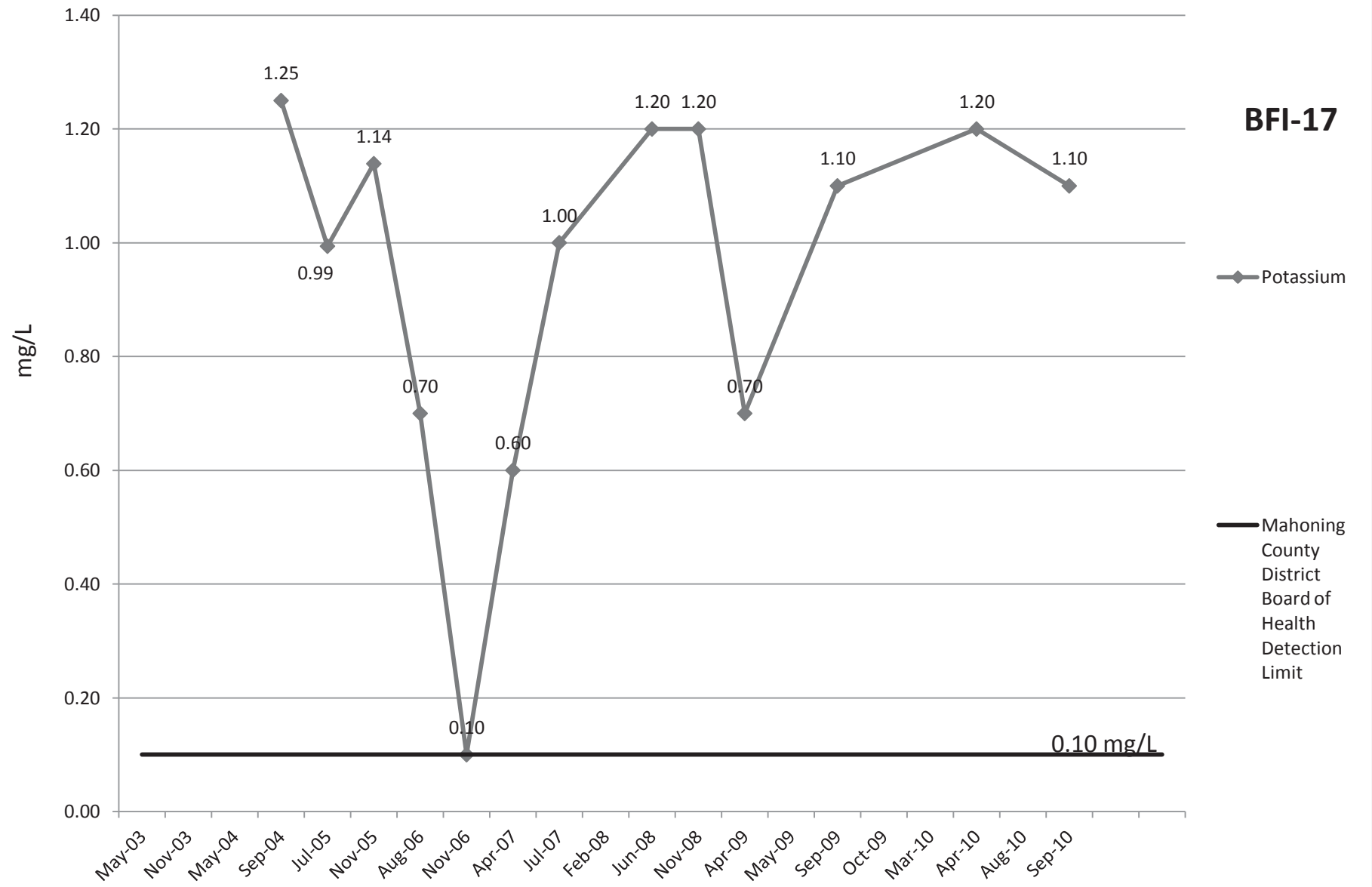


# Magnesium



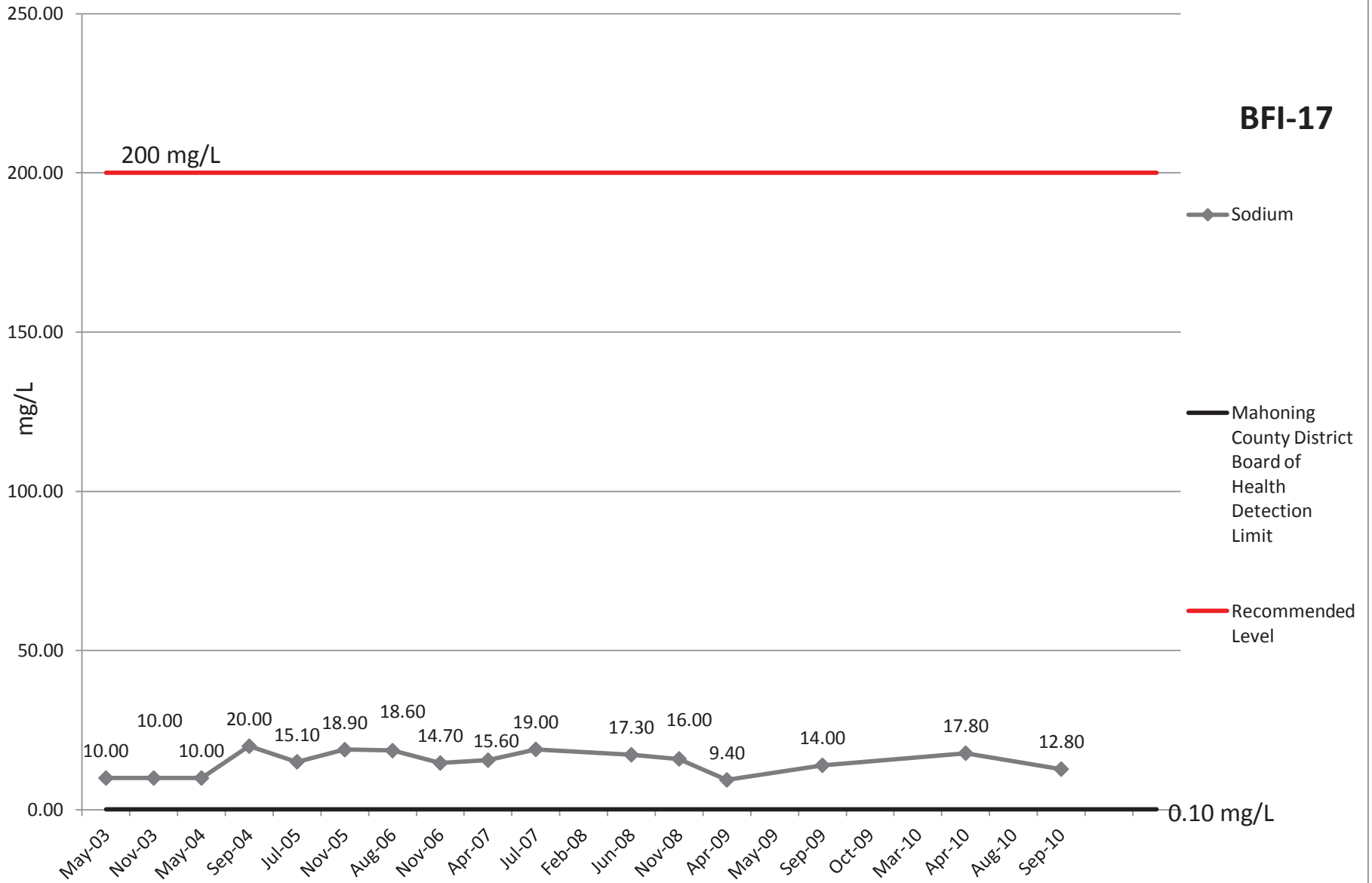


# Potassium



# Sodium

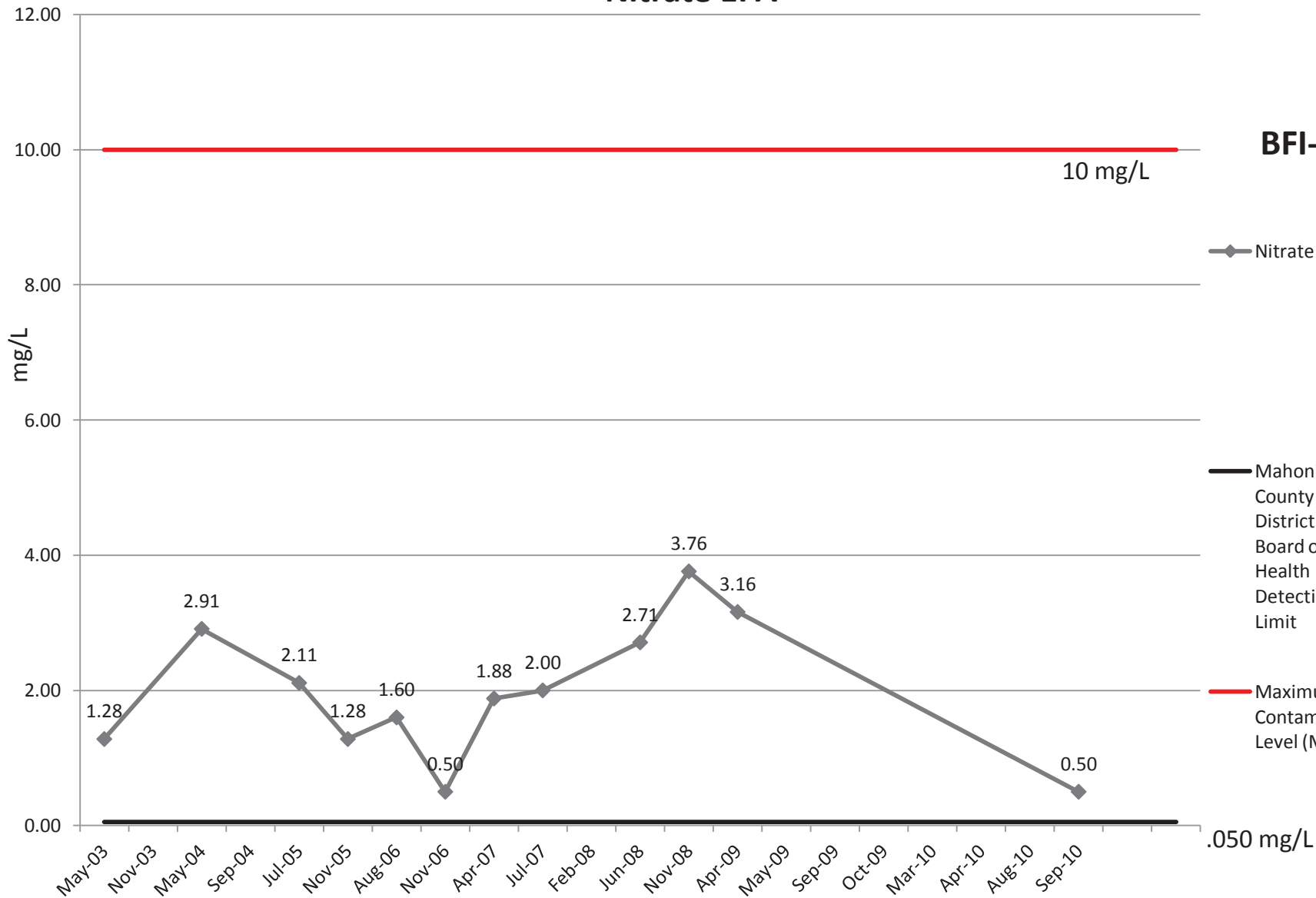
**BFI-17**



# Nitrate EPA

**BFI-17**

10 mg/L



◆ Nitrate EPA

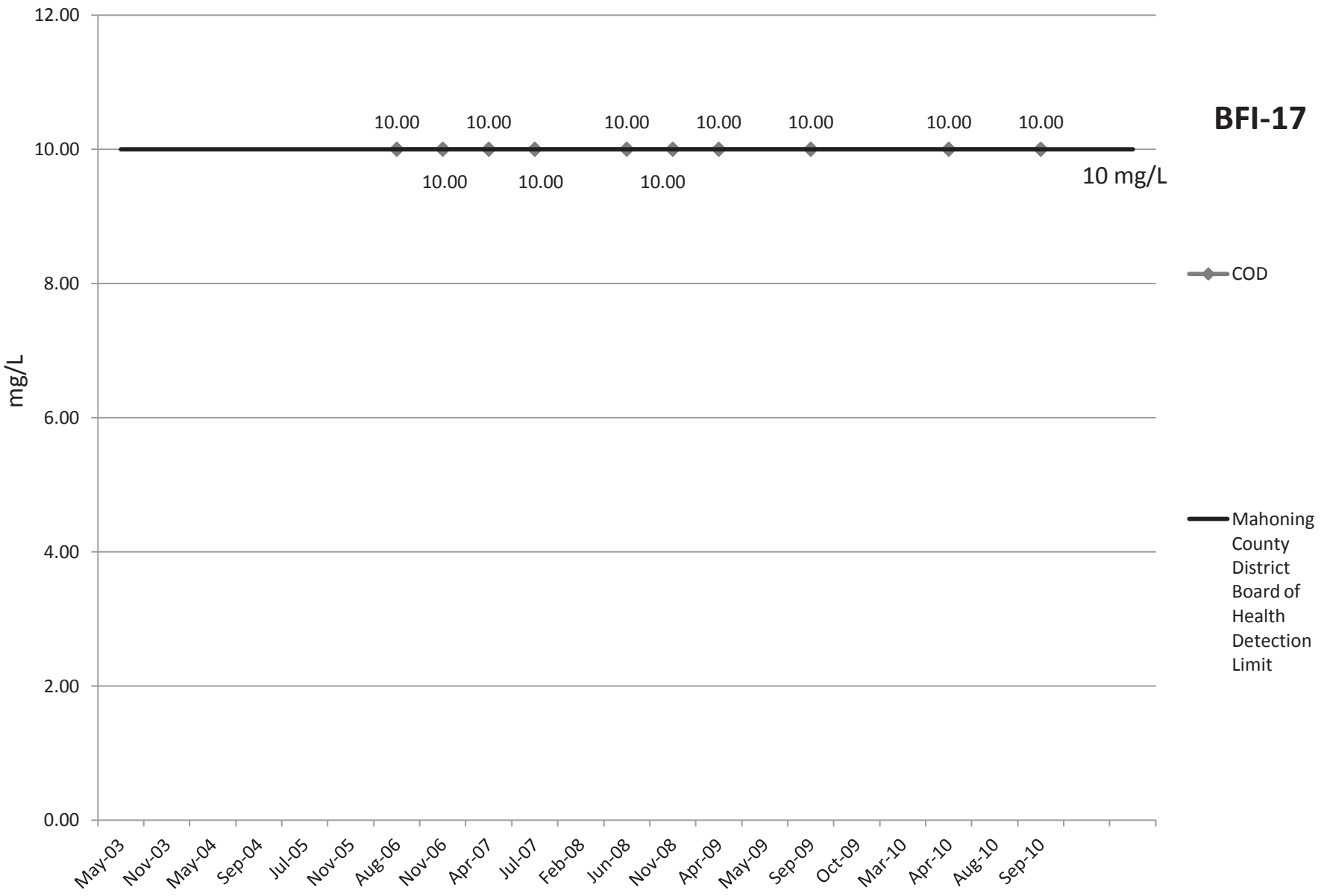
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

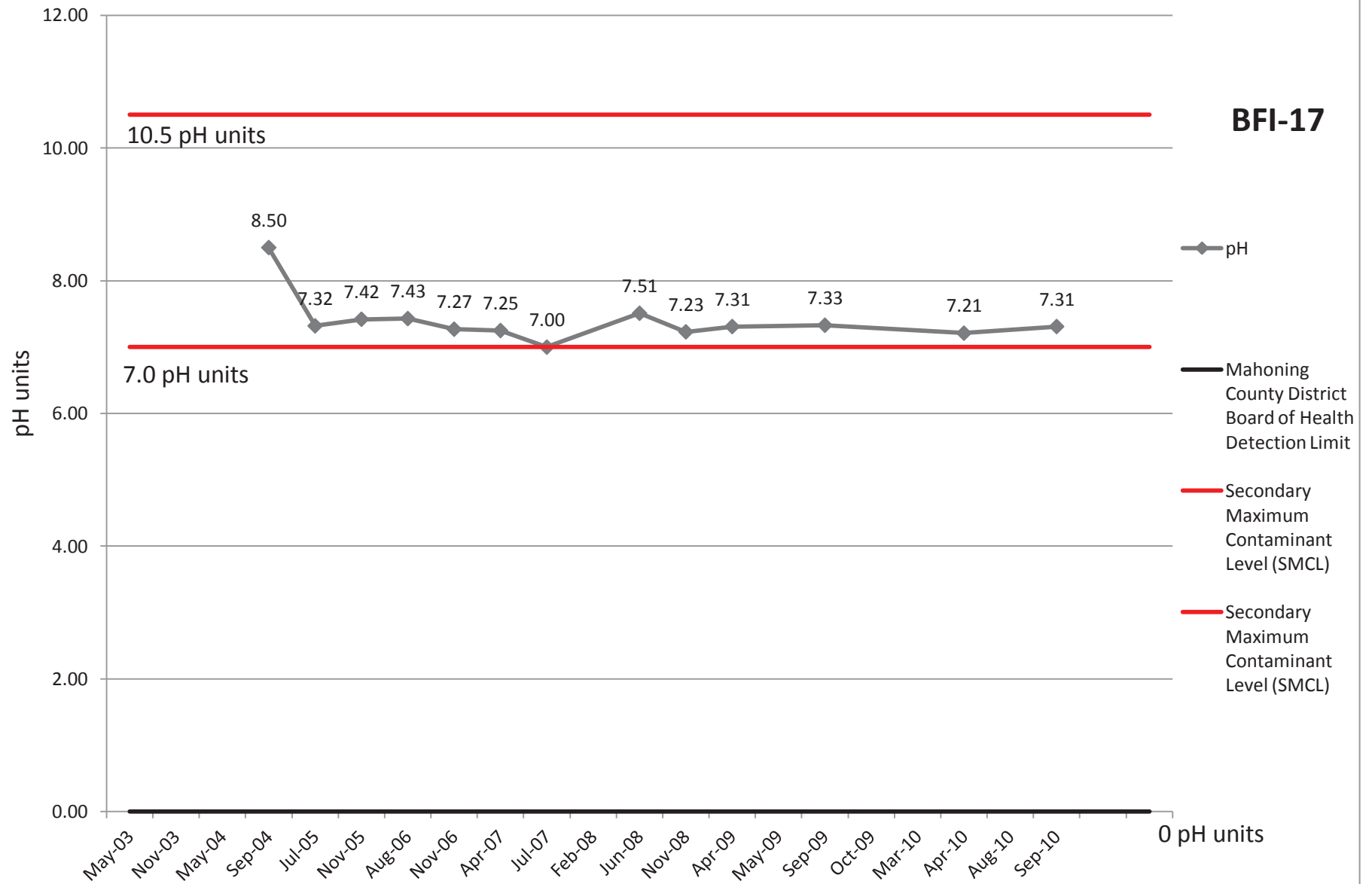
0.050 mg/L

# COD

**BFI-17**

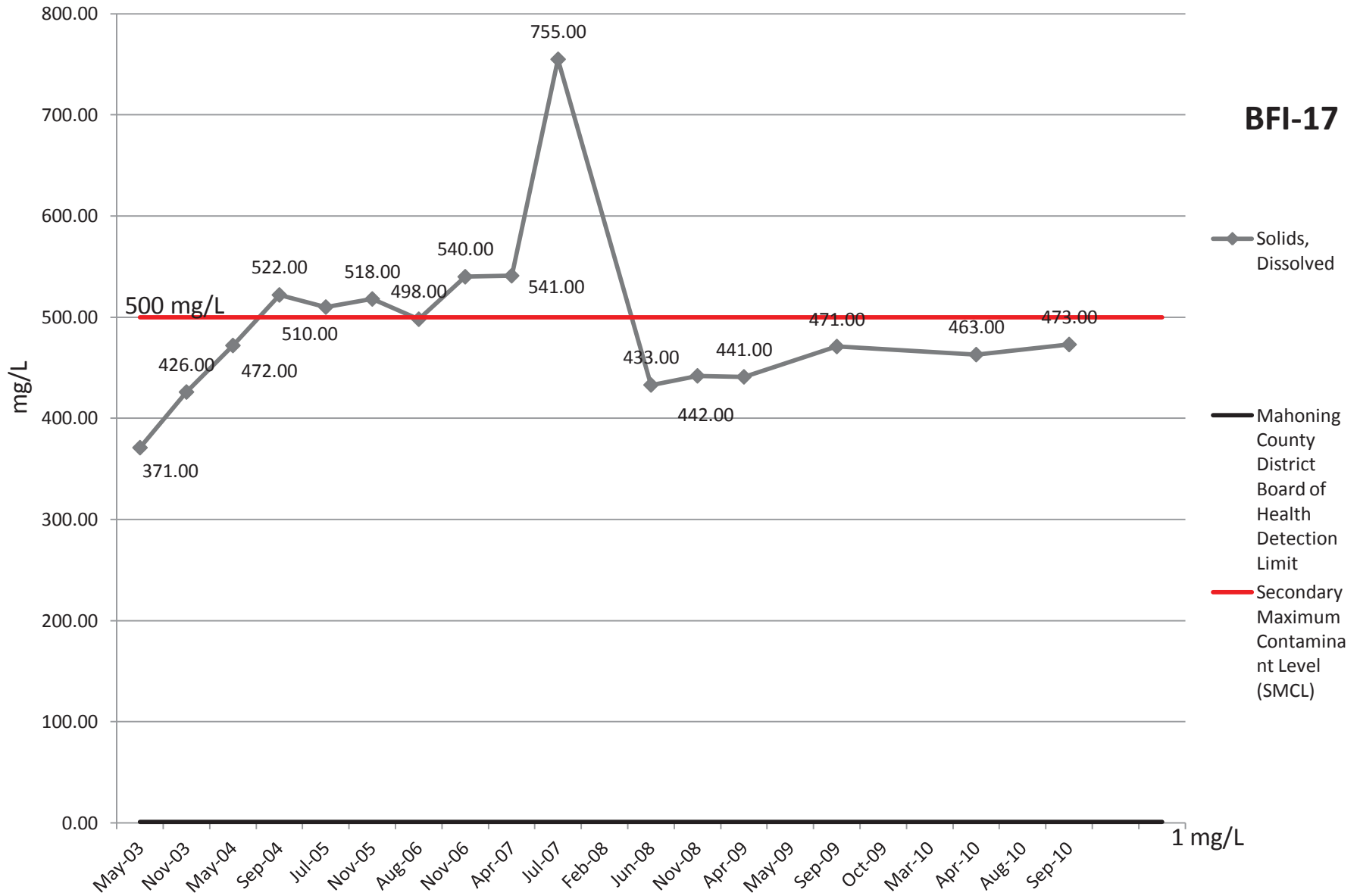


# pH



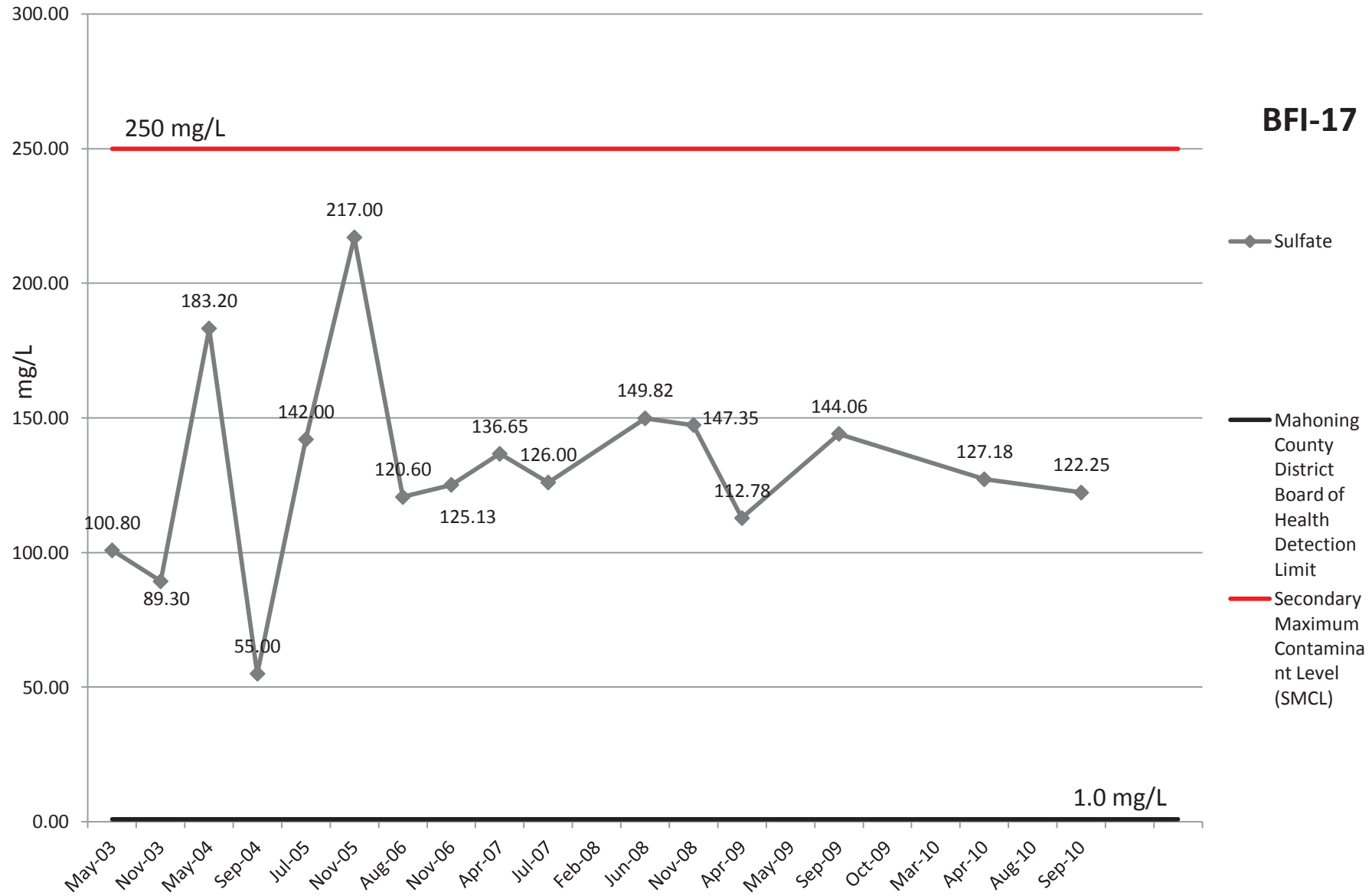
# Solids, Dissolved

**BFI-17**



# Sulfate

**BFI-17**



# Bacteria

**BFI-17**

Positive/Negative

◆ Bacteria

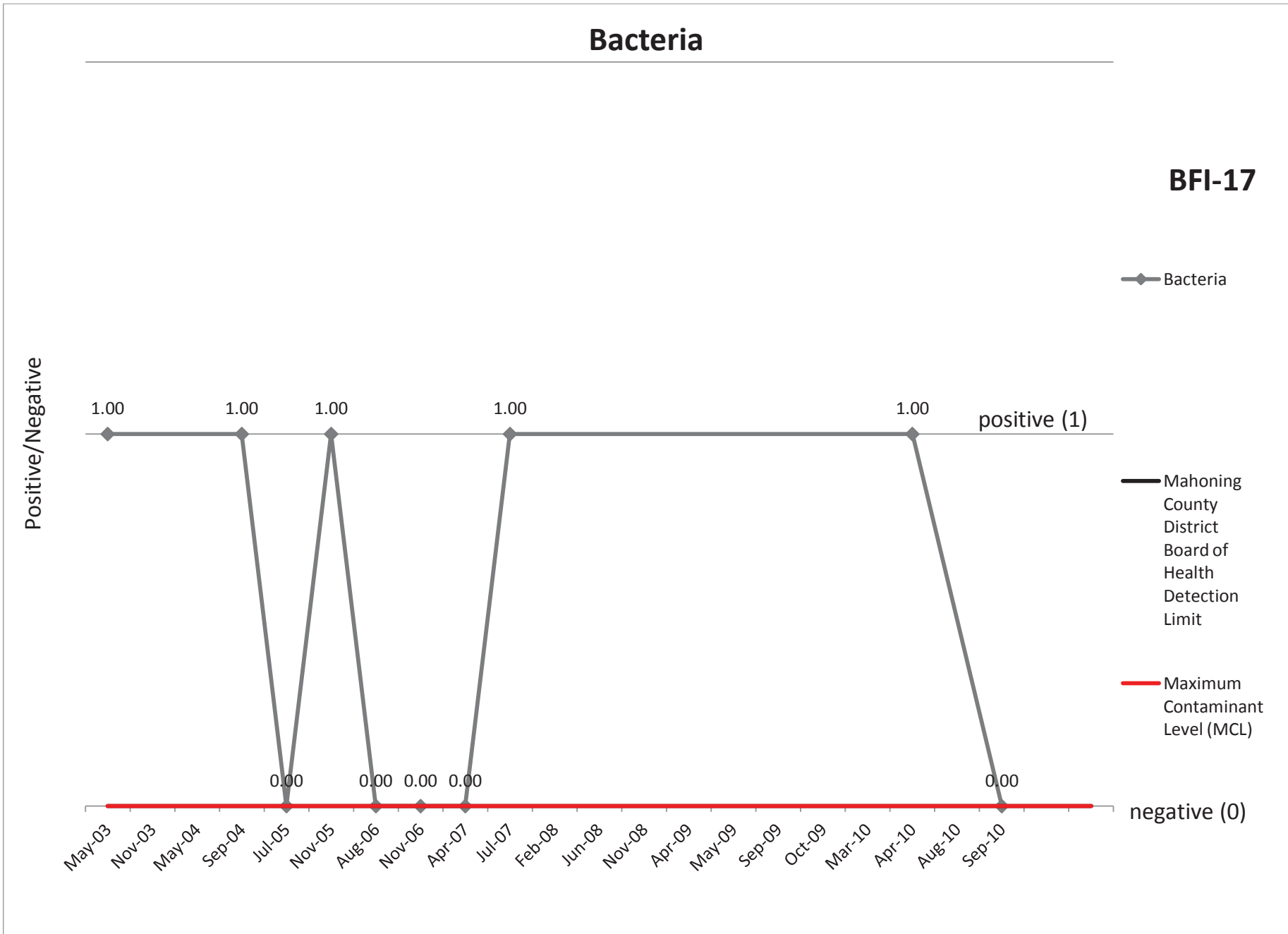
1.00 1.00 1.00 1.00 1.00 positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

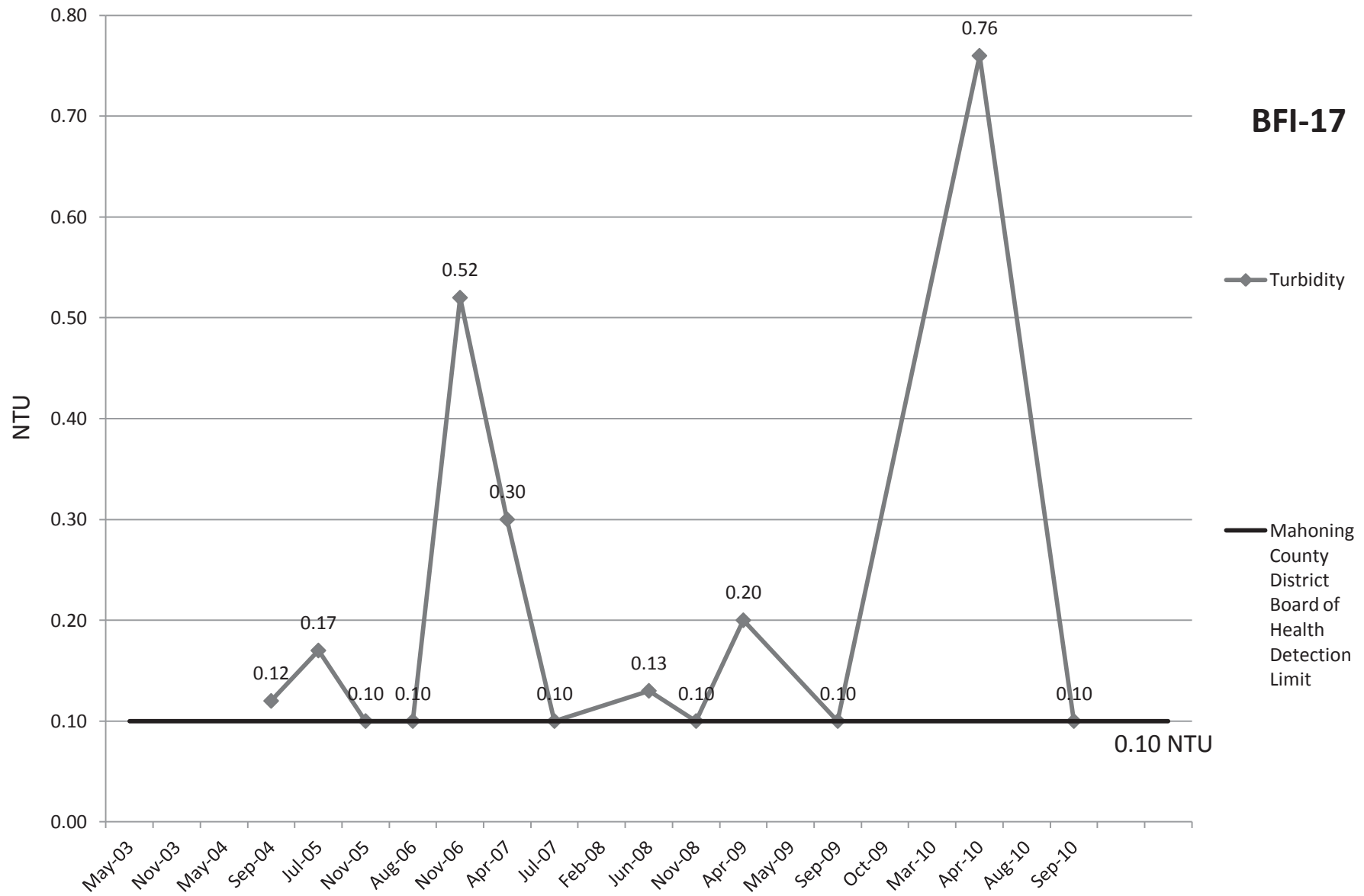
0.00 0.00 0.00 0.00 0.00 negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



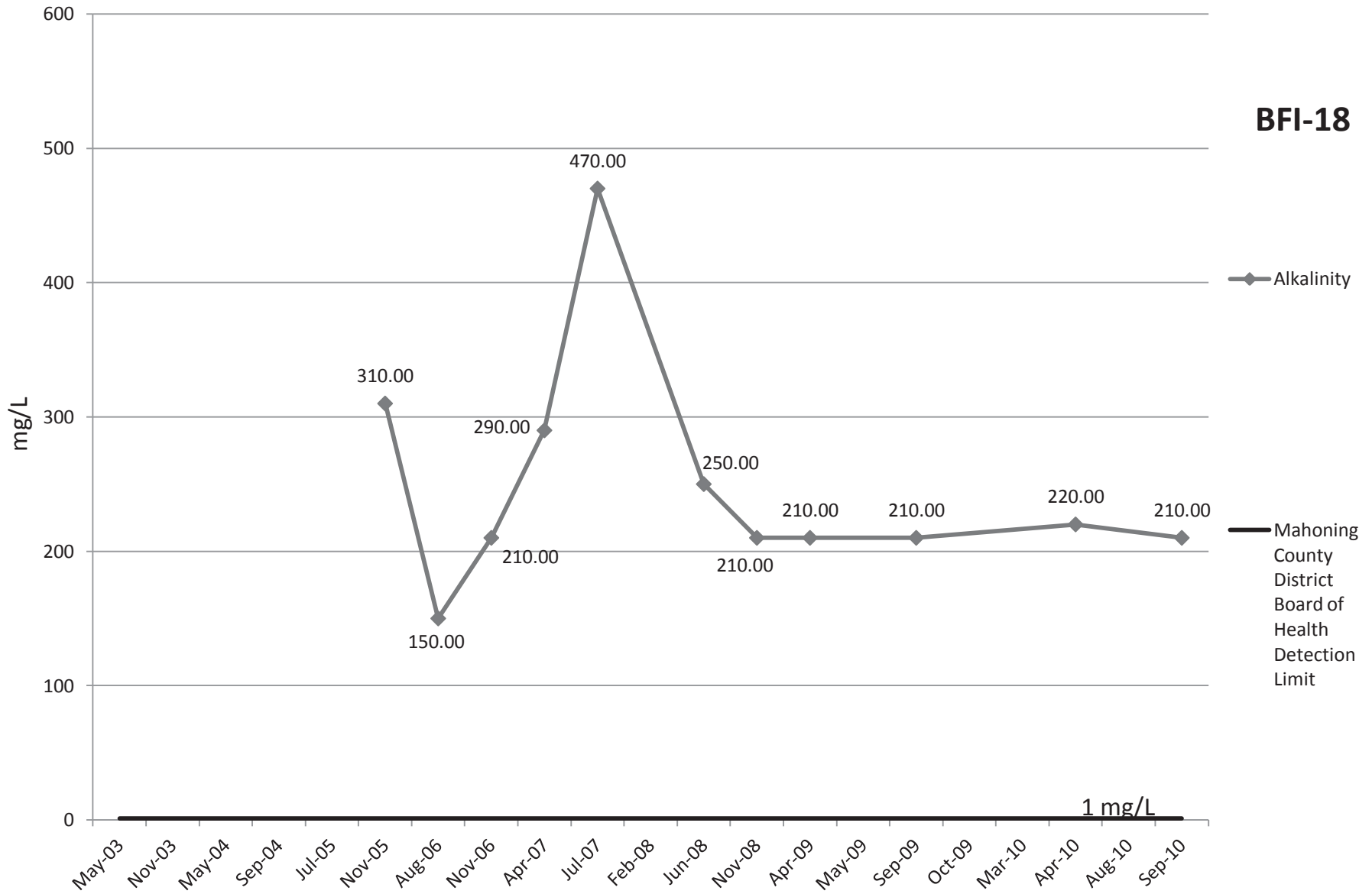


# Turbidity

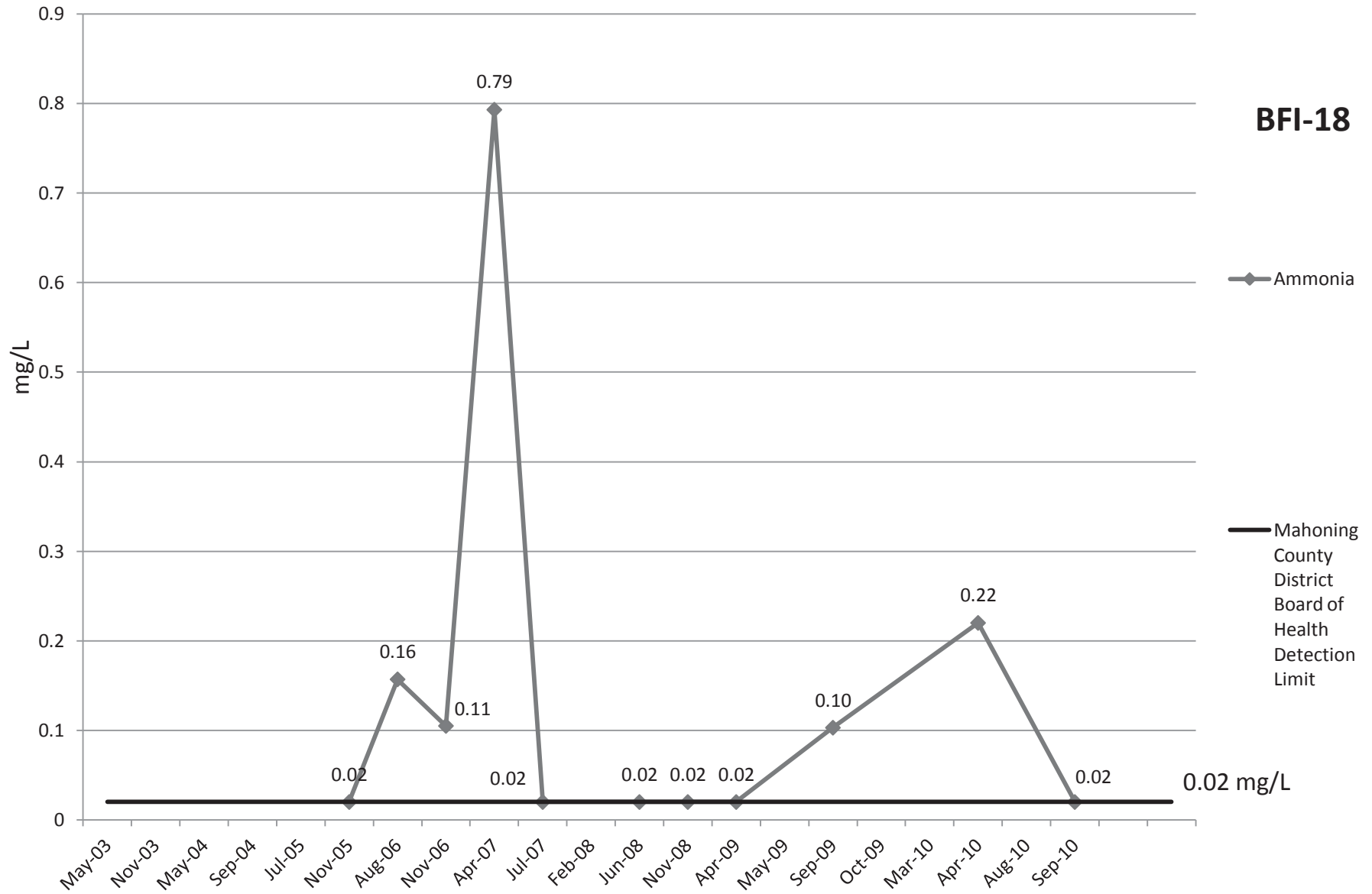


# Alkalinity

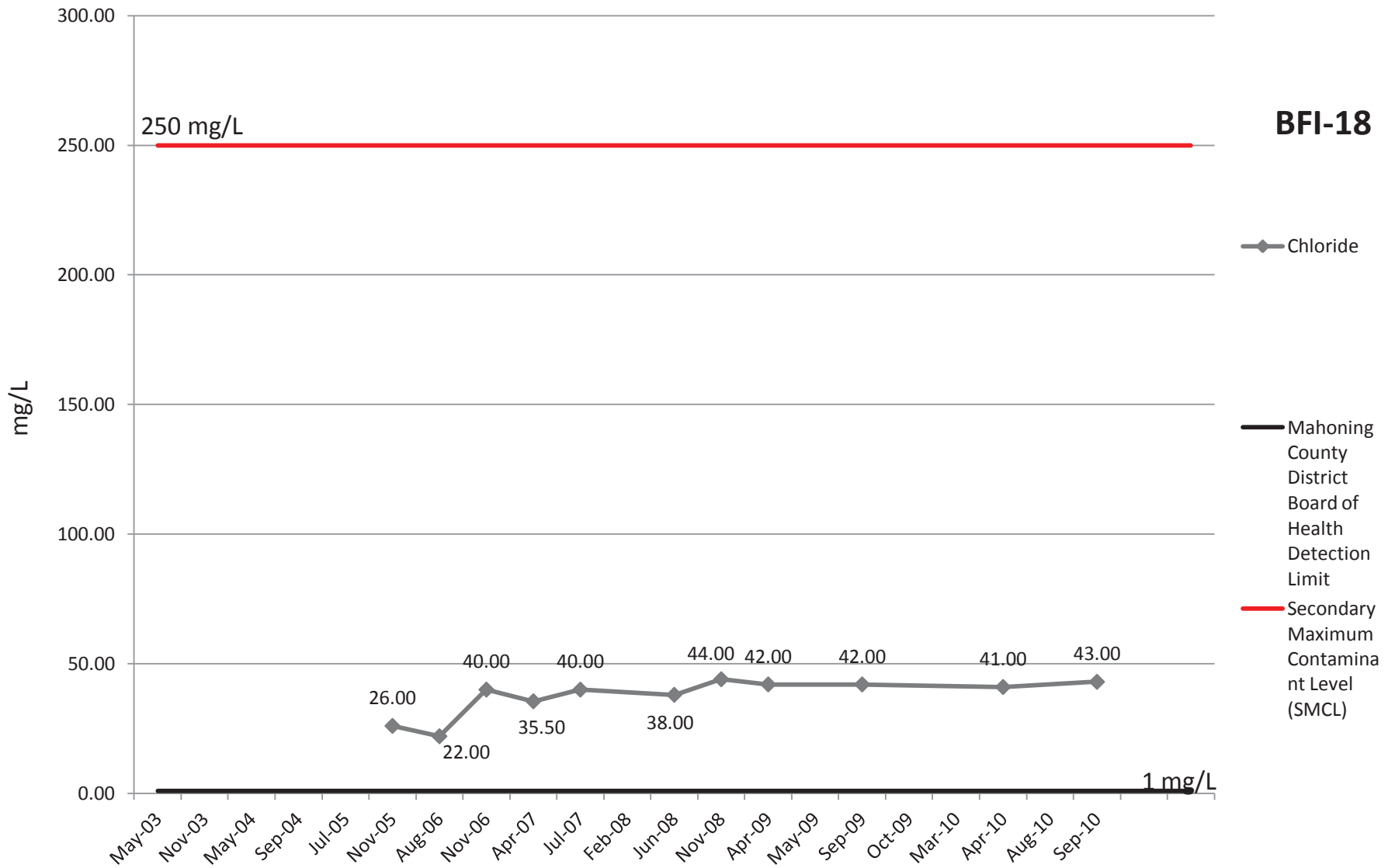
**BFI-18**



# Ammonia

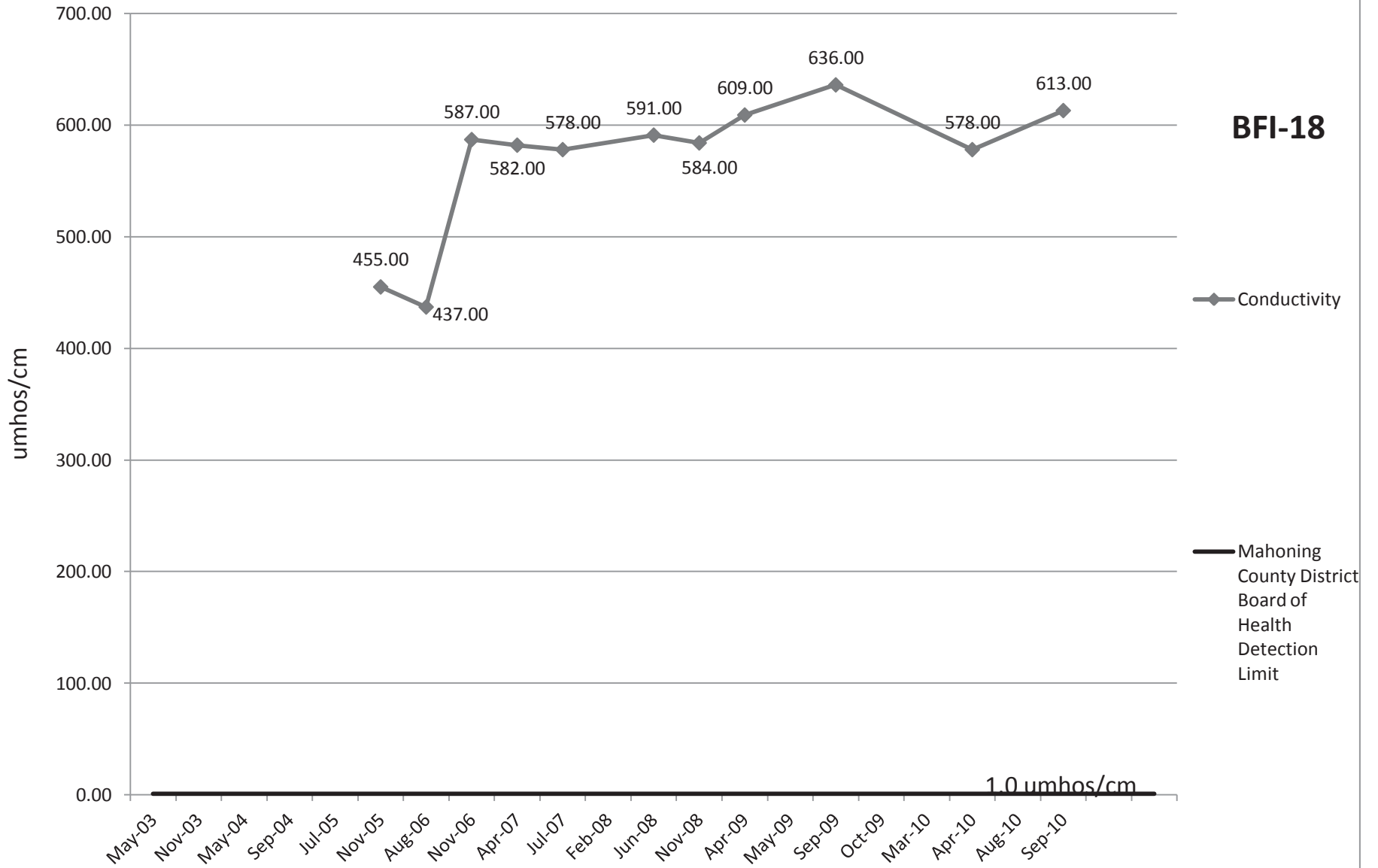


# Chloride

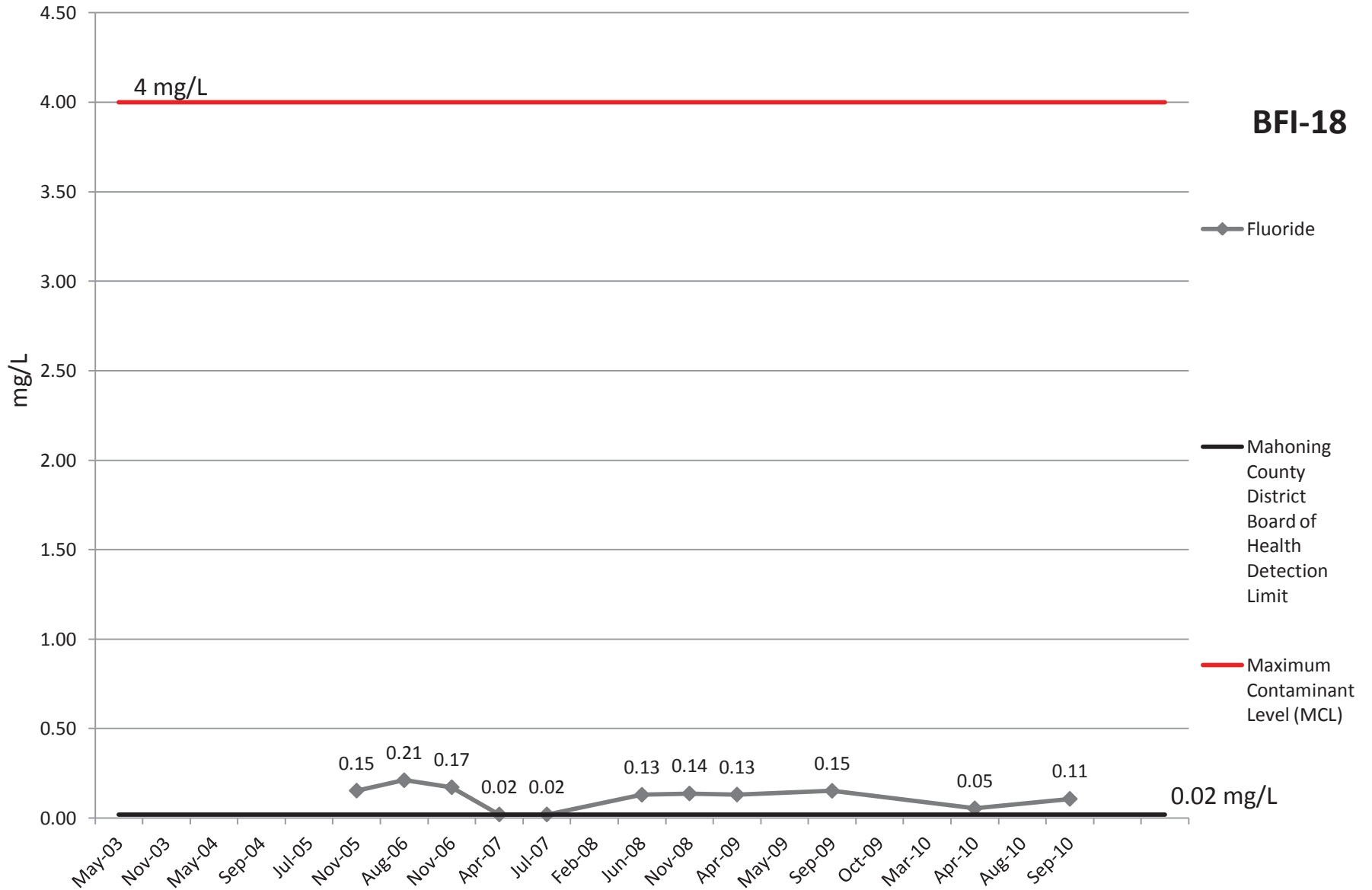


# Conductivity

**BFI-18**

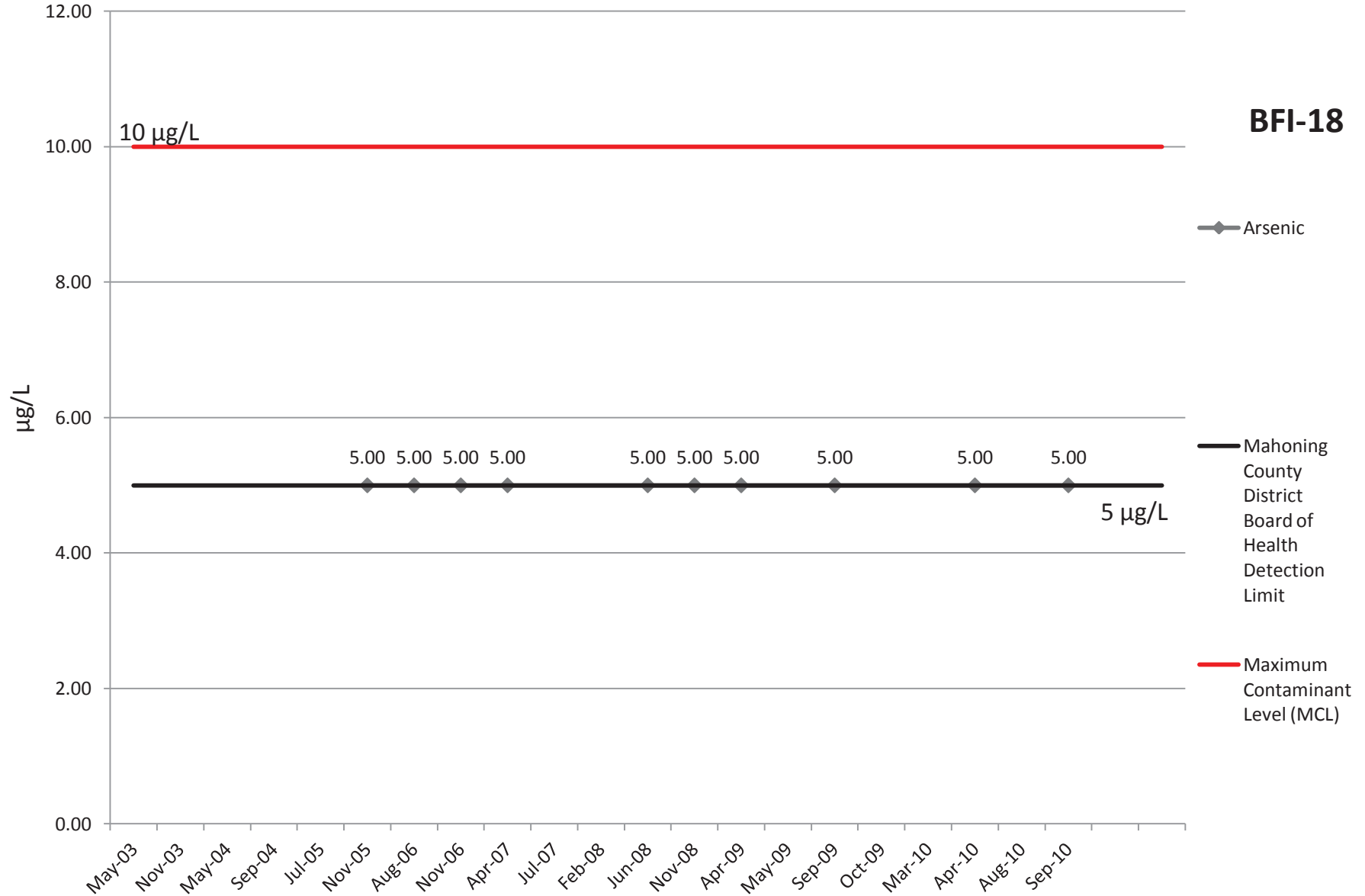


# Fluoride

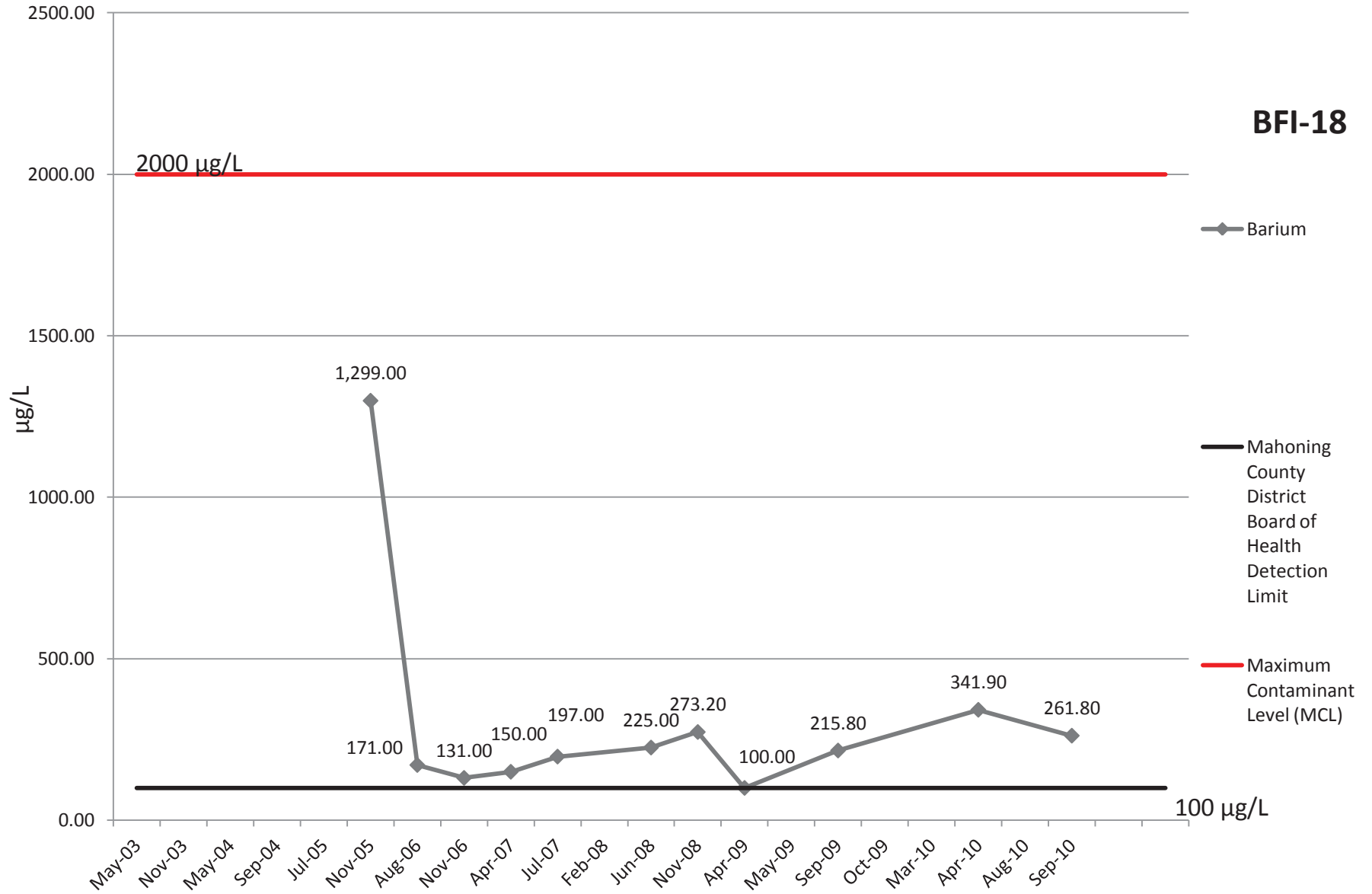


# Arsenic

**BFI-18**



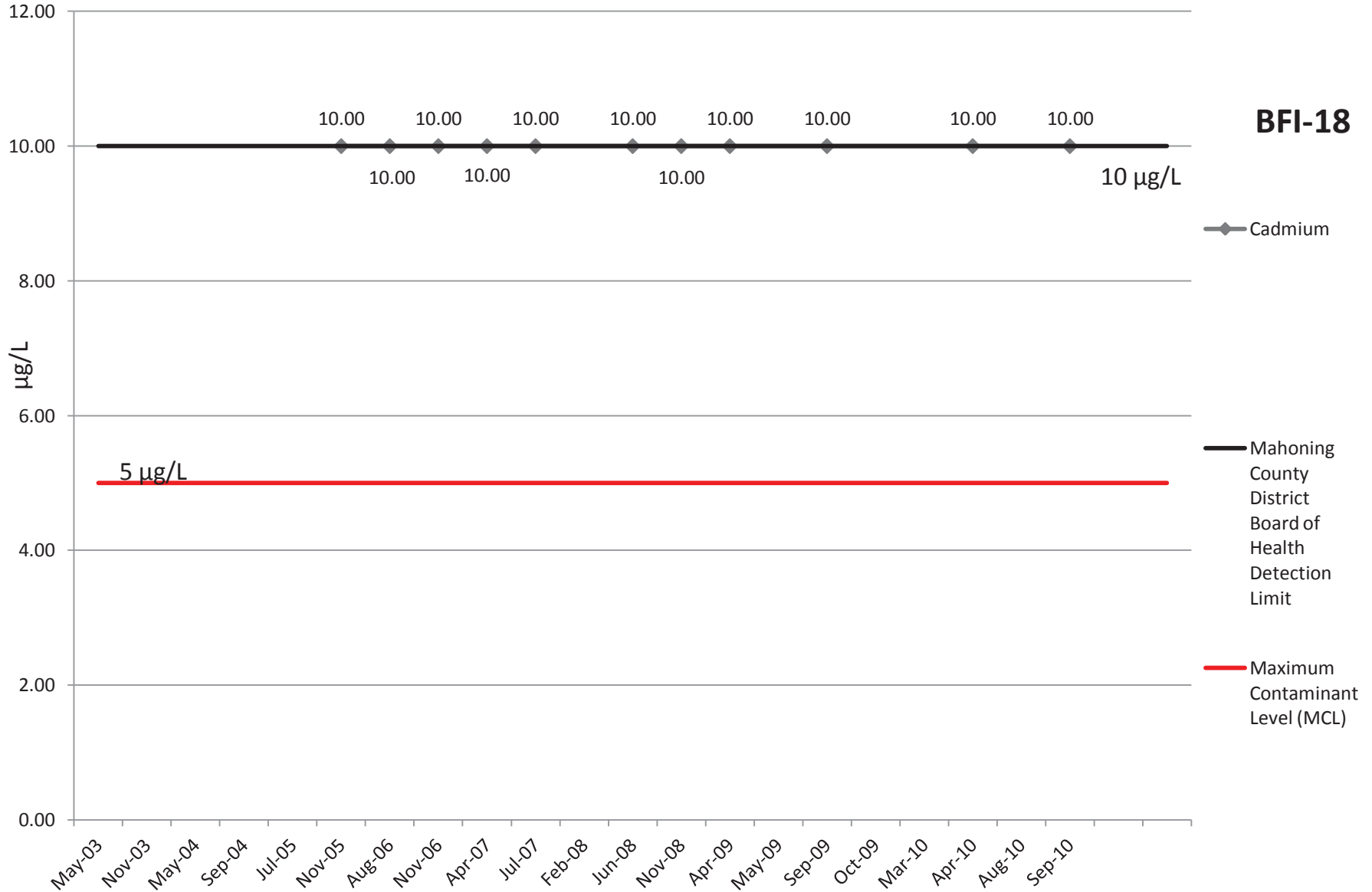
# Barium



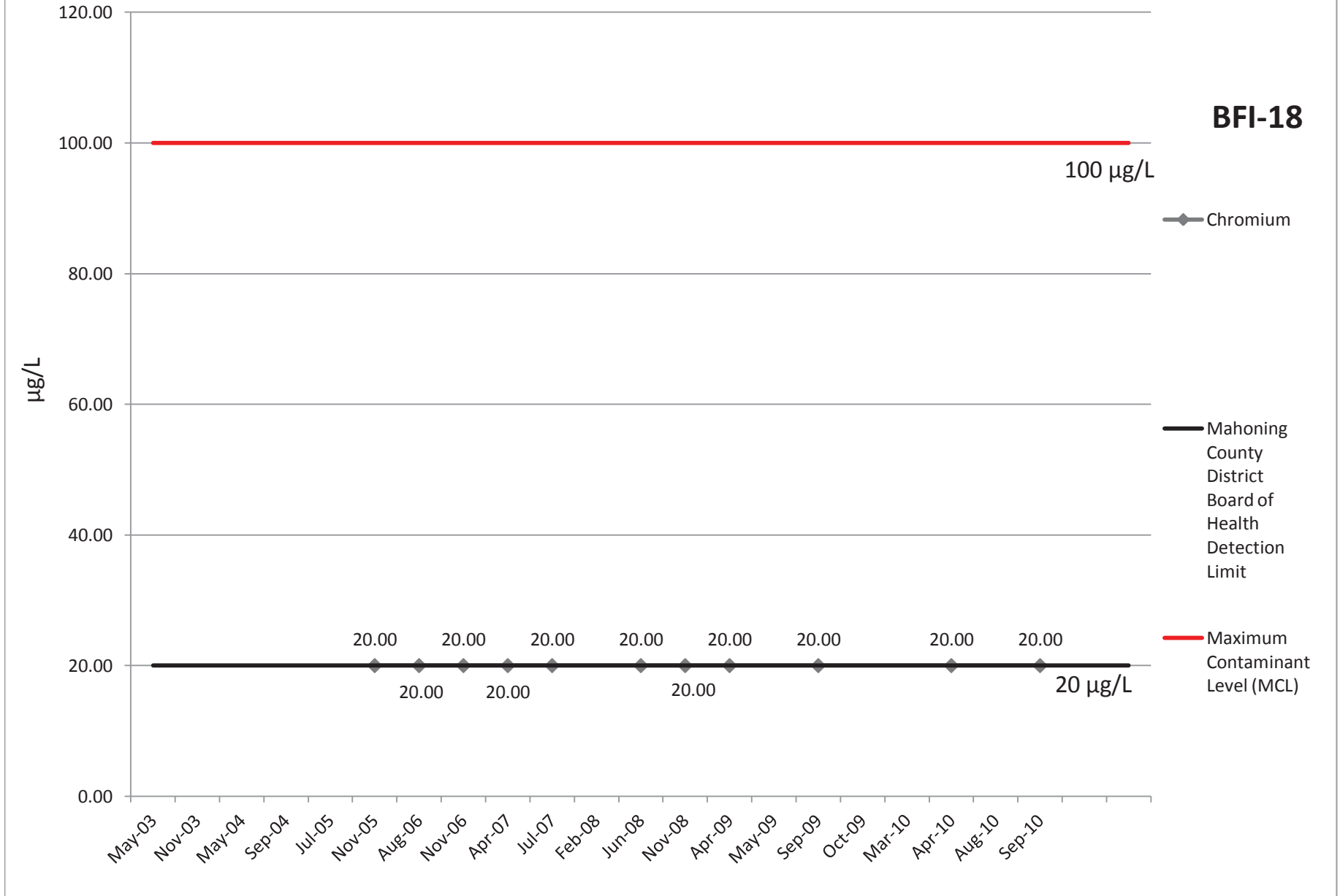


# Cadmium

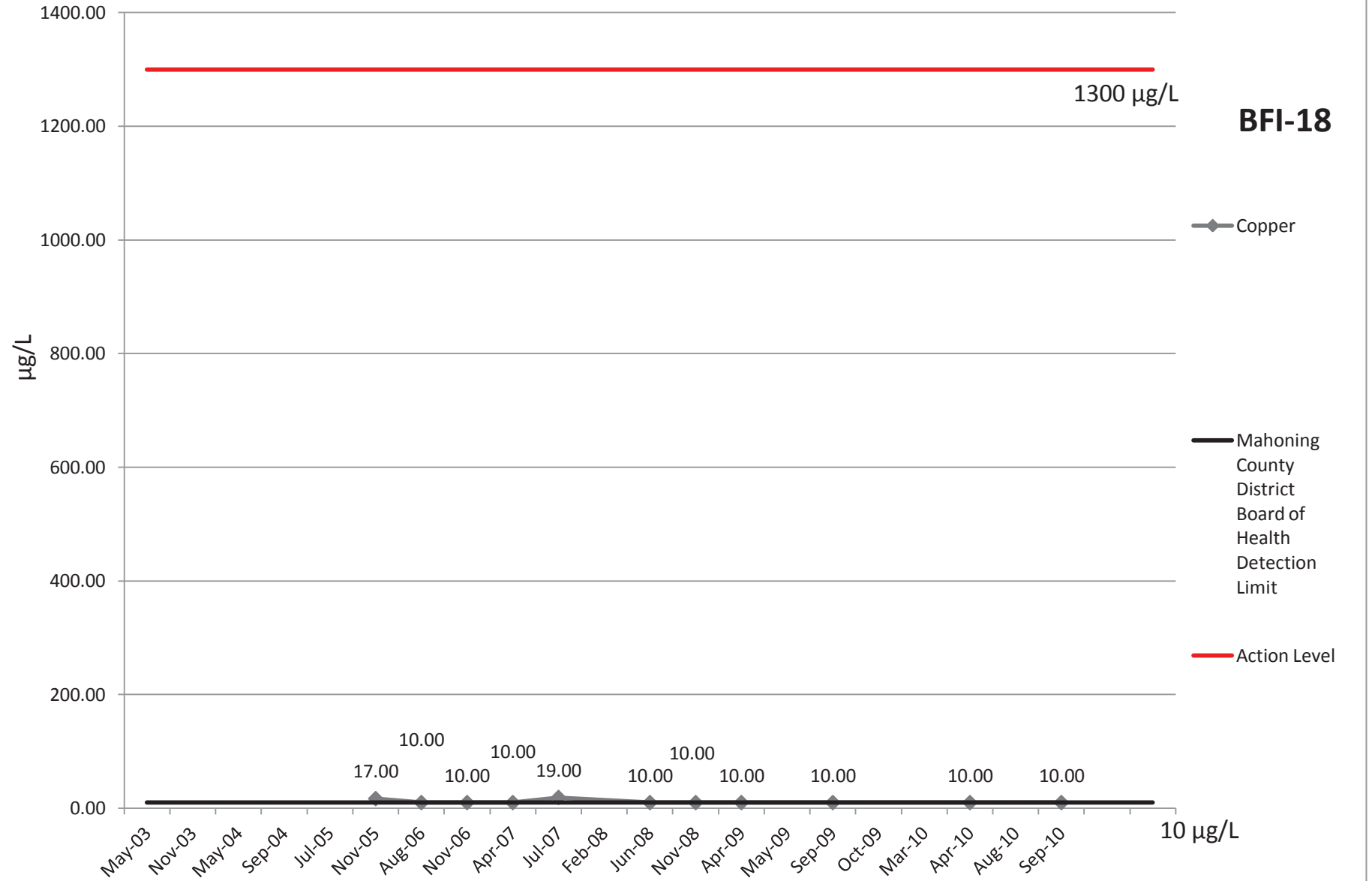
**BFI-18**



# Chromium

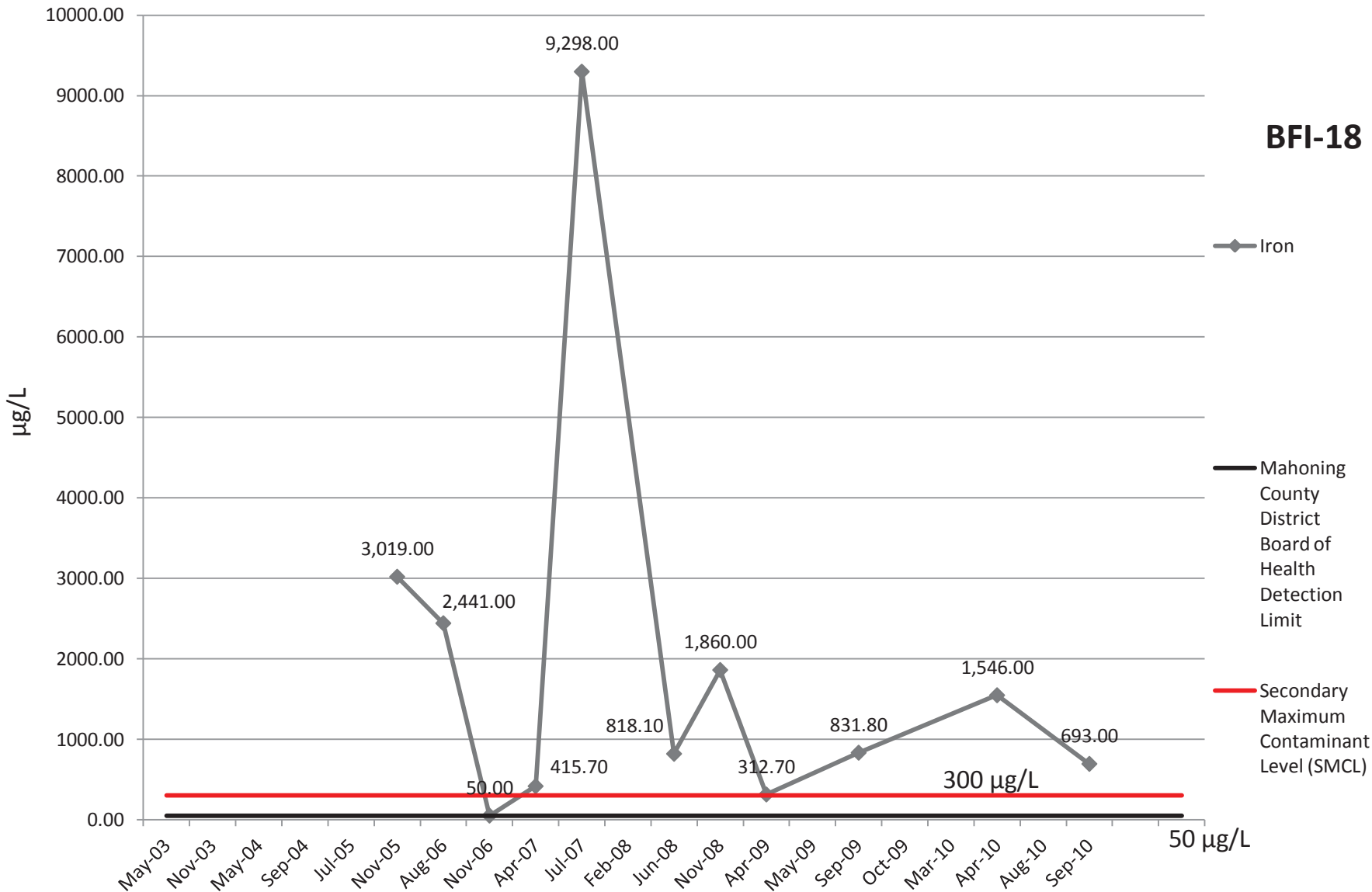


# Copper

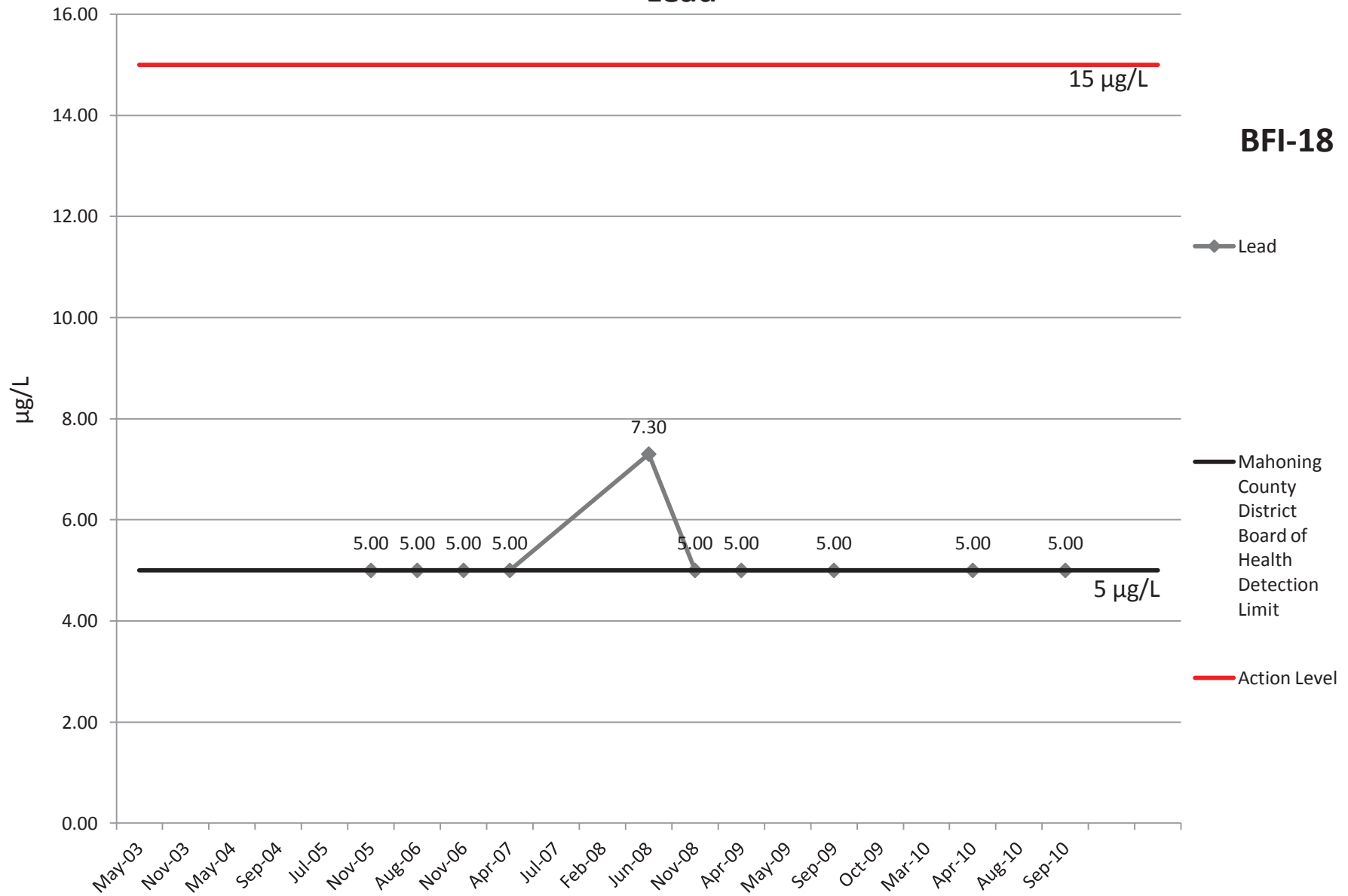


# Iron

**BFI-18**

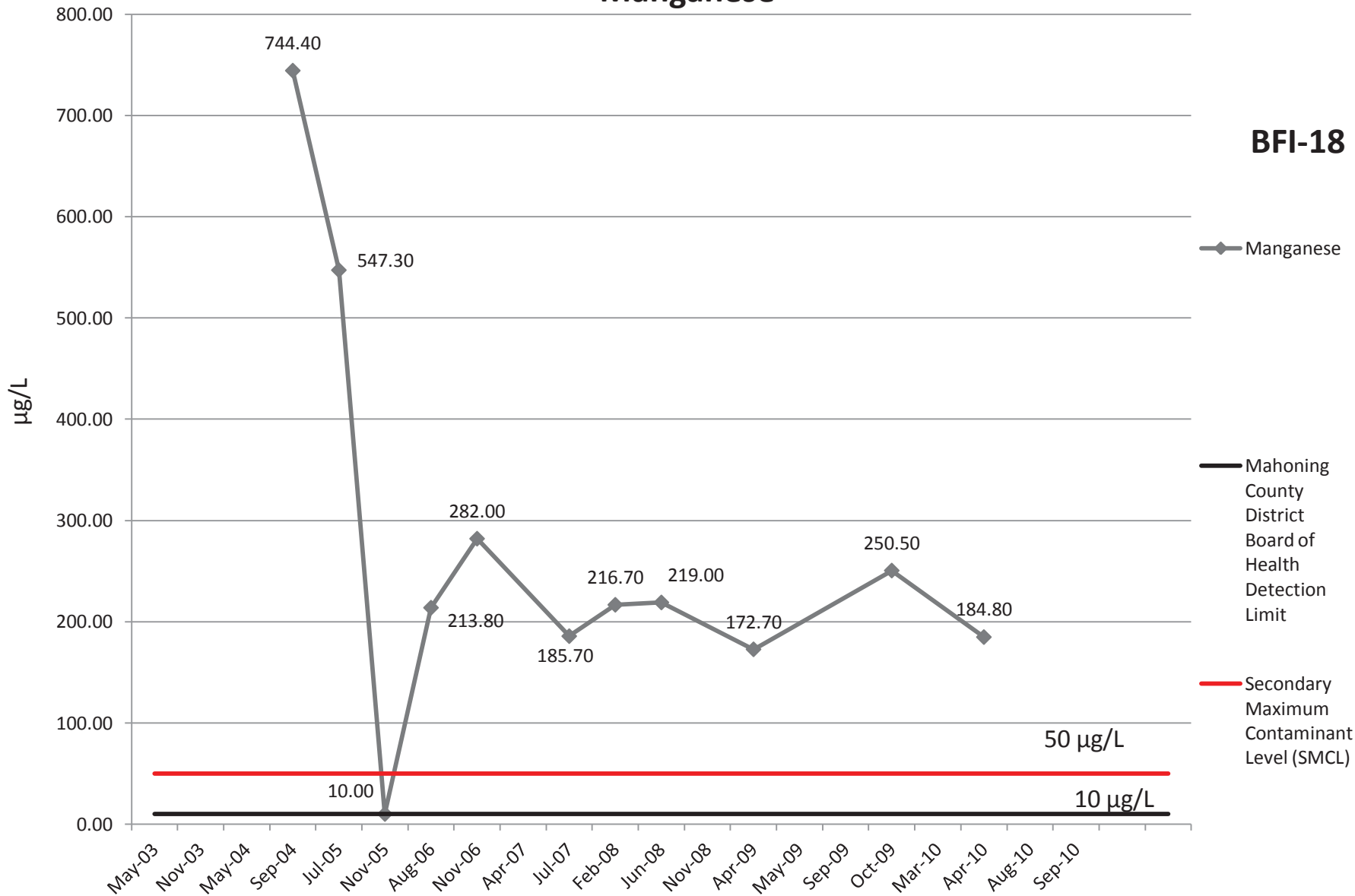


# Lead



# Manganese

**BFI-18**



# Mercury

**BFI-18**

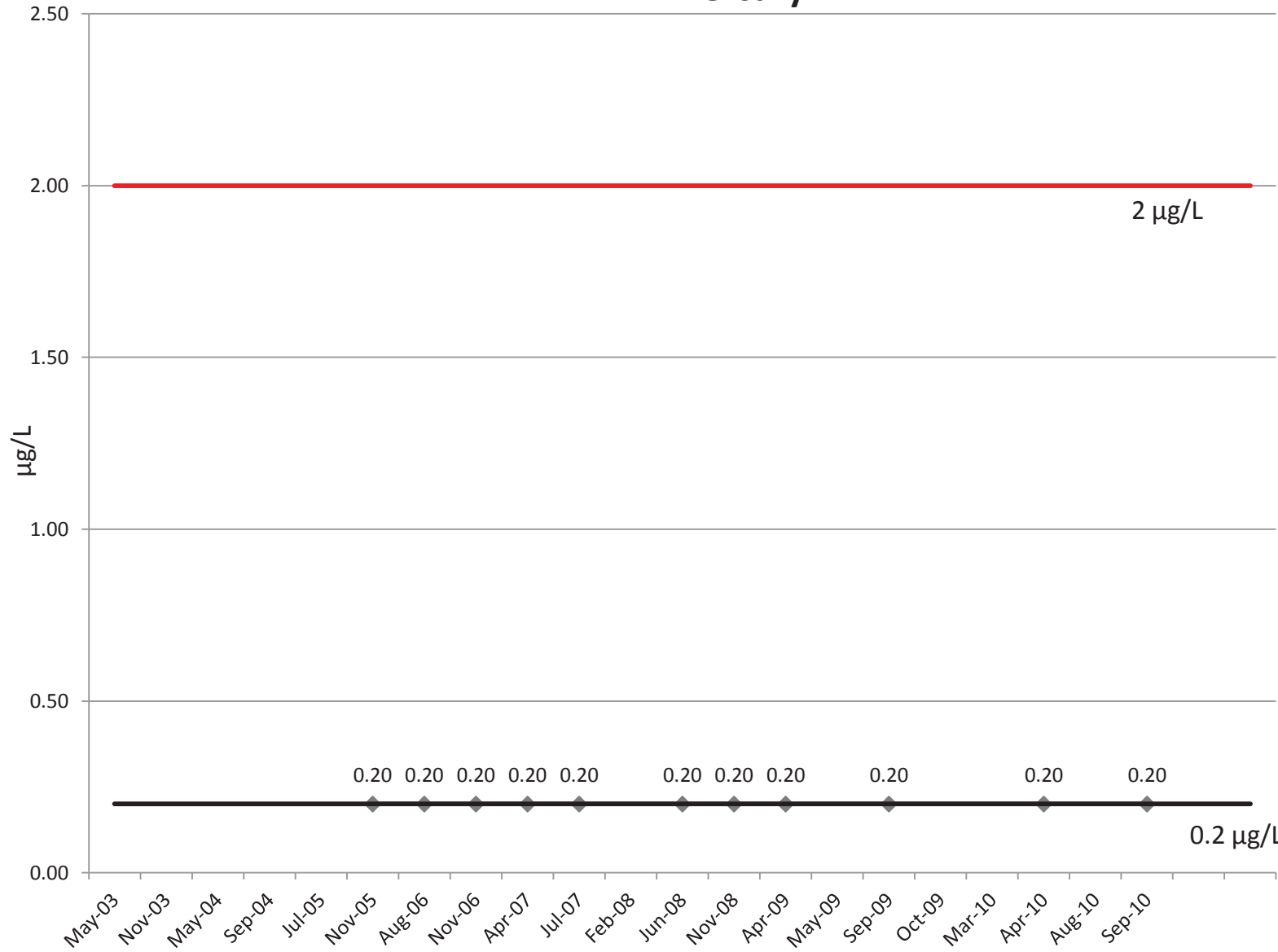
2 µg/L

Mercury

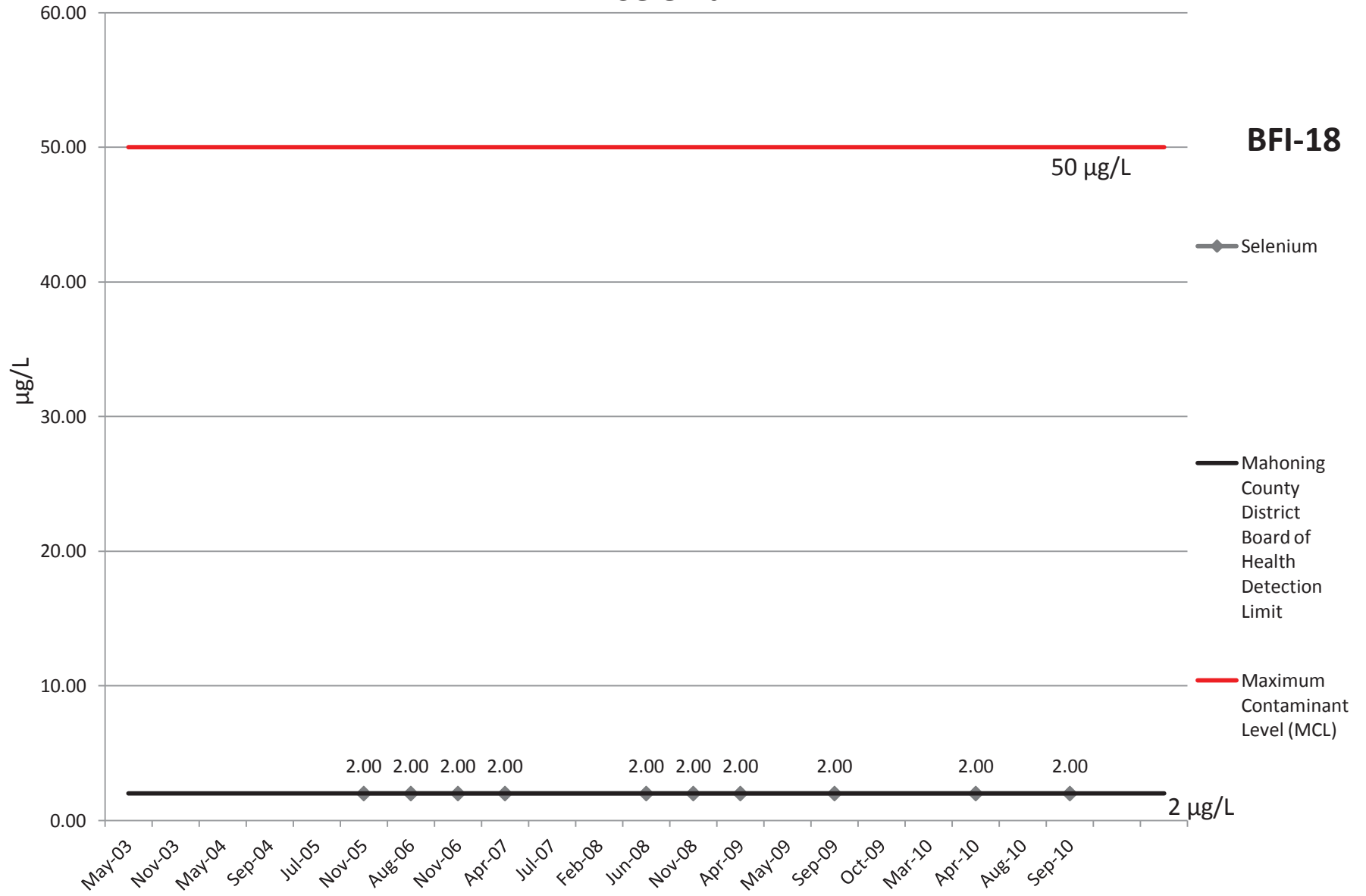
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

0.2 µg/L

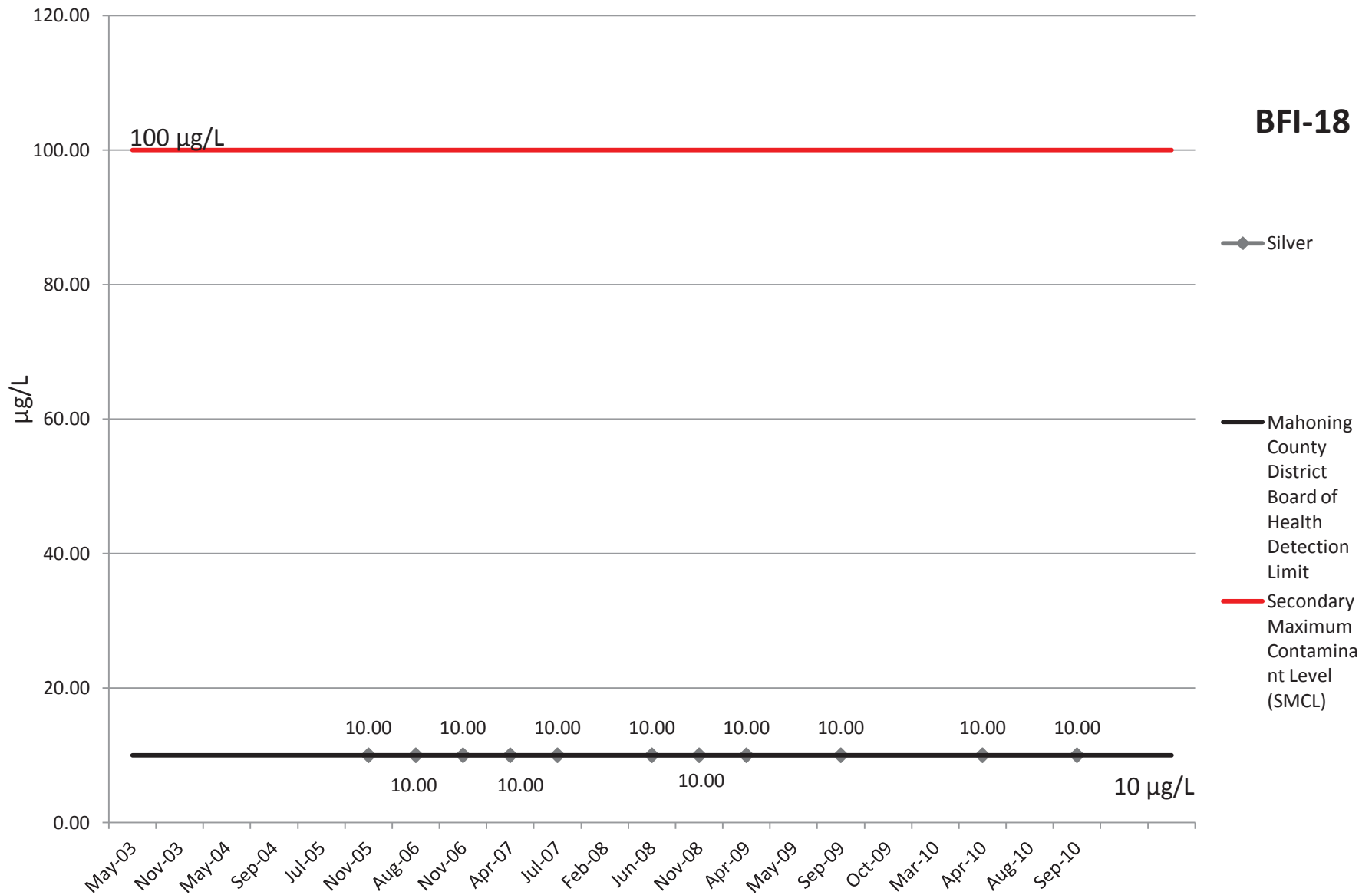


# Selenium





# Silver



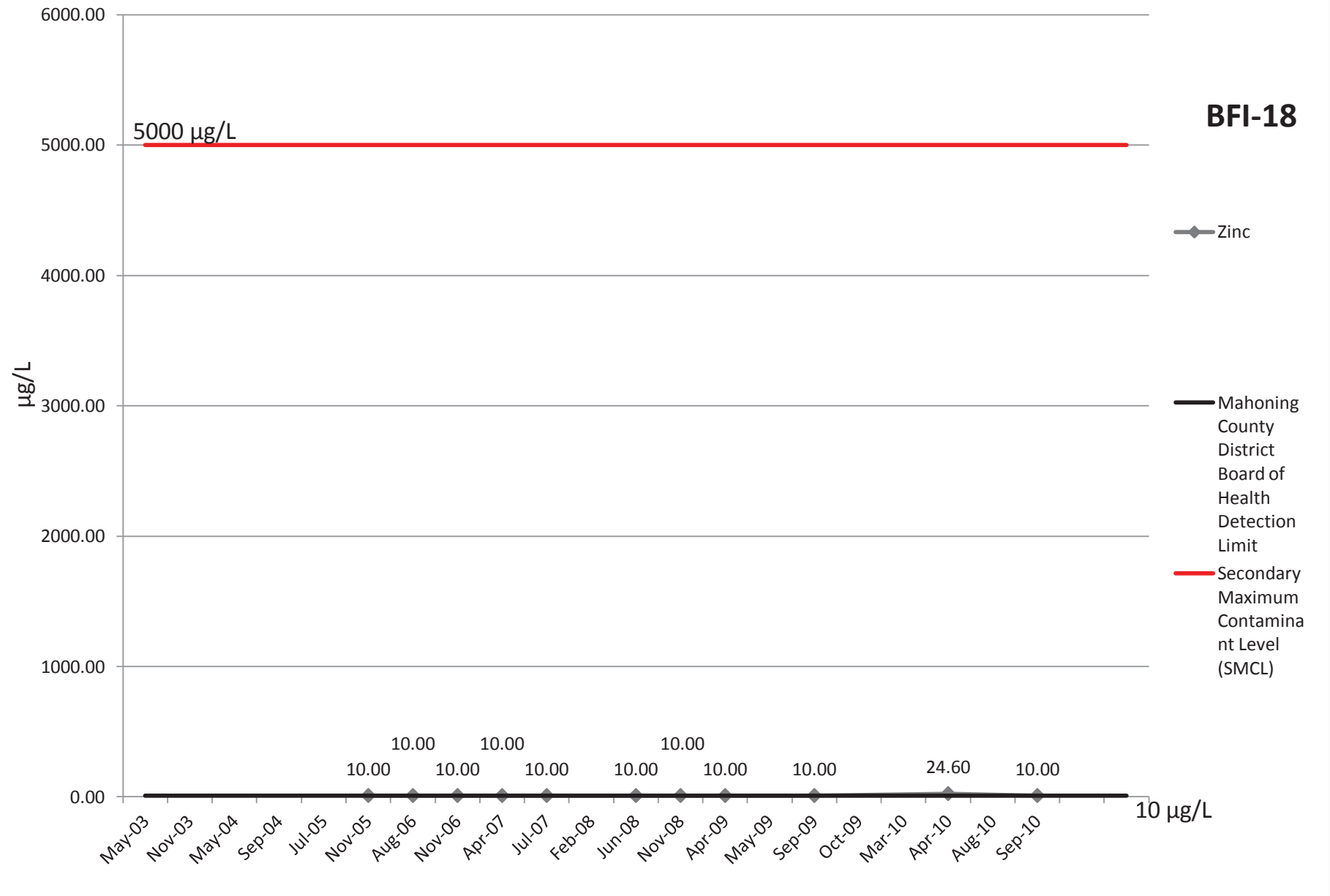
**BFI-18**

◆ Silver

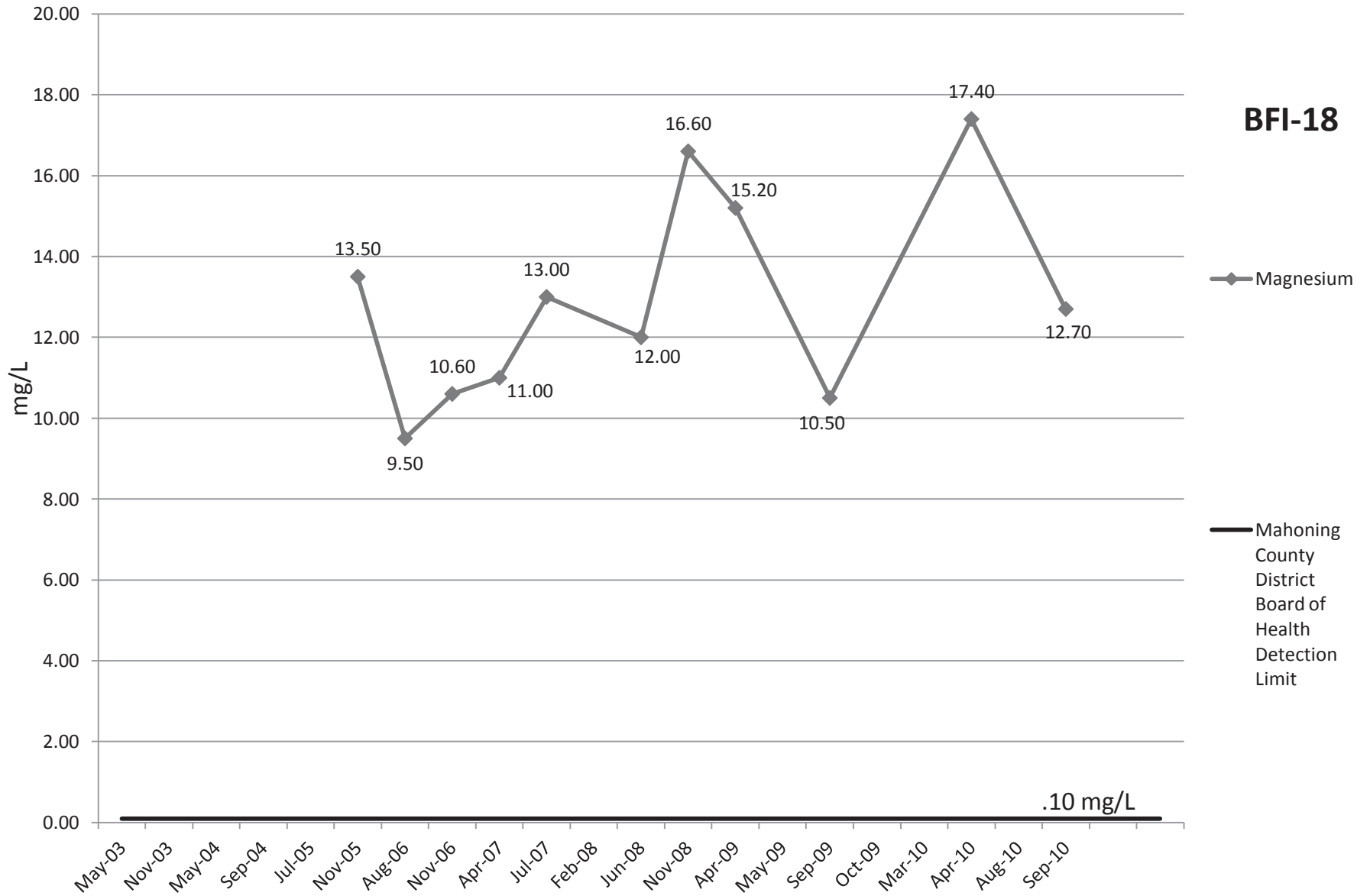
— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

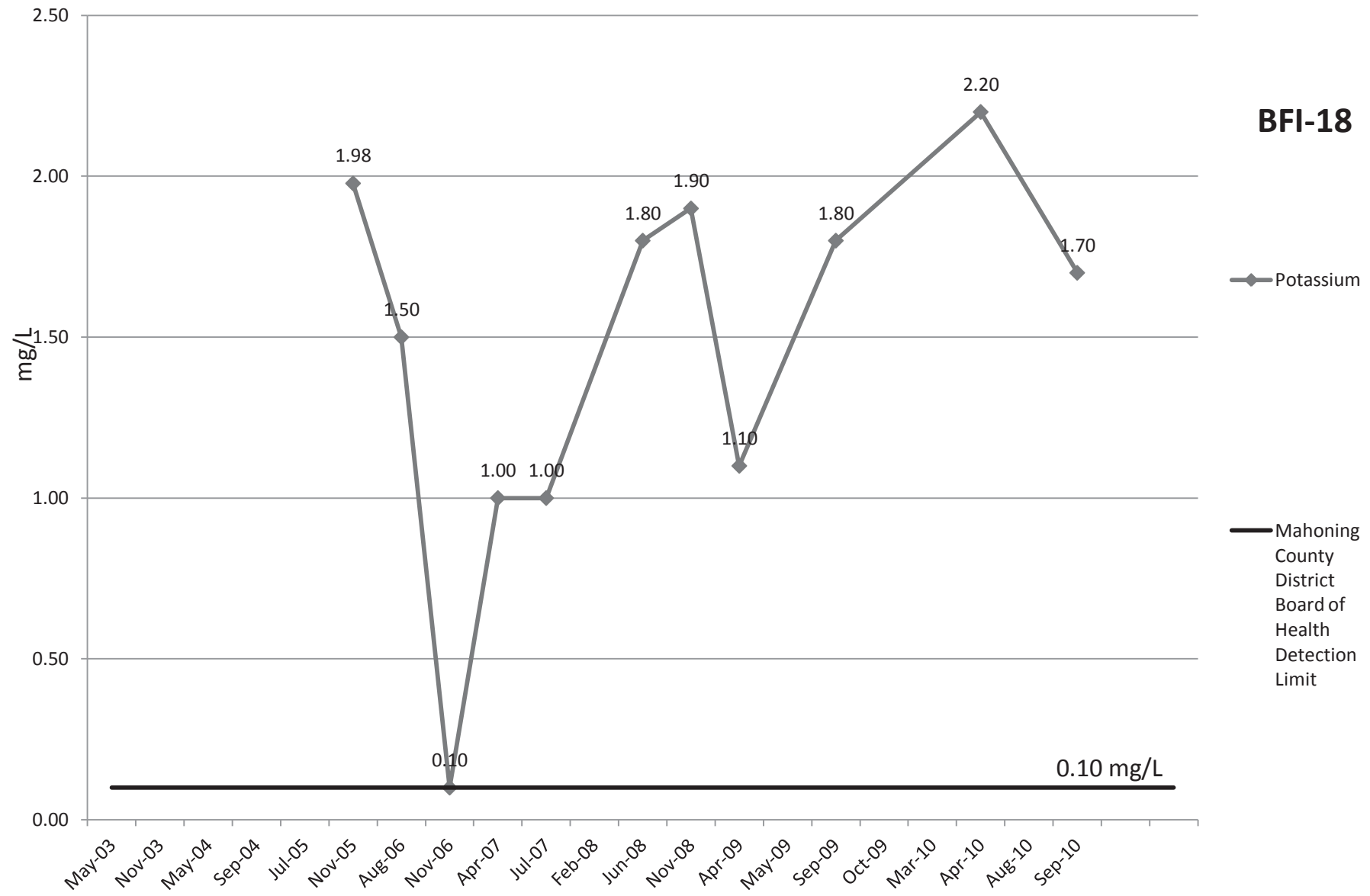
# Zinc



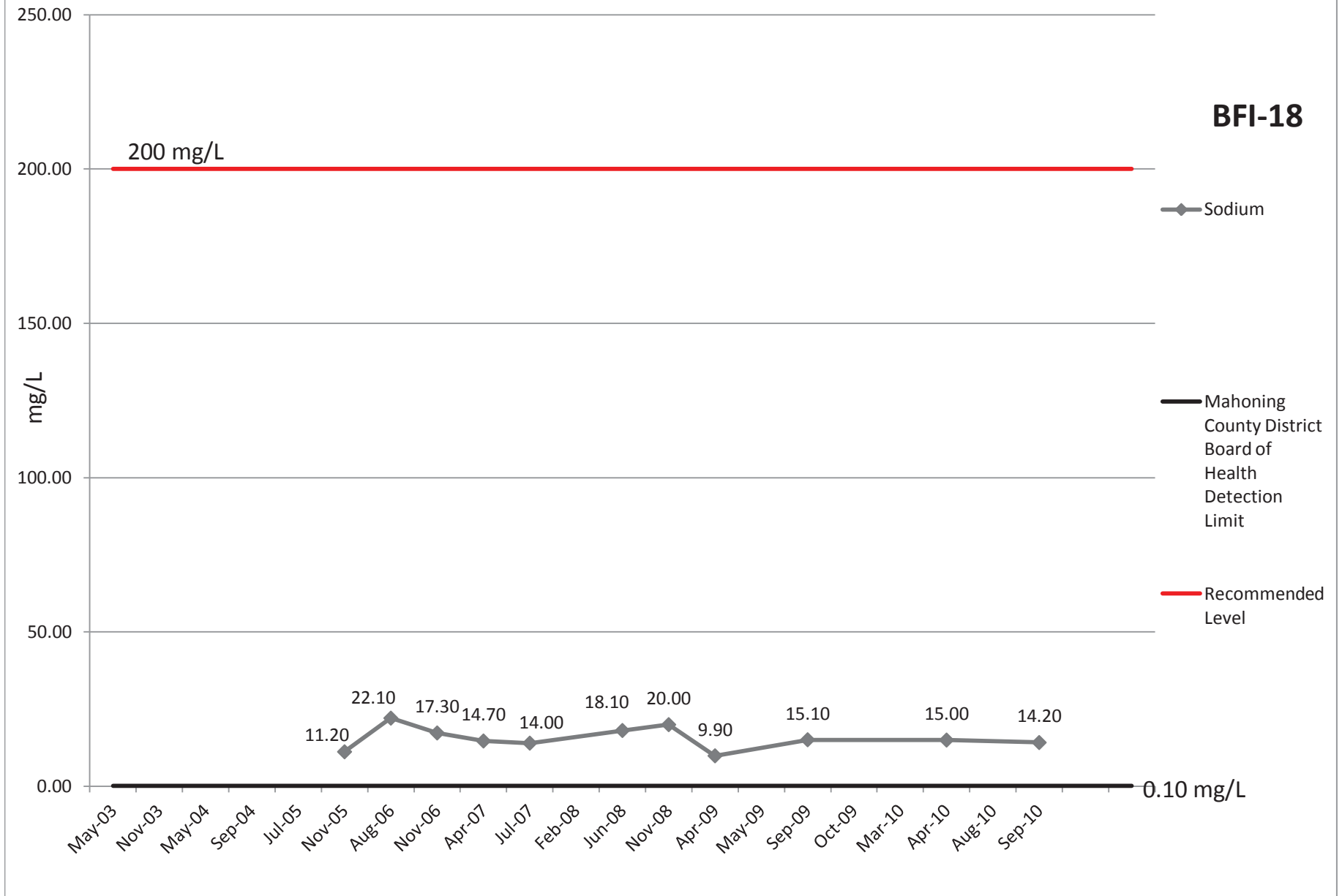
# Magnesium



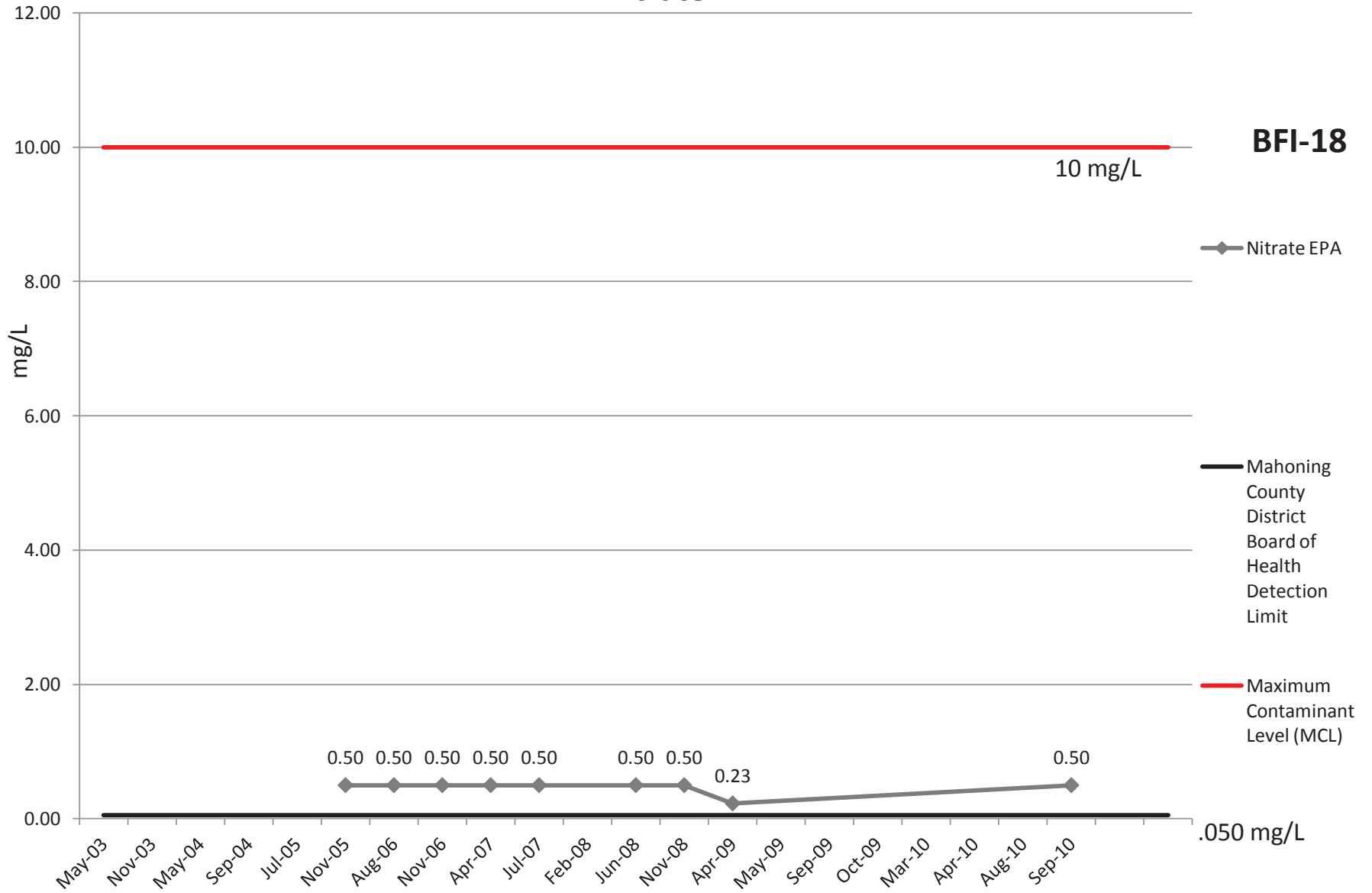
# Potassium



# Sodium

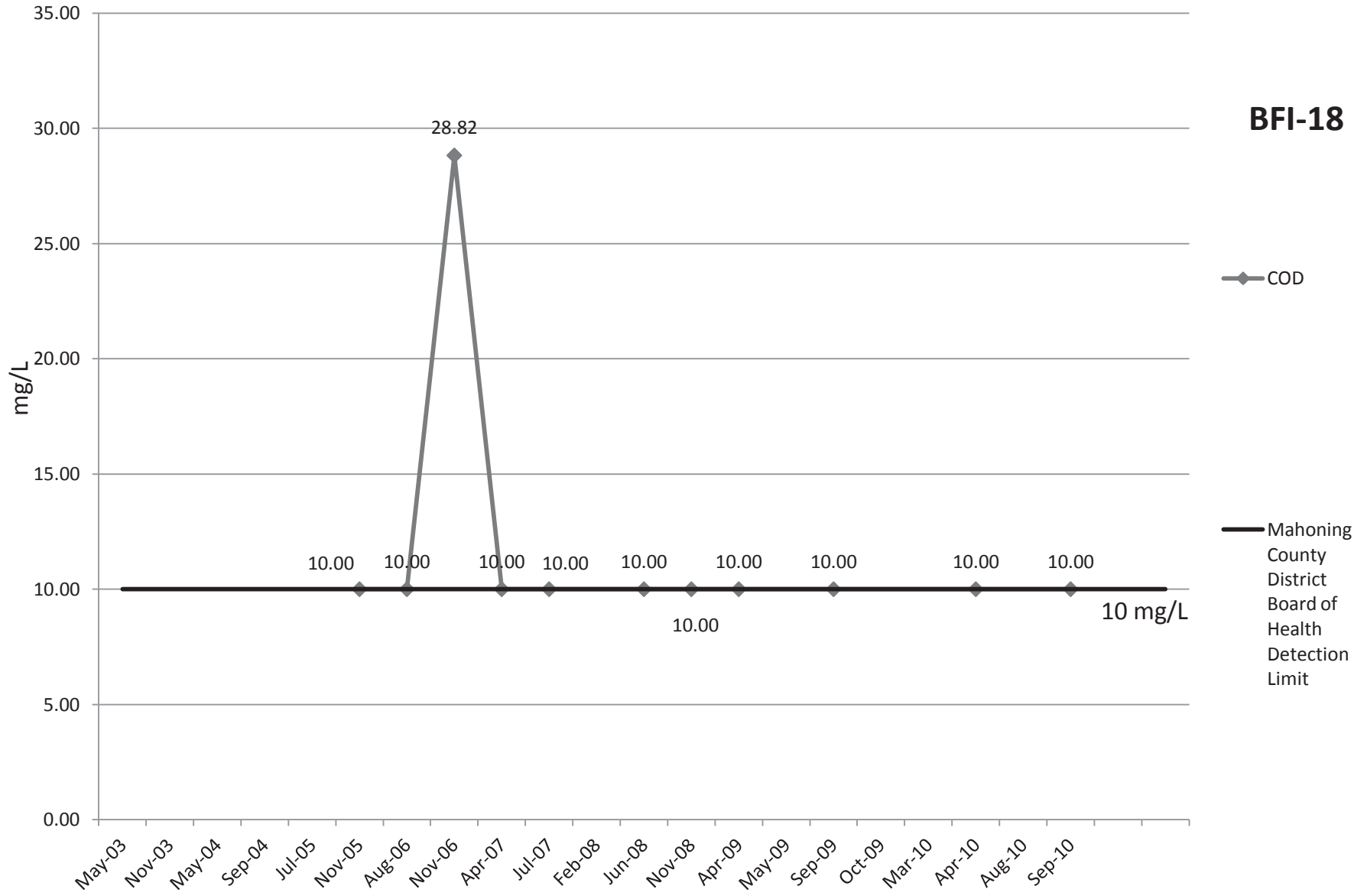


# Nitrate EPA



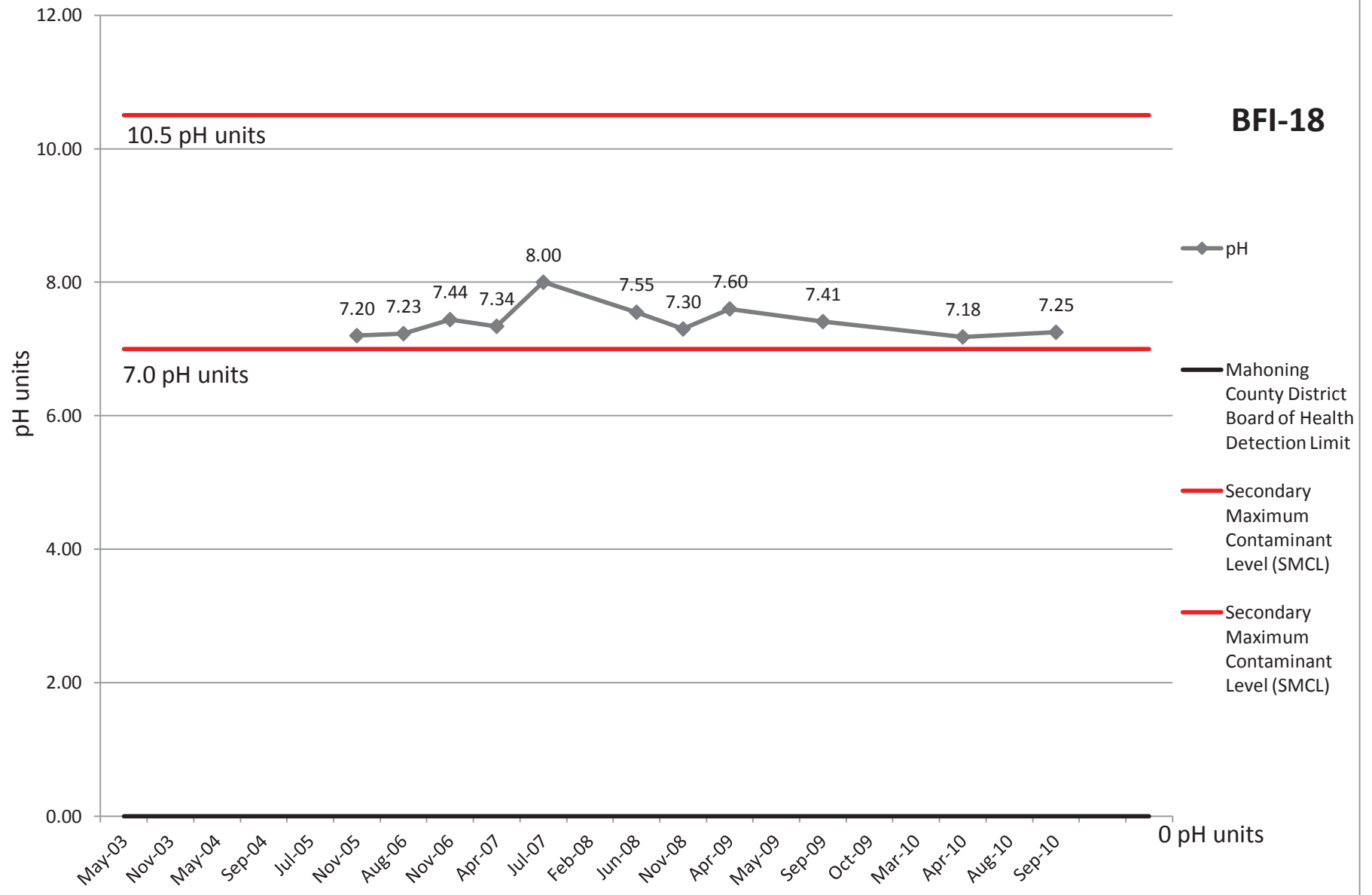
# COD

**BFI-18**



# pH

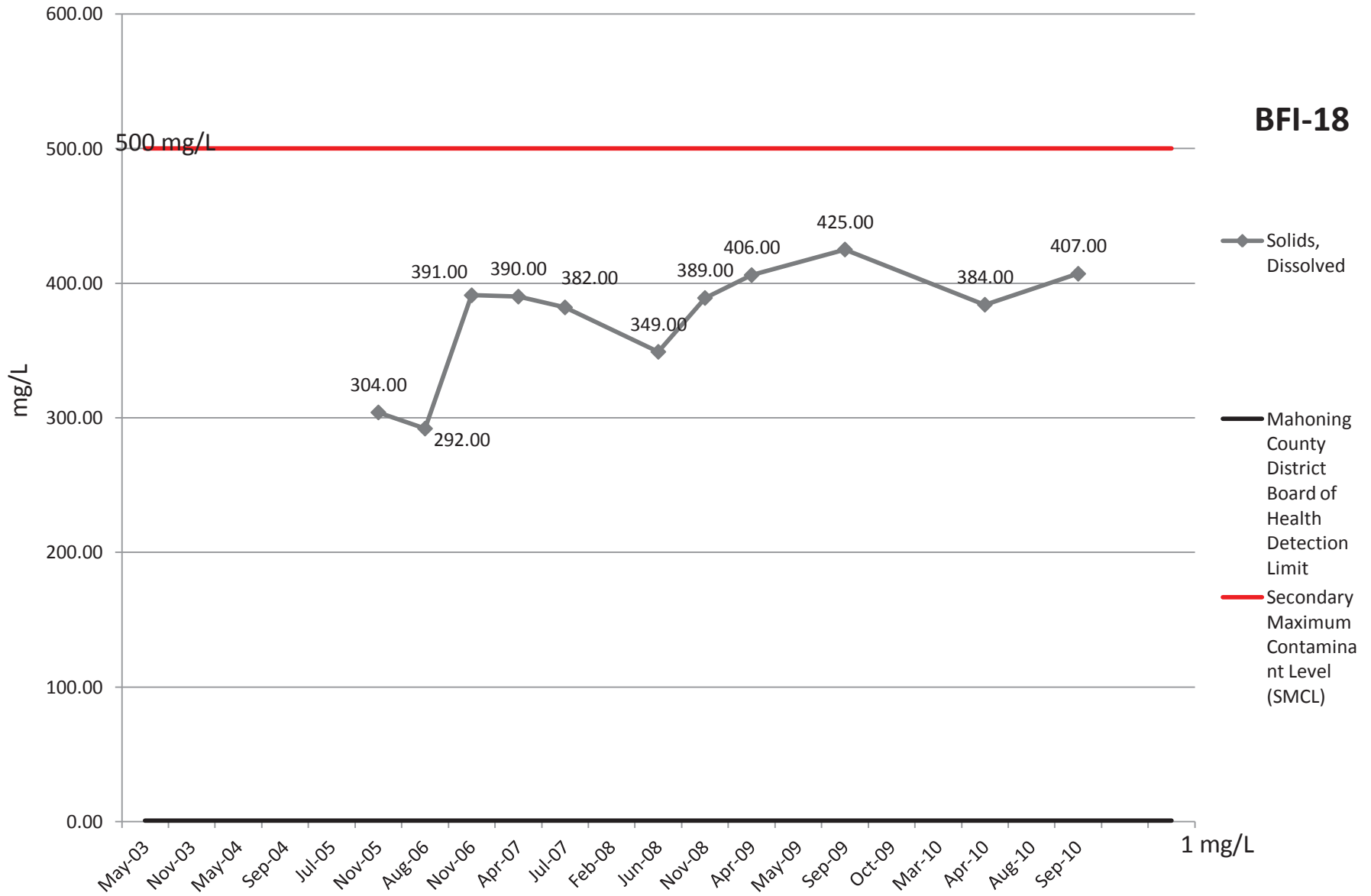
**BFI-18**



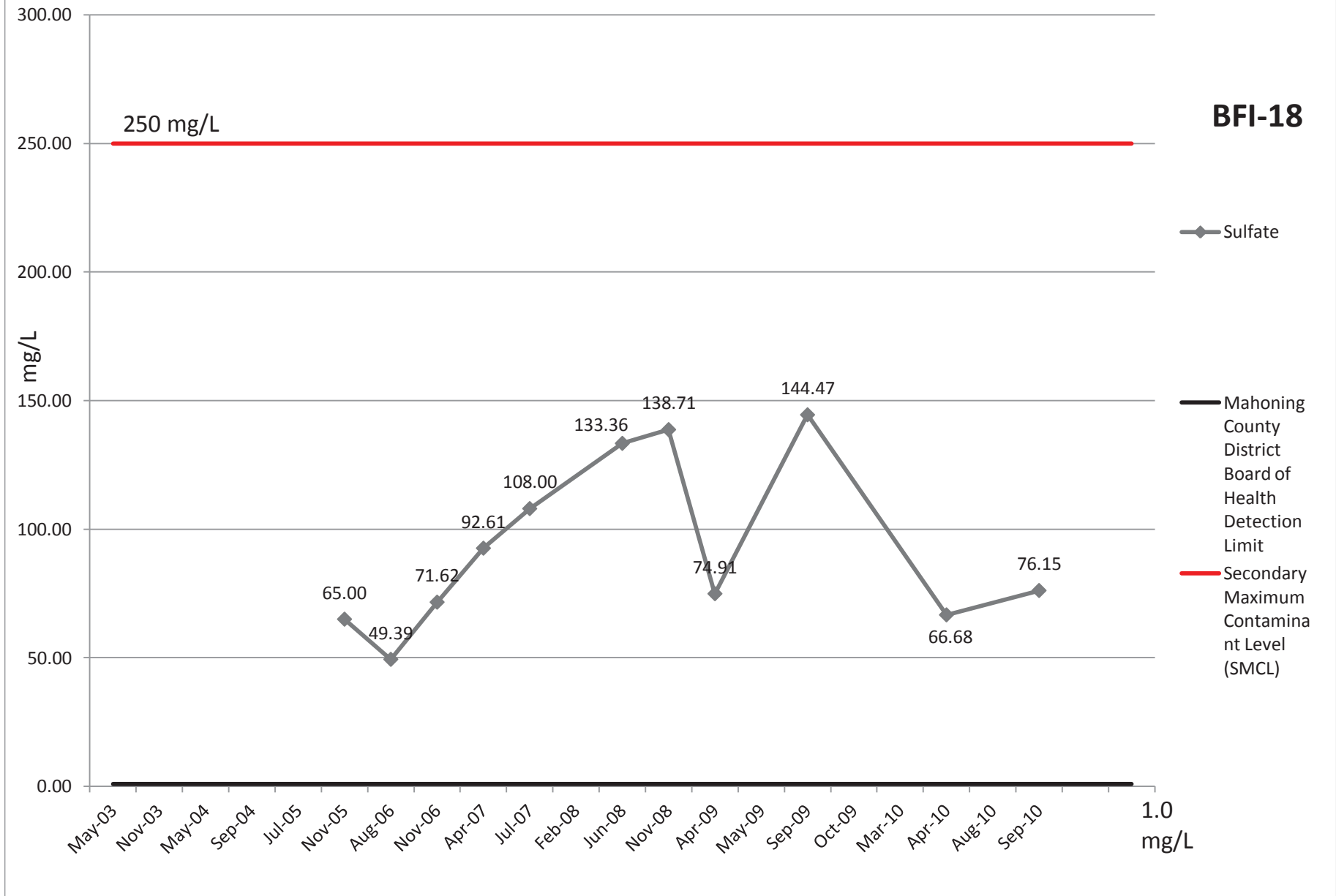


# Solids, Dissolved

**BFI-18**



# Sulfate



# Bacteria

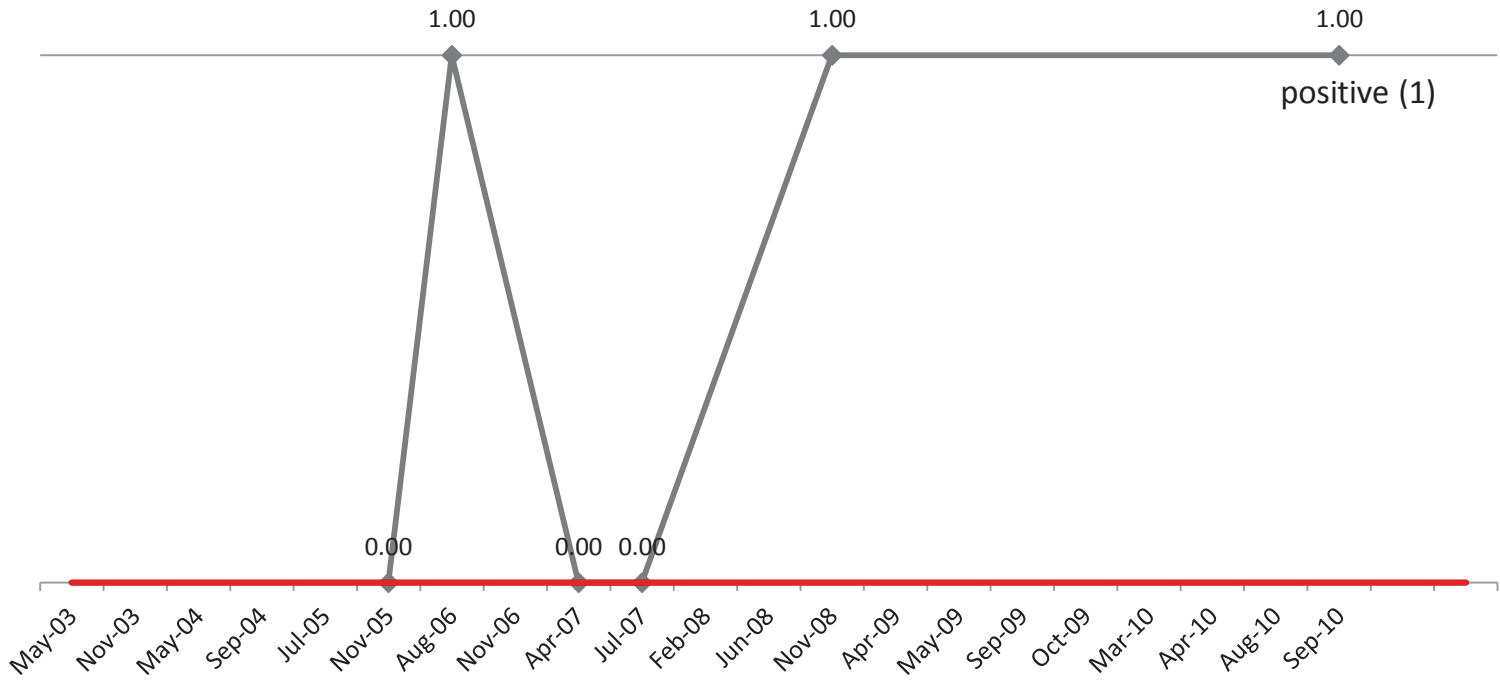
## BFI-18

Positive/Negative

◆ Bacteria

— Mahoning County District Board of Health Detection Limit

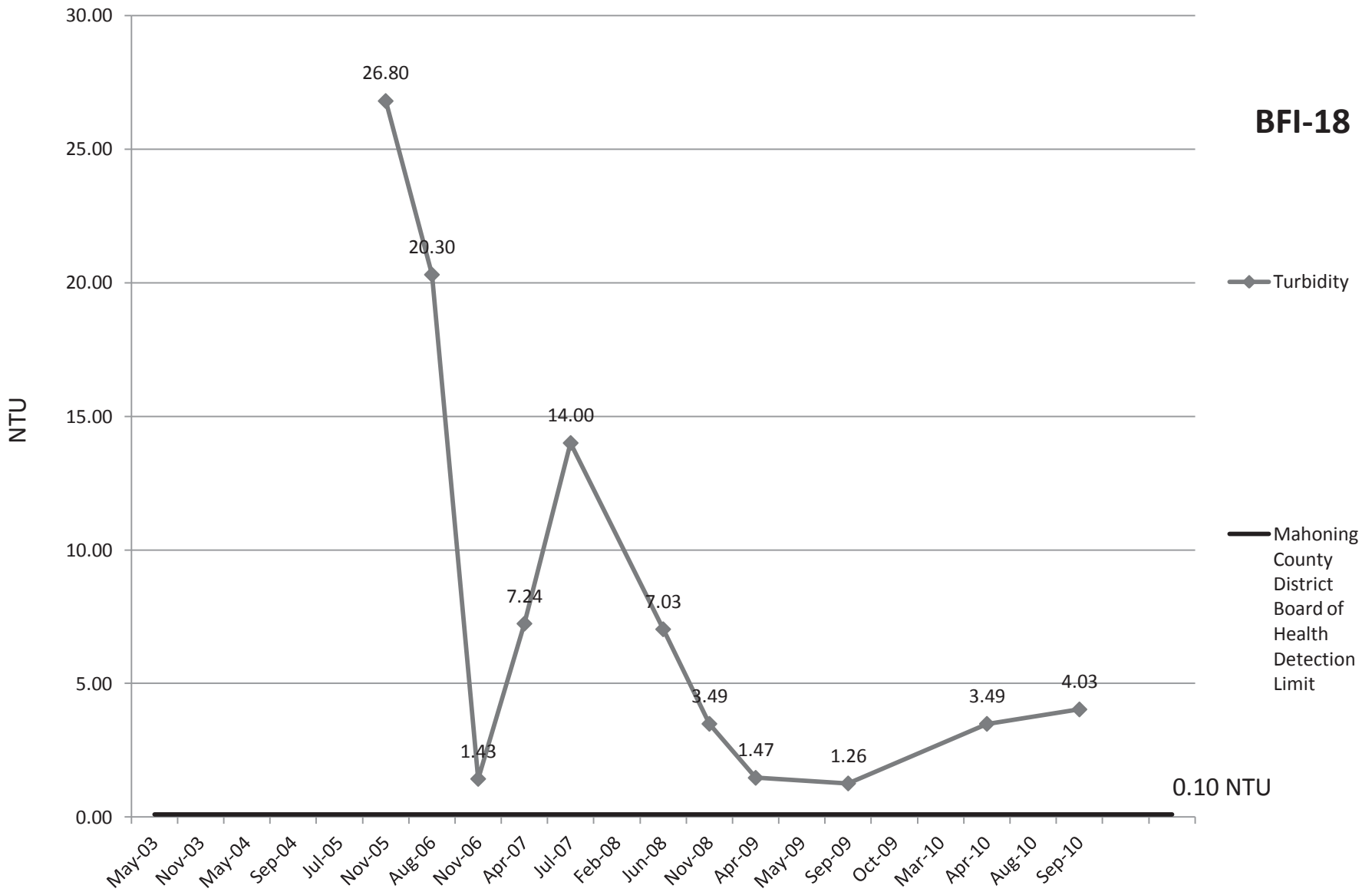
— Maximum Contaminant Level (MCL)



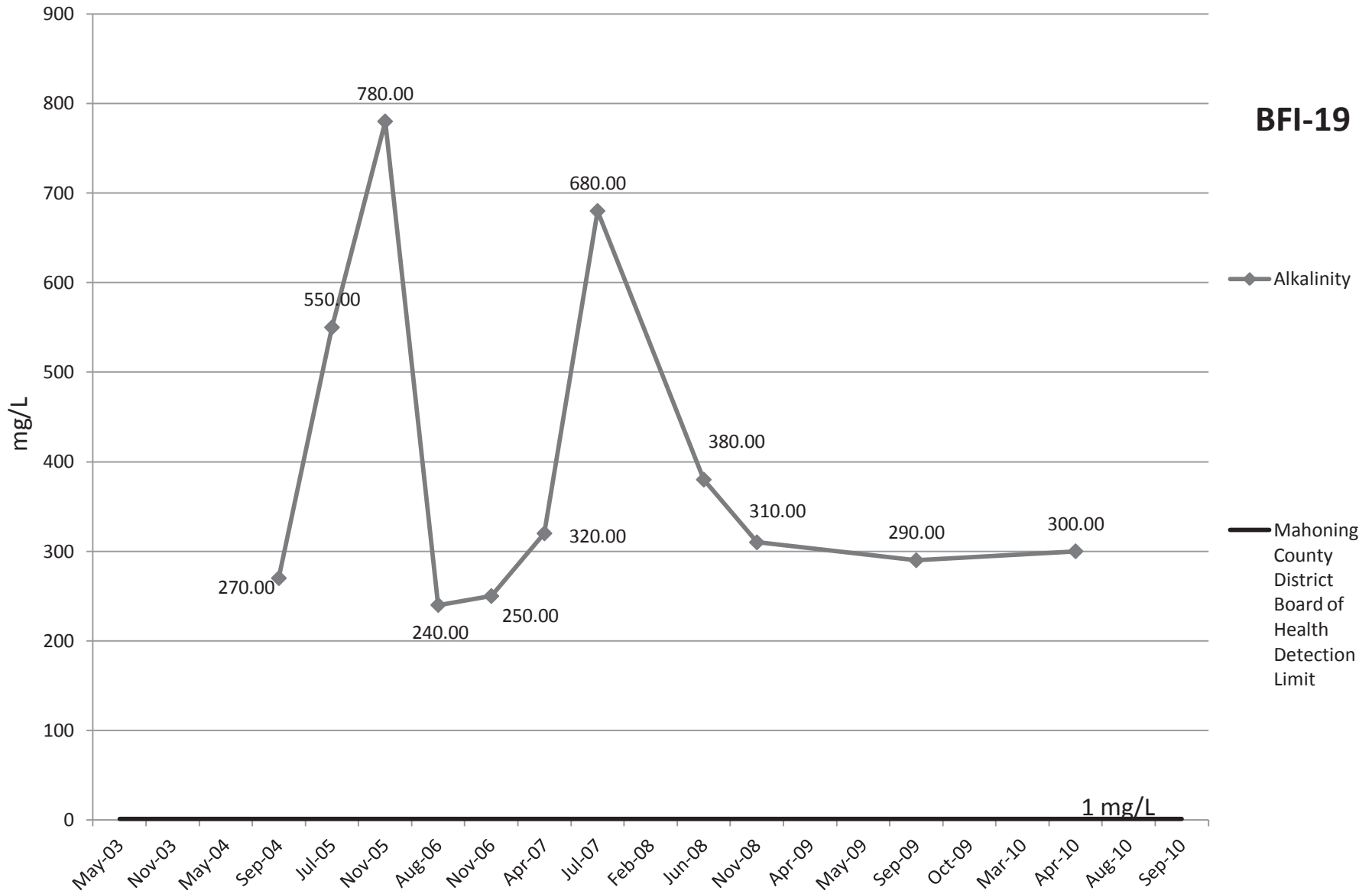
positive (1)

negative (0)

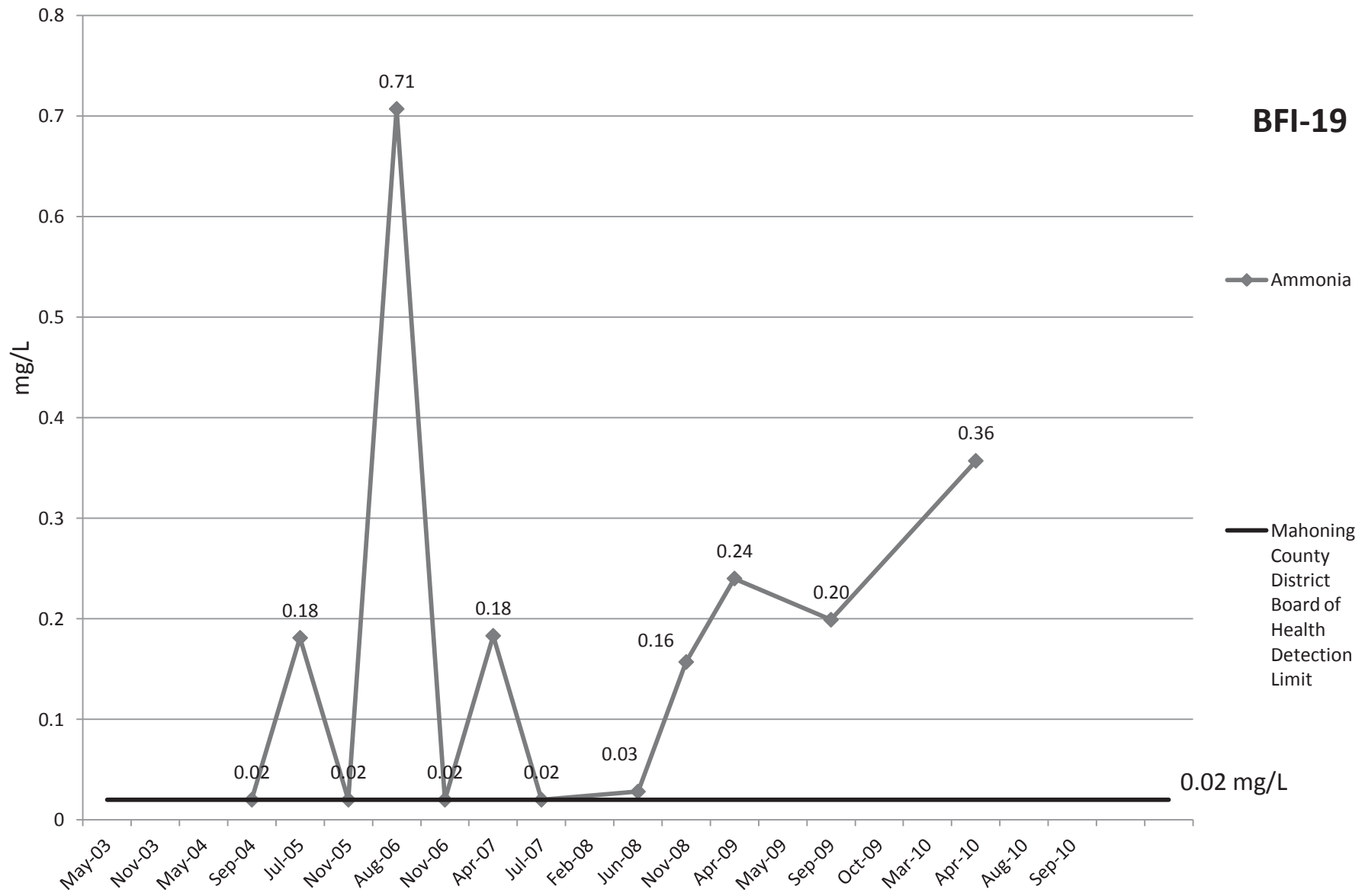
# Turbidity



# Alkalinity



# Ammonia



**BFI-19**

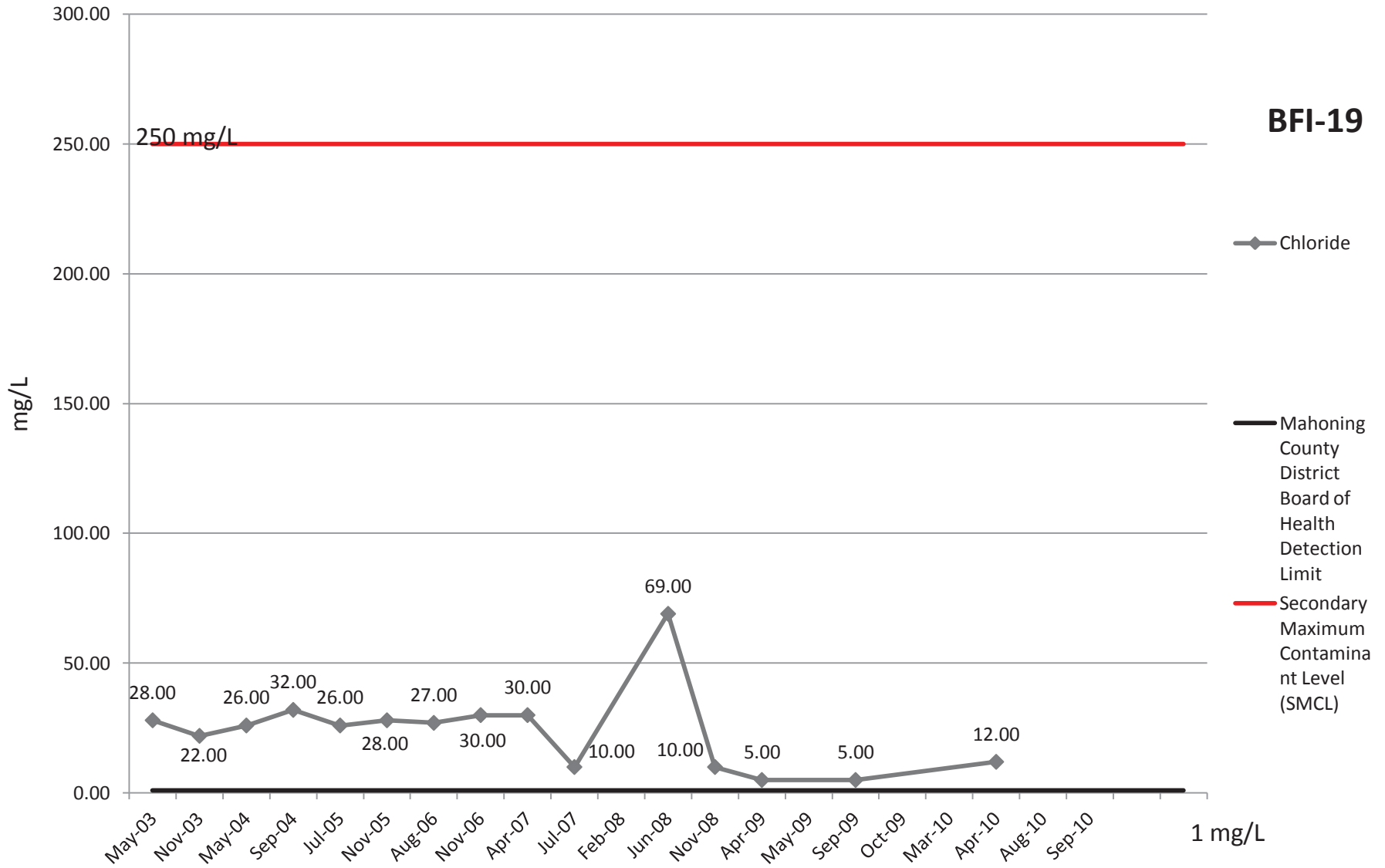
◆ Ammonia

— Mahoning County District Board of Health Detection Limit

0.02 mg/L

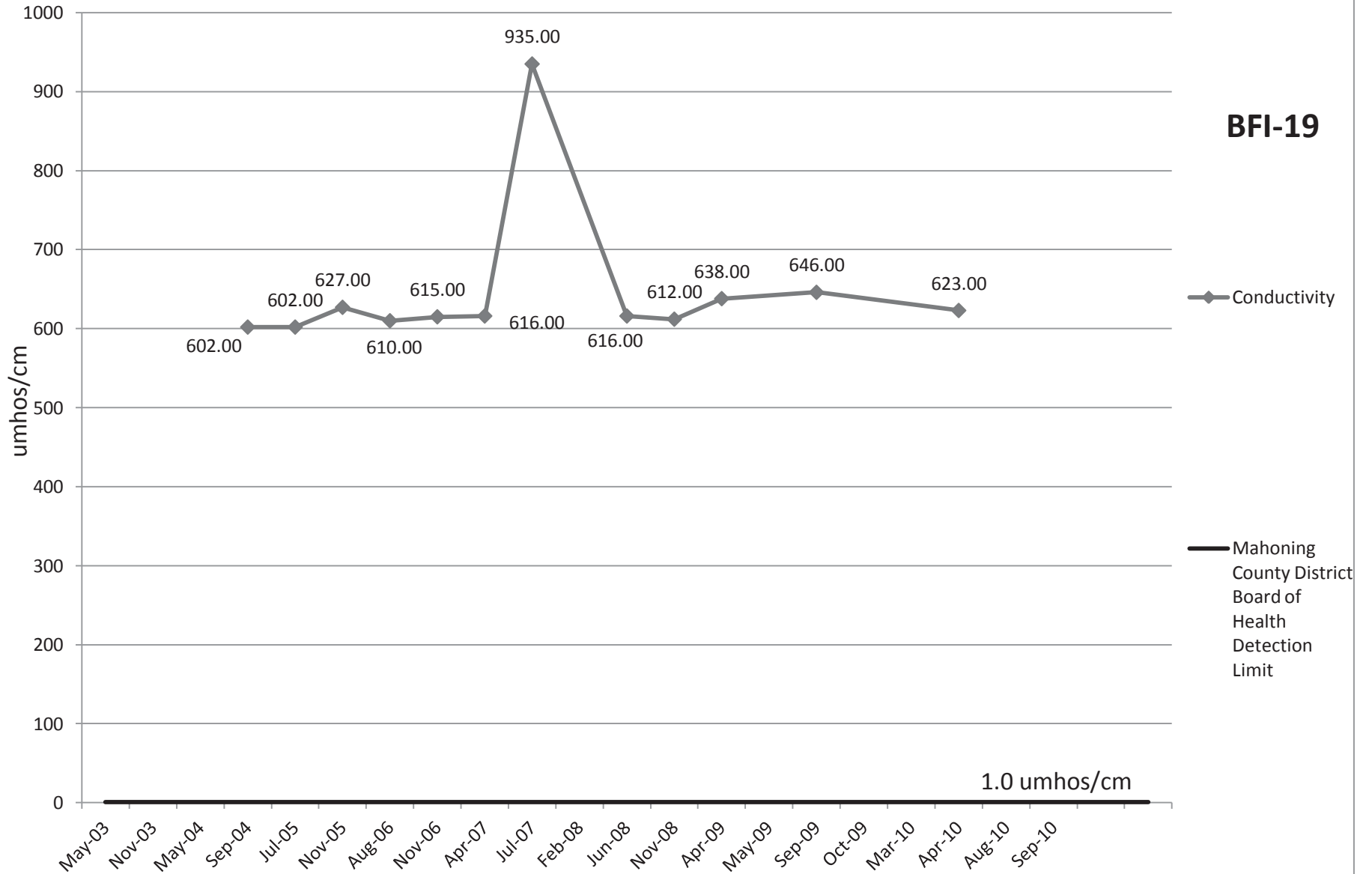
# Chloride

**BFI-19**



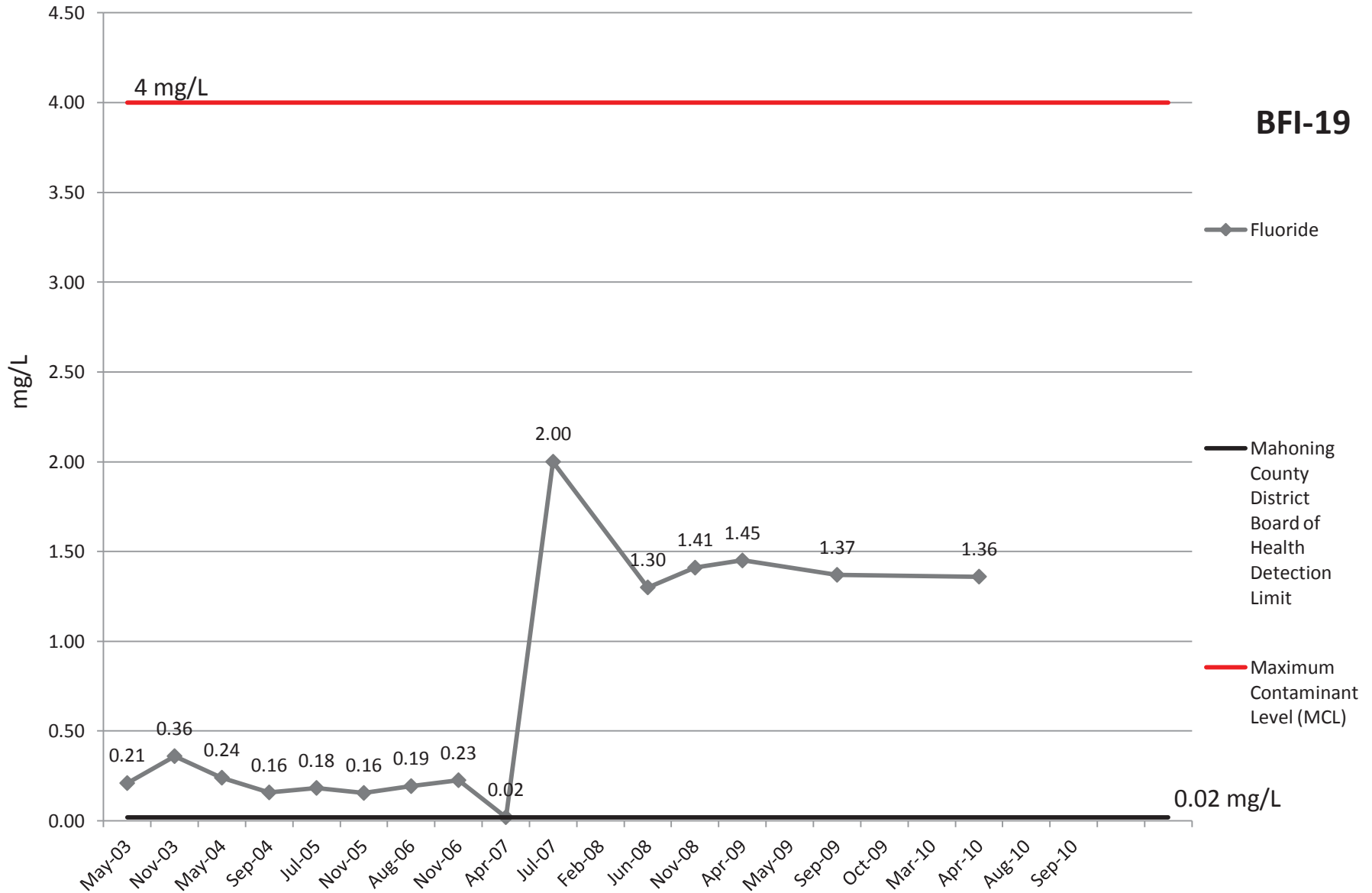
# Conductivity

**BFI-19**



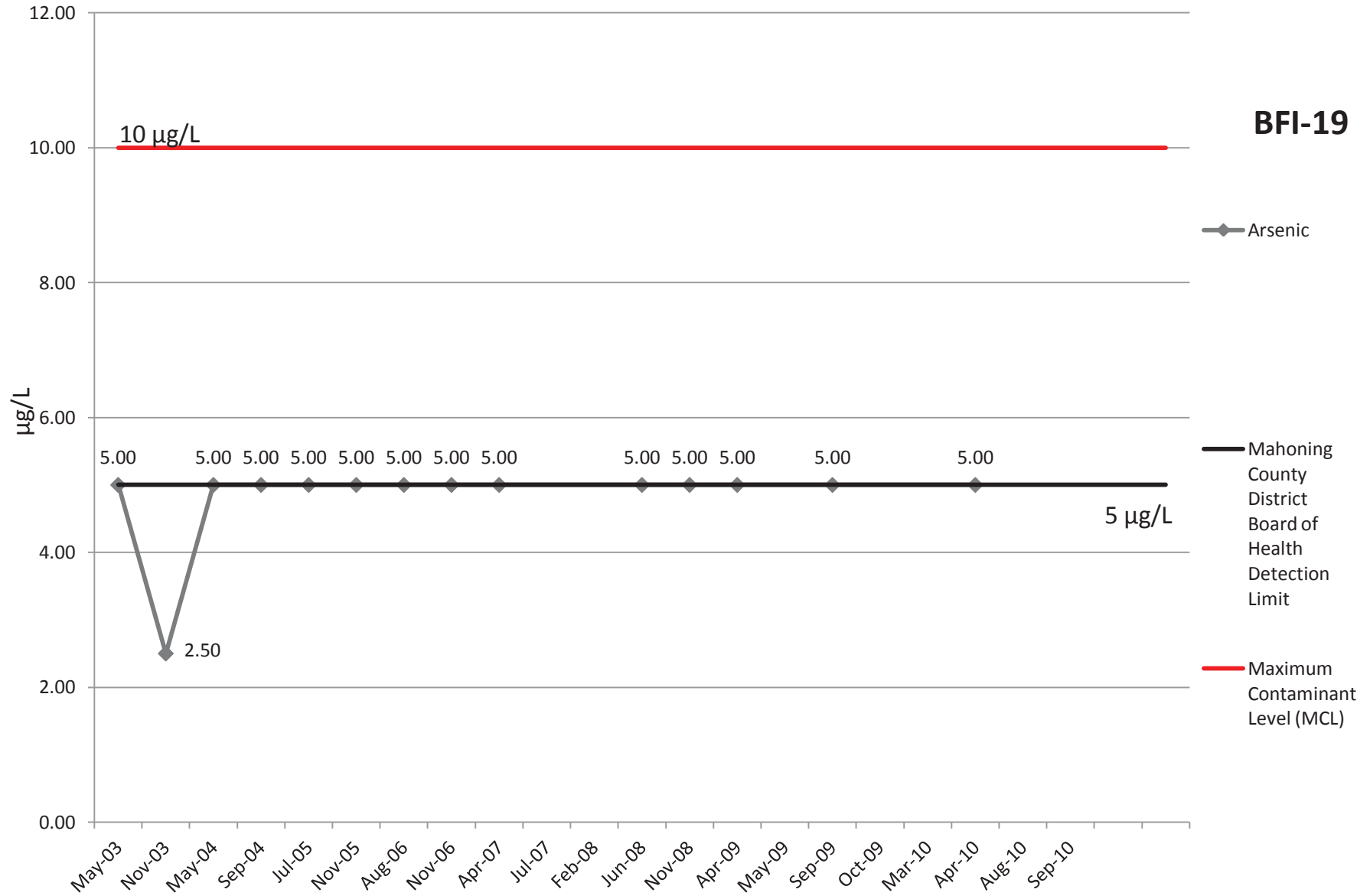


# Fluoride



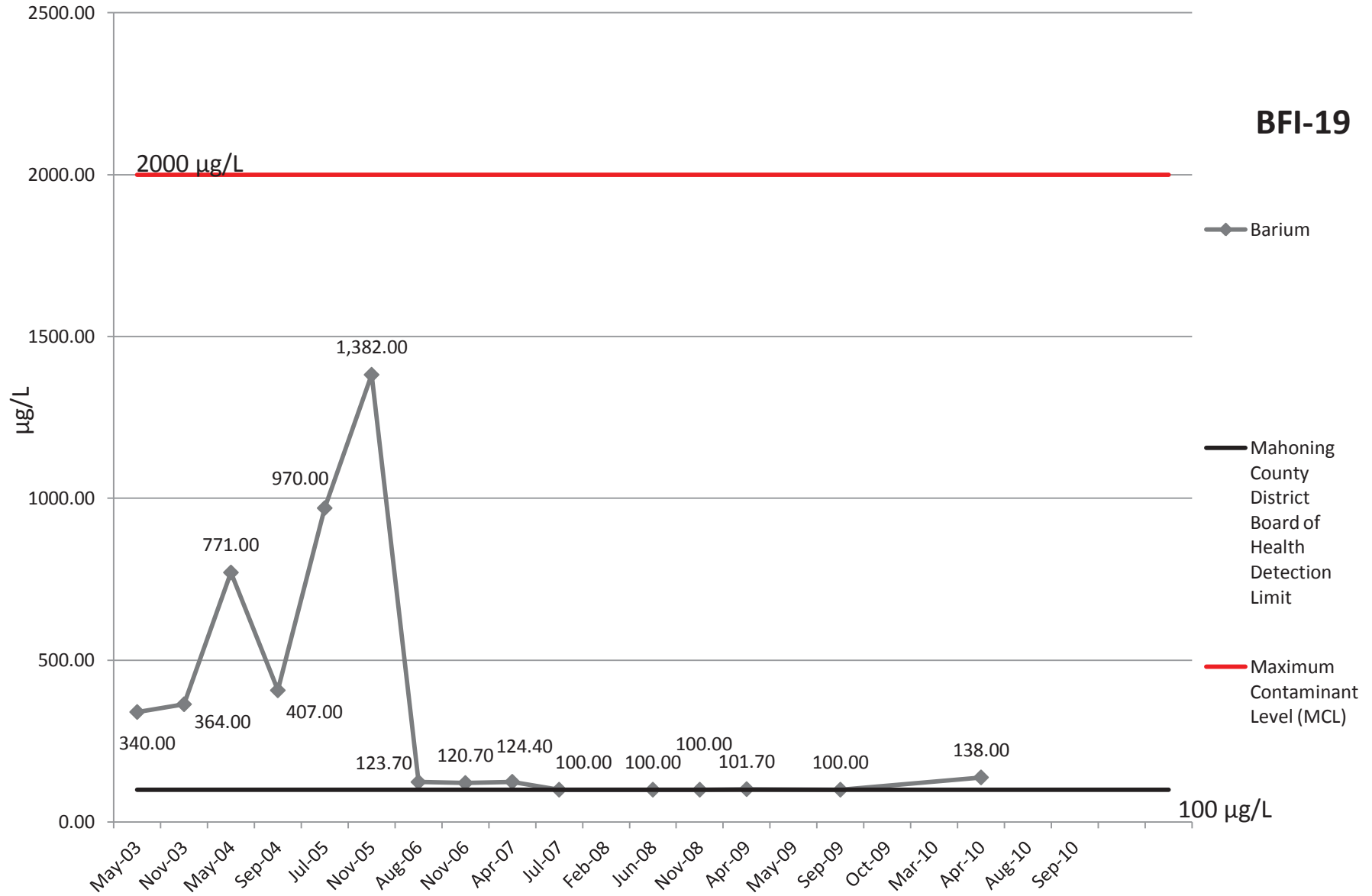
# Arsenic

**BFI-19**



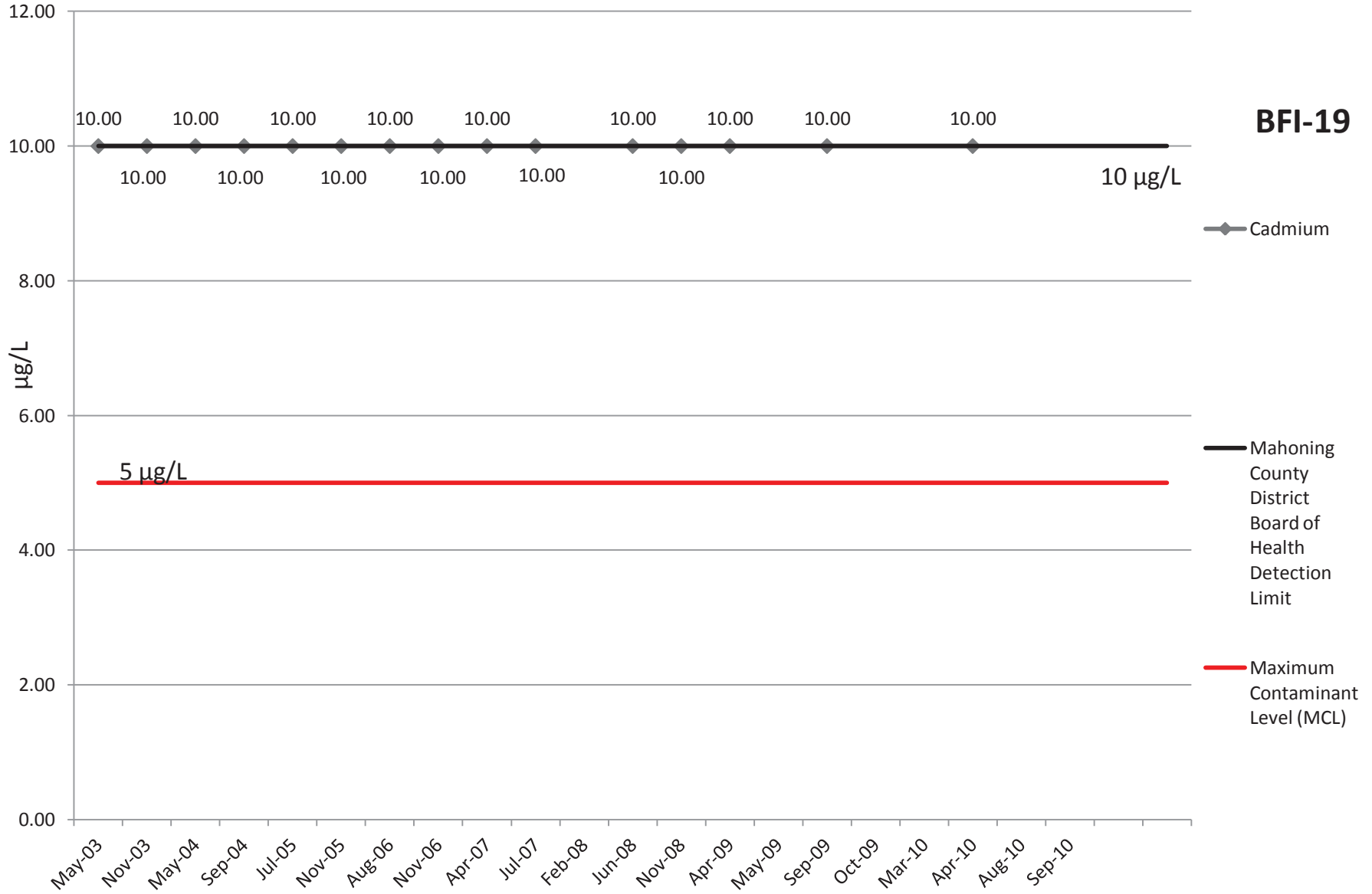
# Barium

**BFI-19**



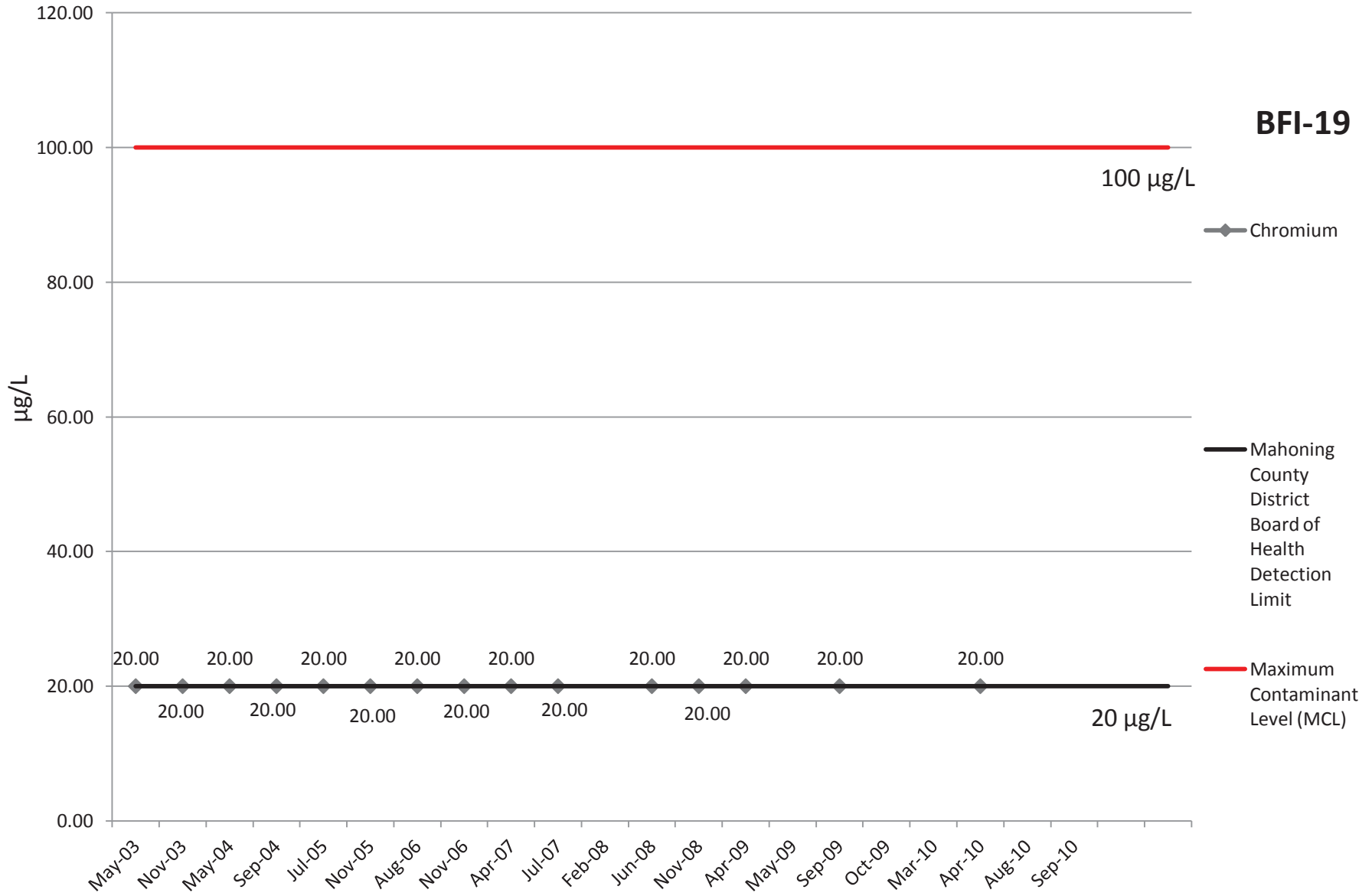
# Cadmium

**BFI-19**

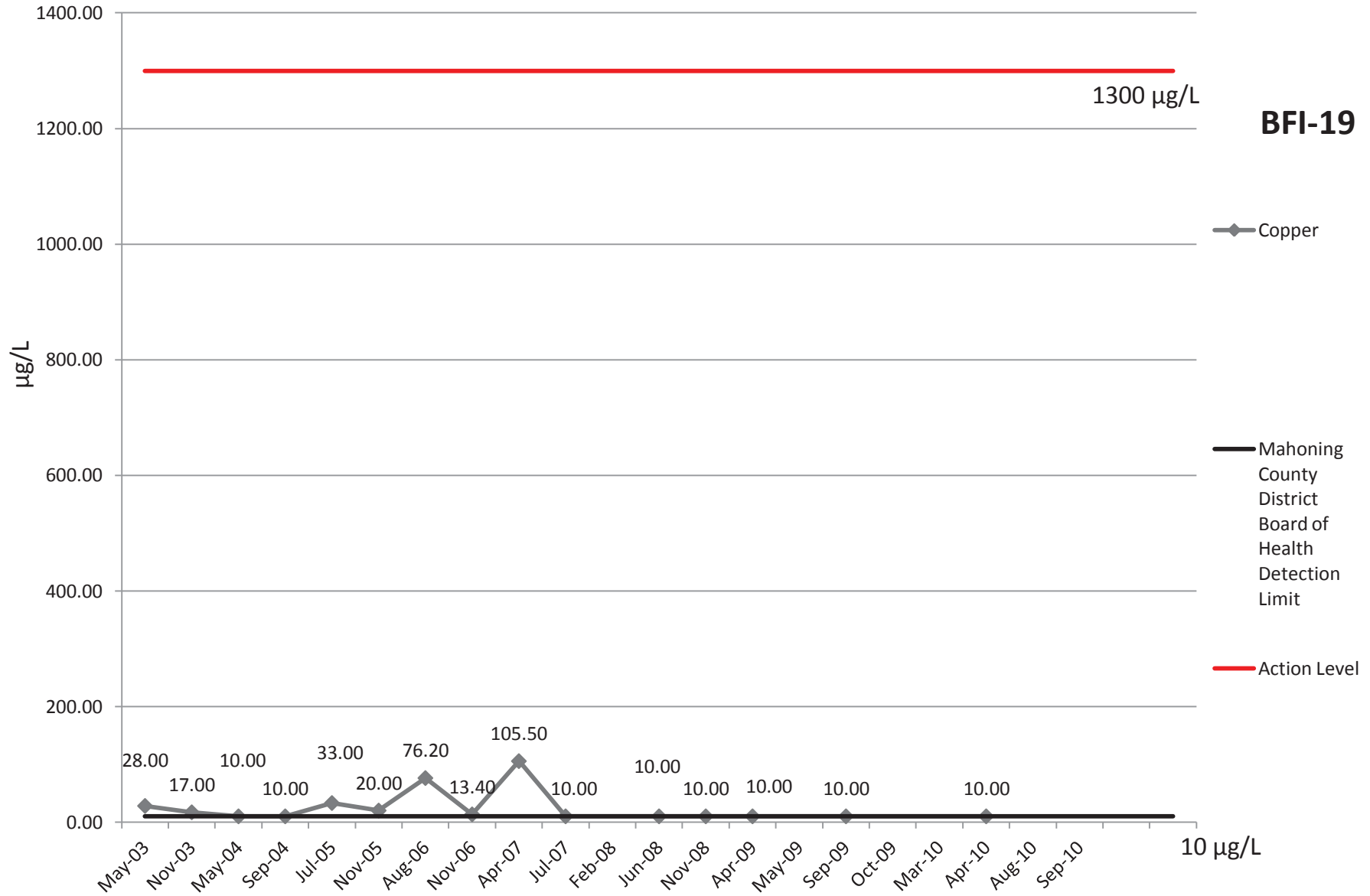


# Chromium

**BFI-19**

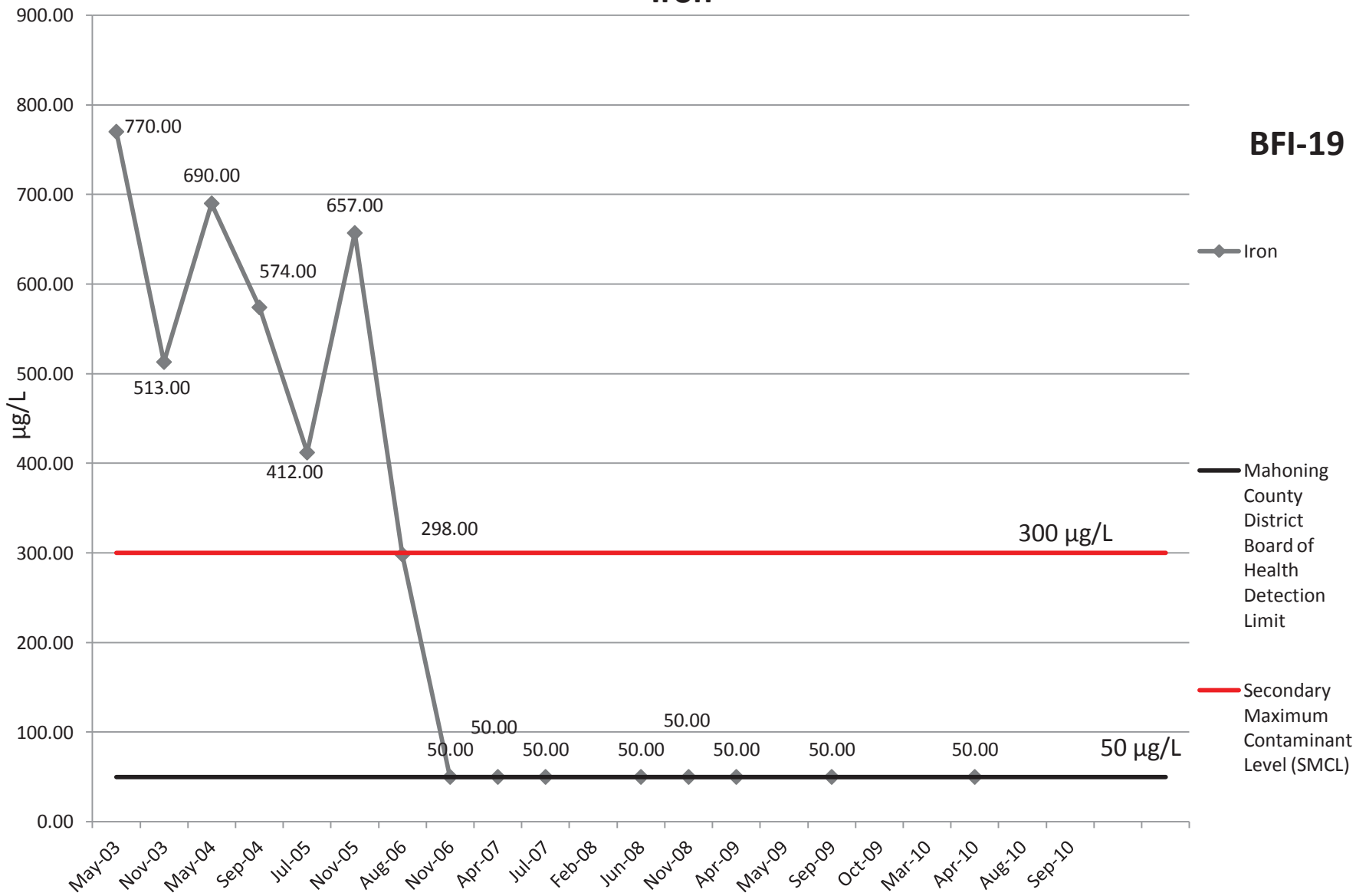


# Copper



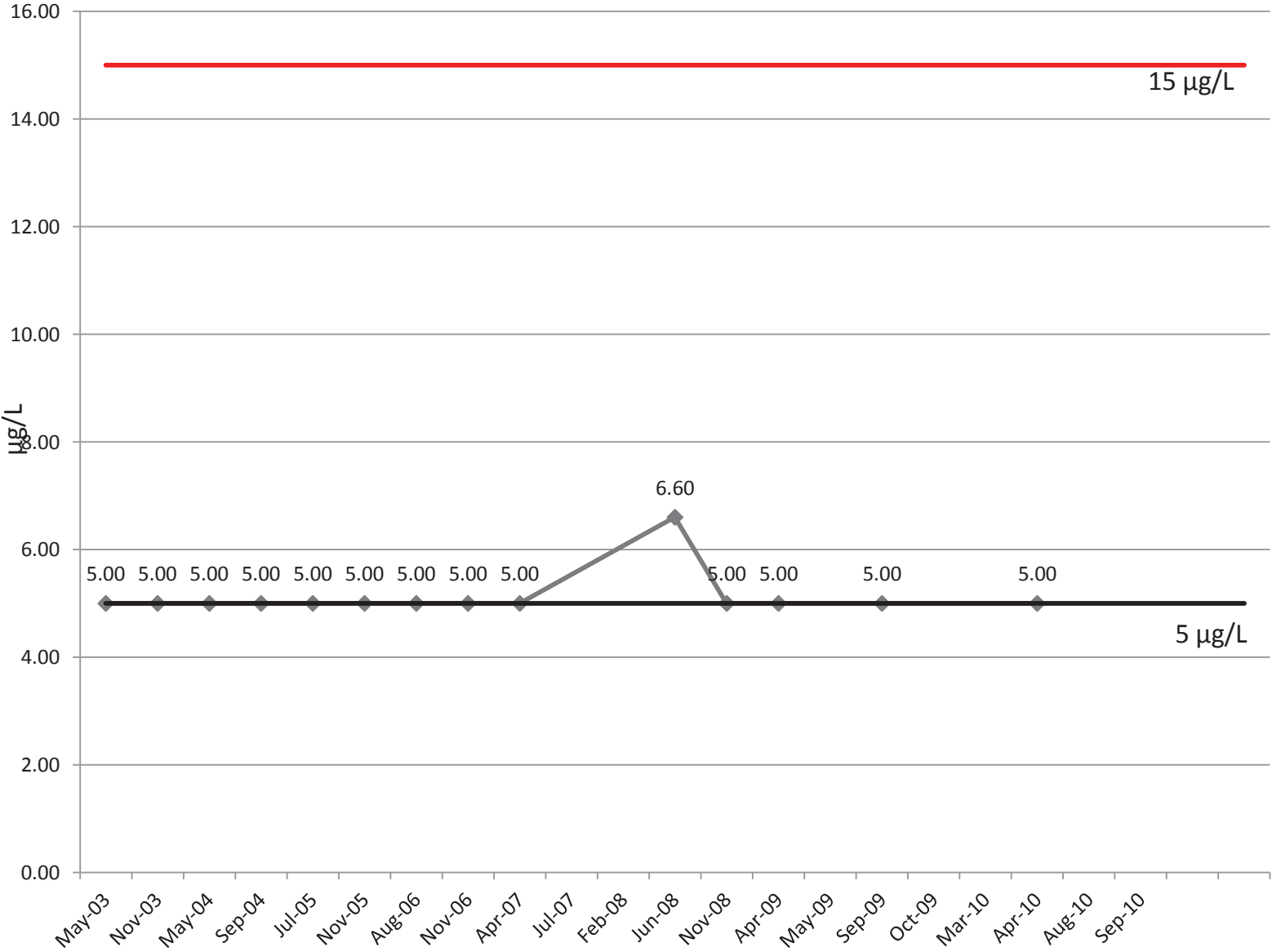
# Iron

**BFI-19**



# Lead

**BFI-19**



Lead

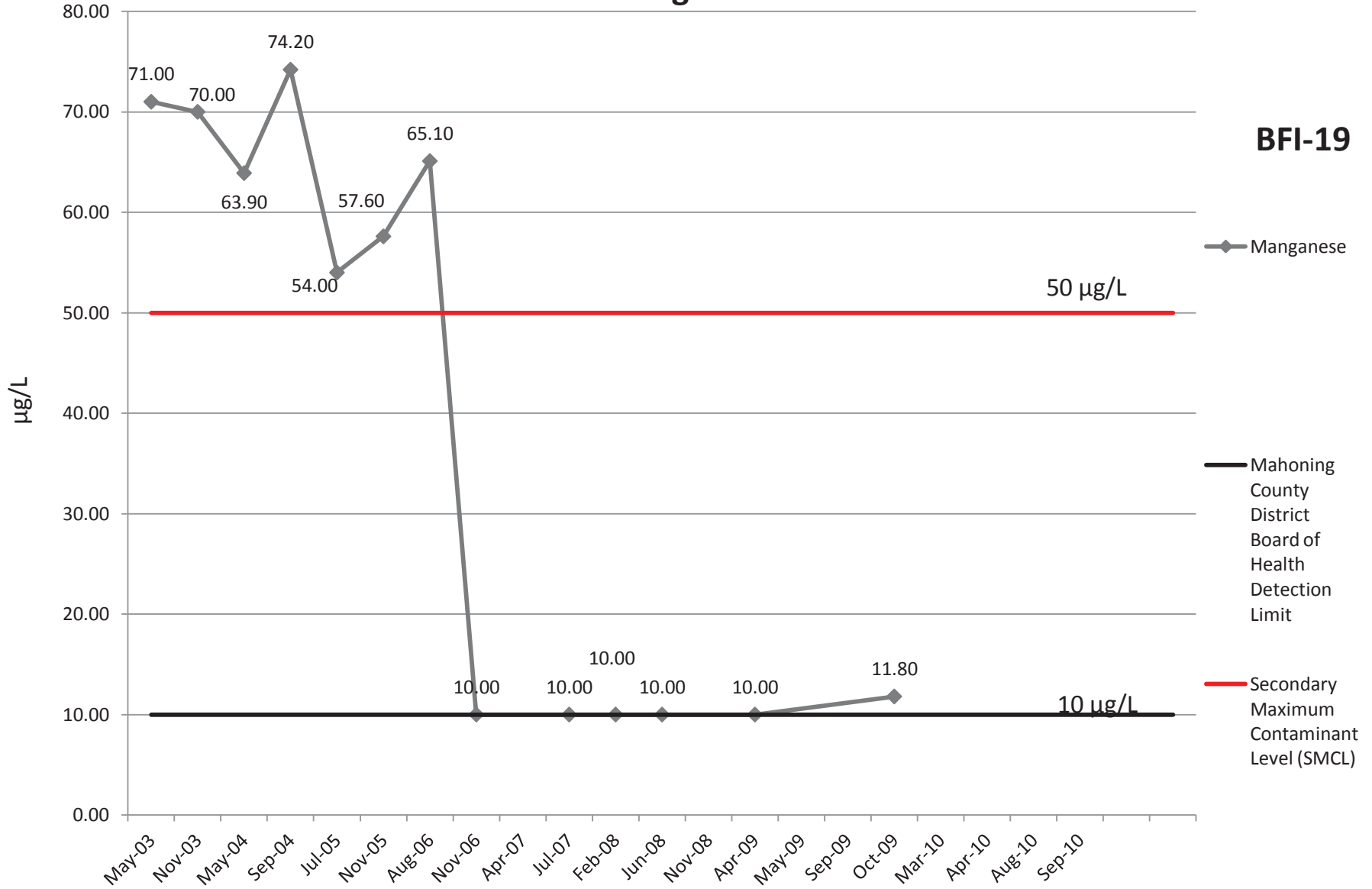
Mahoning County District Board of Health Detection Limit

Action Level



# Manganese

**BFI-19**

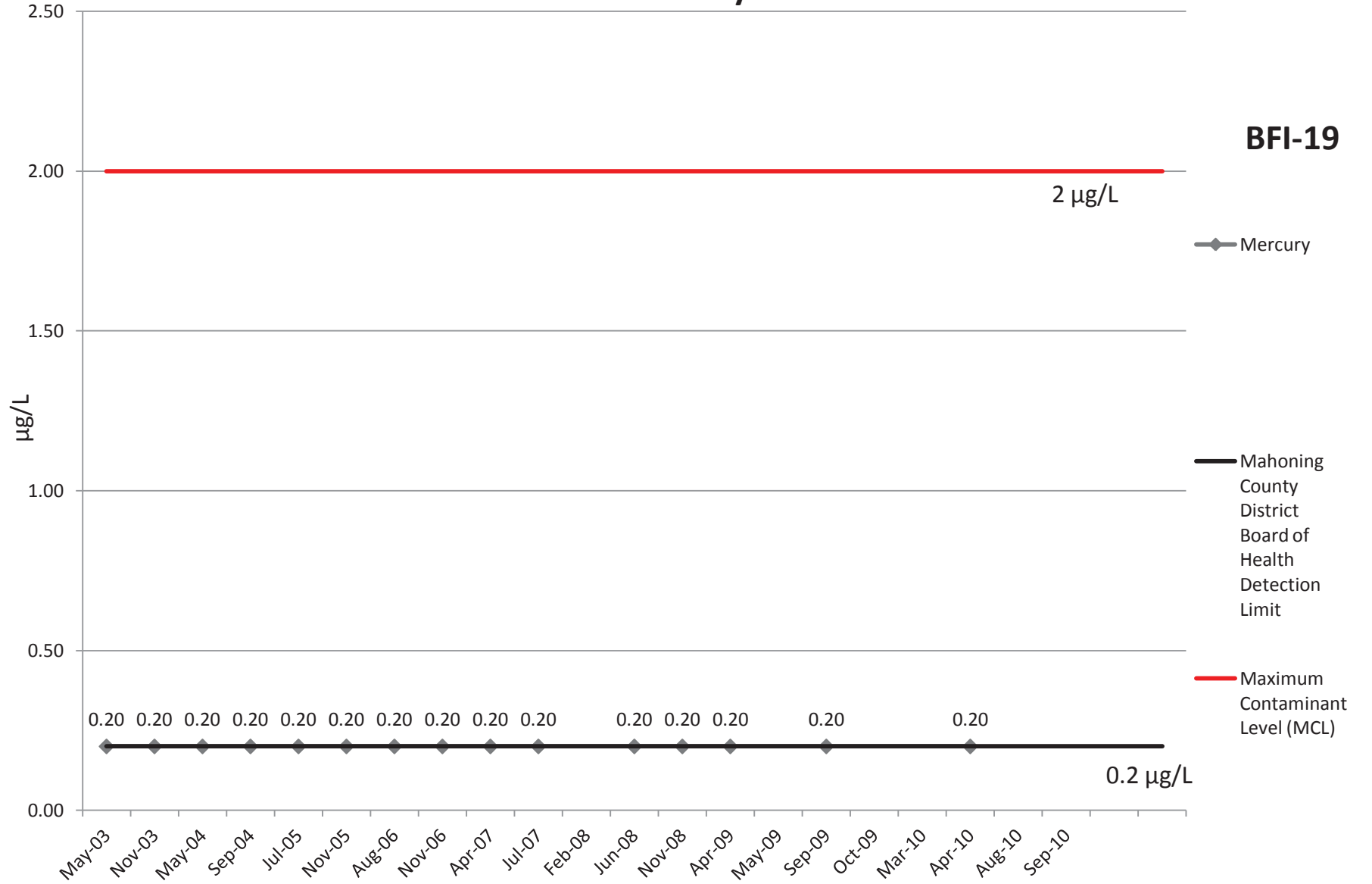


# Mercury

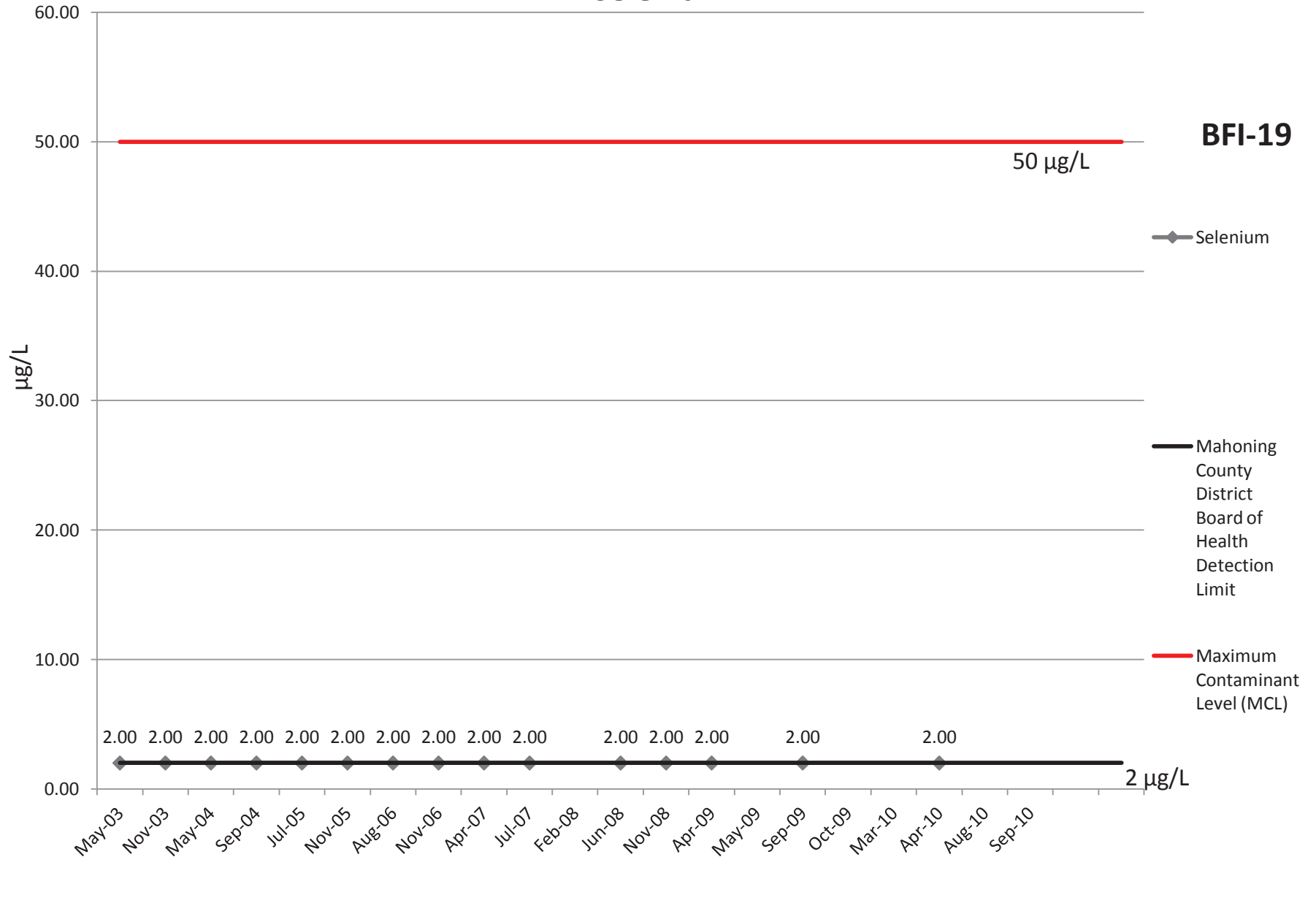
**BFI-19**

2 µg/L

0.2 µg/L

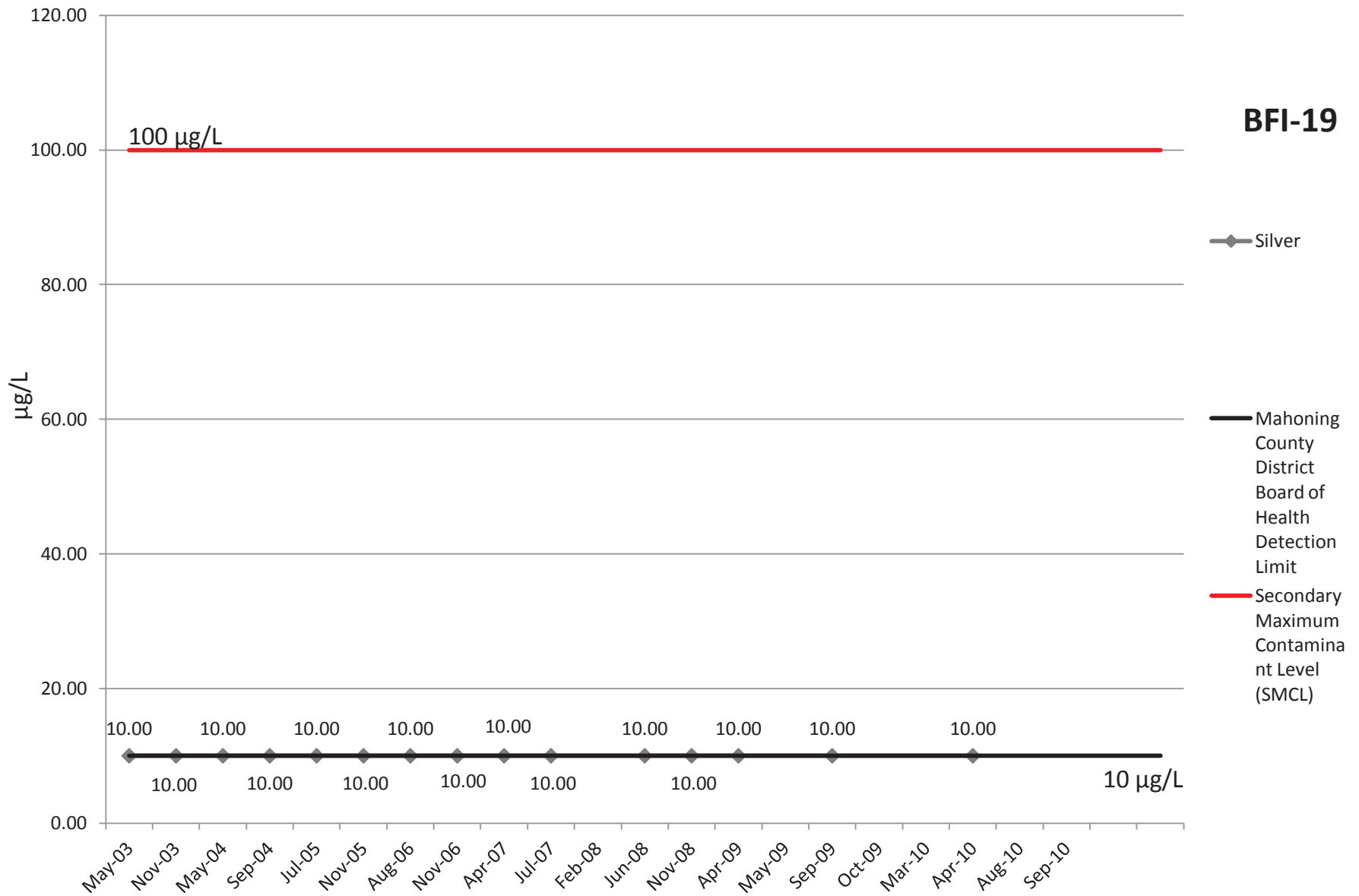


# Selenium

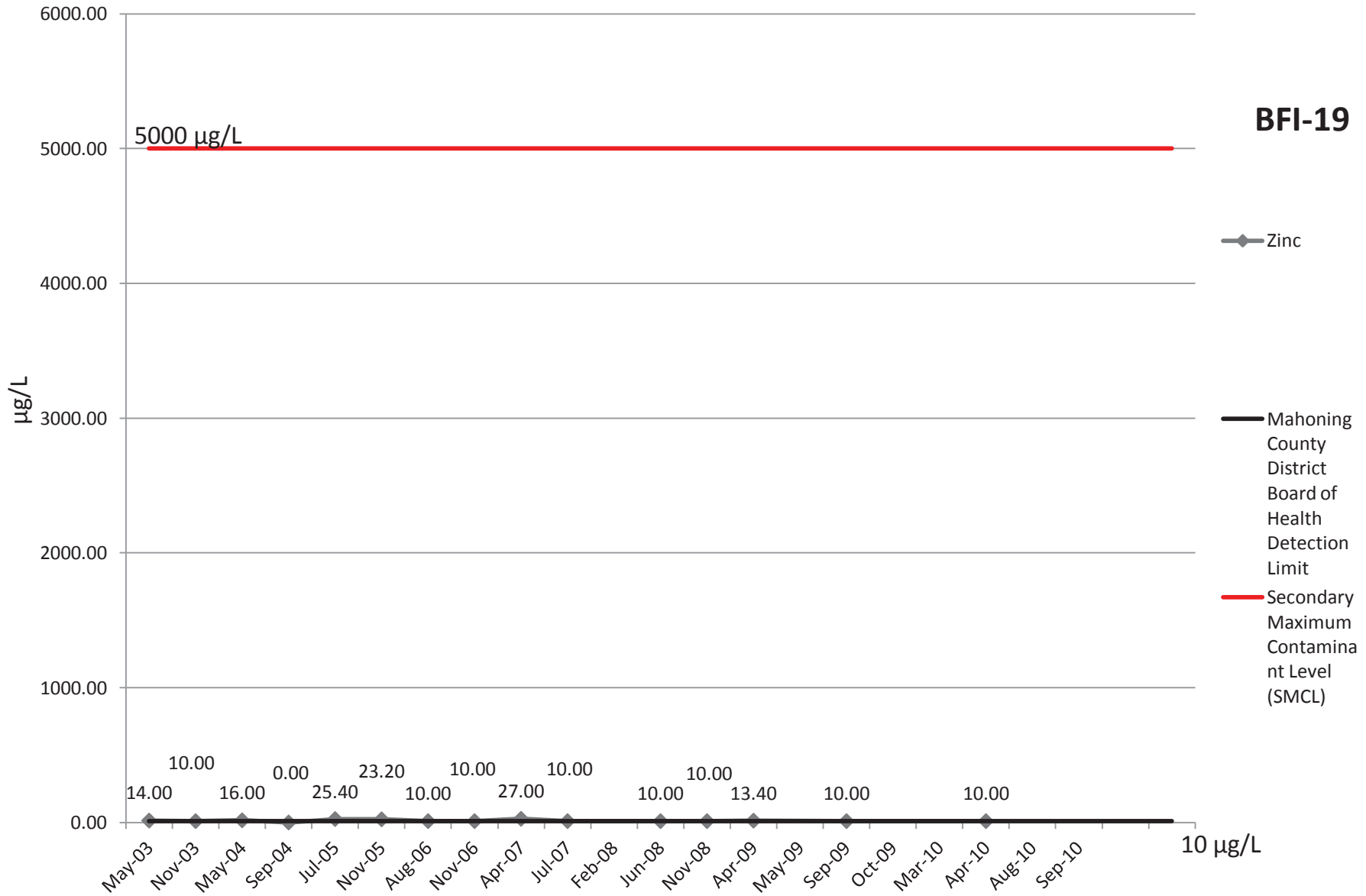


# Silver

**BFI-19**

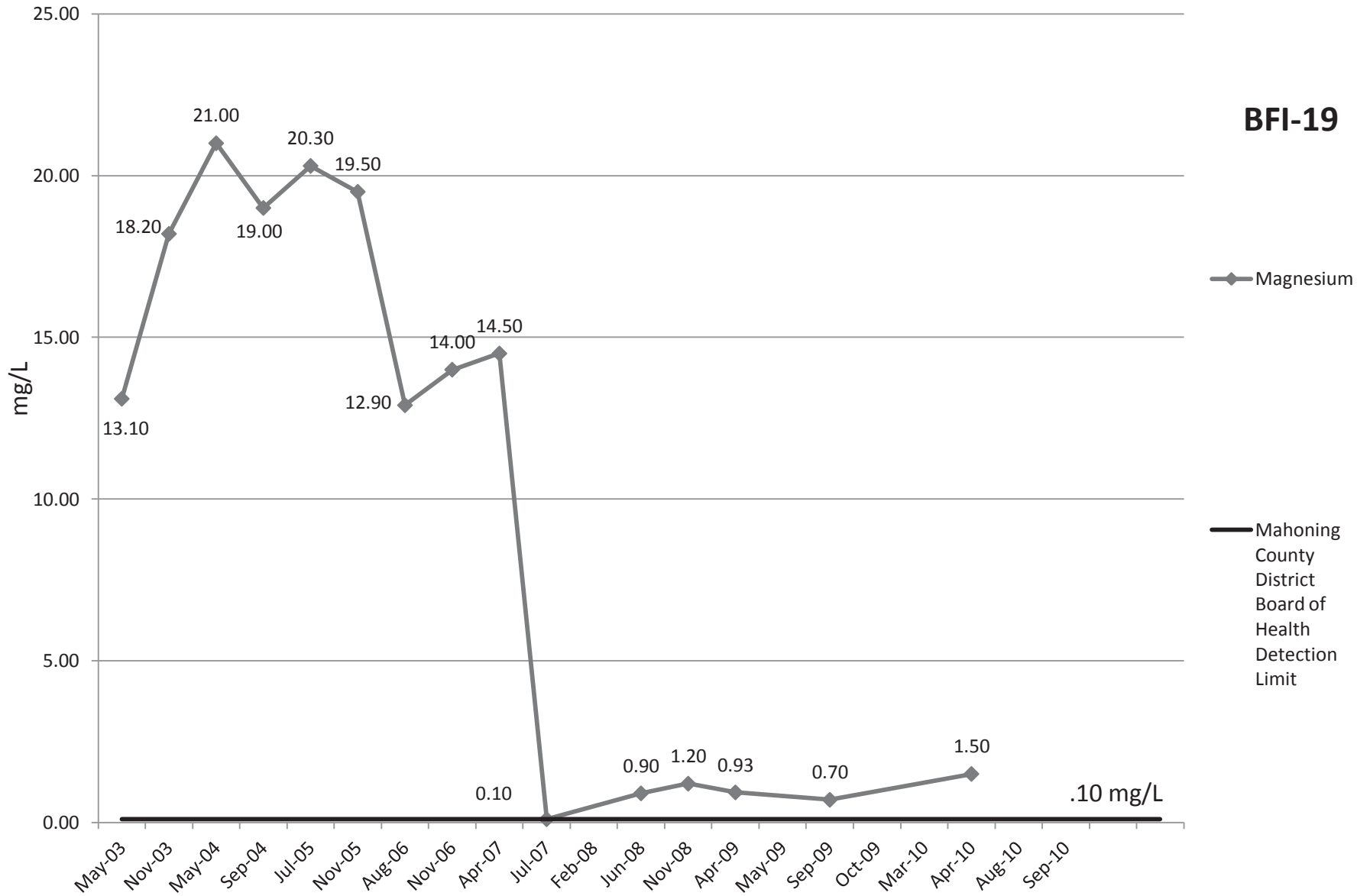


# Zinc

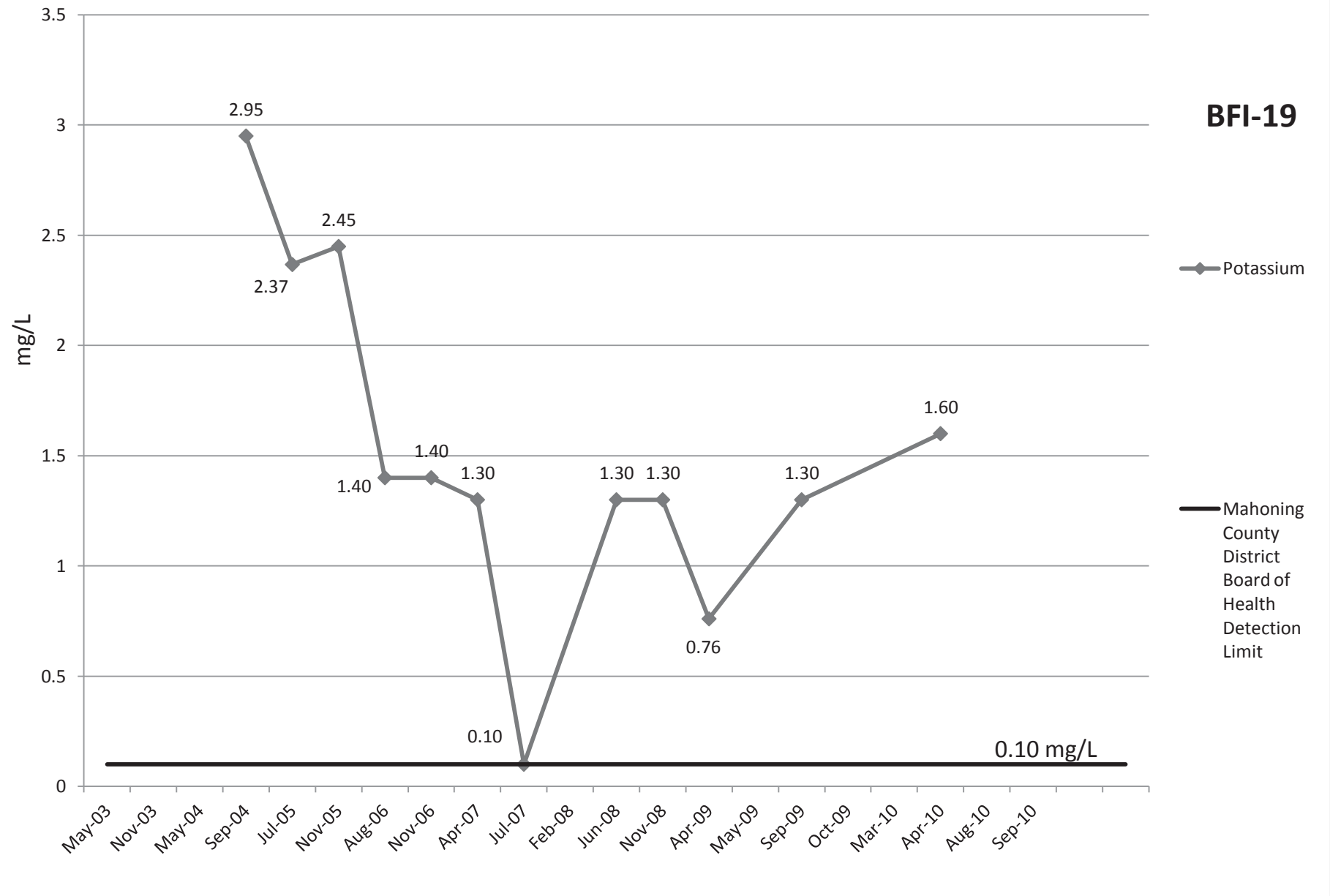


# Magnesium

**BFI-19**

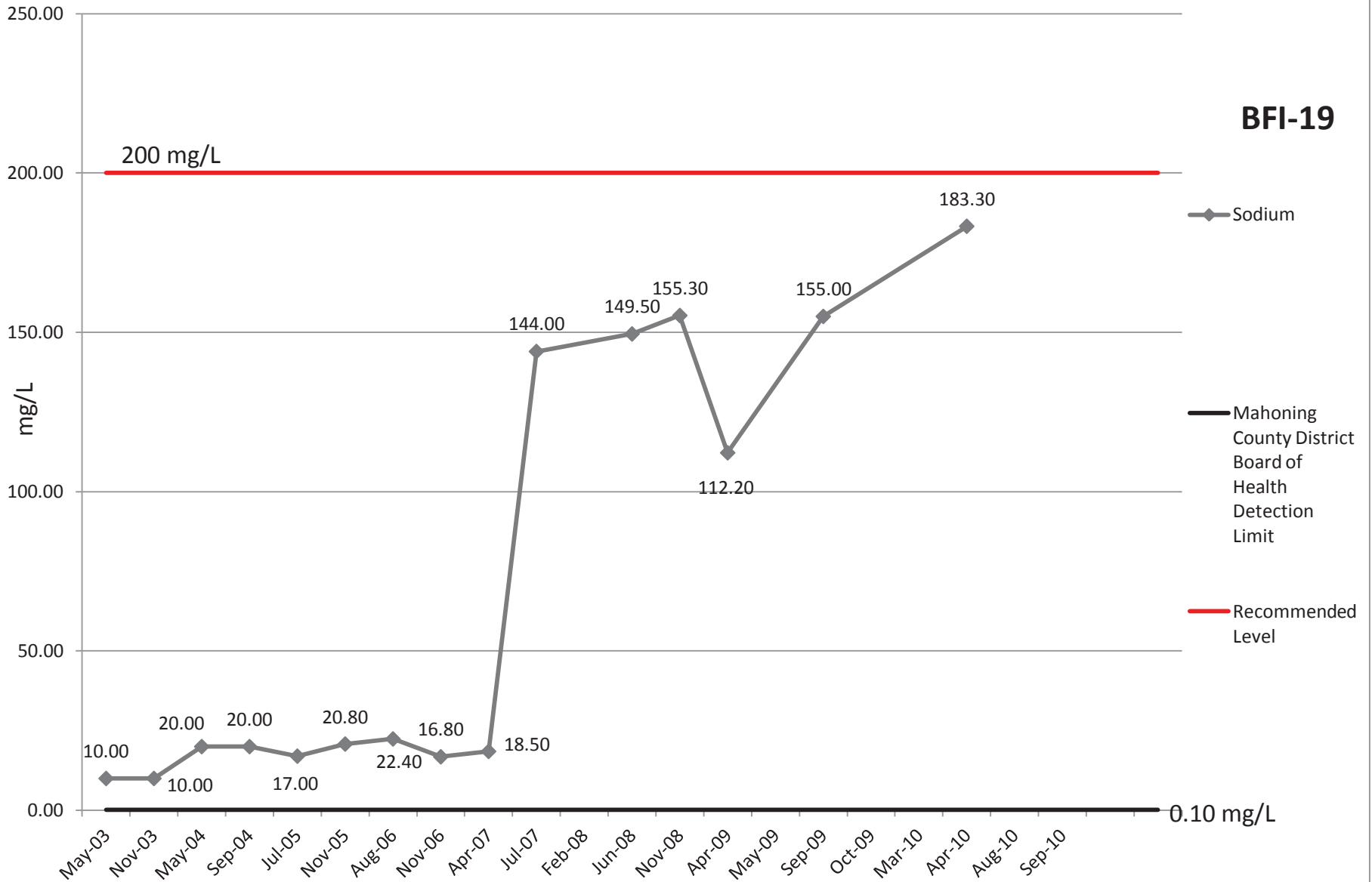


# Potassium



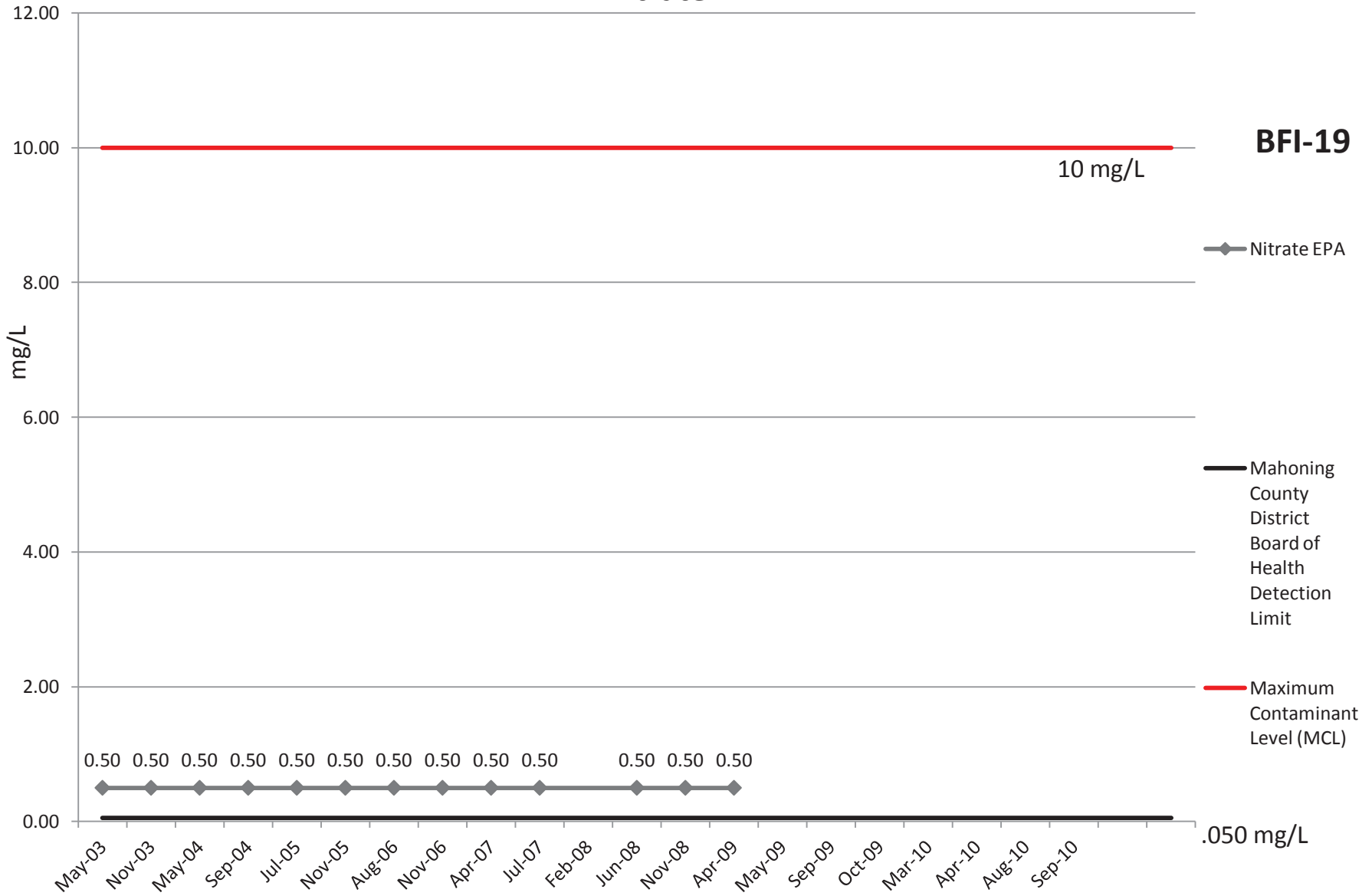
# Sodium

**BFI-19**





# Nitrate EPA



**BFI-19**

◆ Nitrate EPA

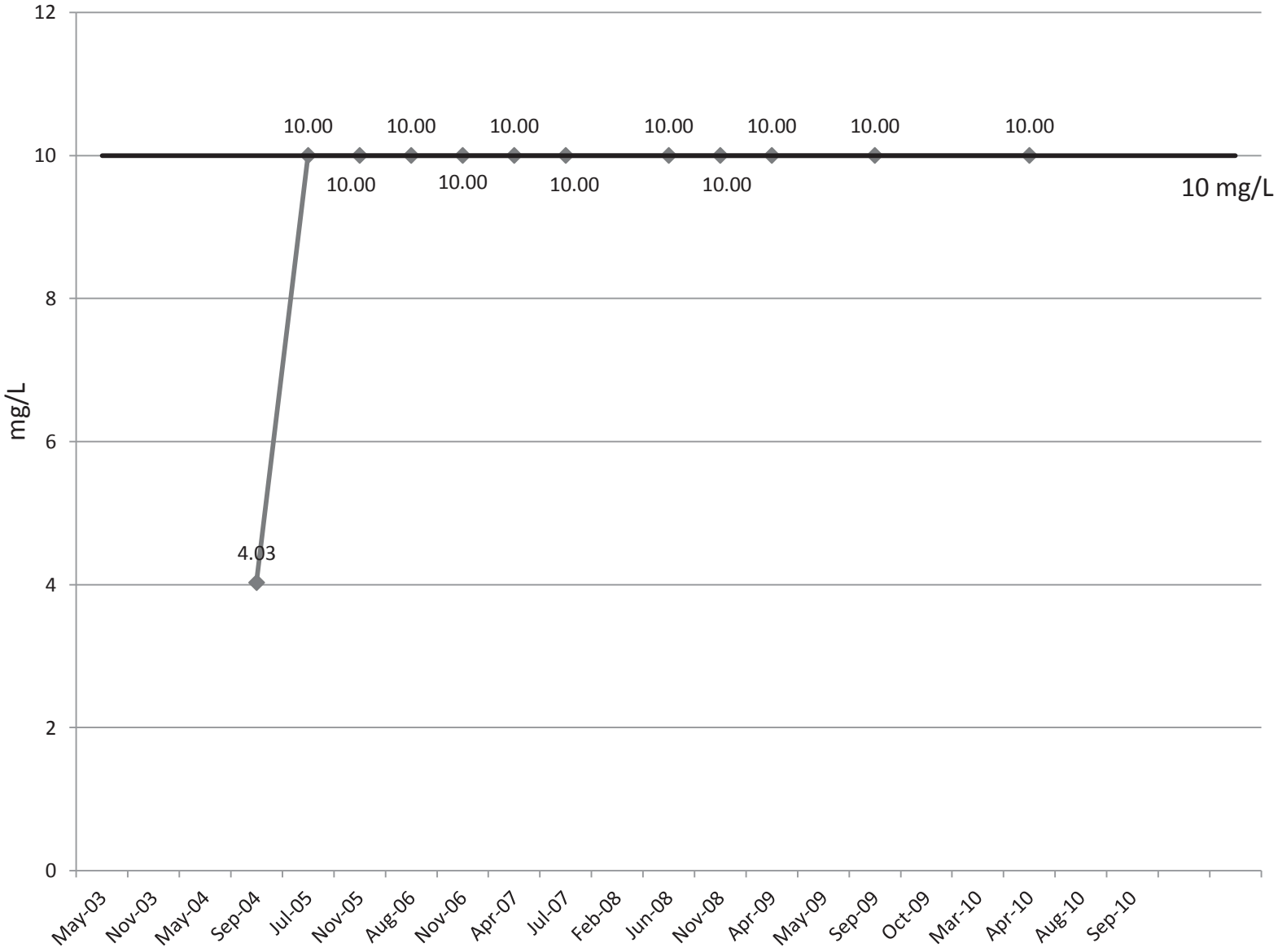
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

0.050 mg/L

# COD

**BFI-19**

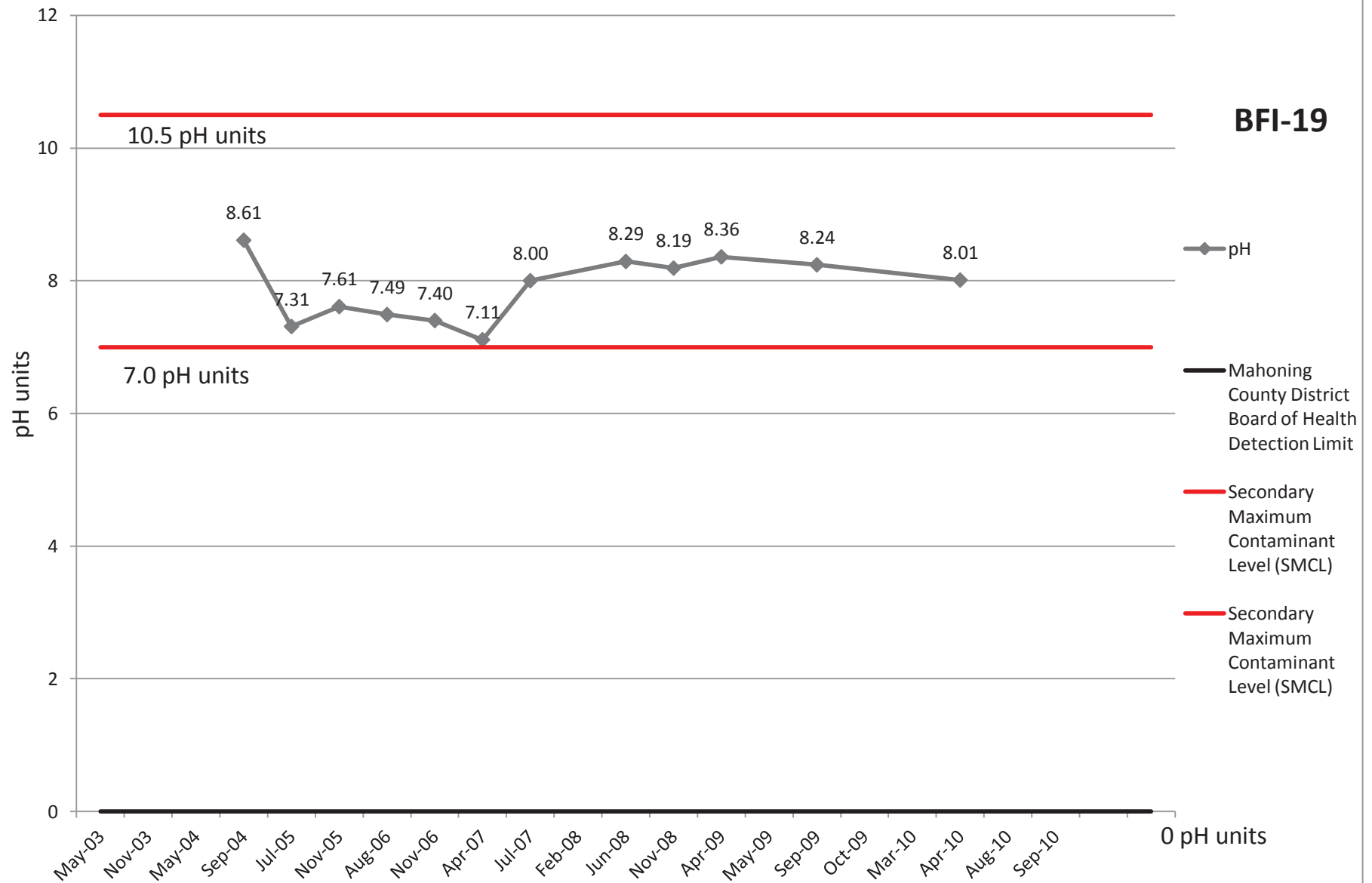


◆ COD

— Mahoning County District Board of Health Detection Limit

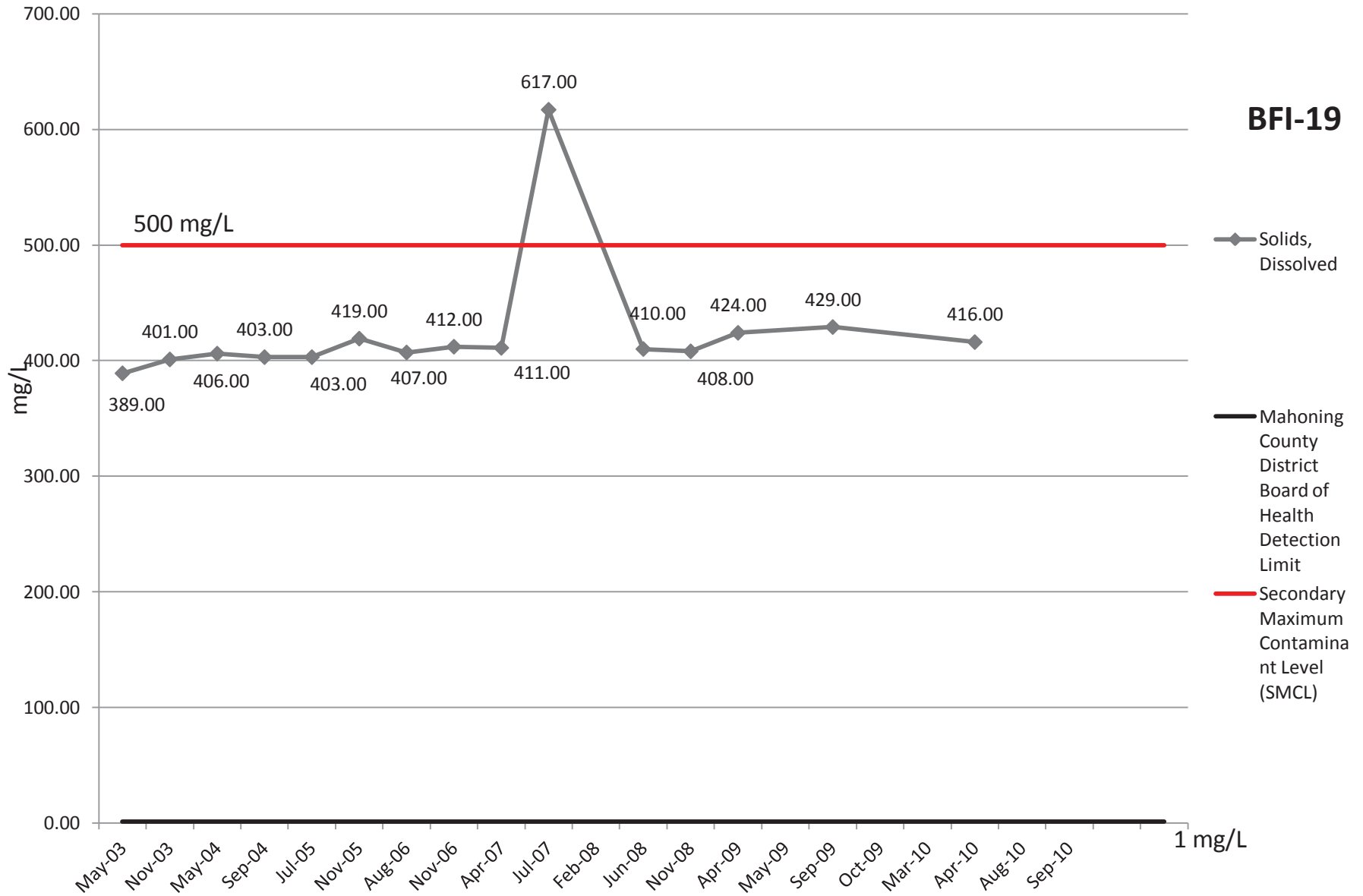
# pH

**BFI-19**



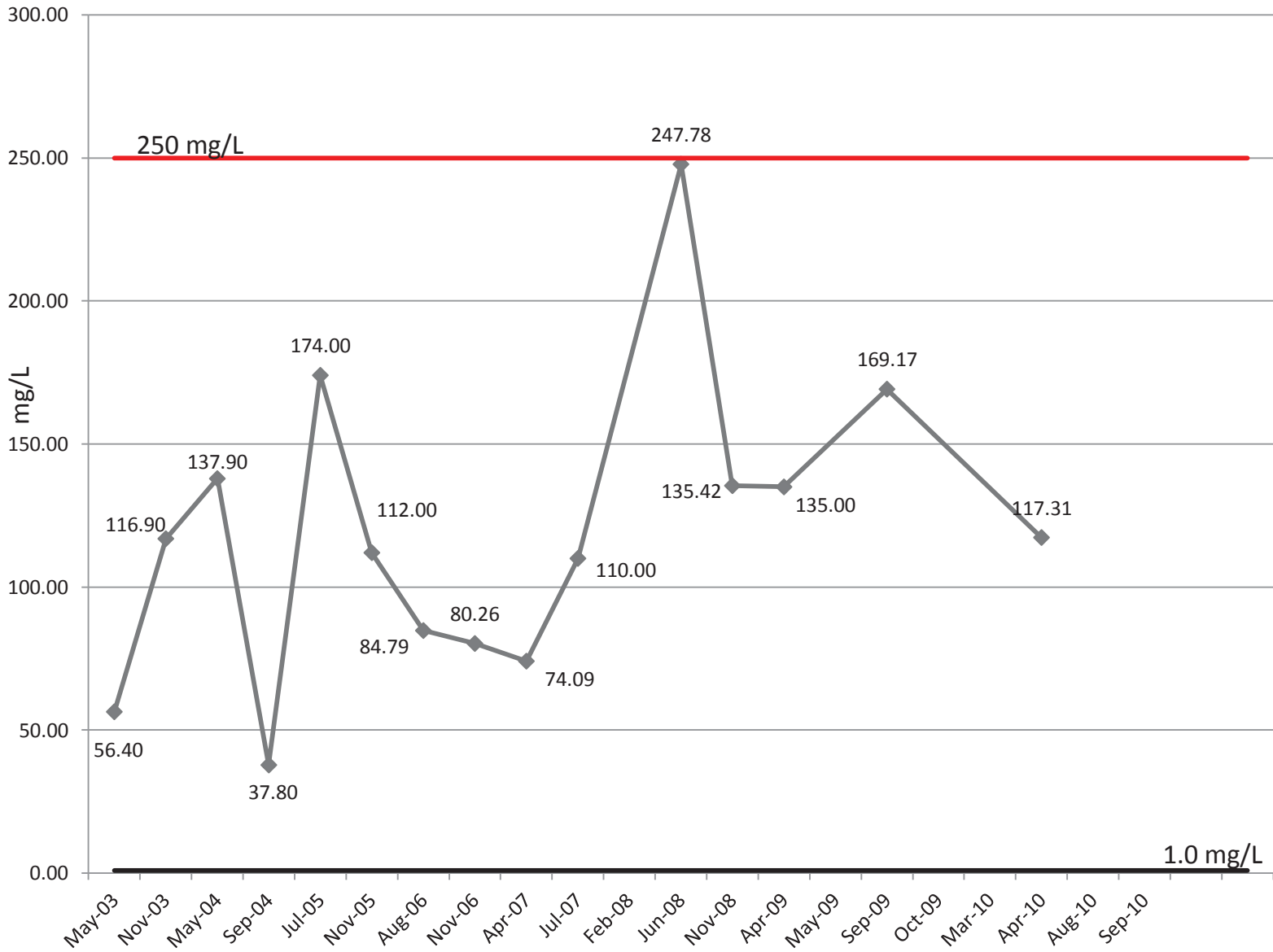
# Solids, Dissolved

**BFI-19**



# Sulfate

**BFI-19**



# Bacteria

## BFI-19

Positive/Negative

◆ Bacteria

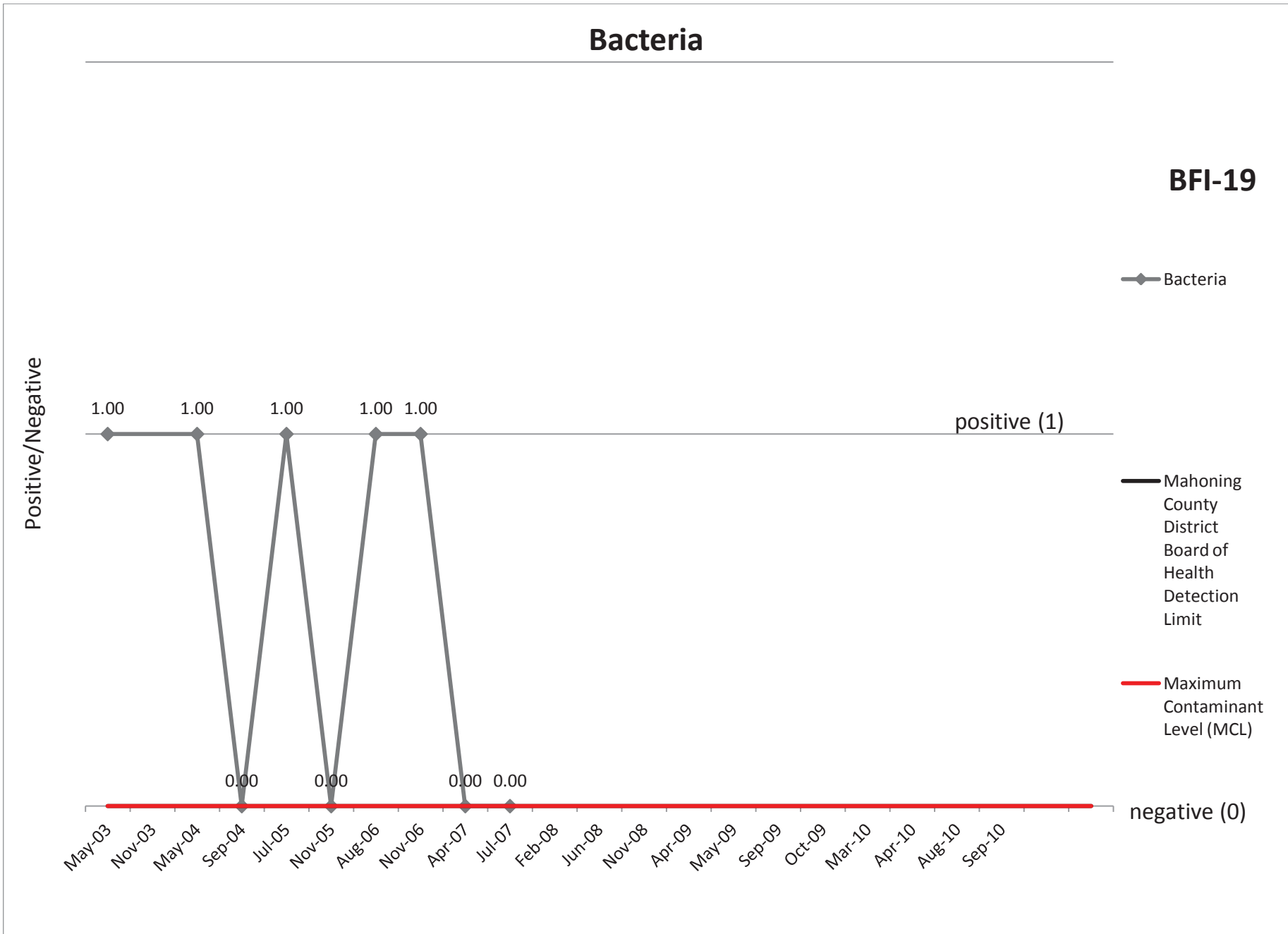
1.00 1.00 1.00 1.00 1.00 positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

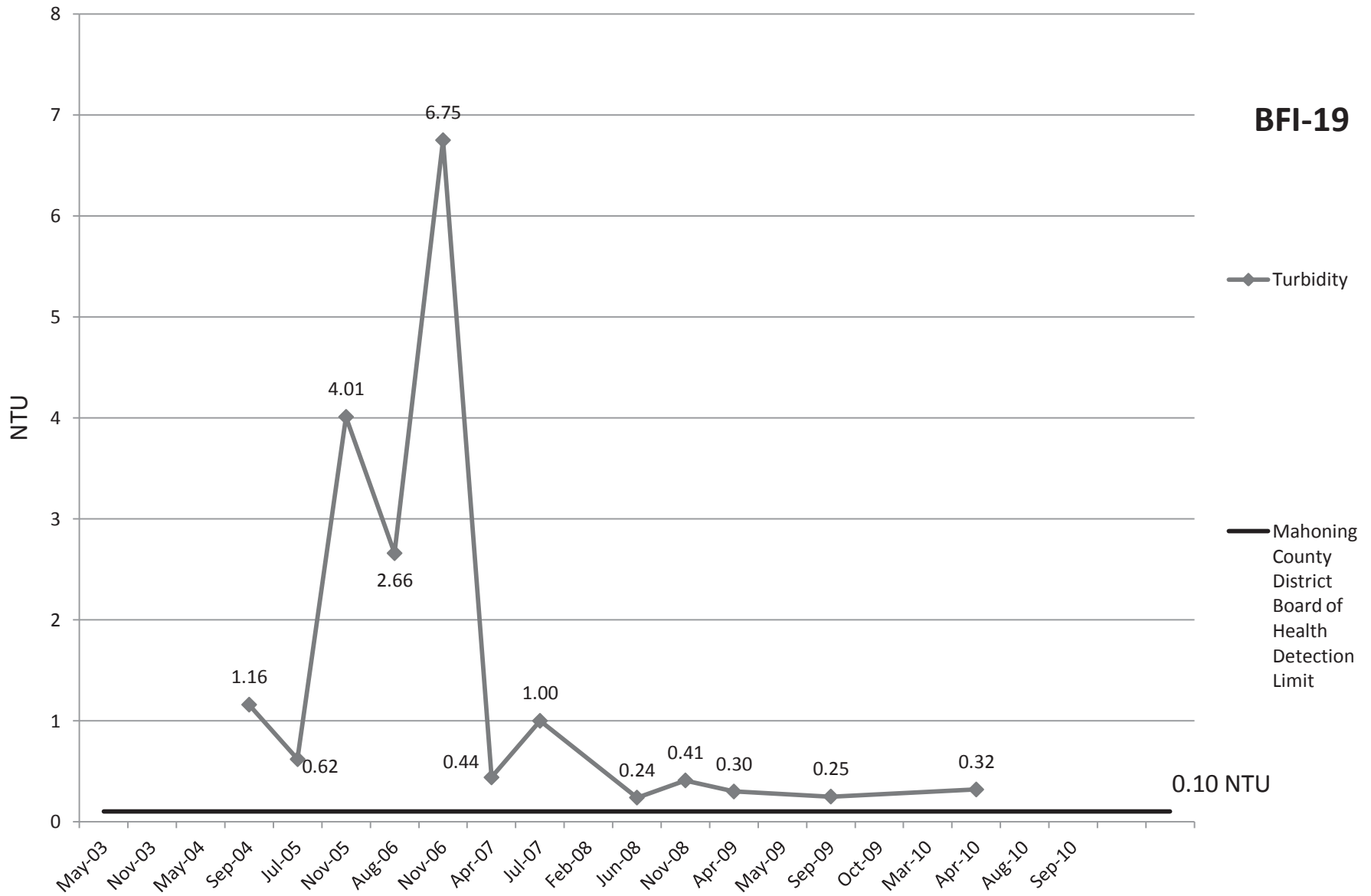
— Maximum  
Contaminant  
Level (MCL)

0.00 0.00 0.00 0.00 0.00 negative (0)

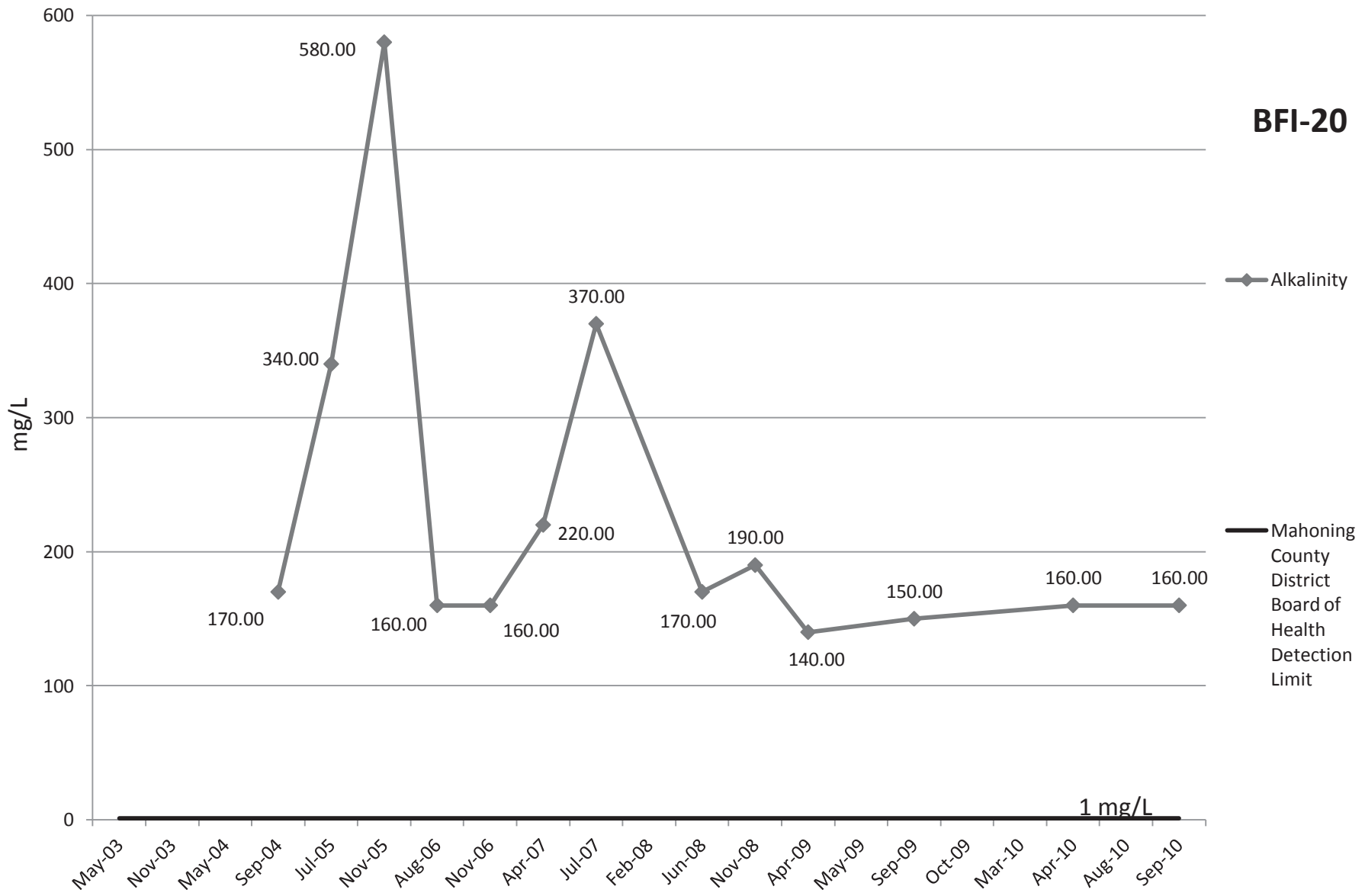
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# Turbidity

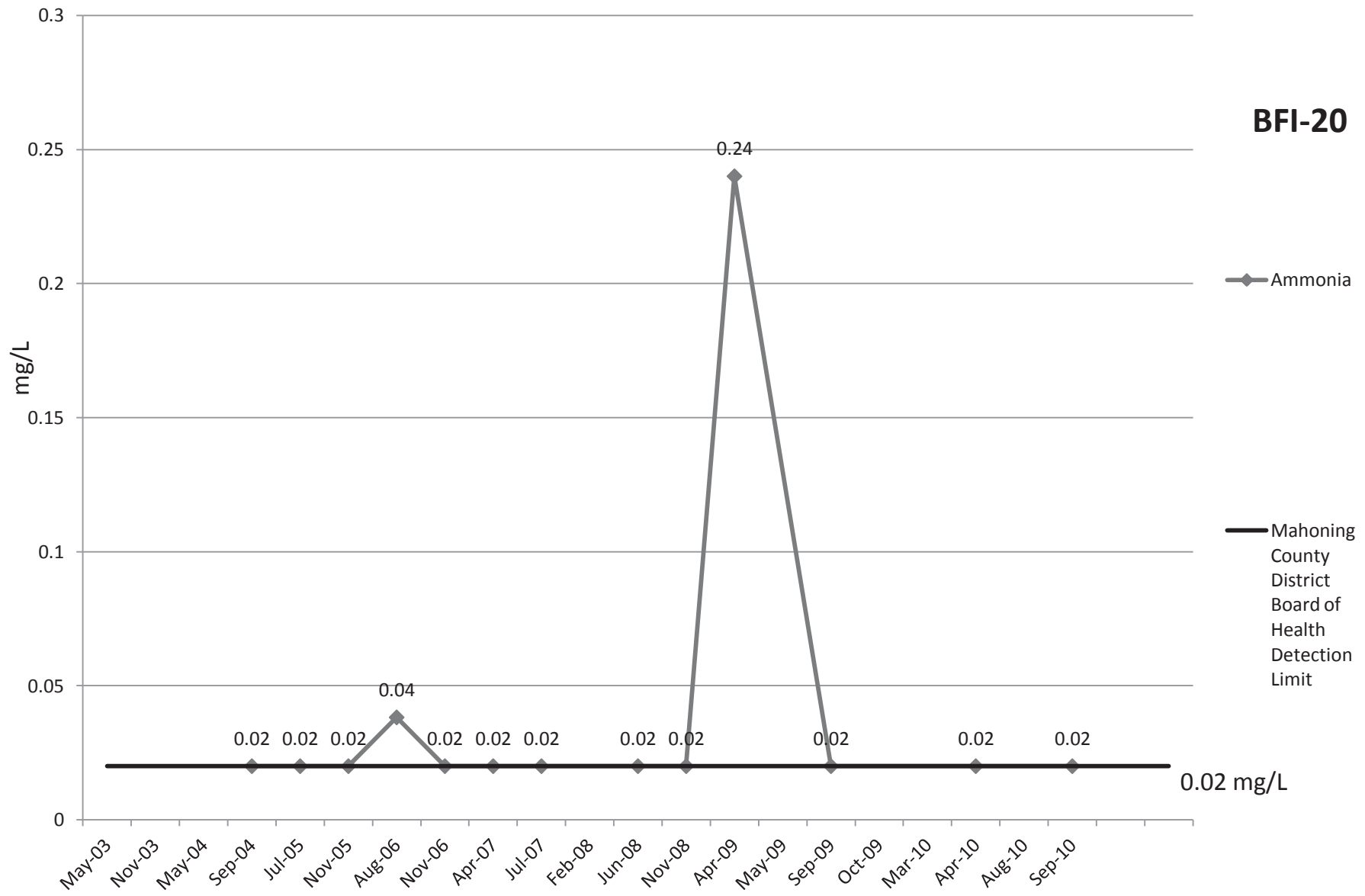


# Alkalinity

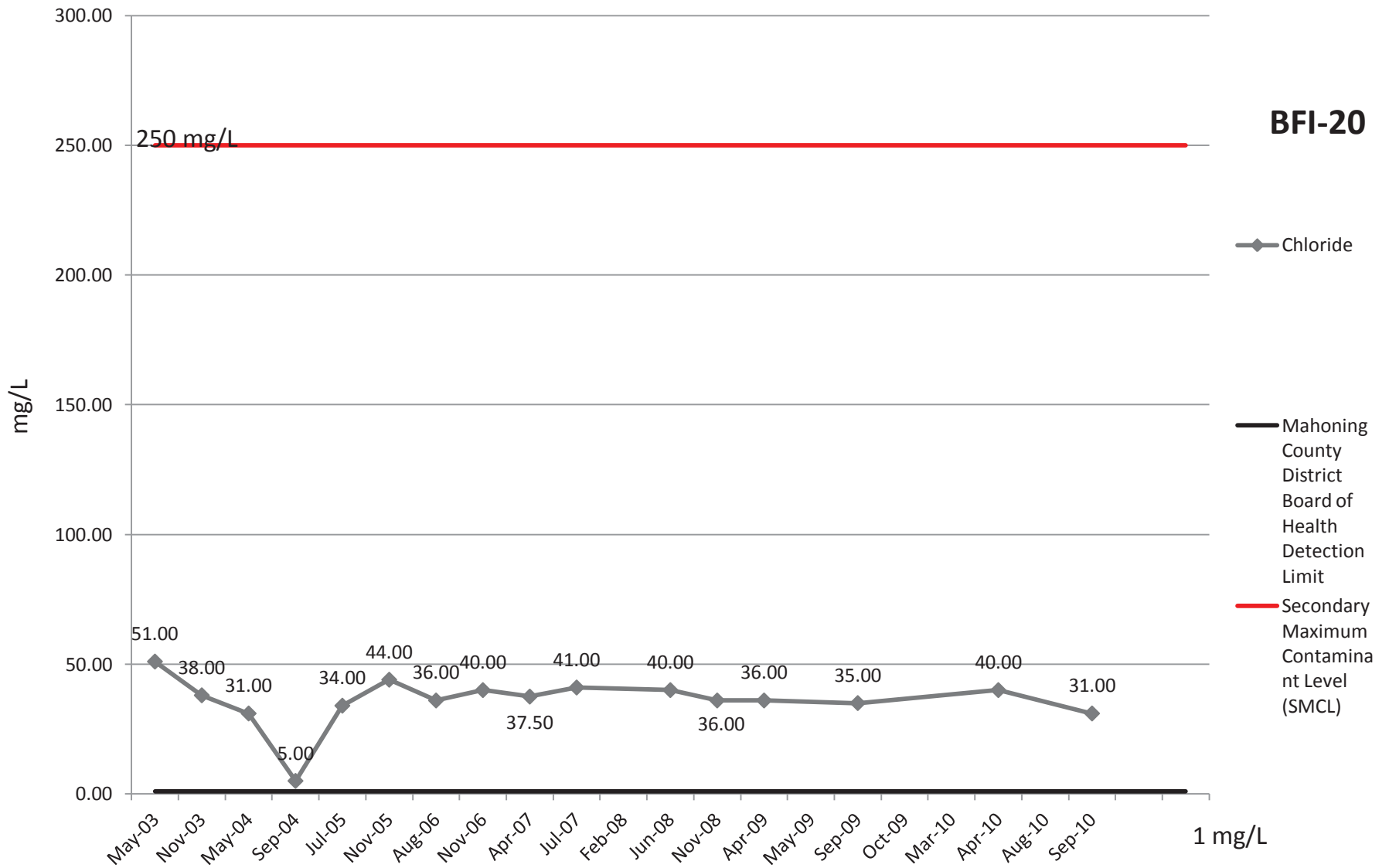




# Ammonia

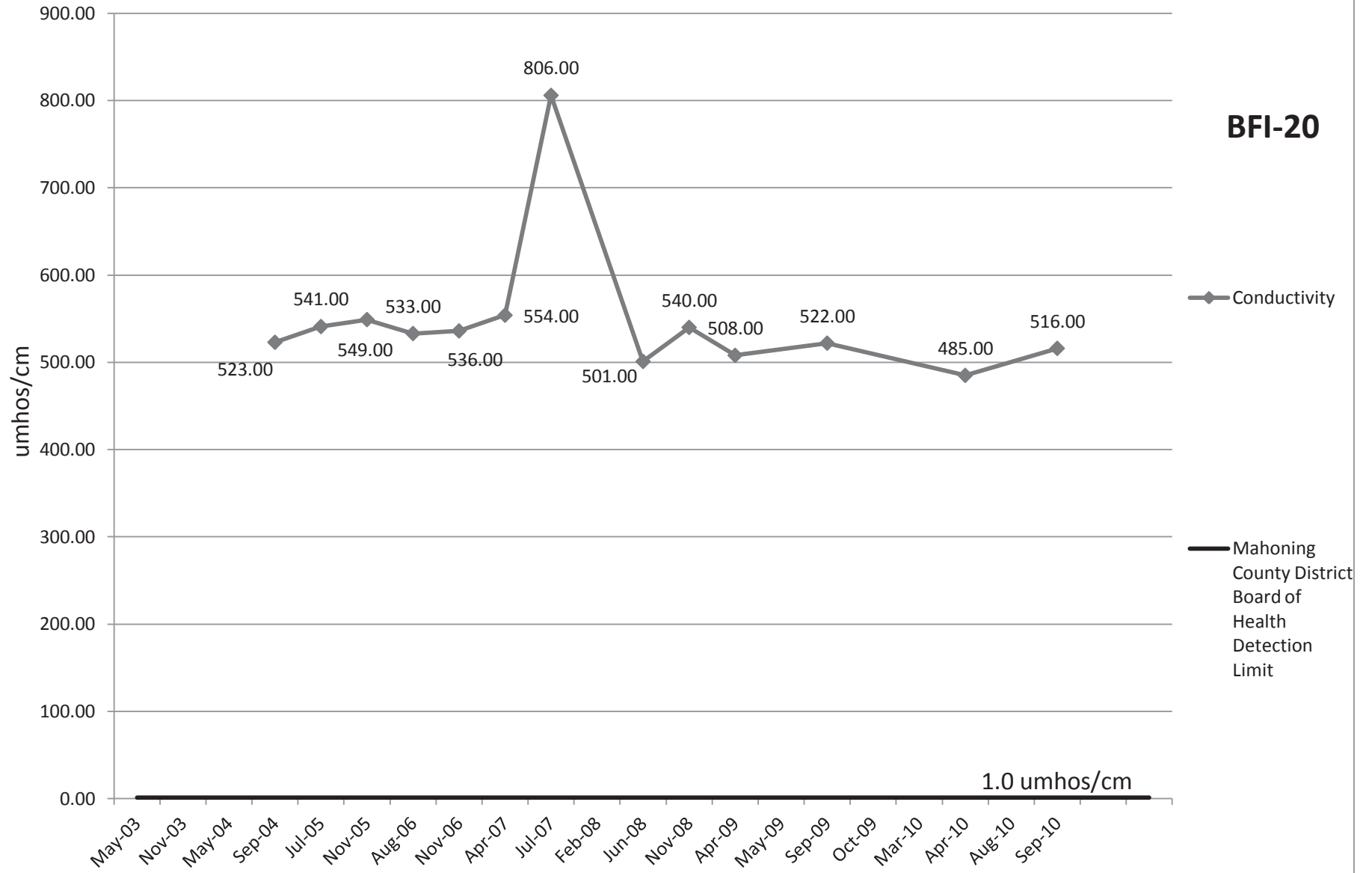


# Chloride

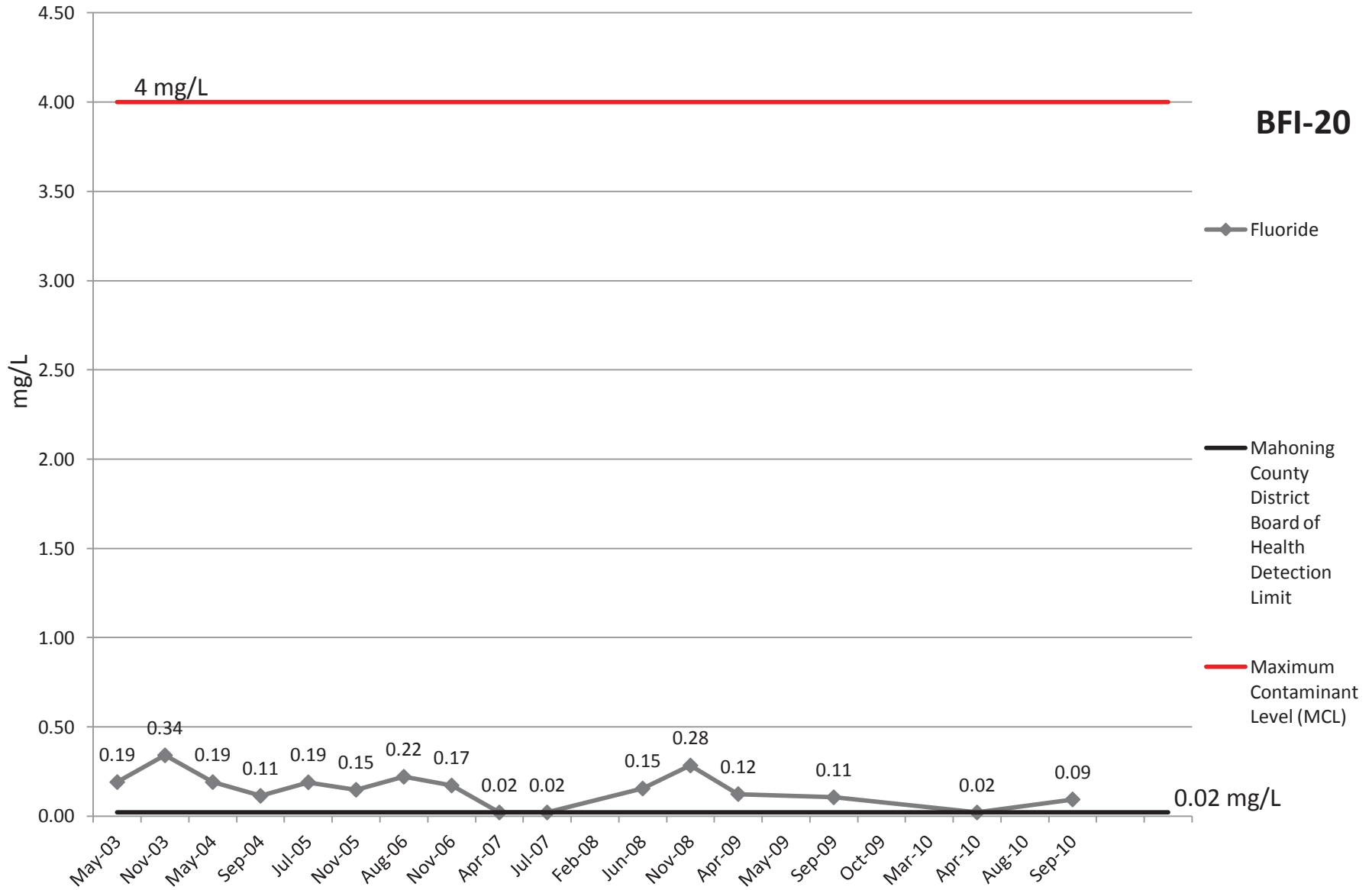


1 mg/L

# Conductivity

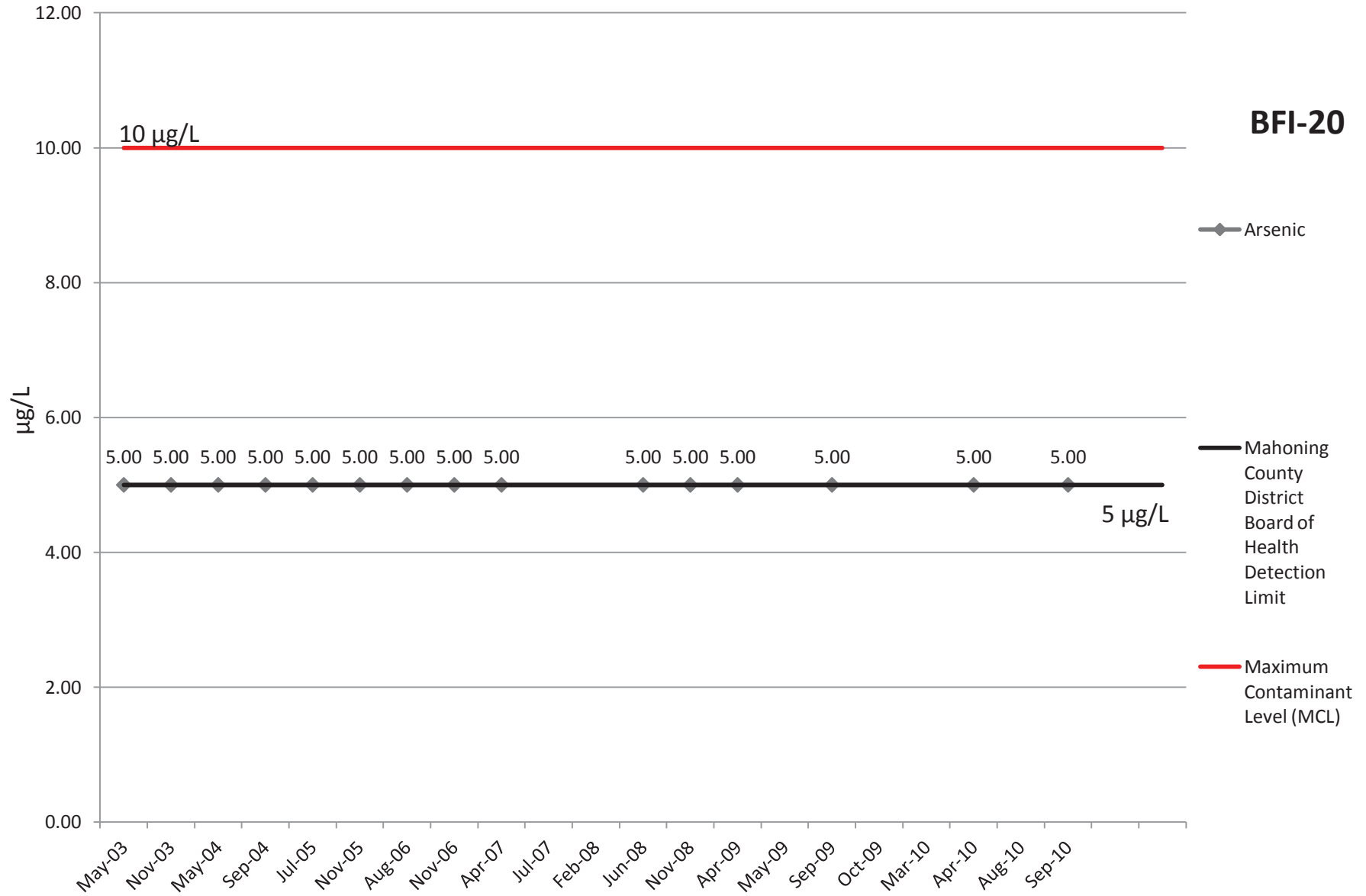


# Fluoride

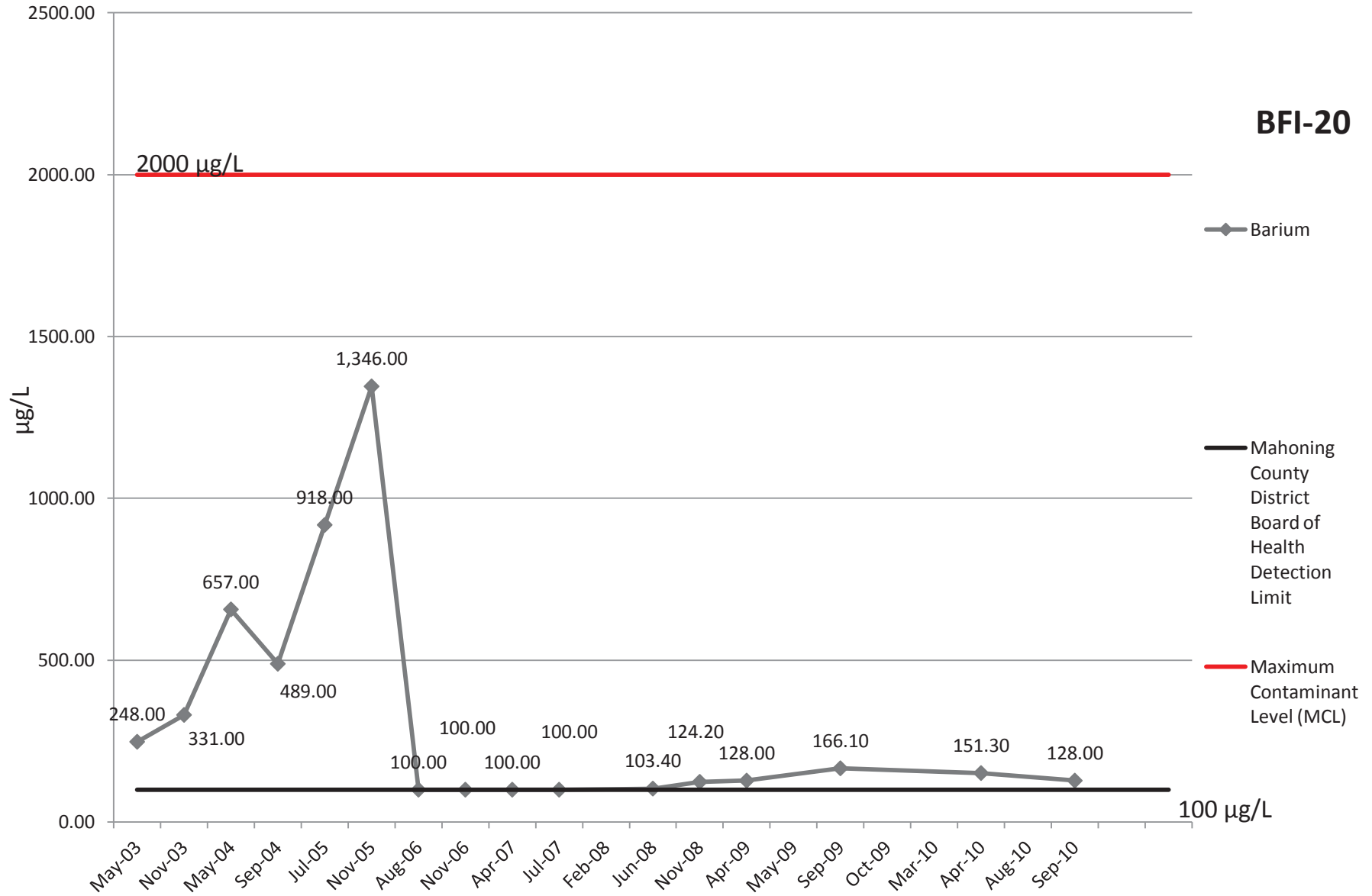


# Arsenic

**BFI-20**

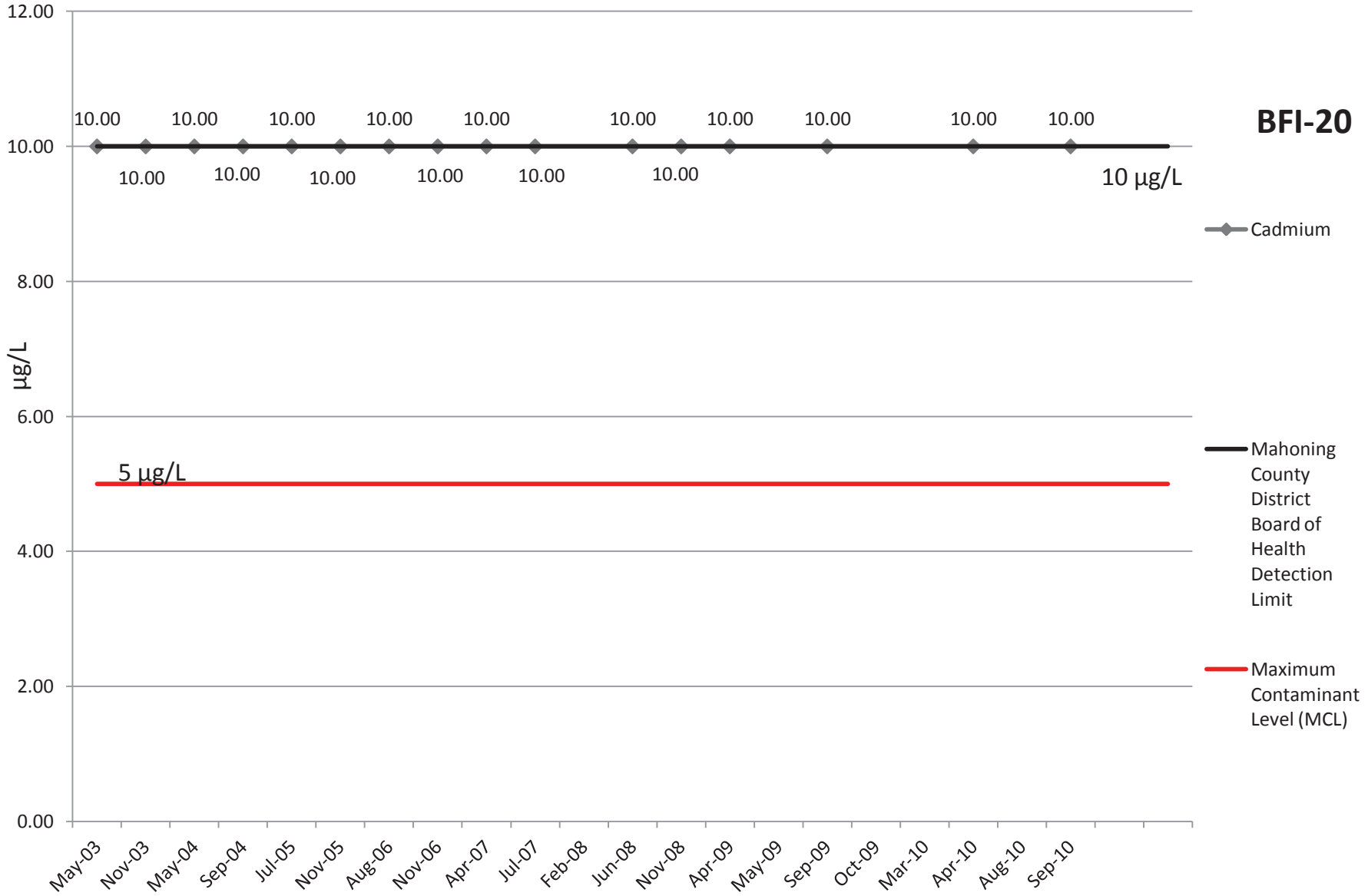


# Barium

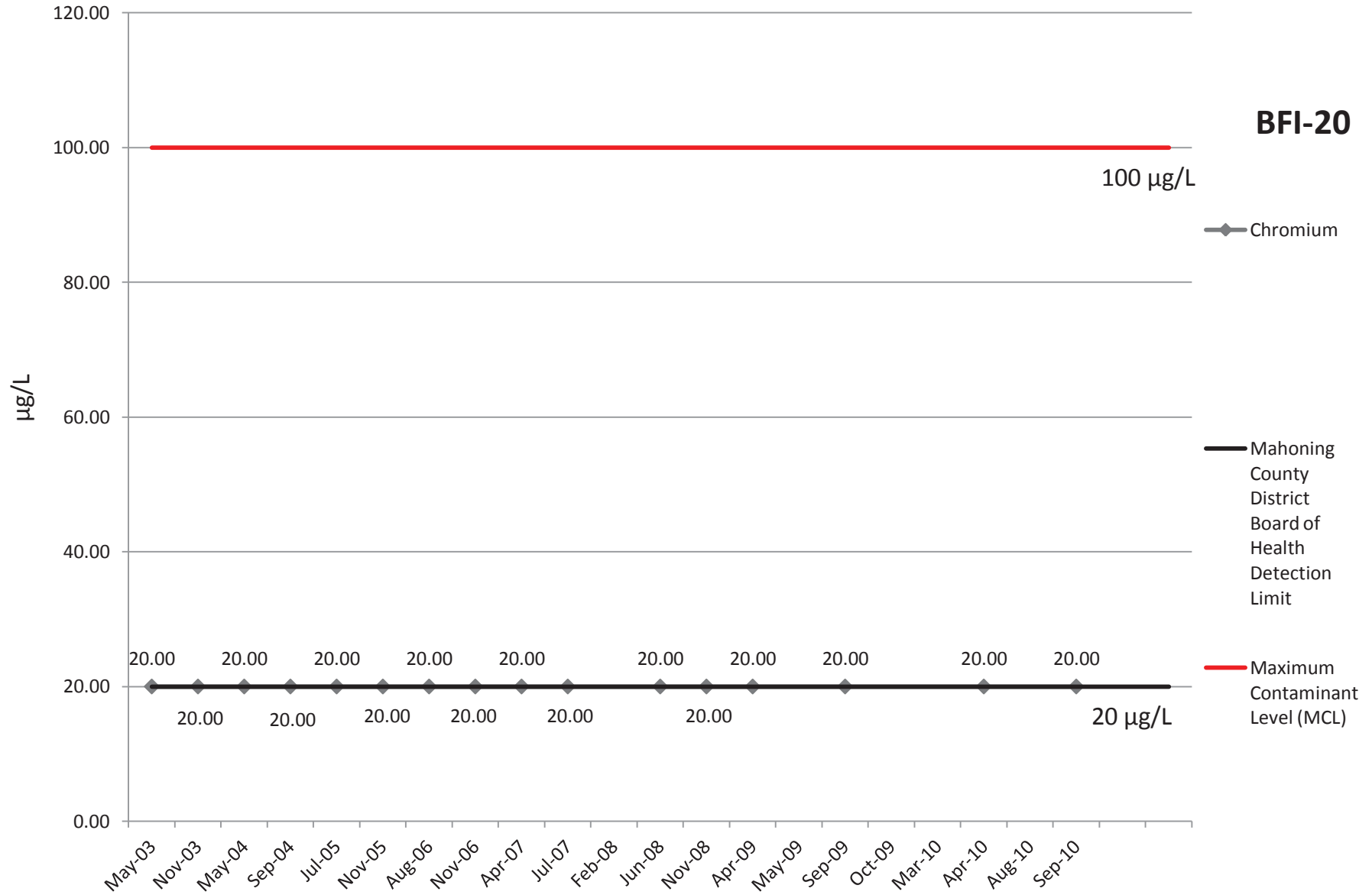


# Cadmium

**BFI-20**

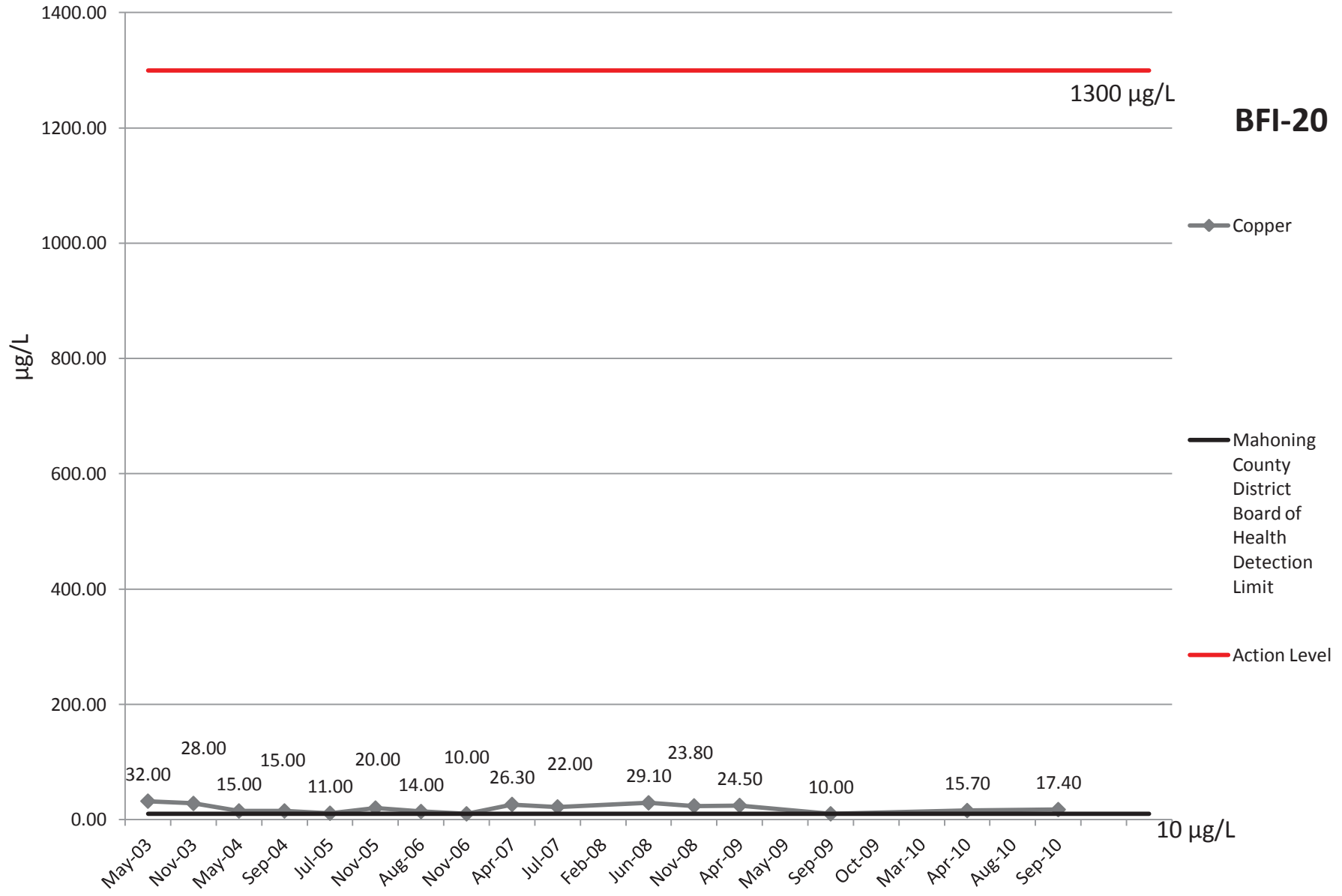


# Chromium

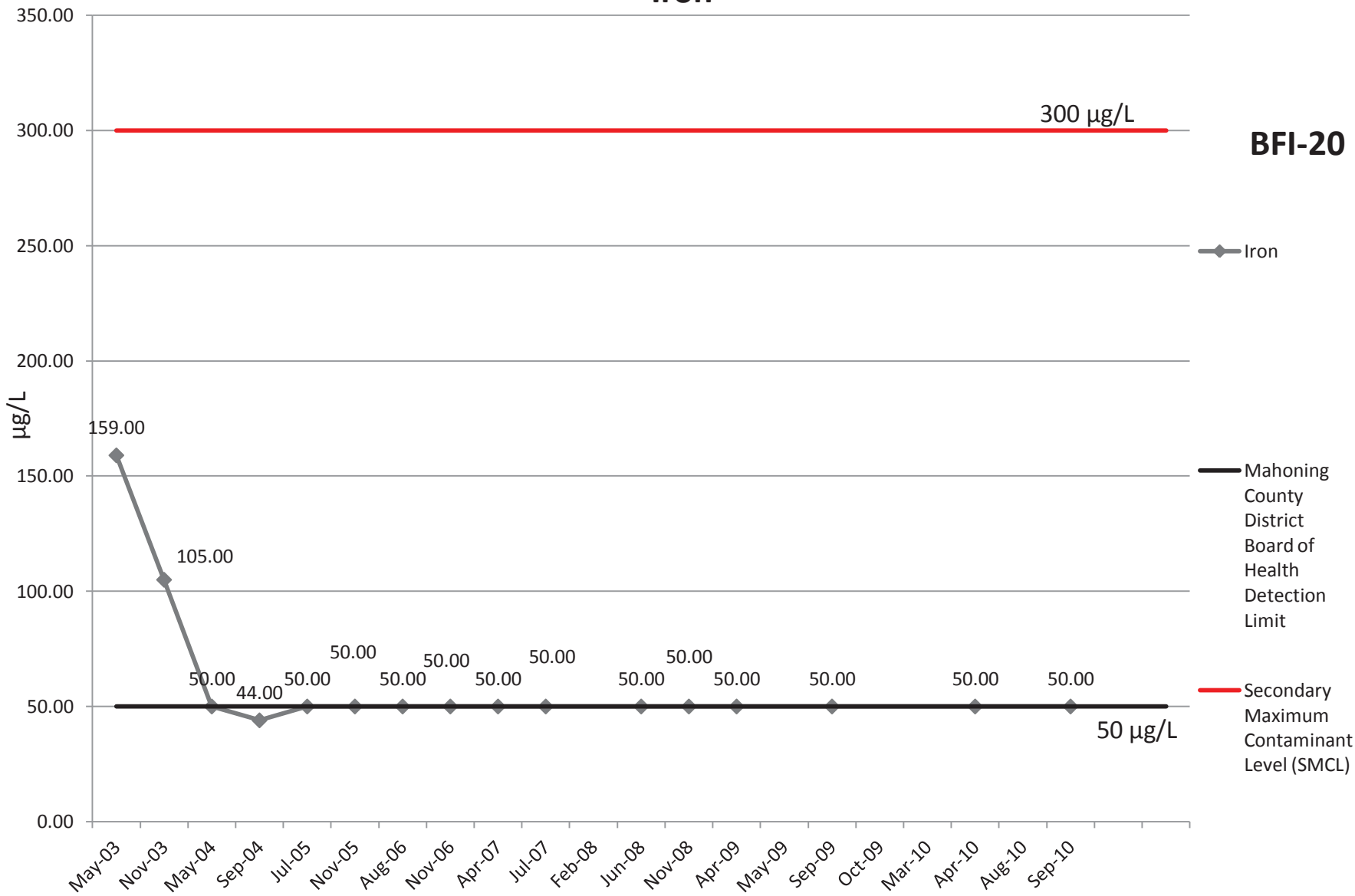




# Copper

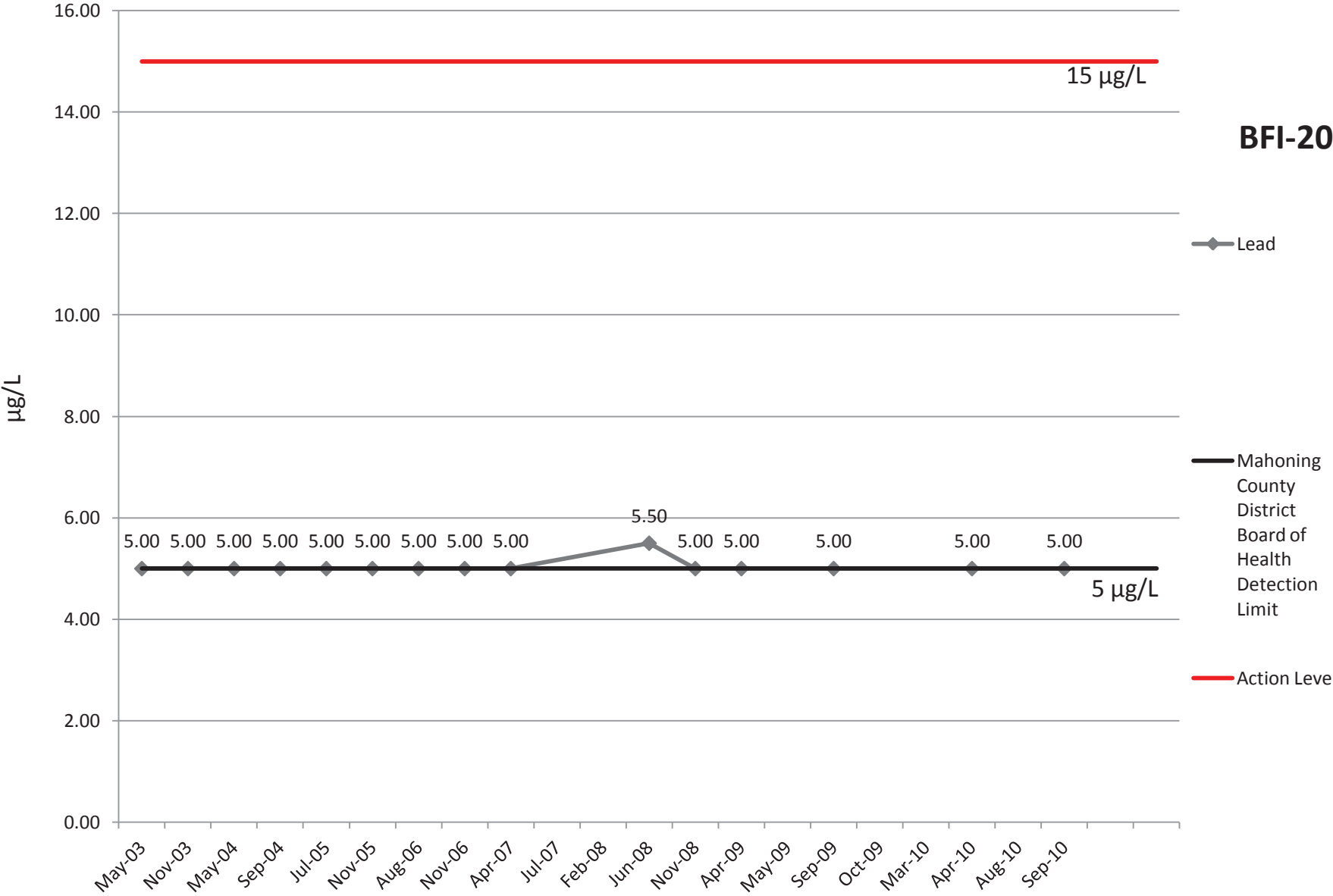


# Iron



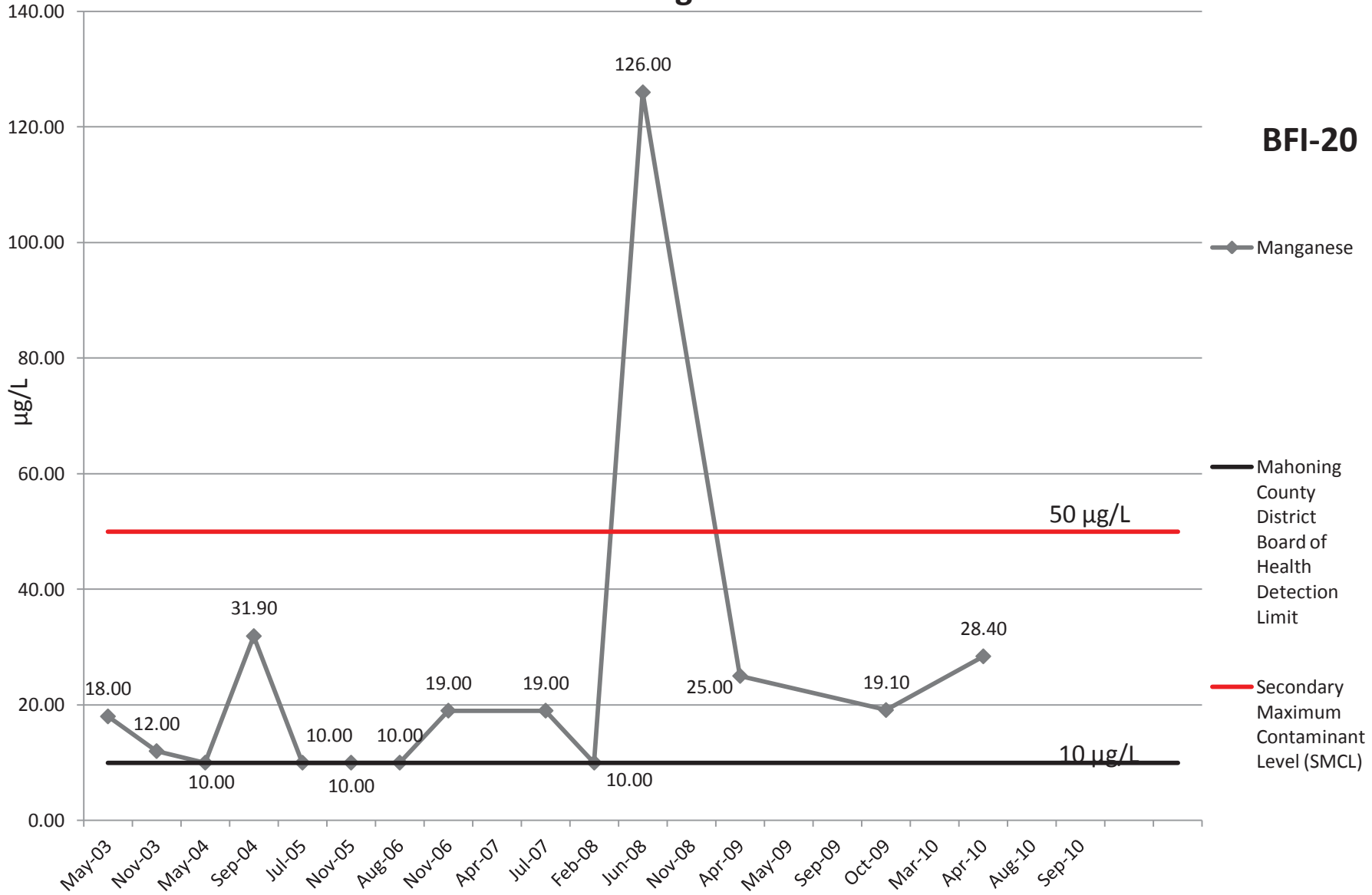
# Lead

**BFI-20**



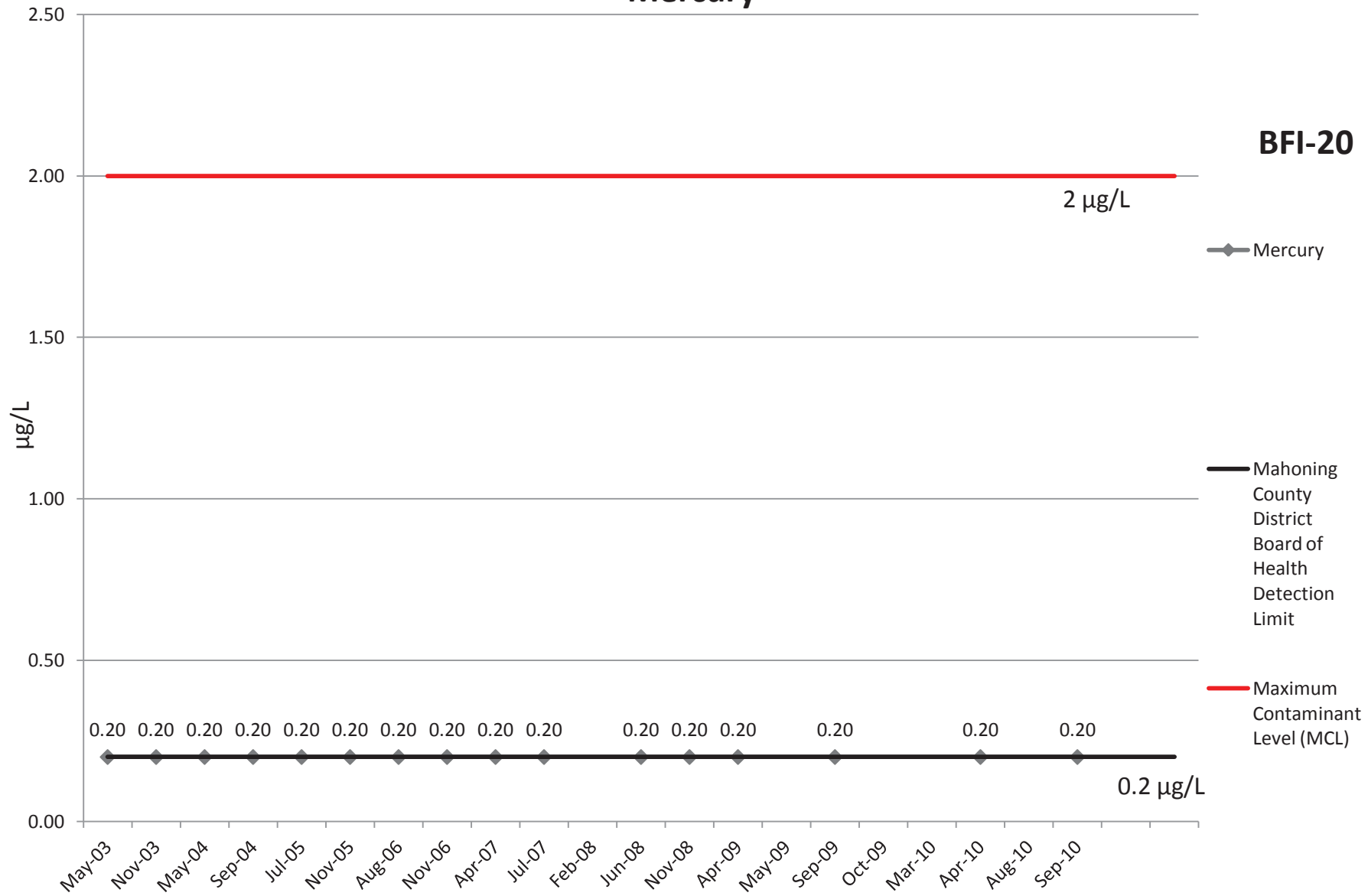
# Manganese

**BFI-20**

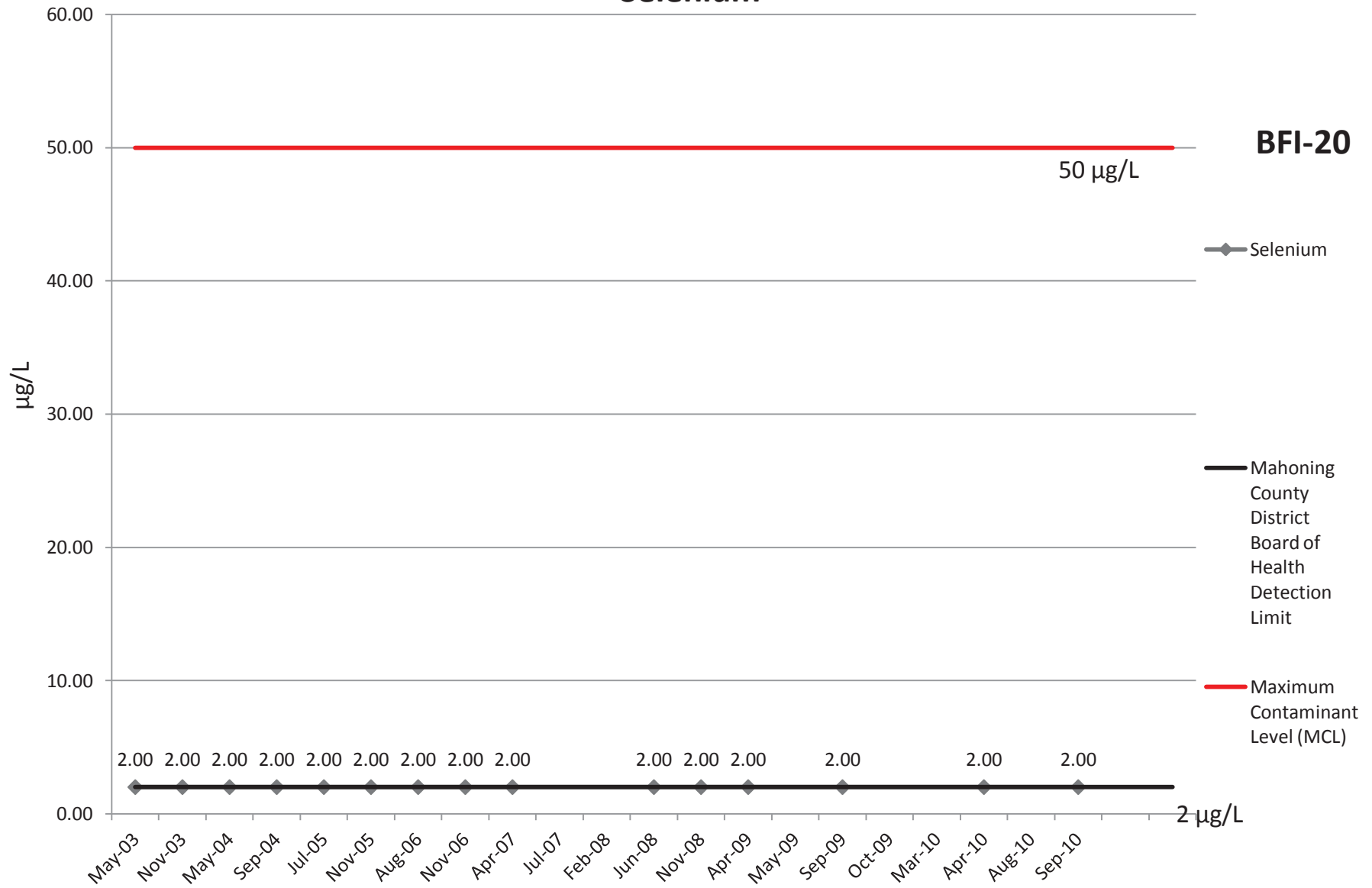


# Mercury

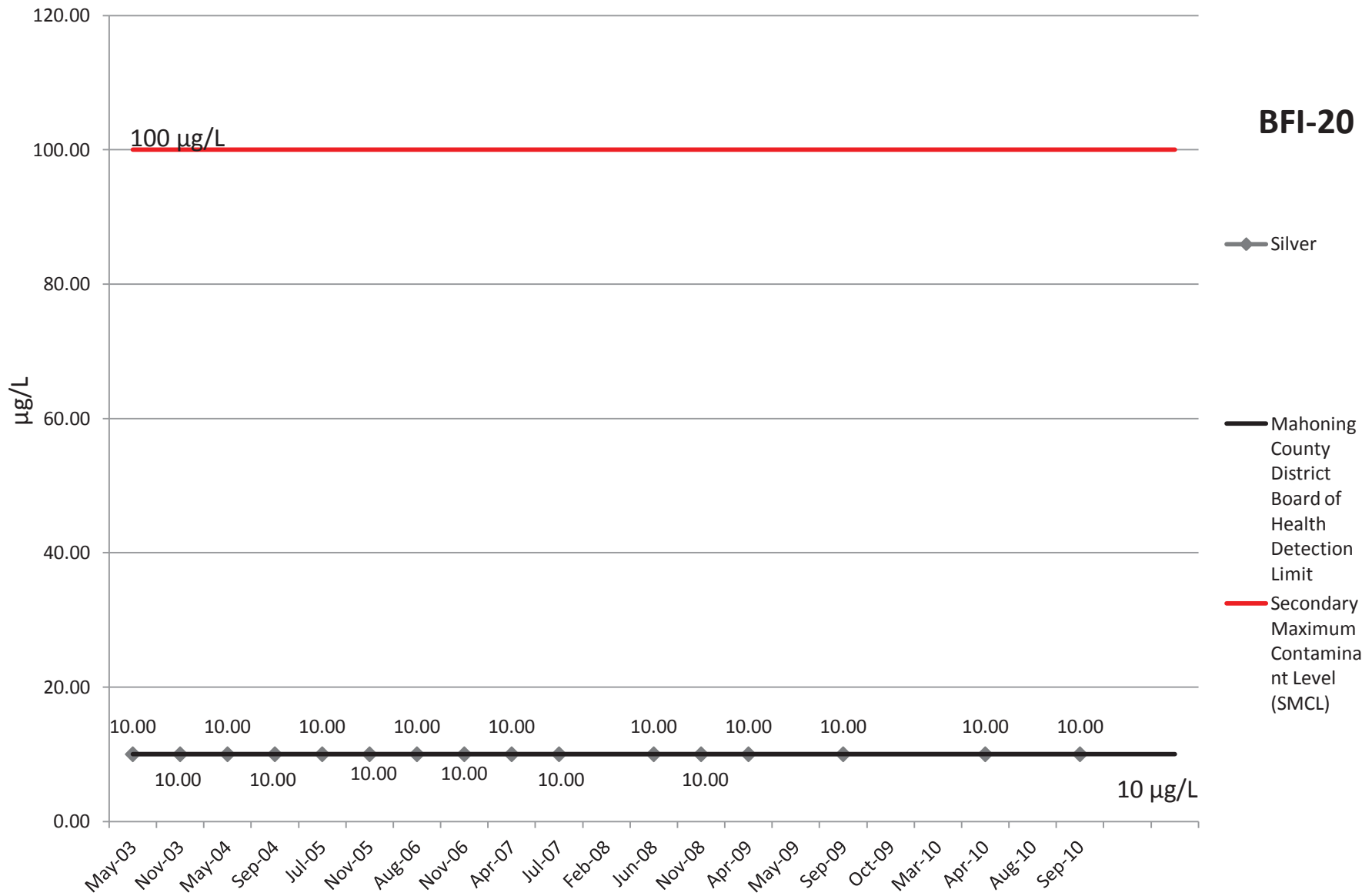
**BFI-20**



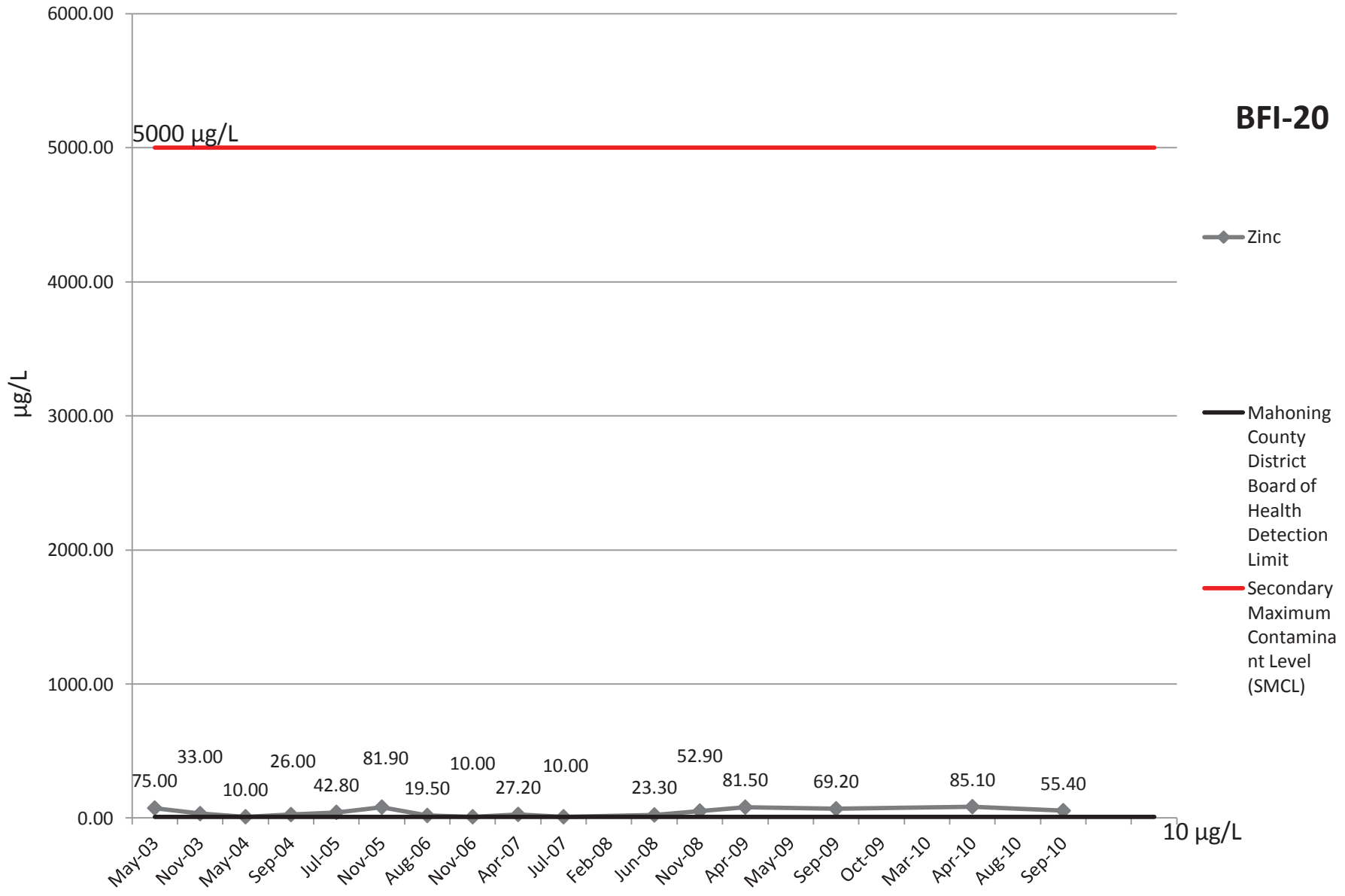
# Selenium



# Silver

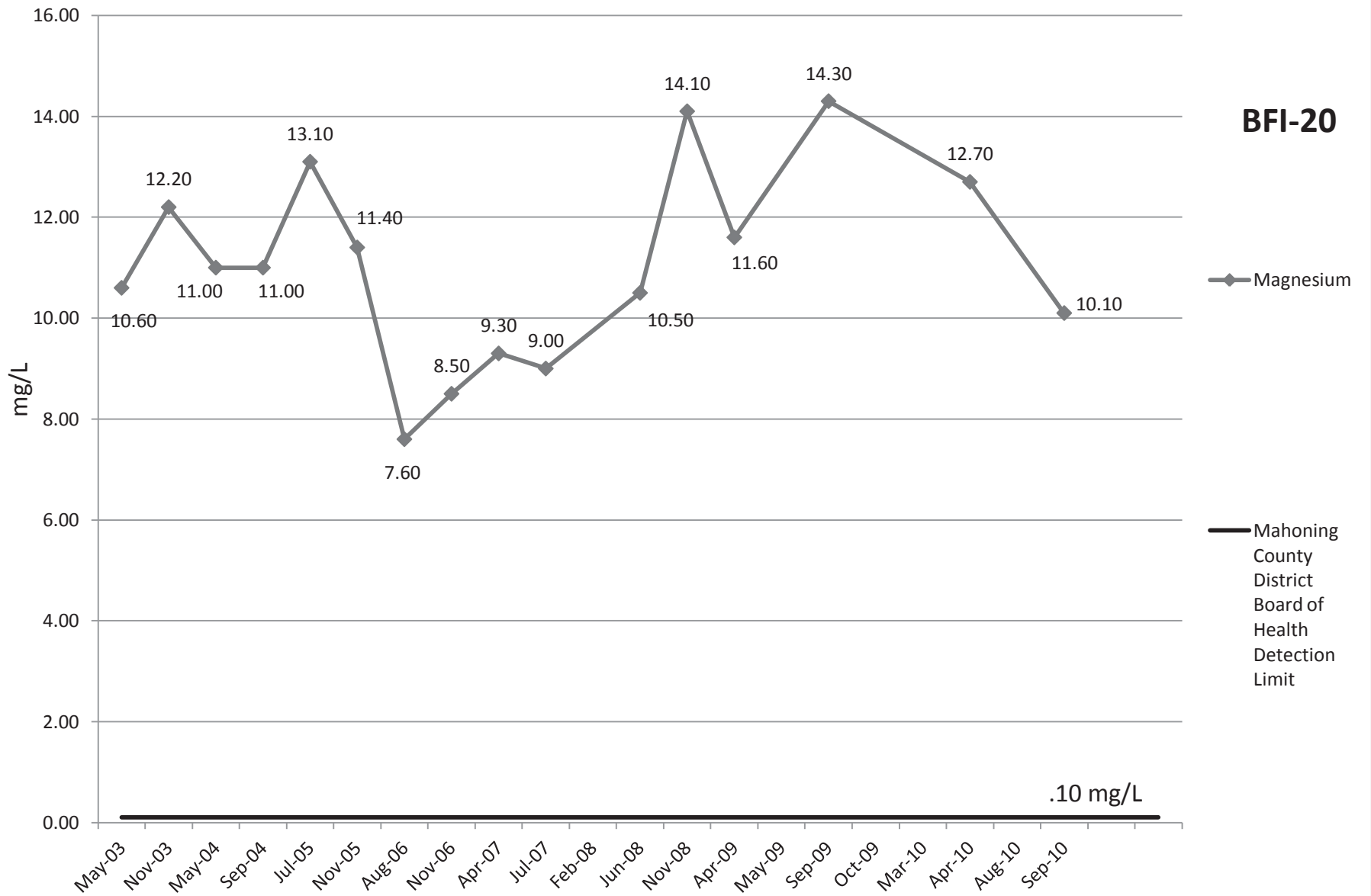


# Zinc

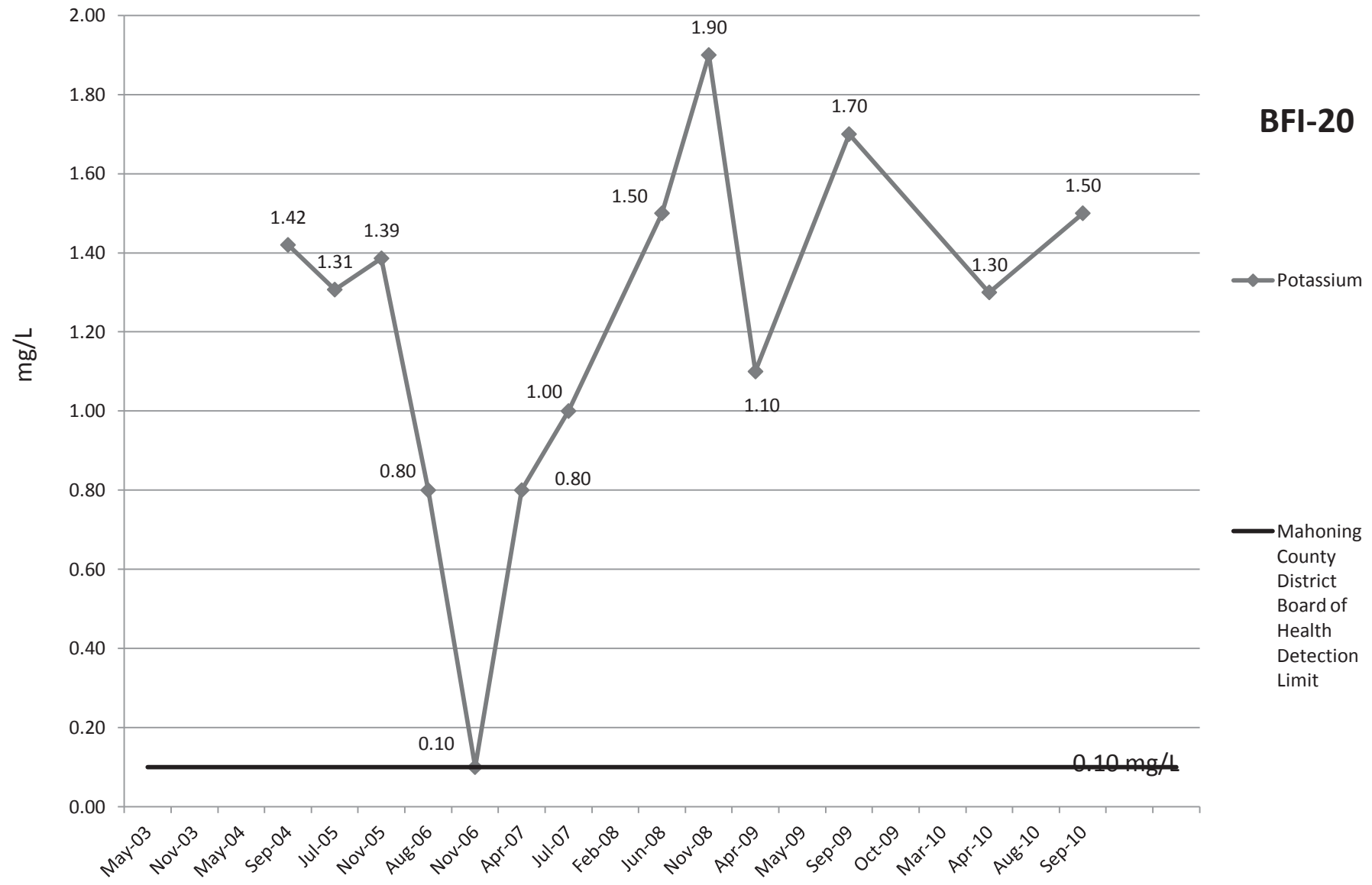




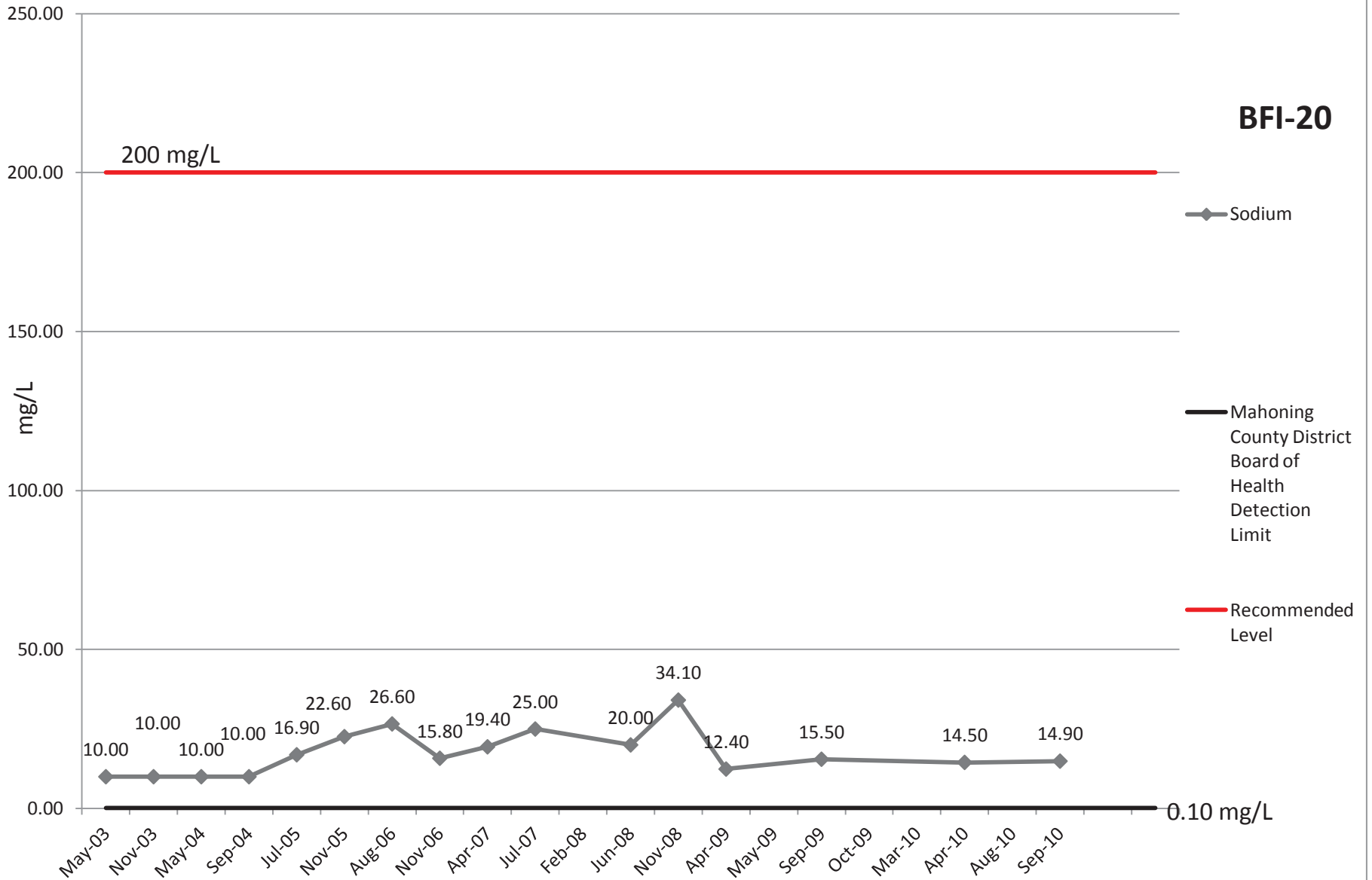
# Magnesium



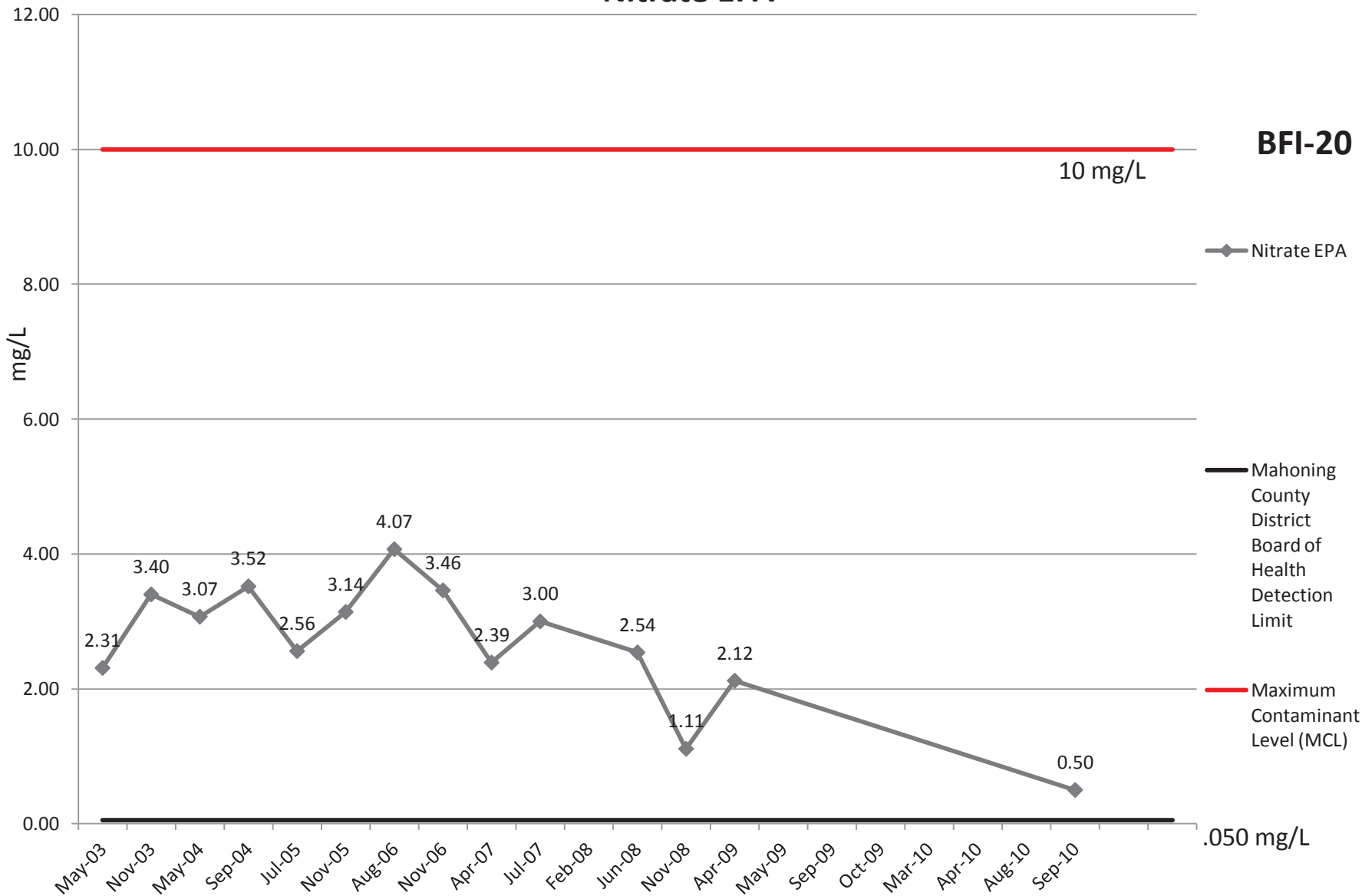
# Potassium



# Sodium

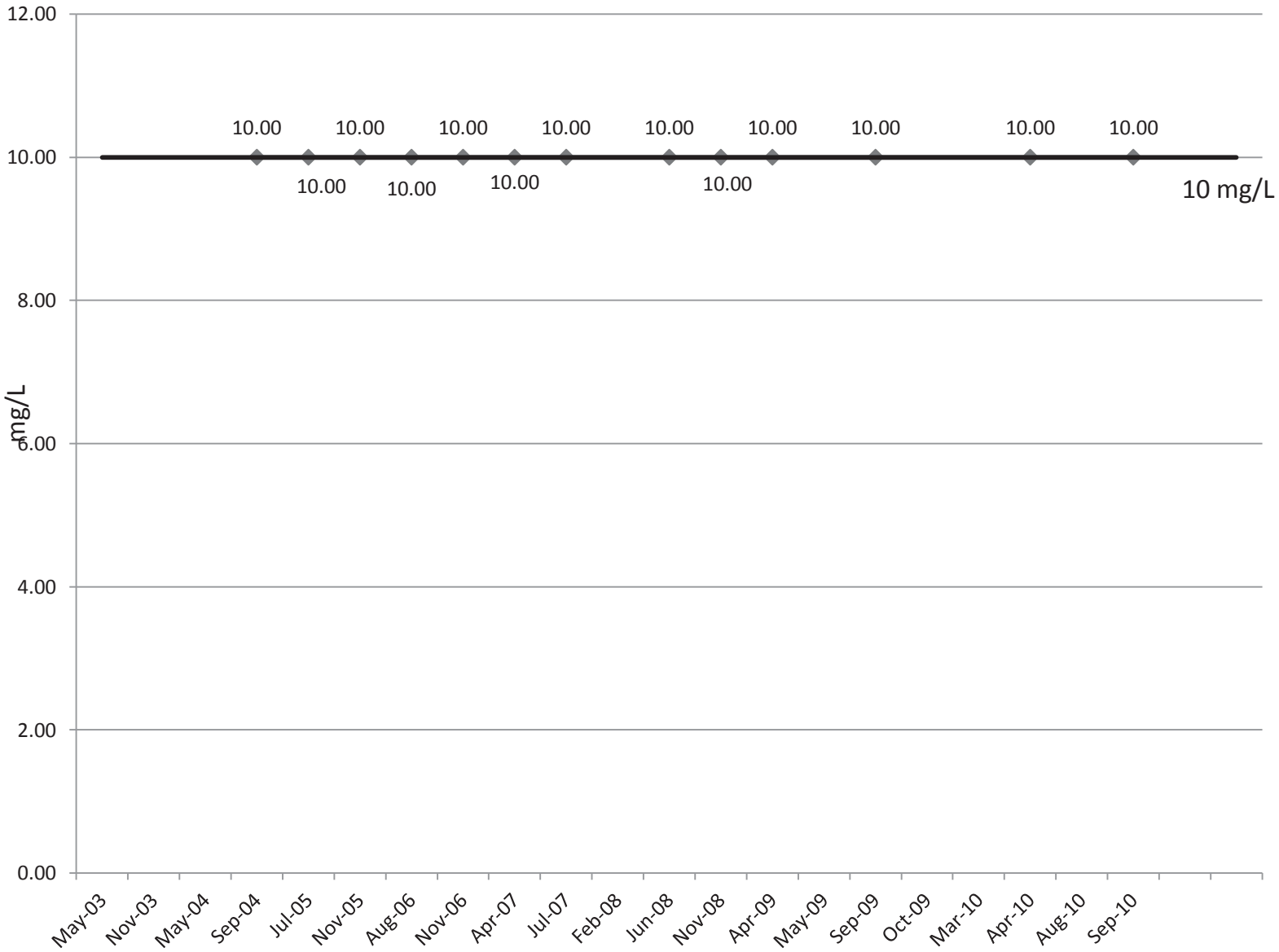


# Nitrate EPA



# COD

**BFI-20**

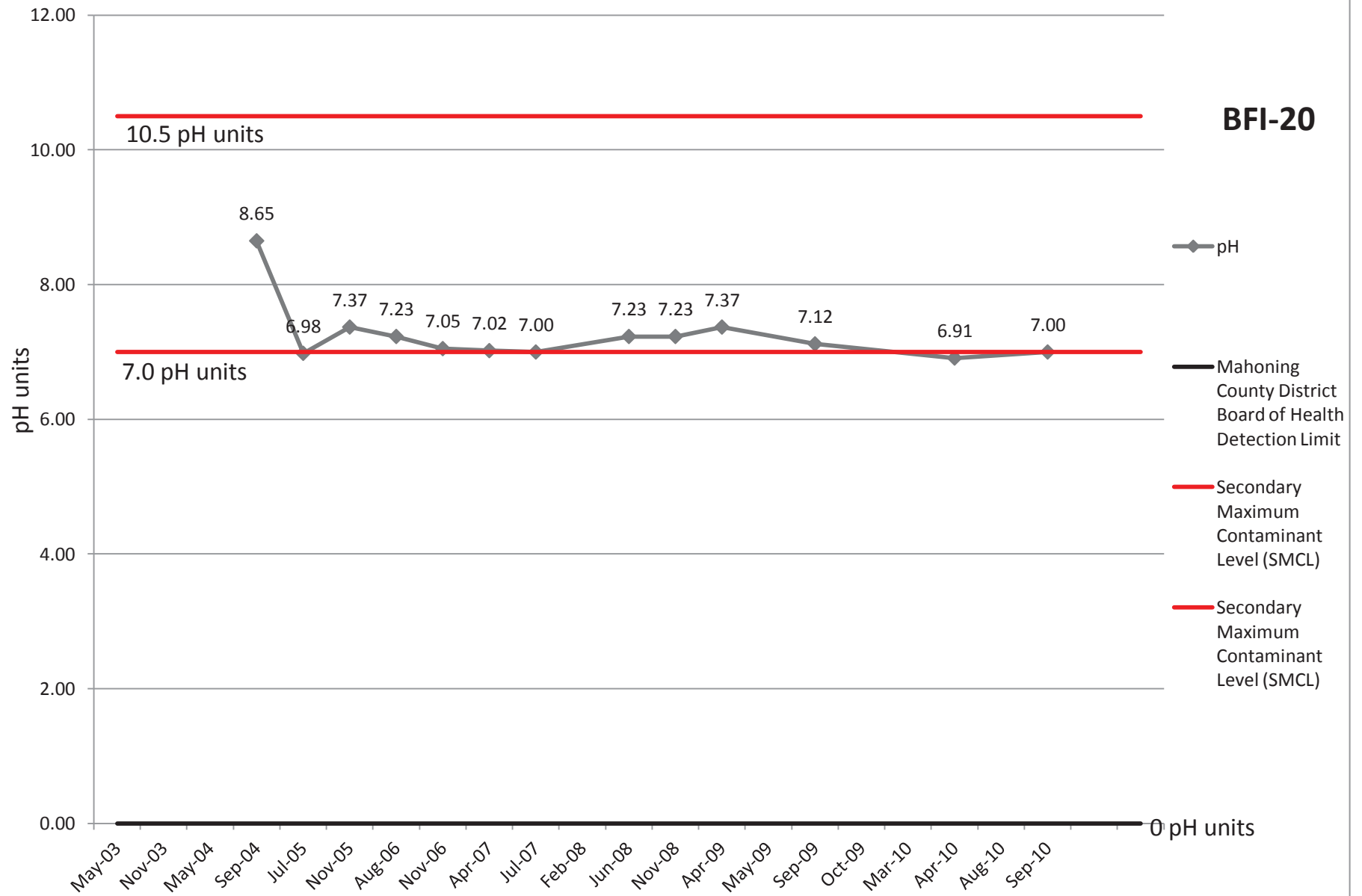


—◆— COD

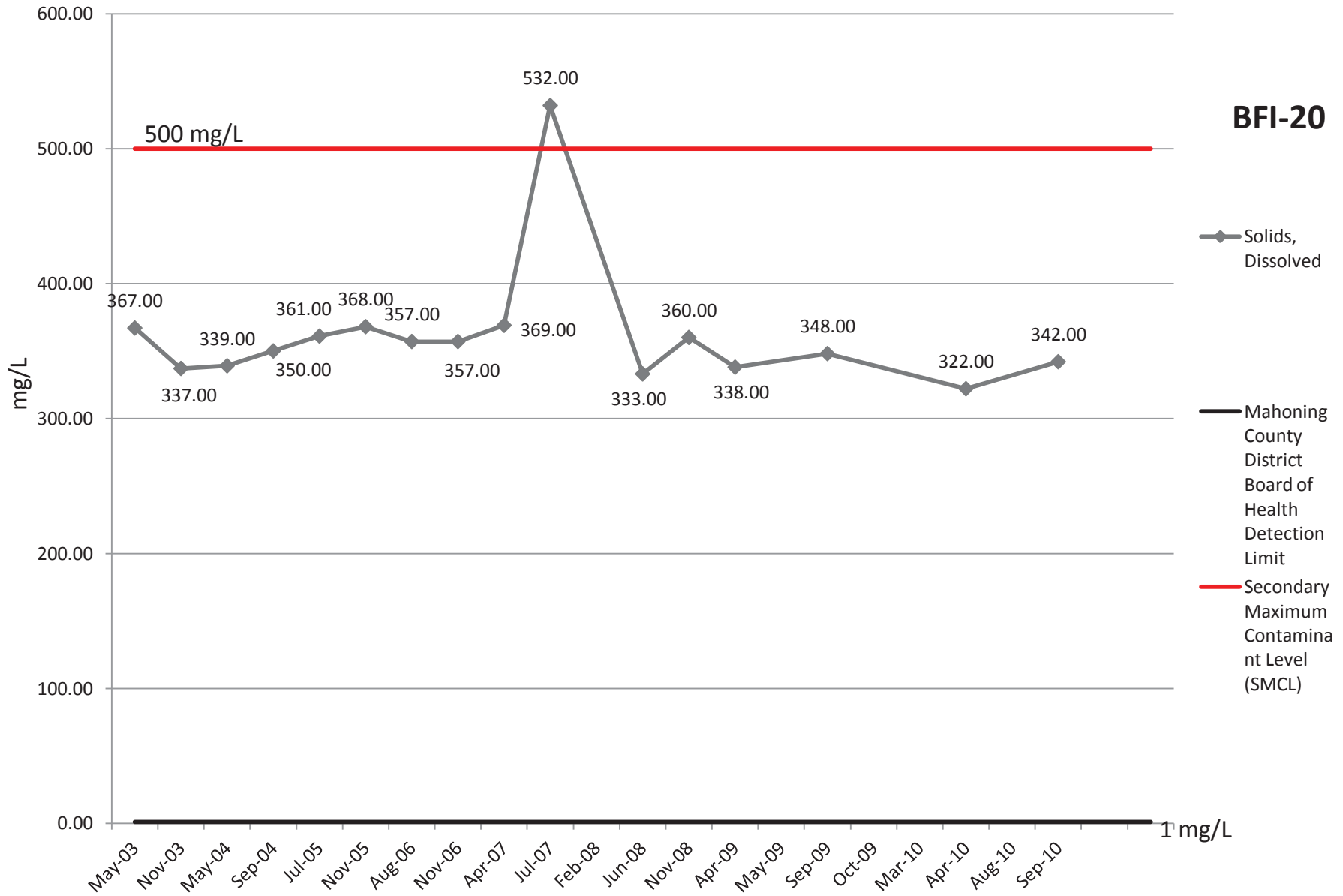
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

# pH

**BFI-20**

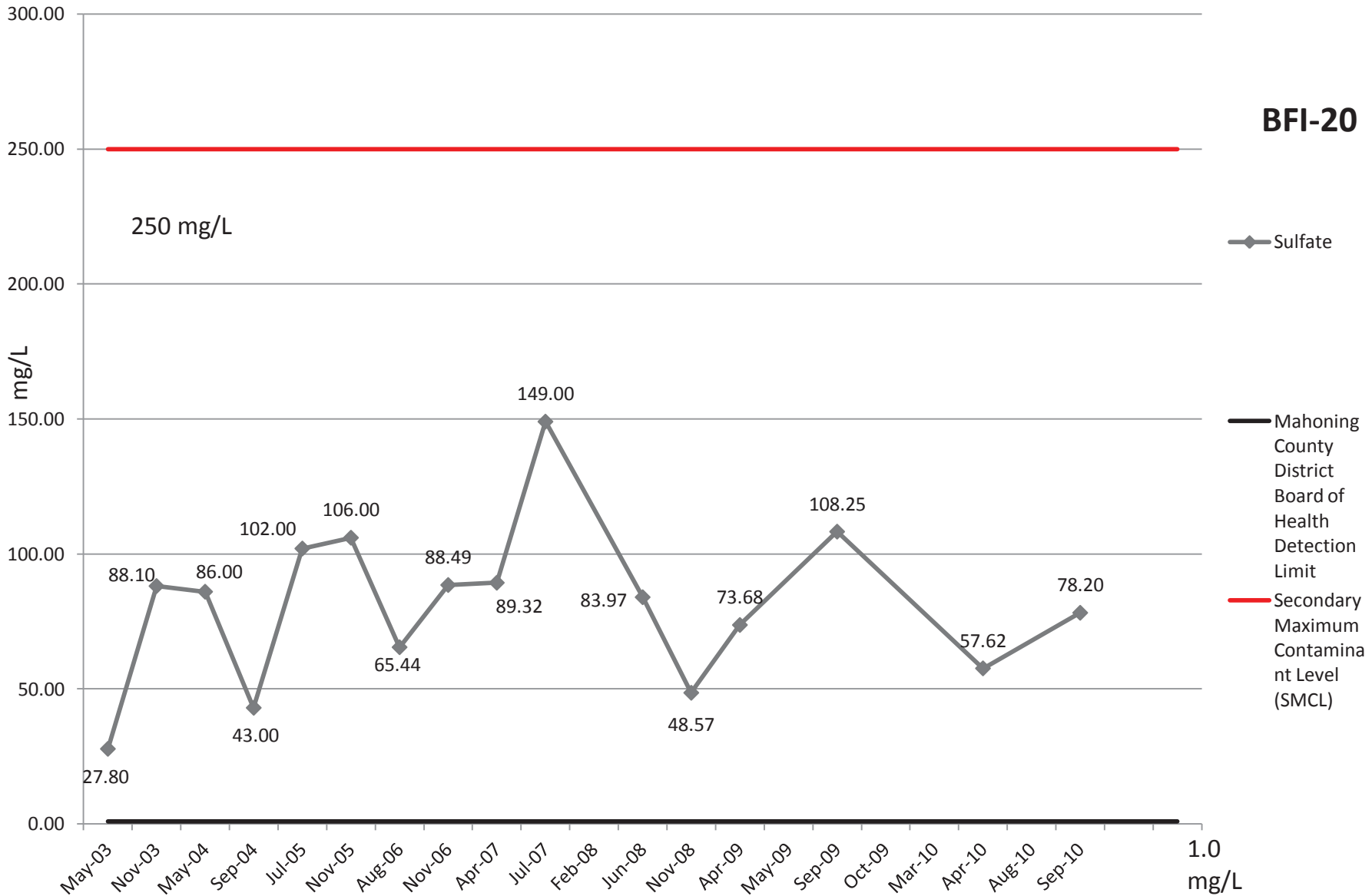


# Solids, Dissolved



# Sulfate

**BFI-20**



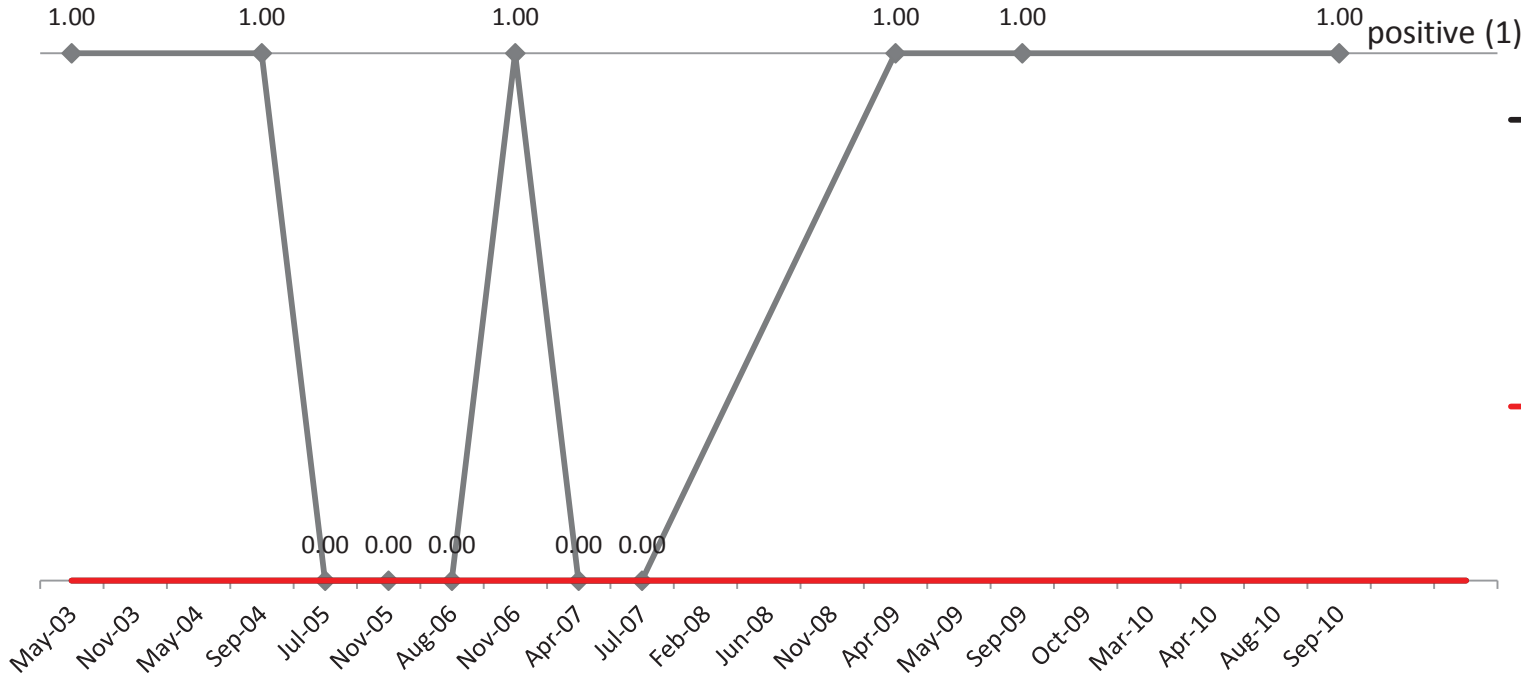


# Bacteria

## BFI-20

Positive/Negative

◆ Bacteria



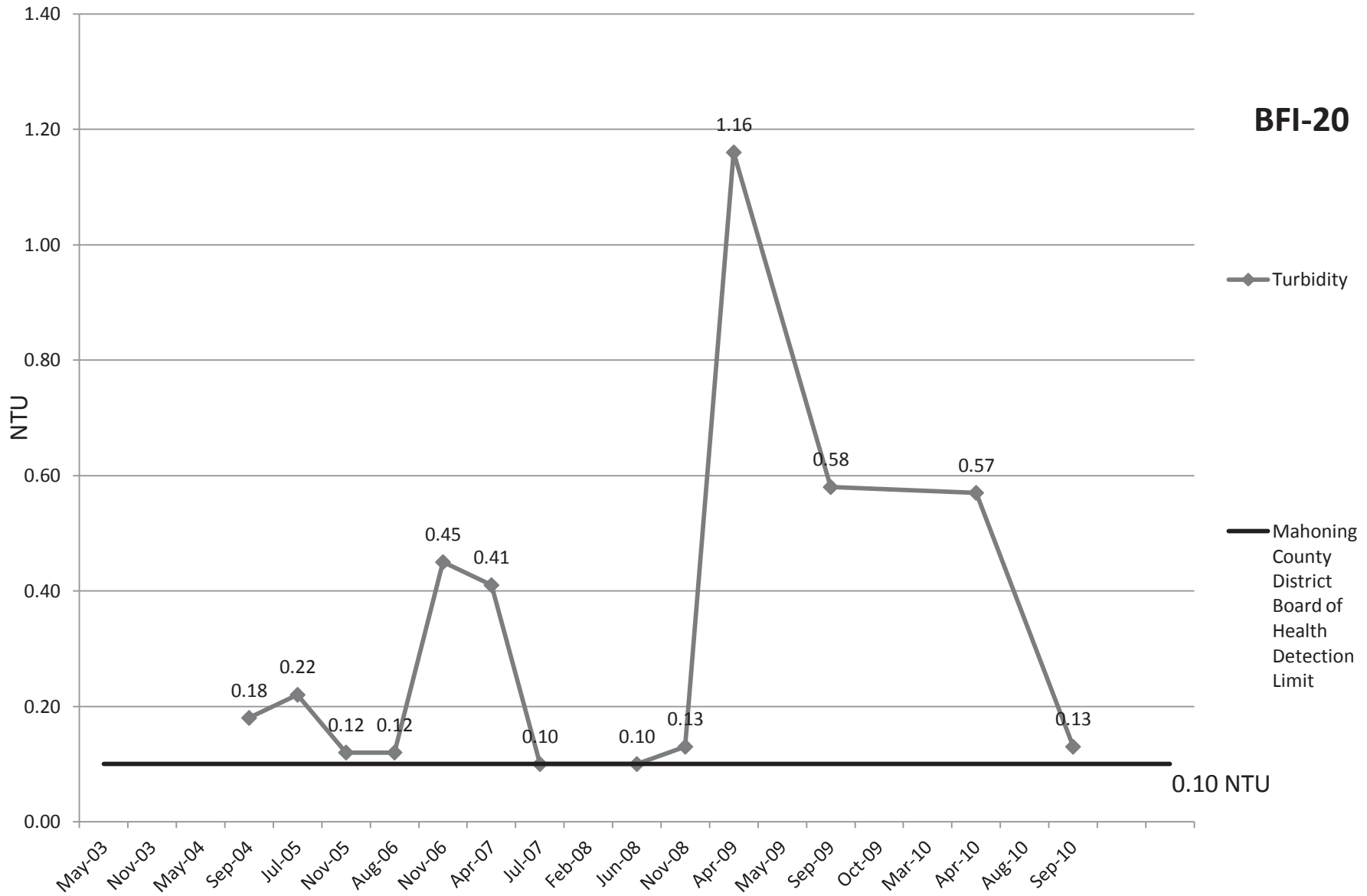
positive (1)

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

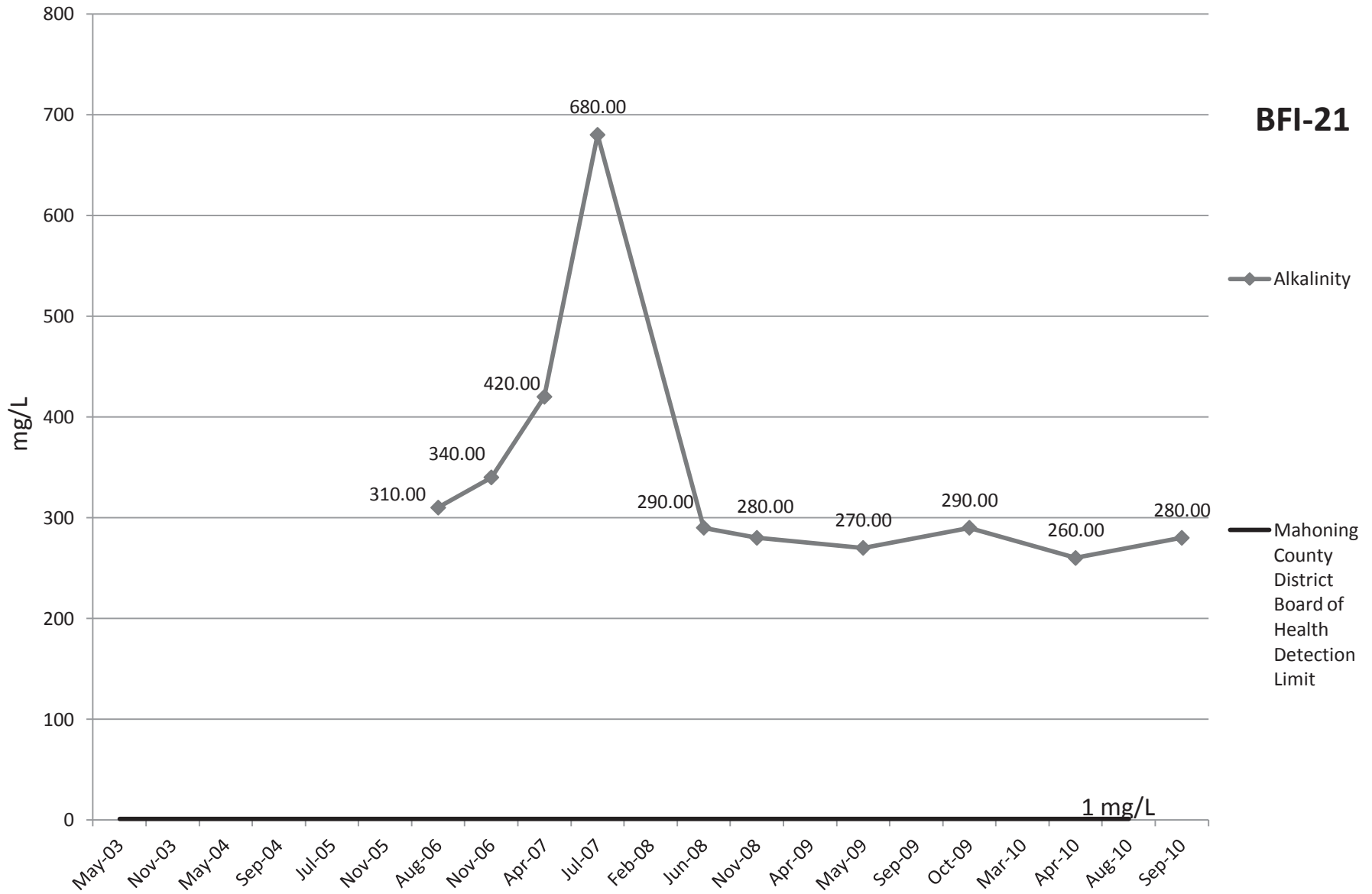
negative (0)

# Turbidity

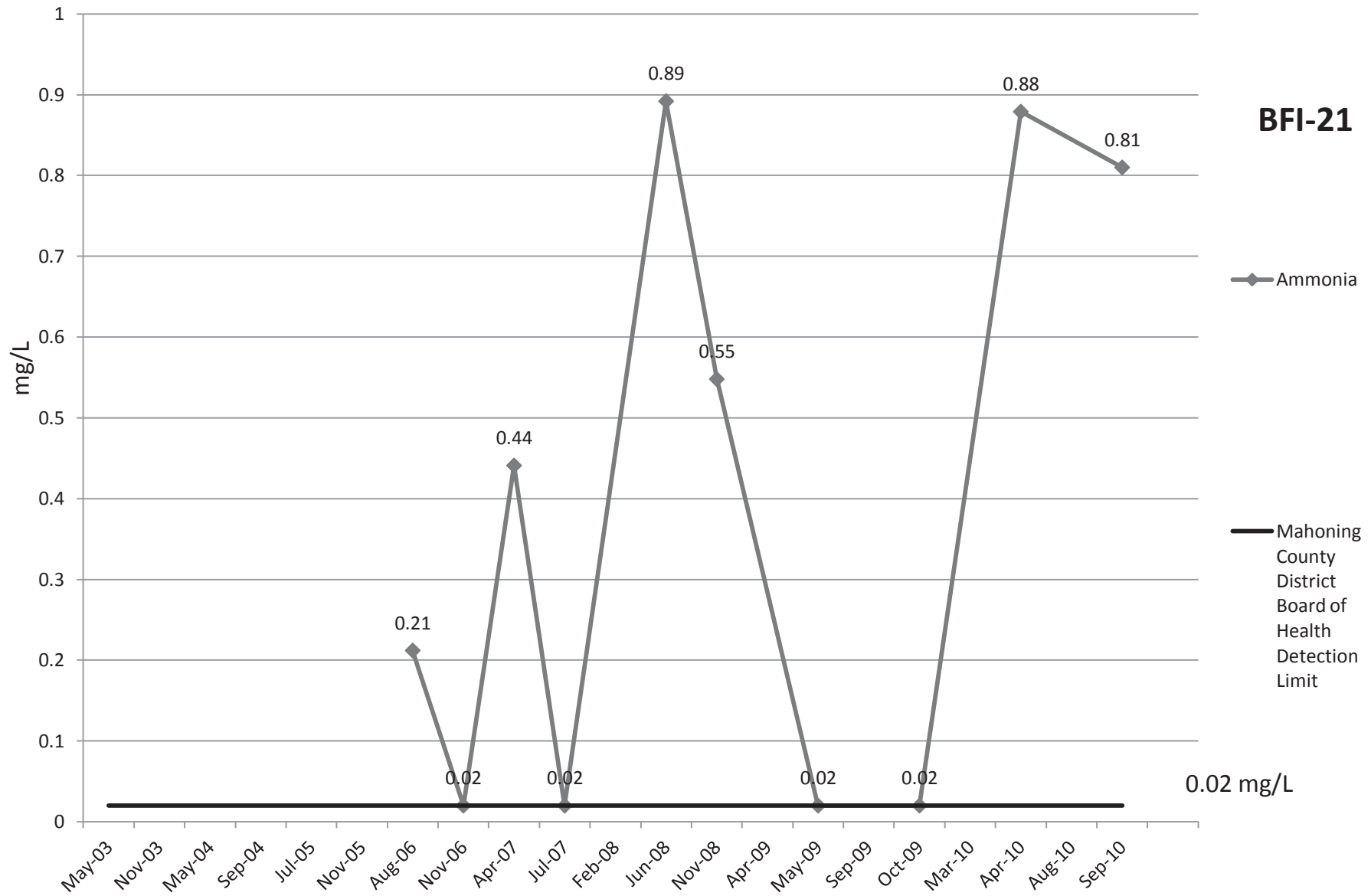


# Alkalinity

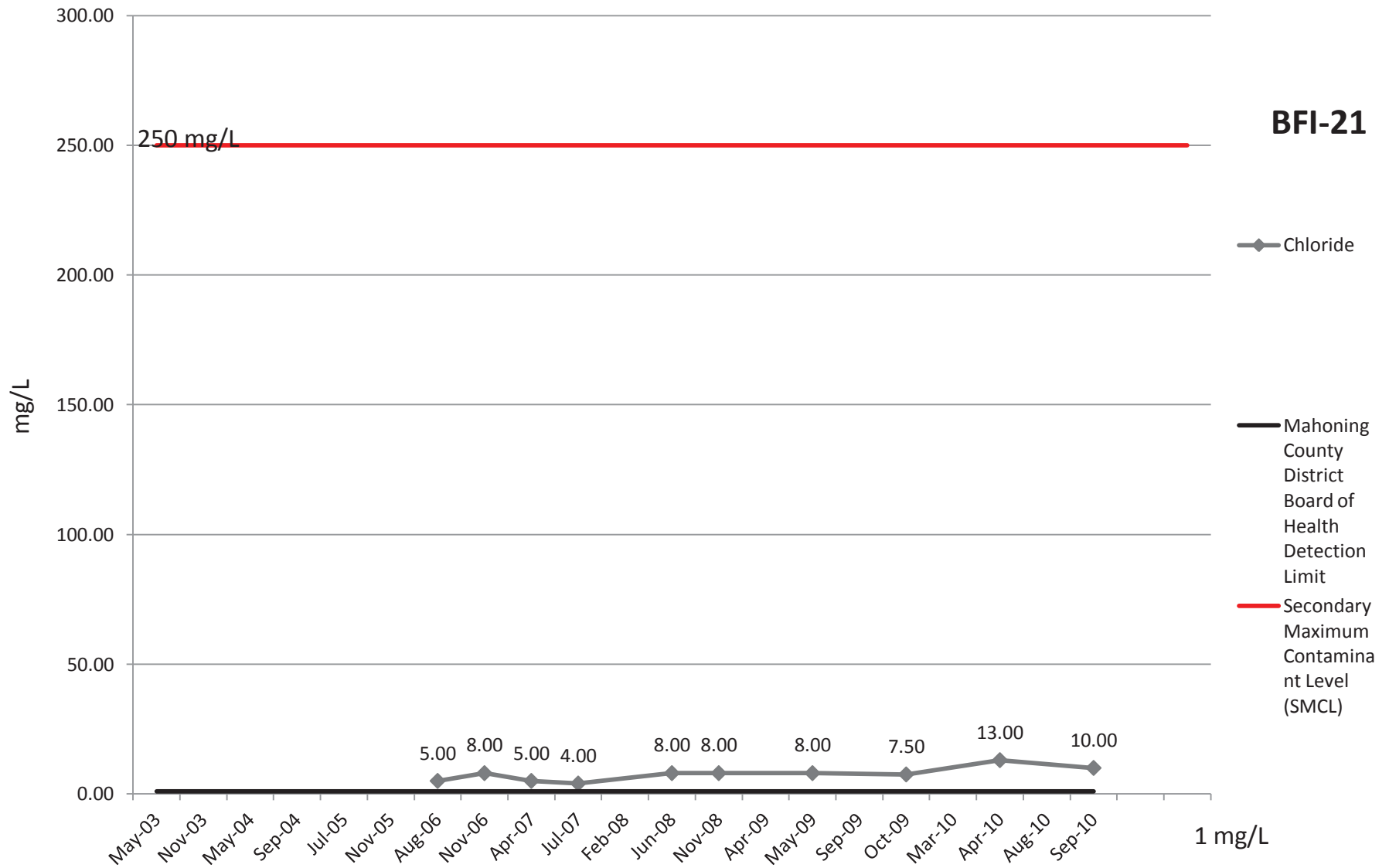
**BFI-21**



# Ammonia

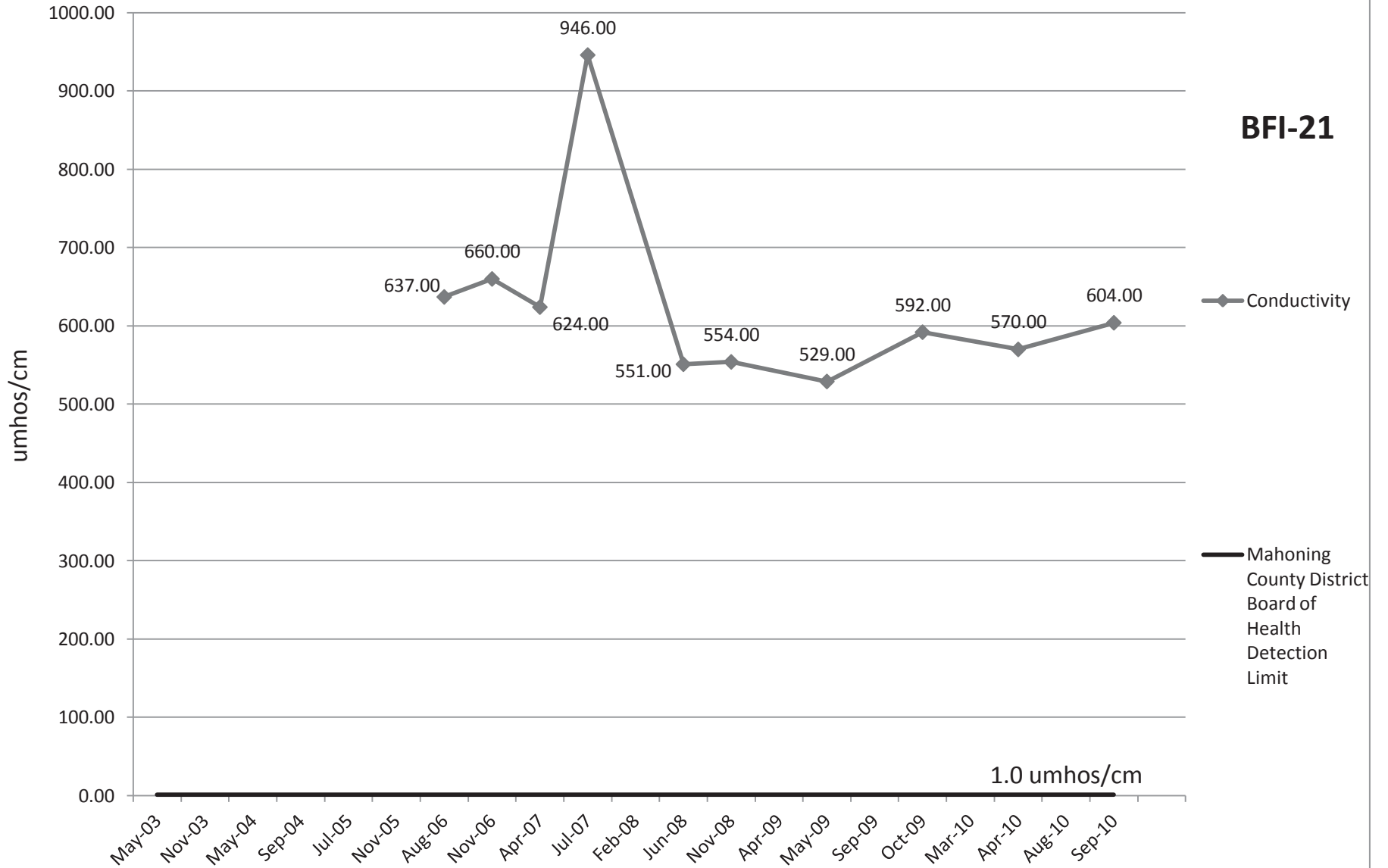


# Chloride

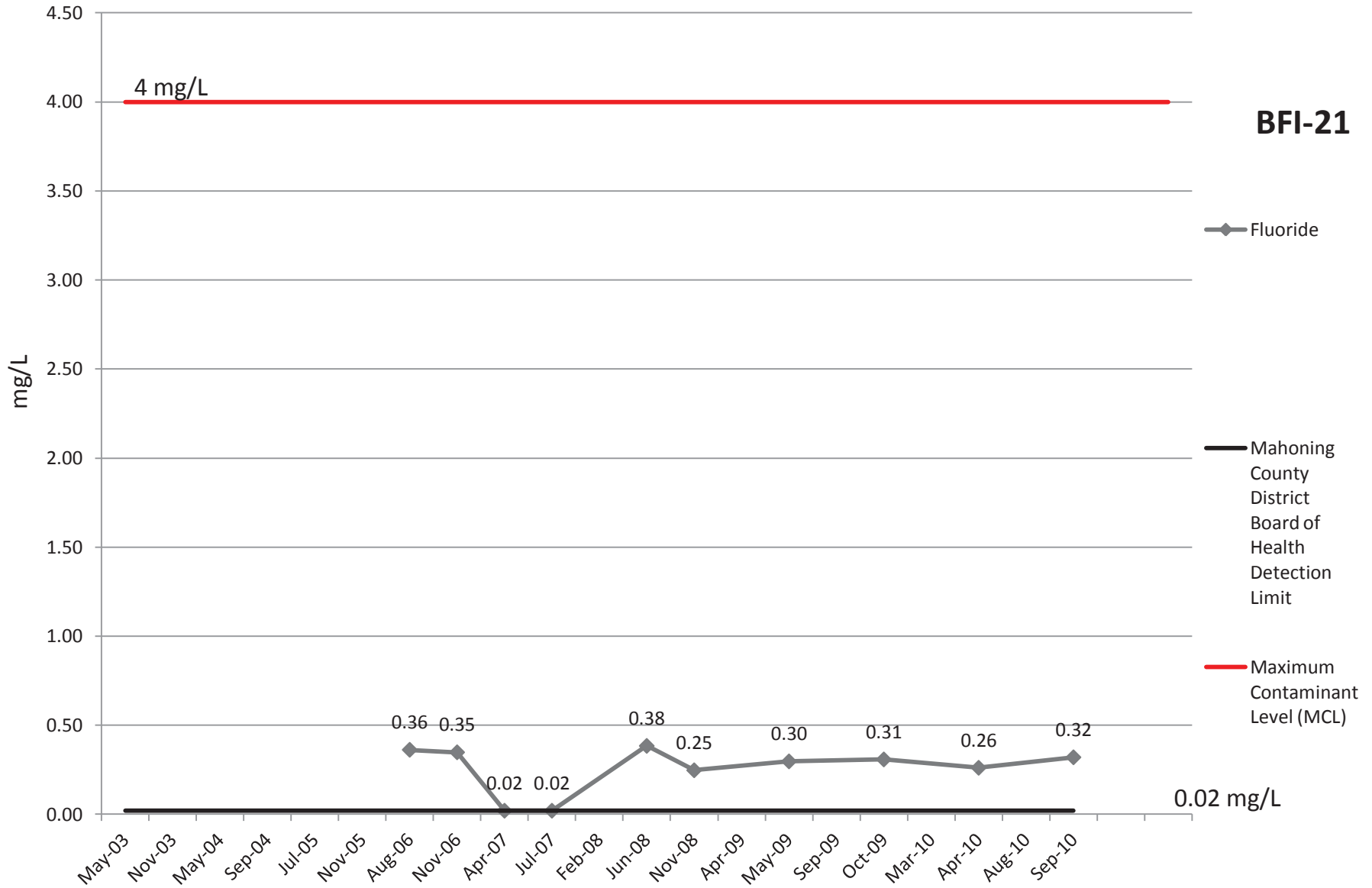


# Conductivity

**BFI-21**



# Fluoride



**BFI-21**

◆ Fluoride

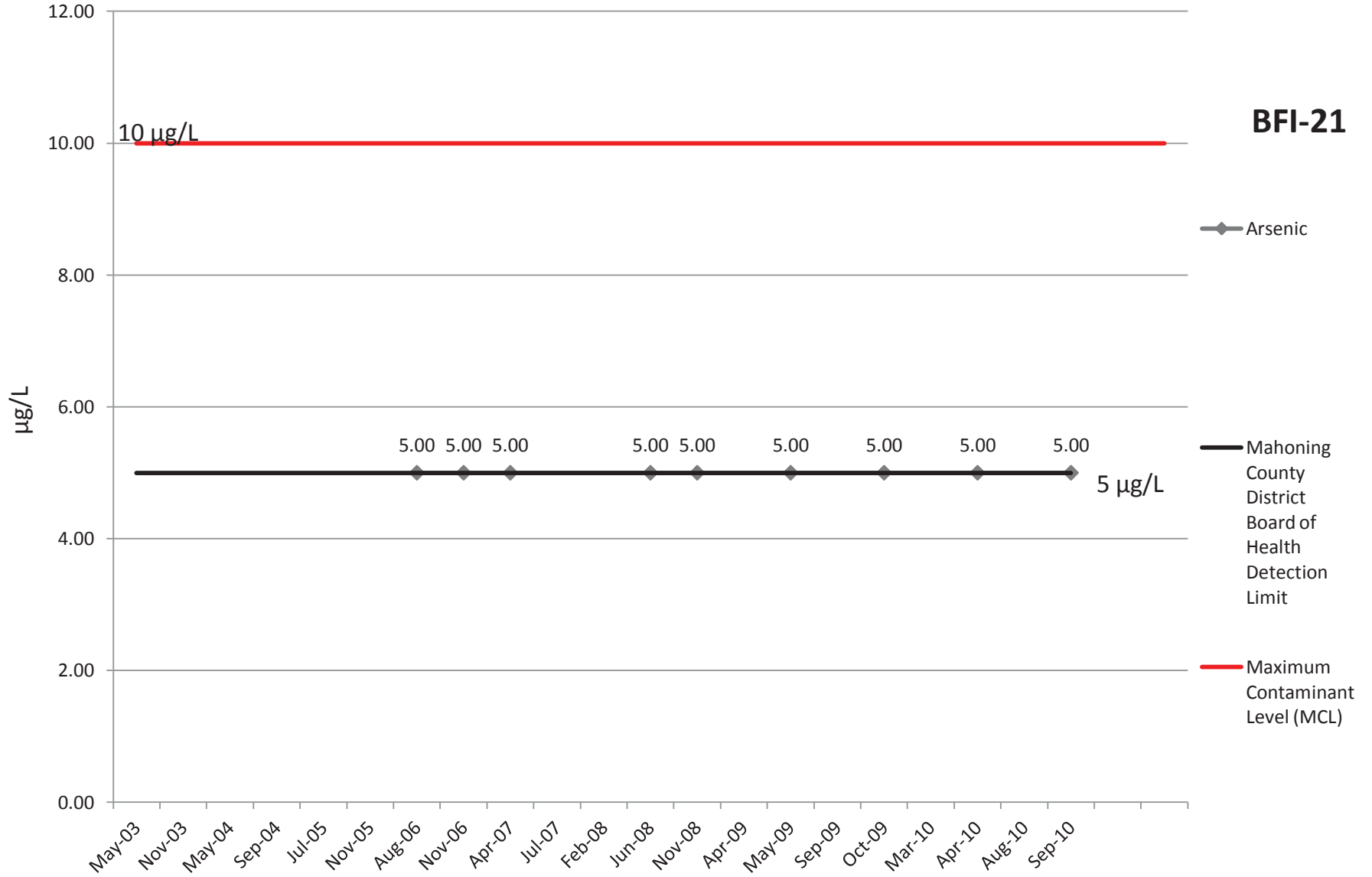
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

0.02 mg/L

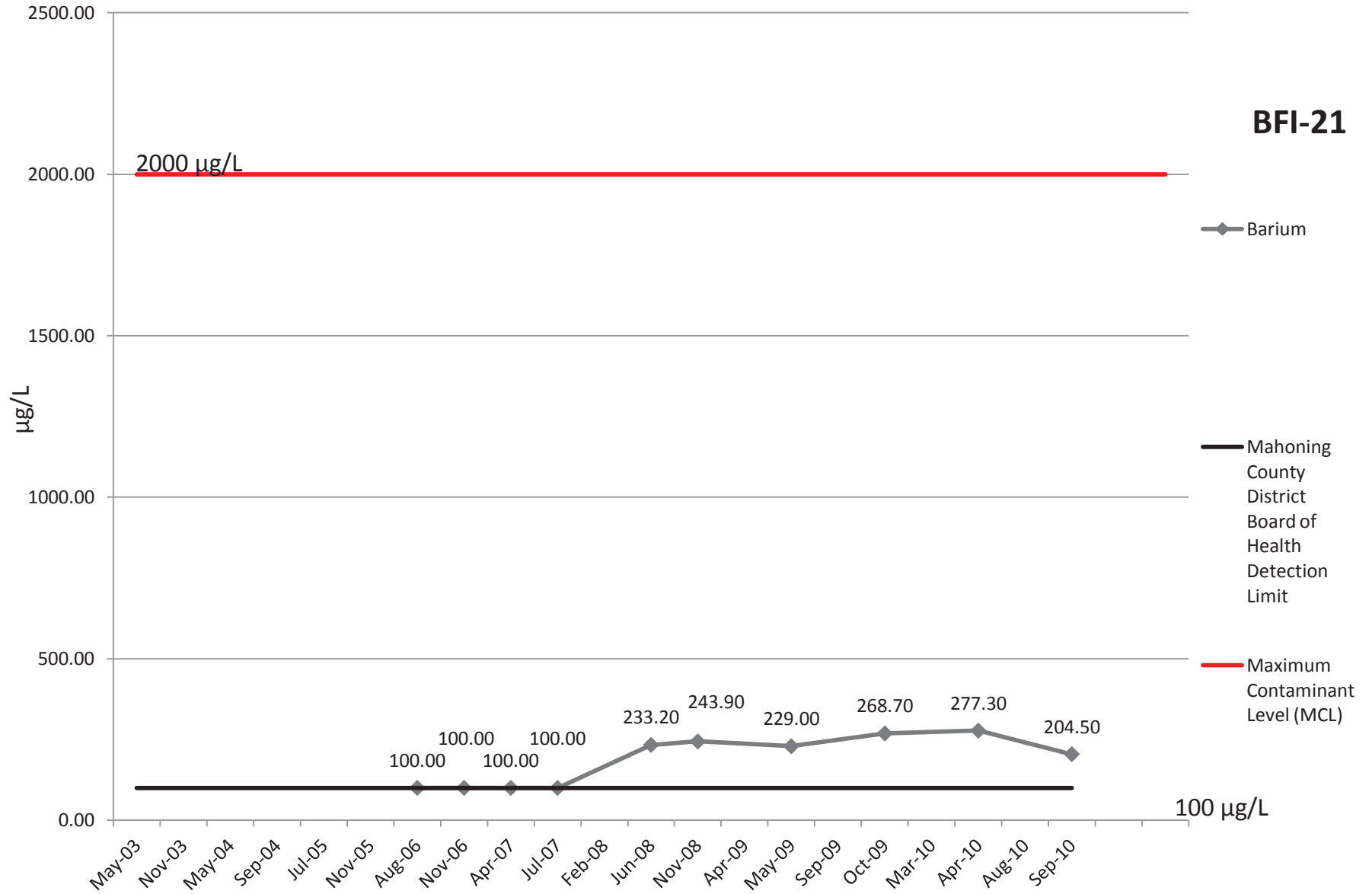
# Arsenic

**BFI-21**

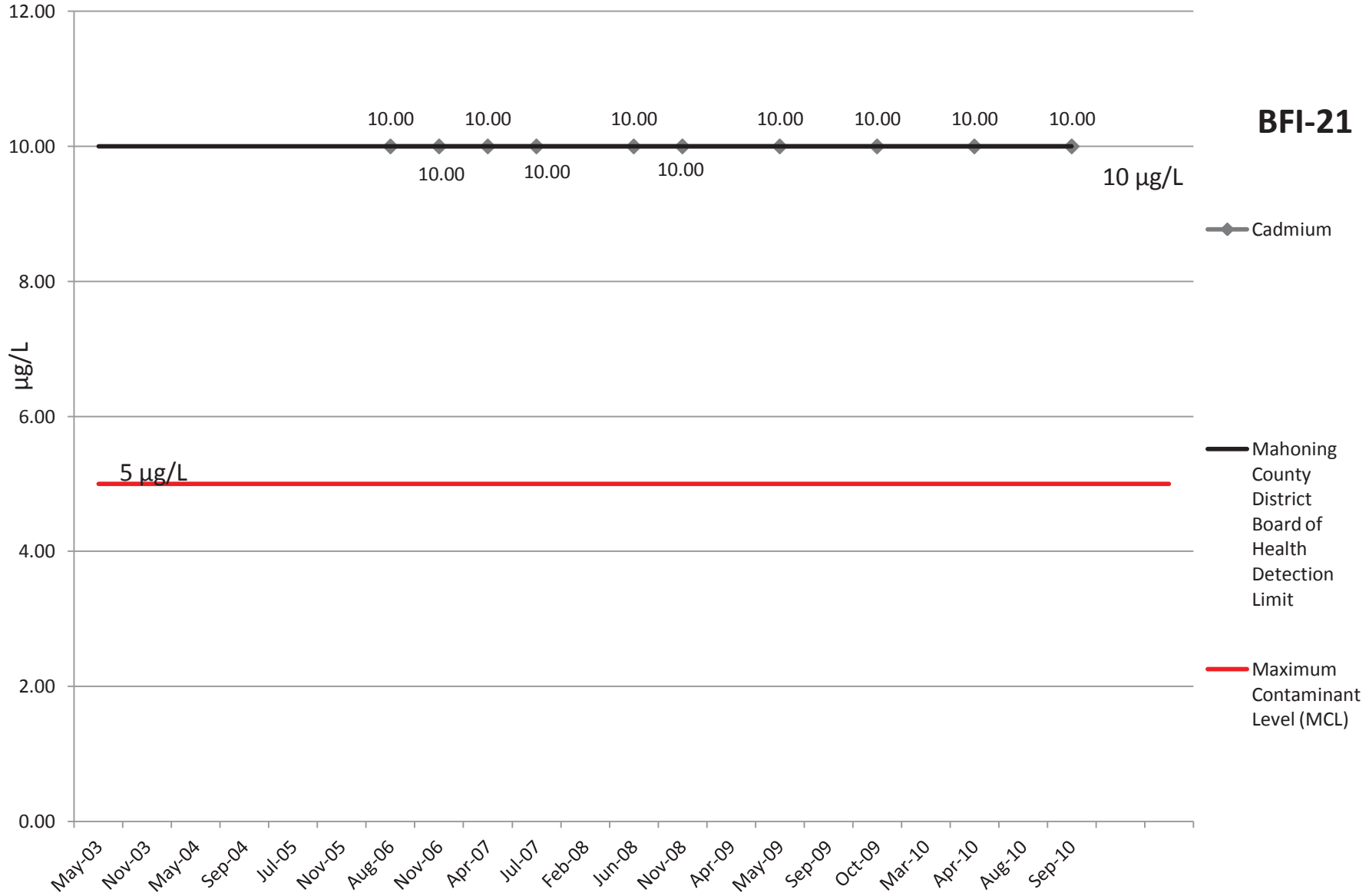




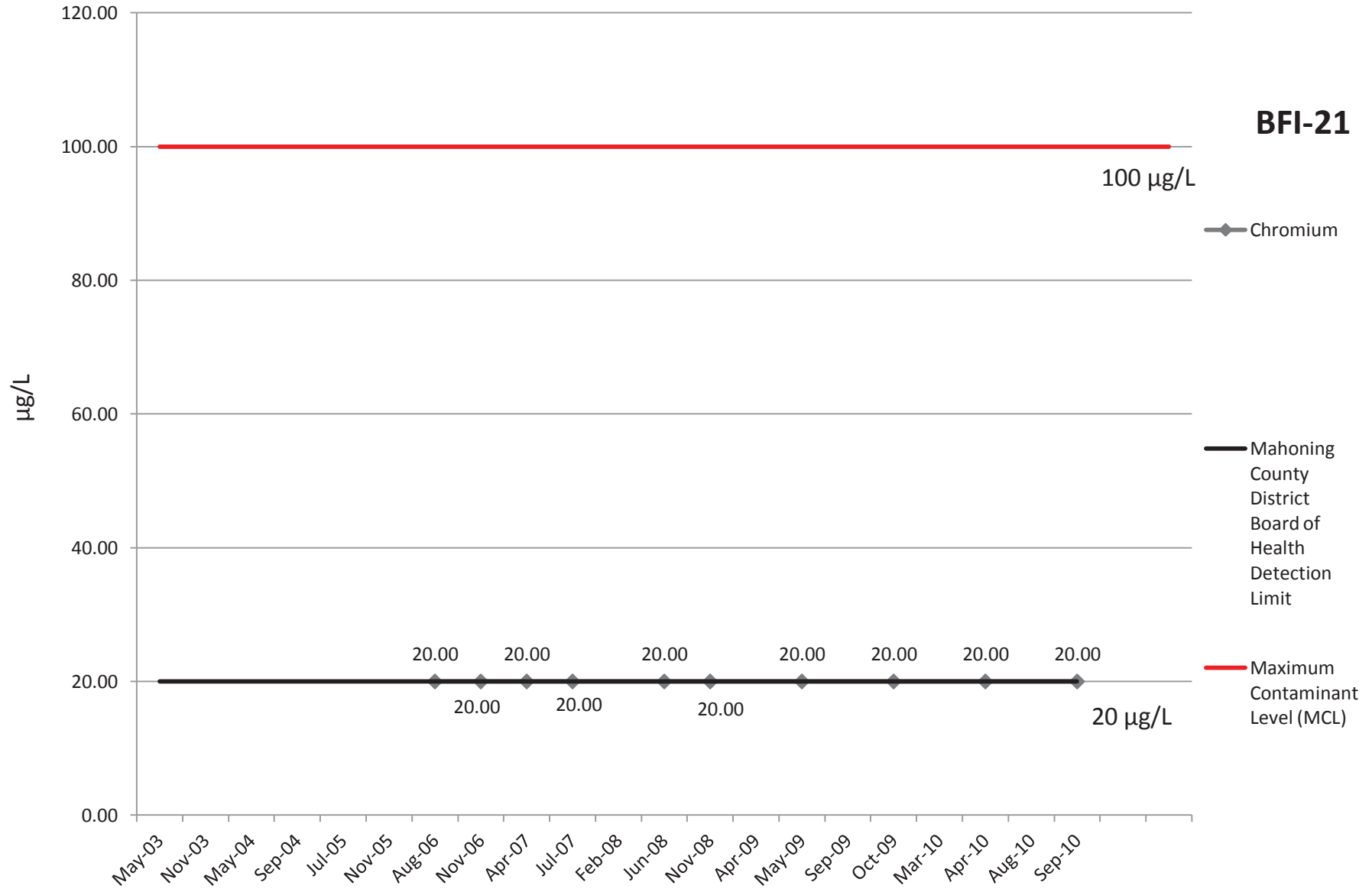
# Barium



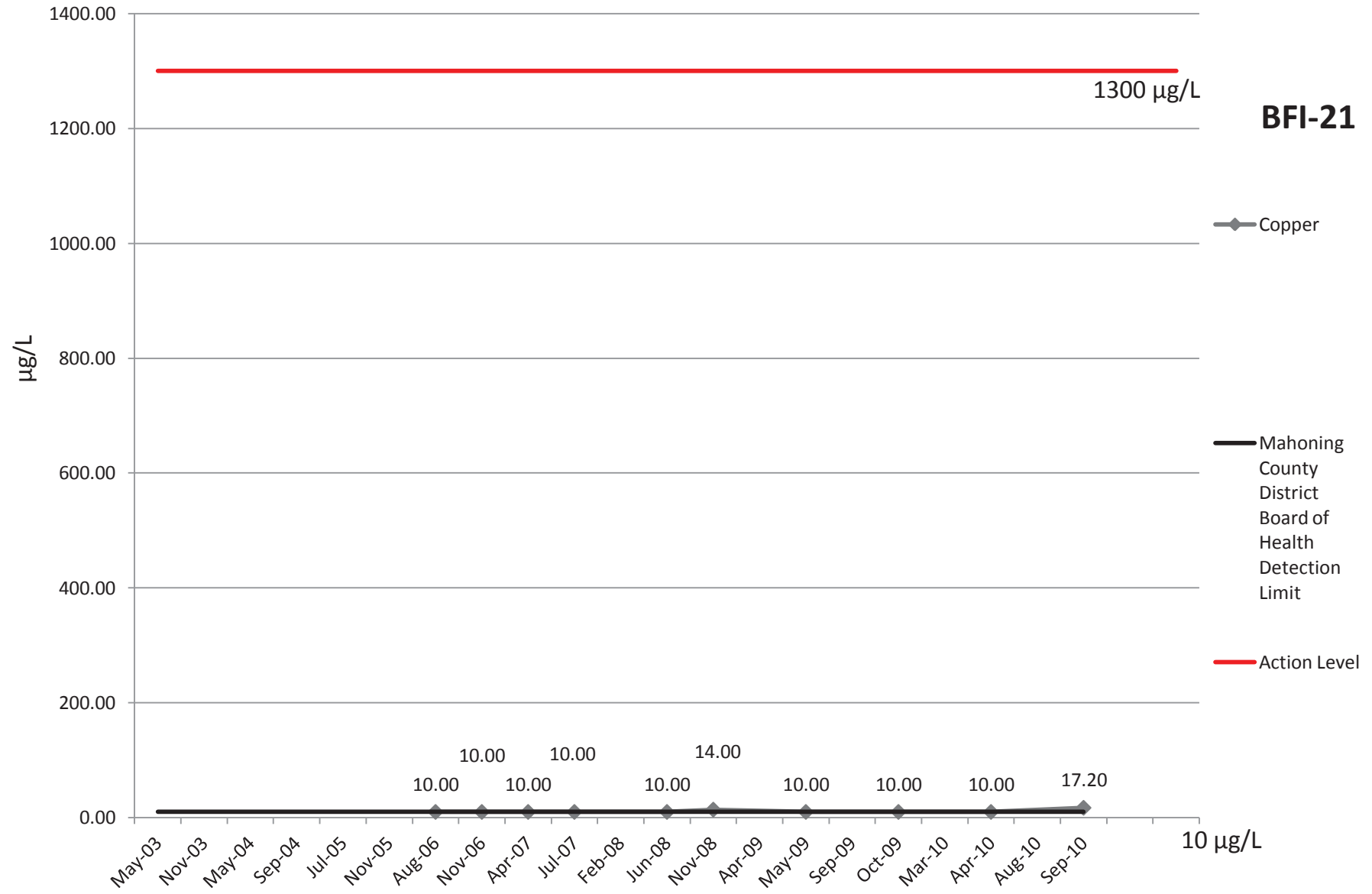
# Cadmium



# Chromium

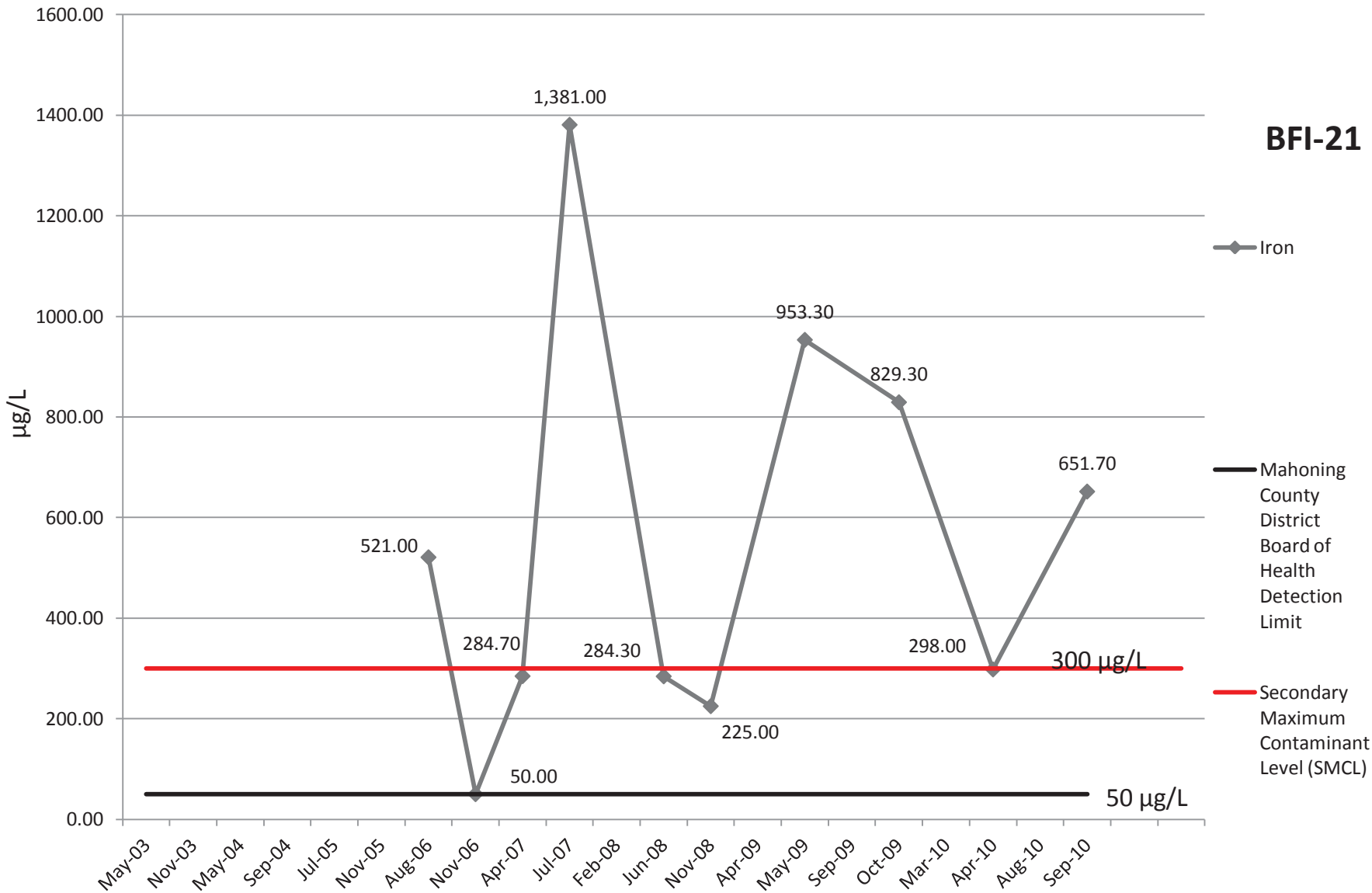


# Copper



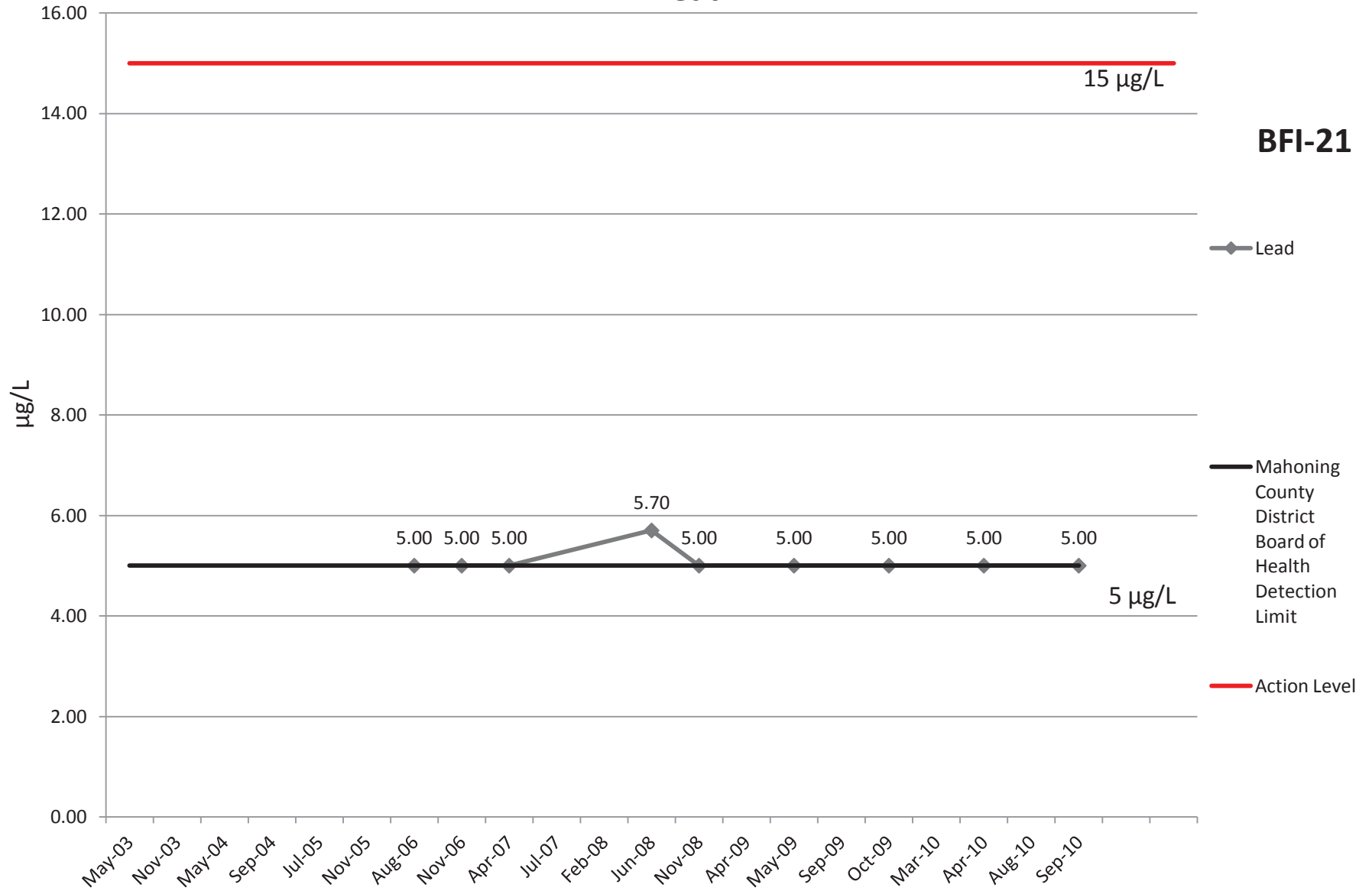
# Iron

**BFI-21**

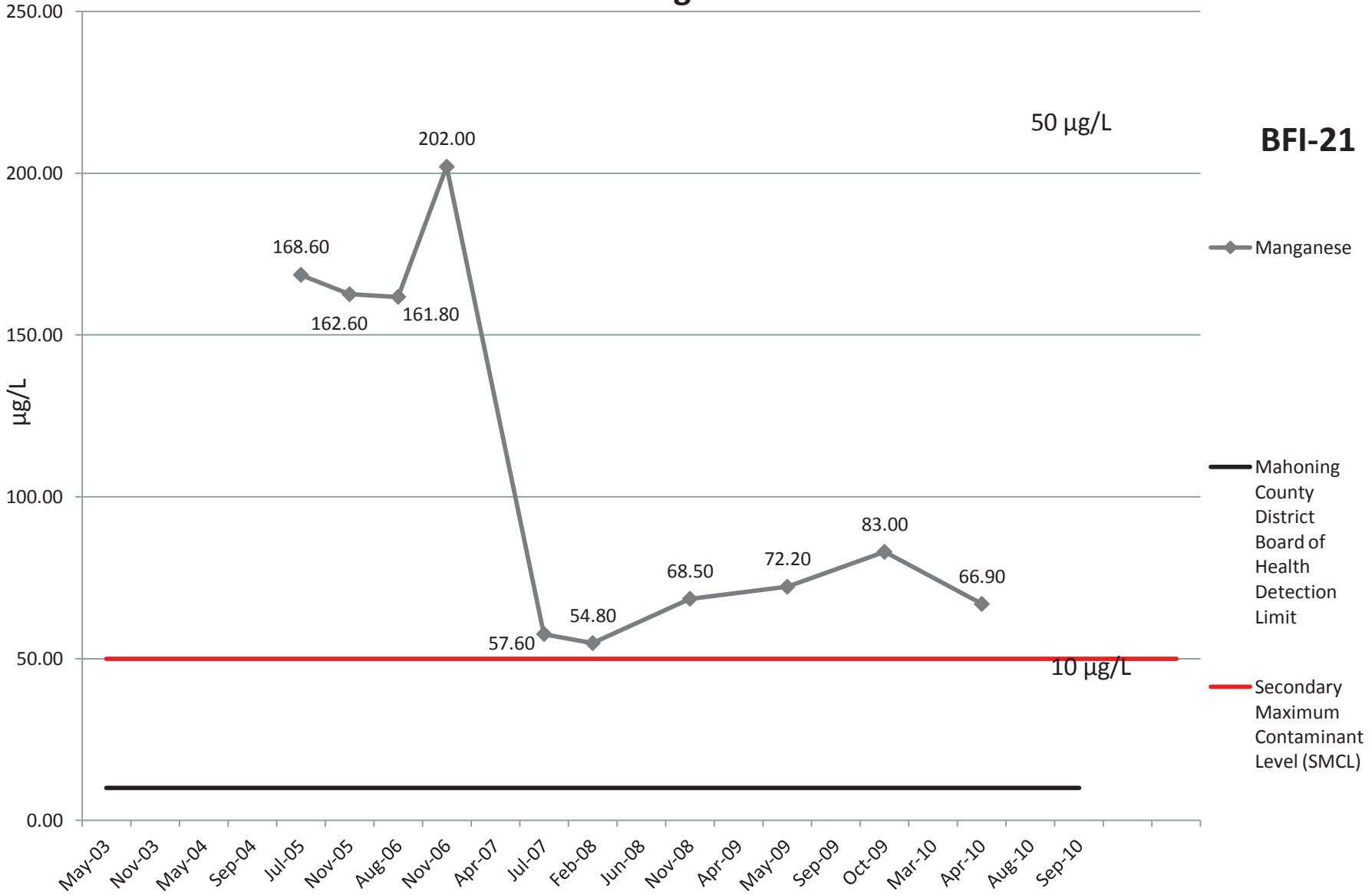


# Lead

**BFI-21**

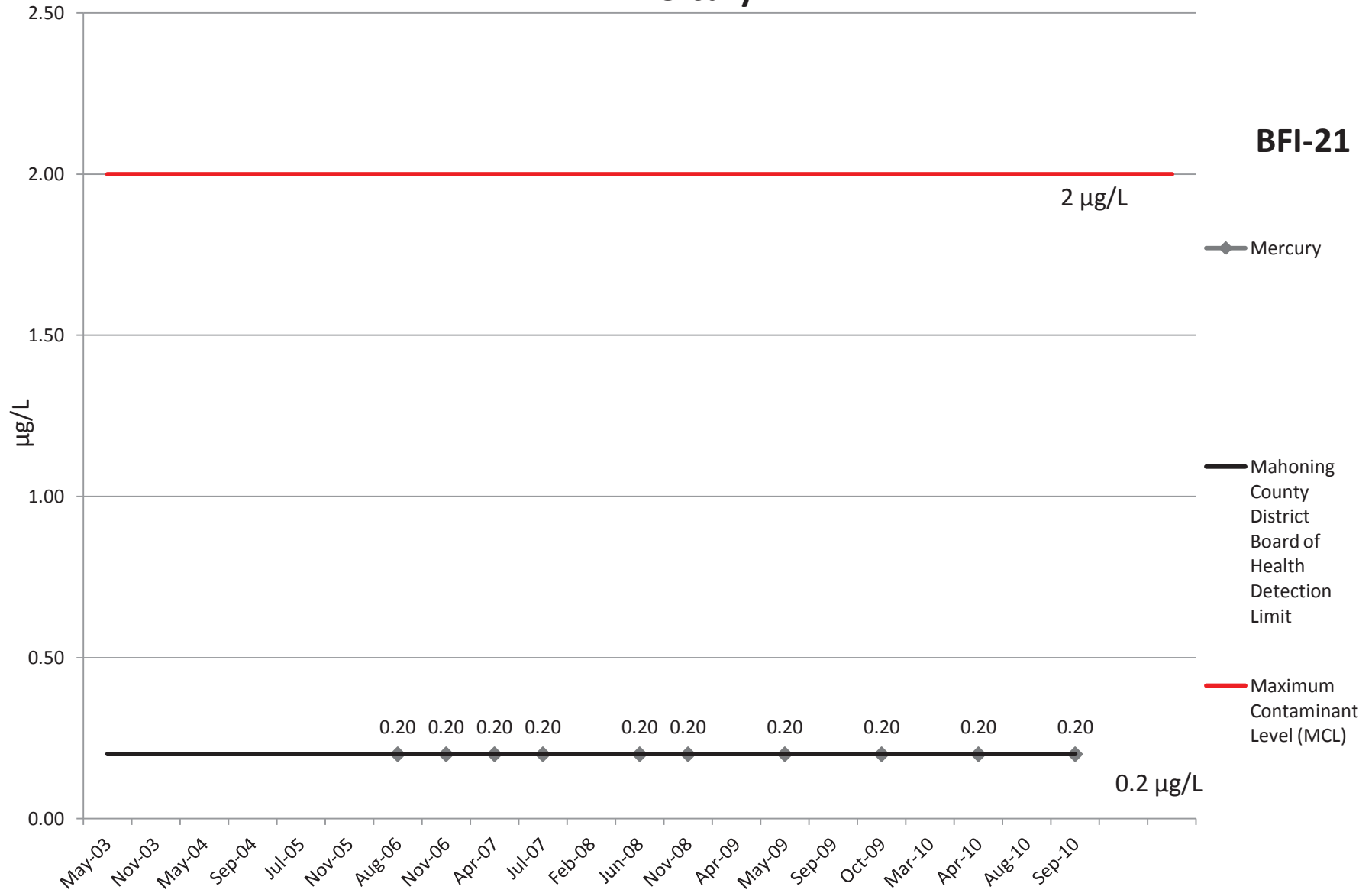


# Manganese



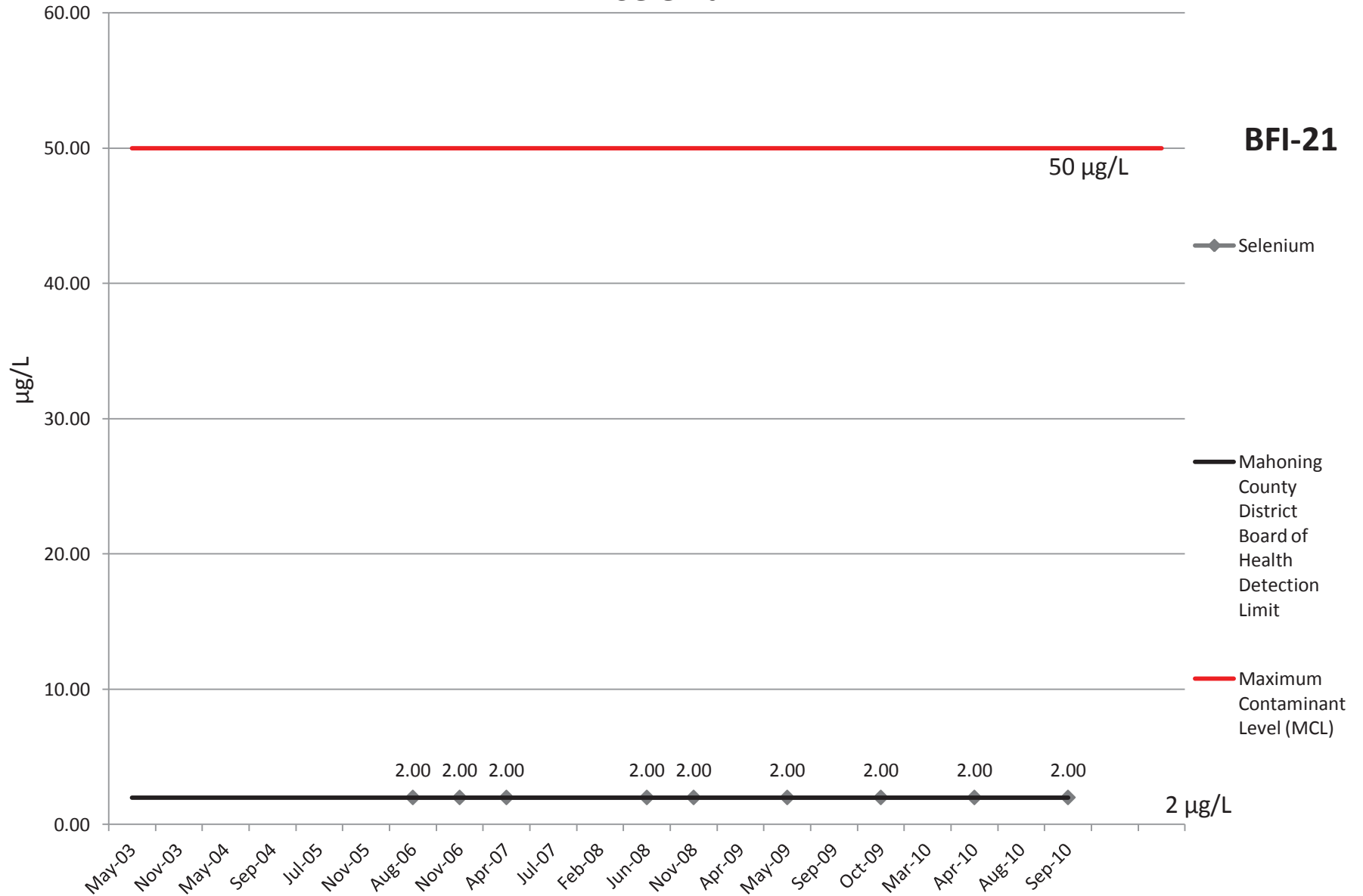
# Mercury

**BFI-21**



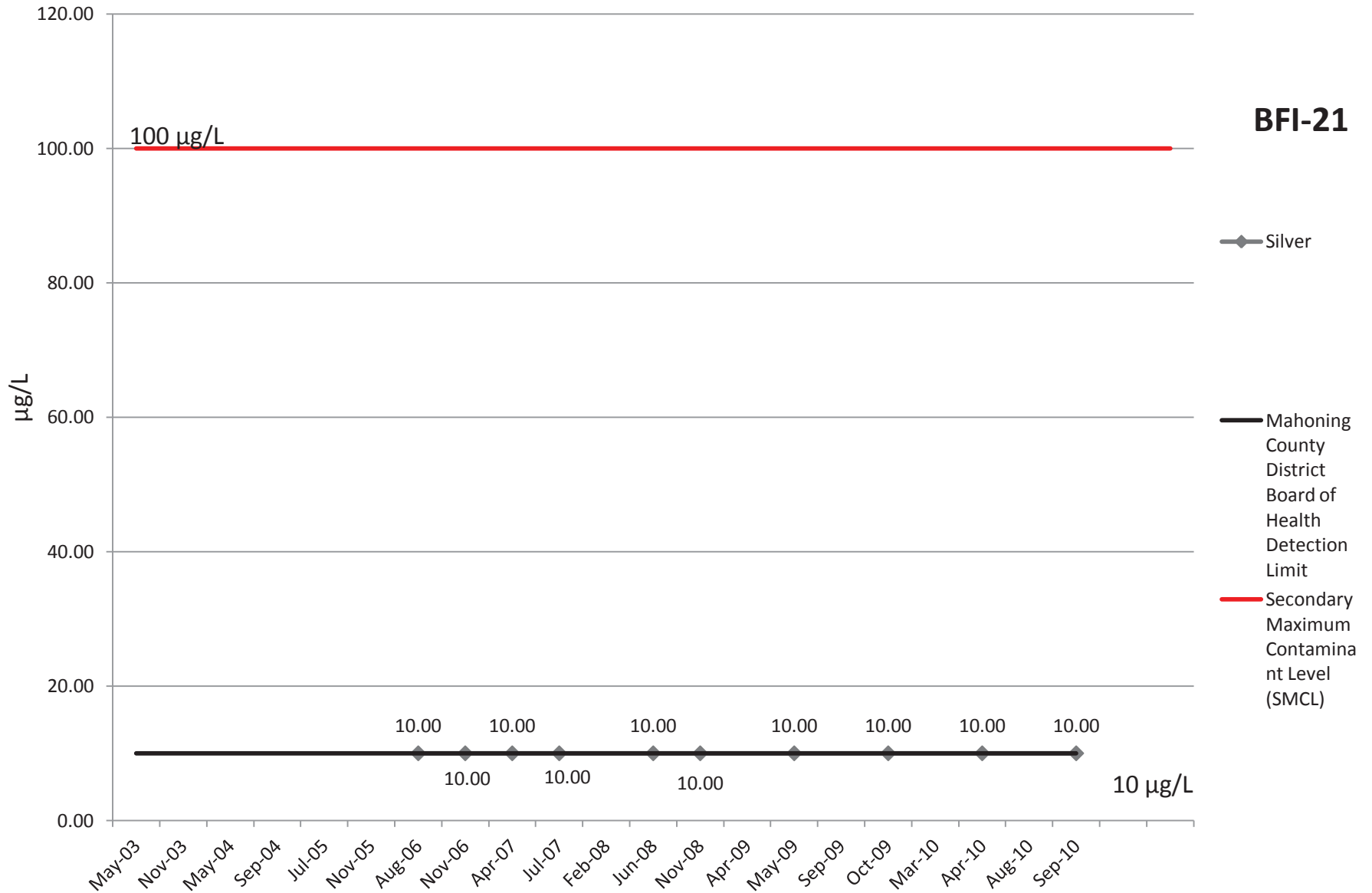


# Selenium

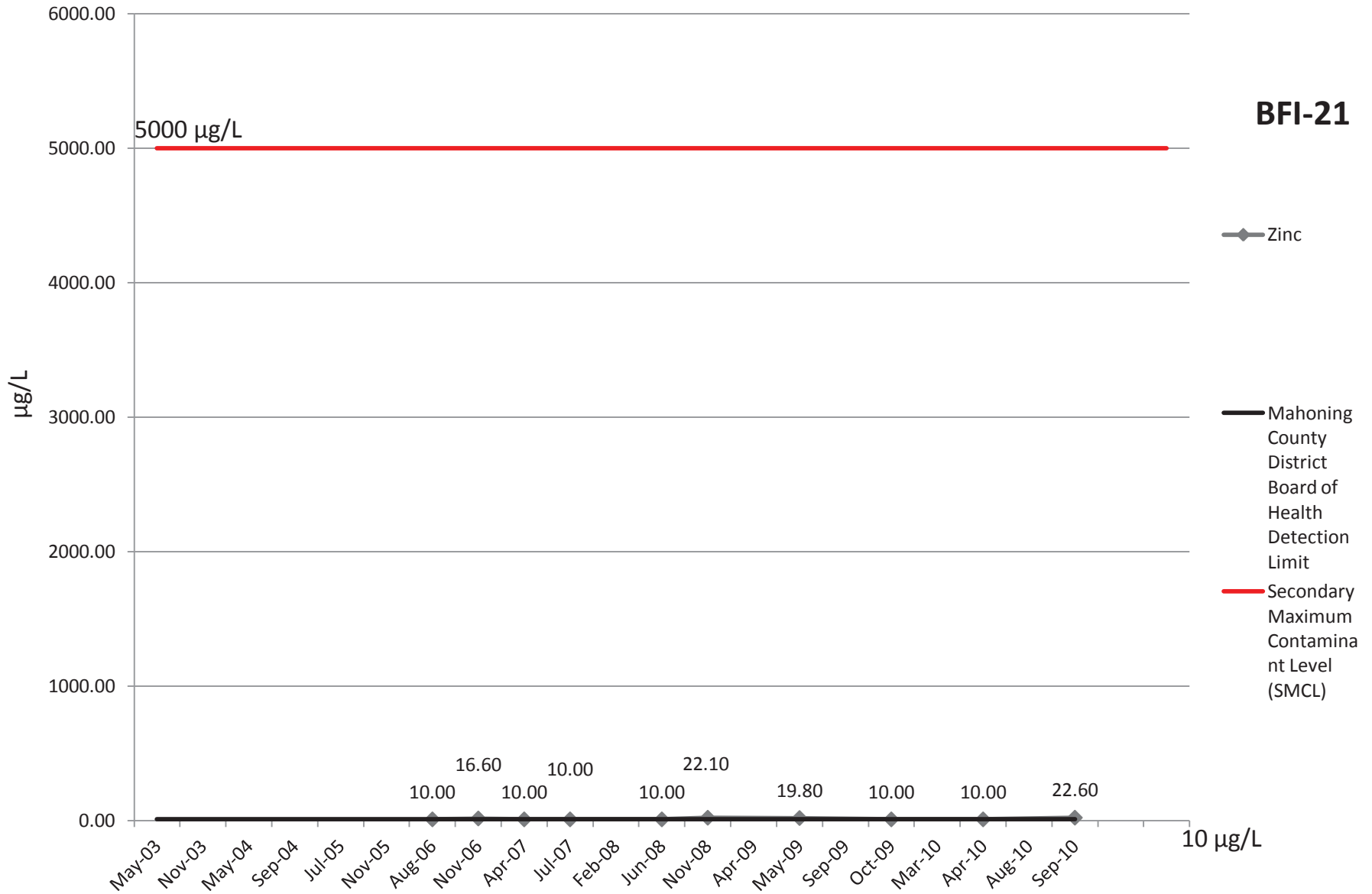


# Silver

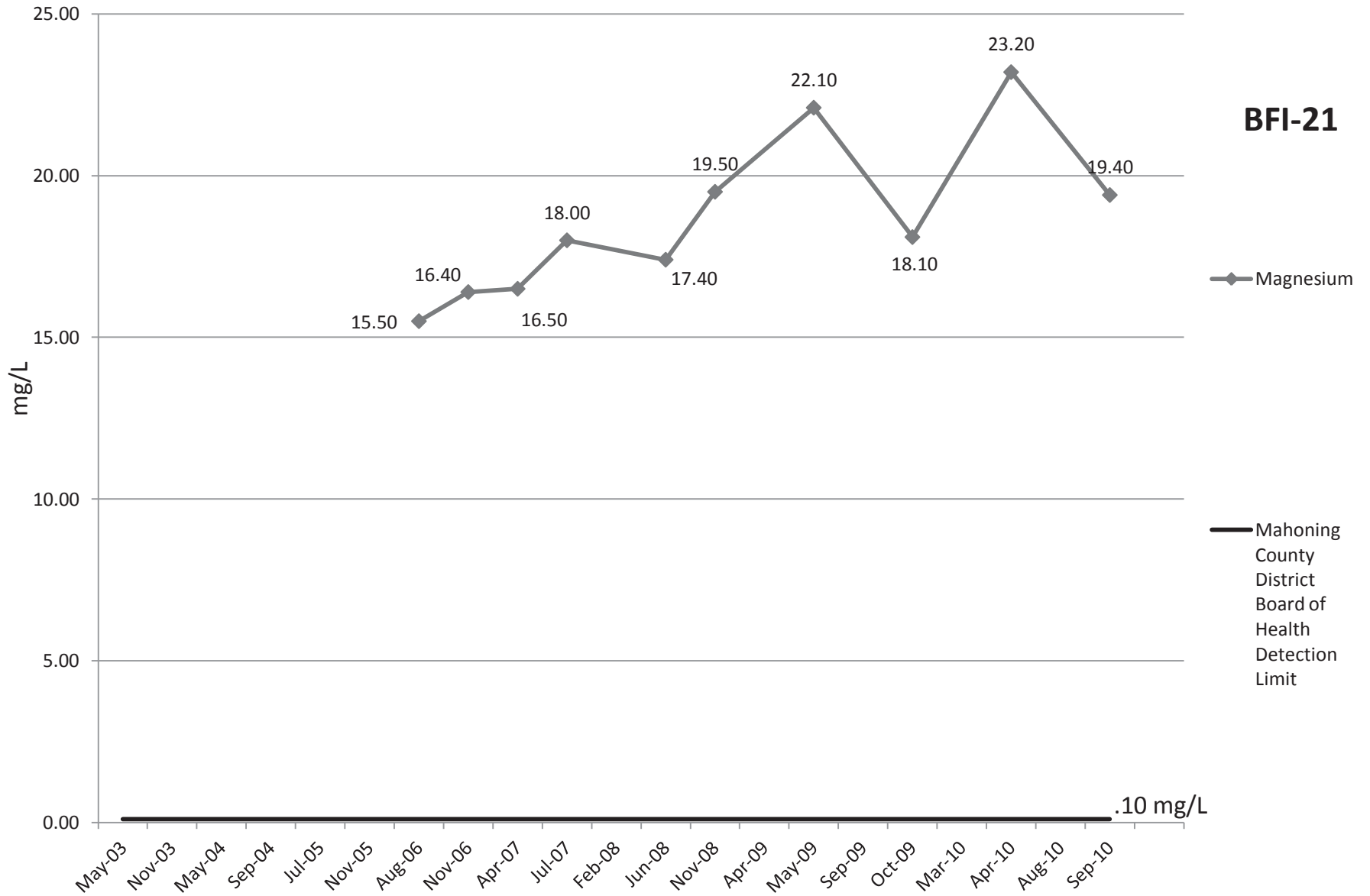
**BFI-21**



# Zinc

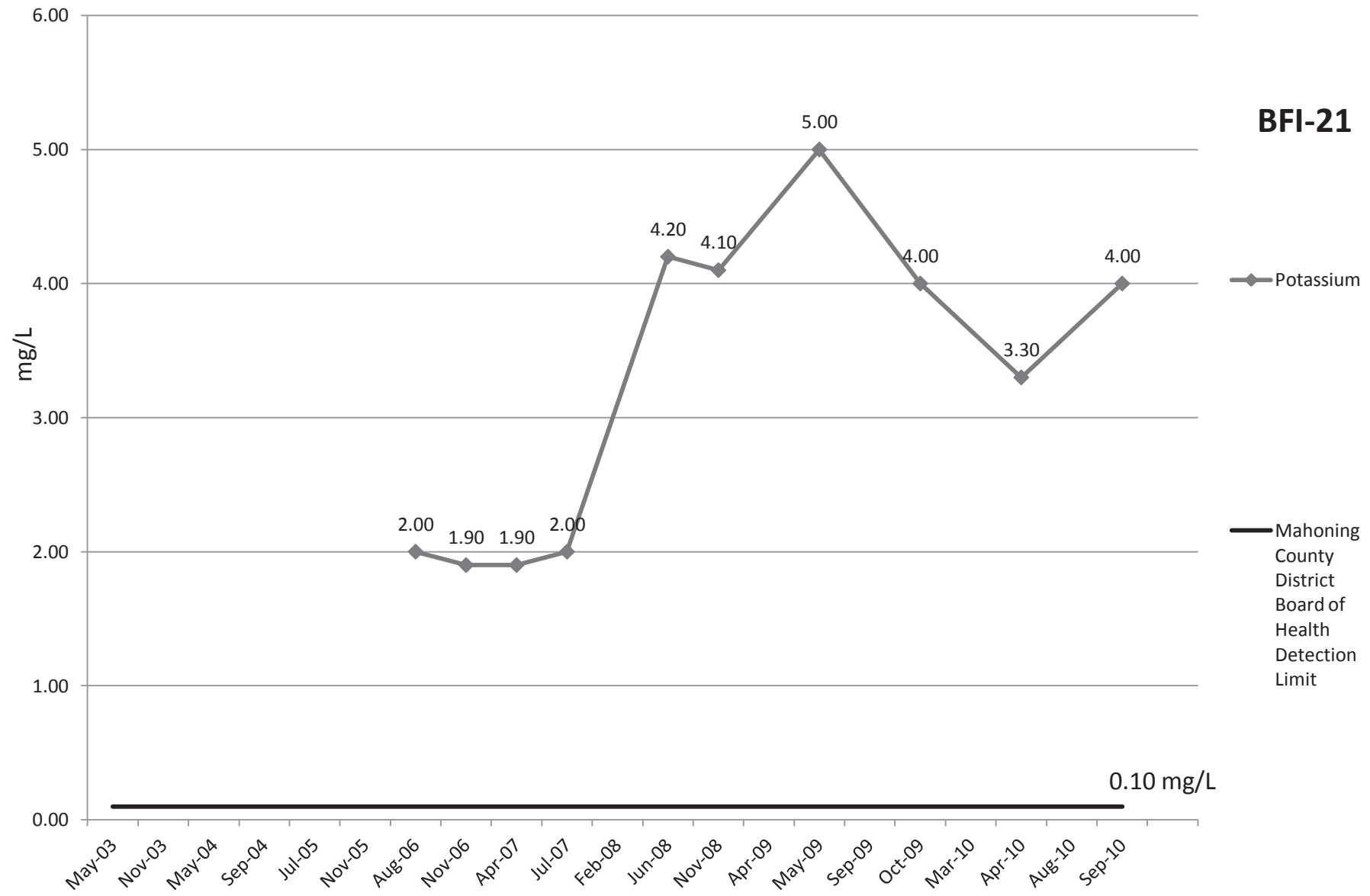


# Magnesium

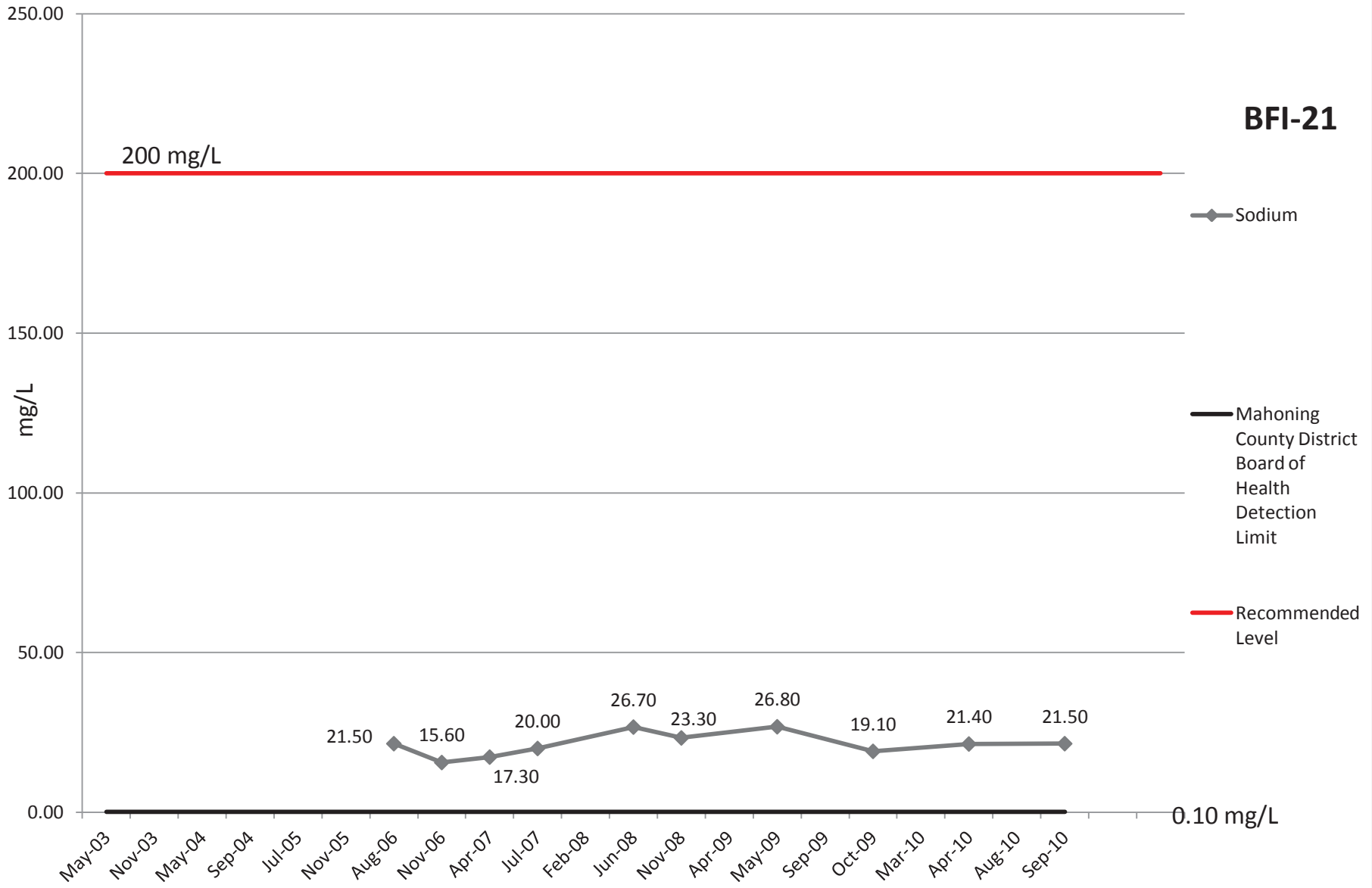


# Potassium

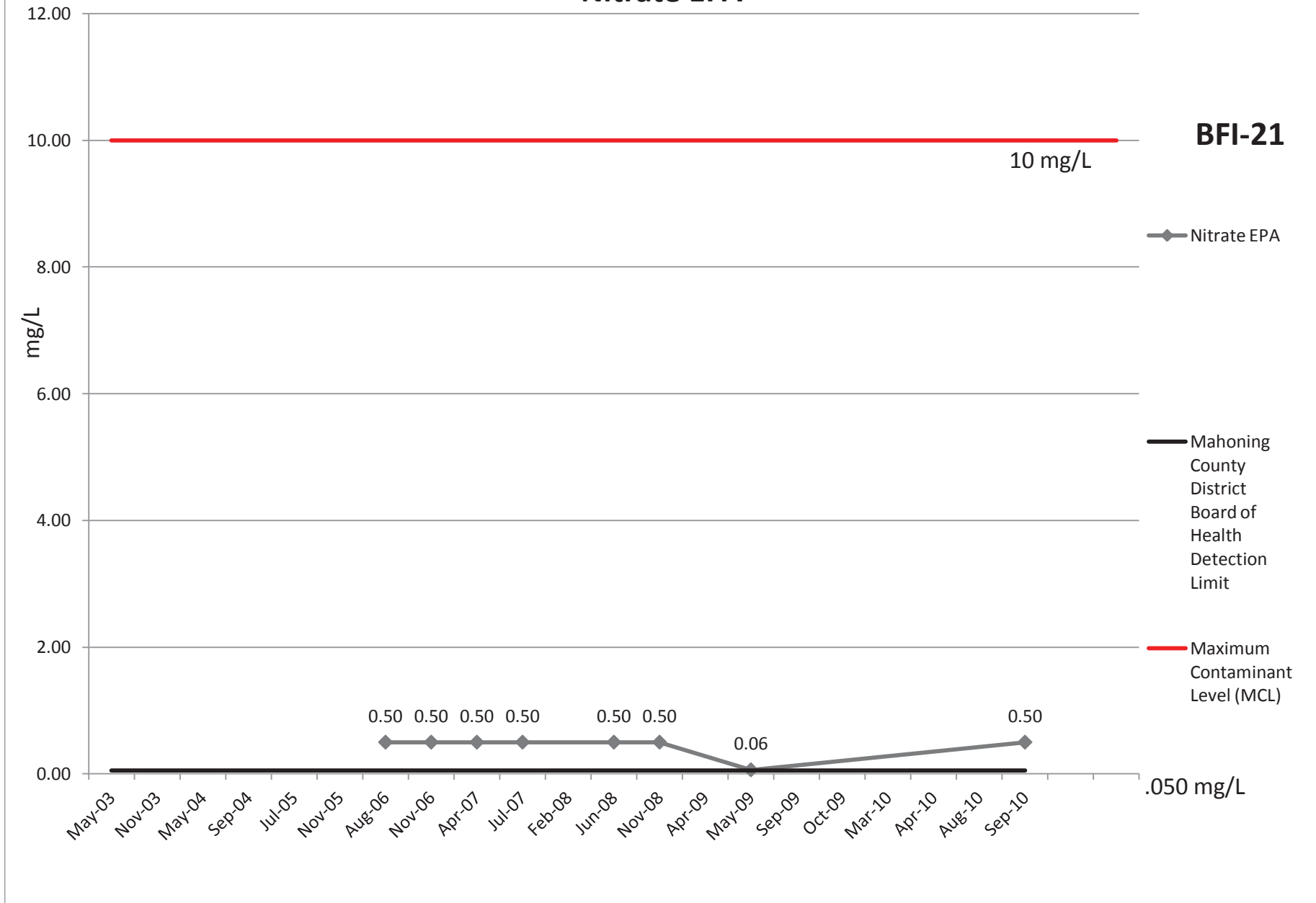
**BFI-21**



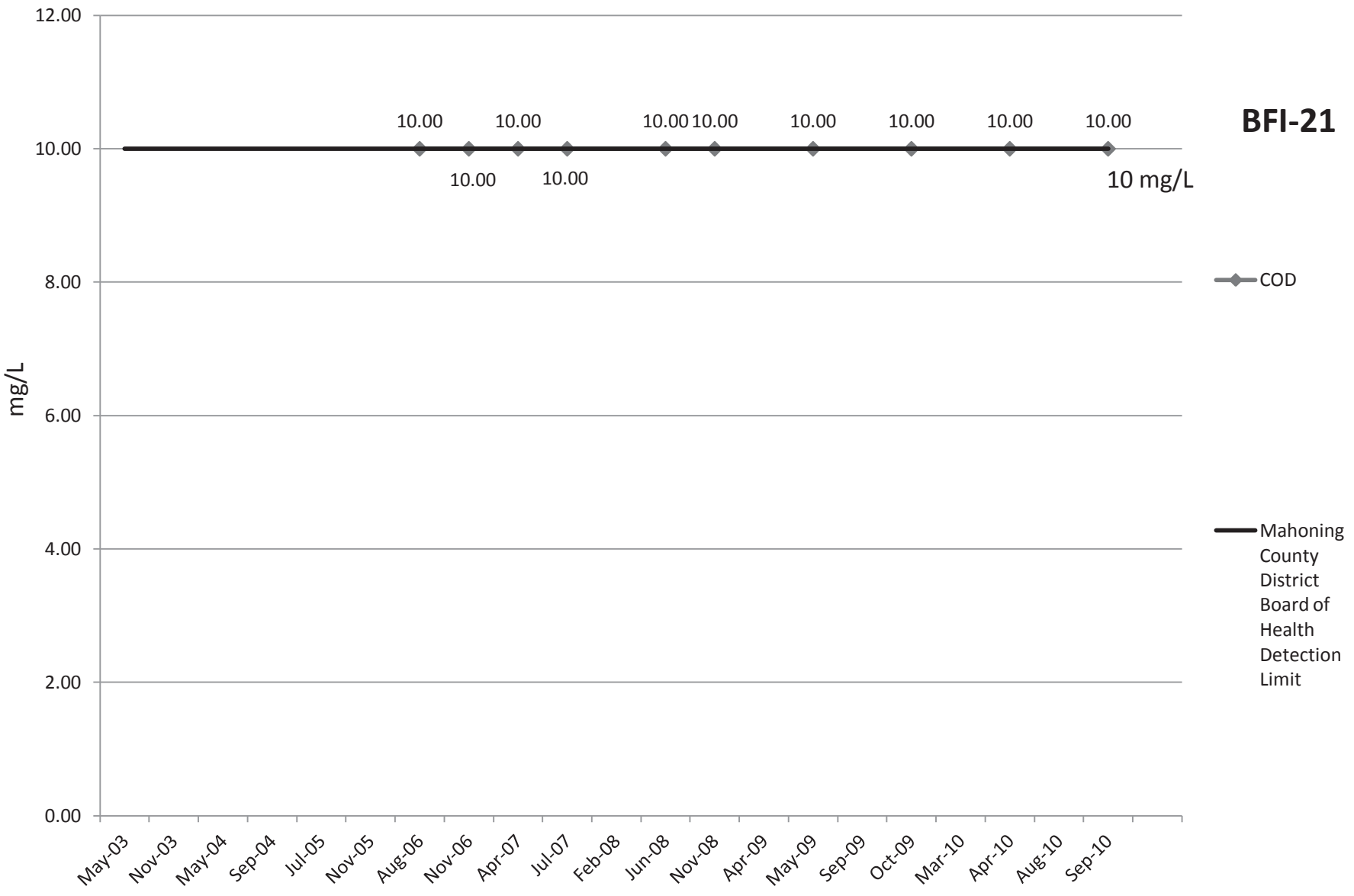
# Sodium



# Nitrate EPA



# COD



**BFI-21**

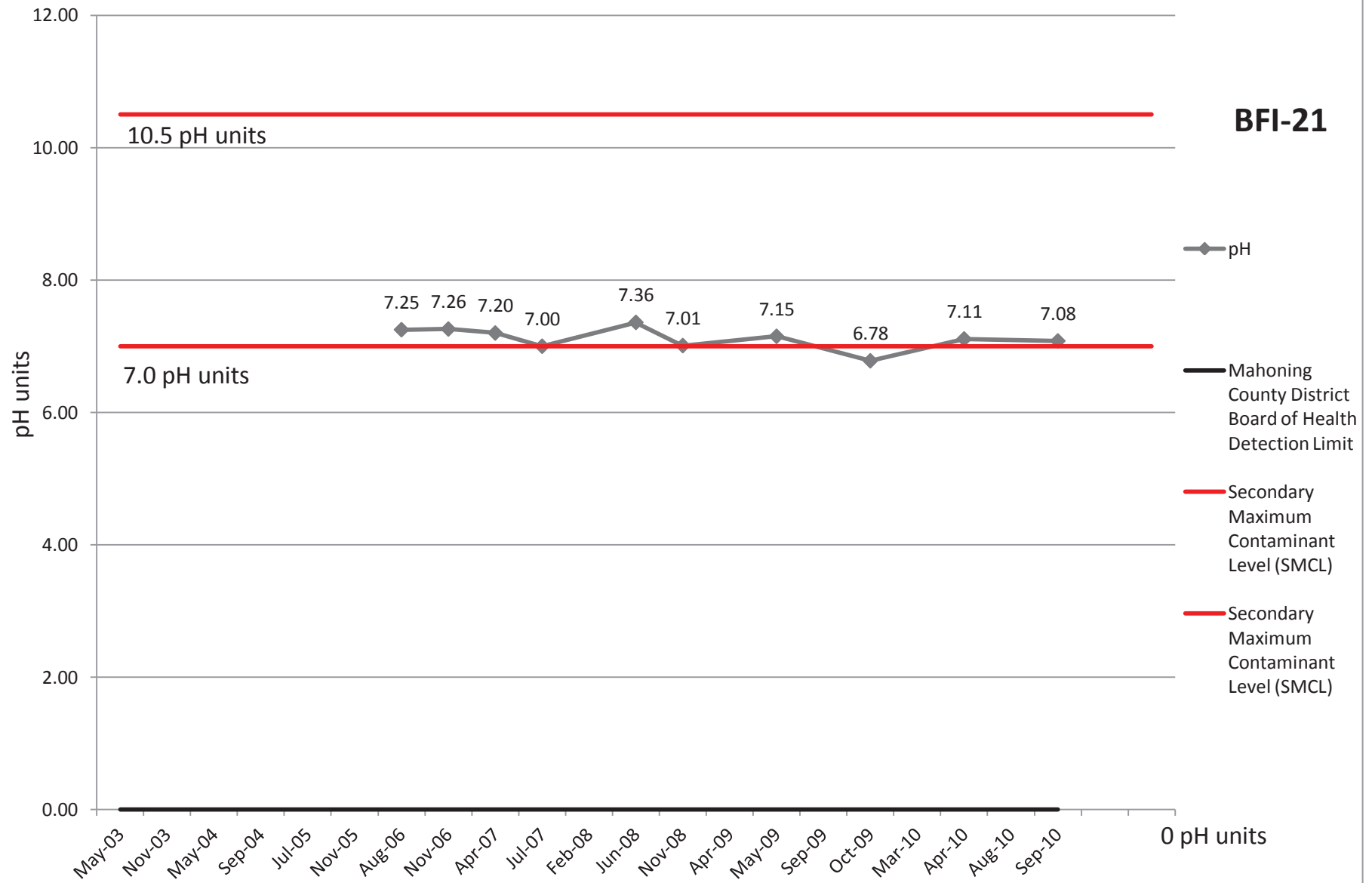
◆ COD

— Mahoning County District Board of Health Detection Limit



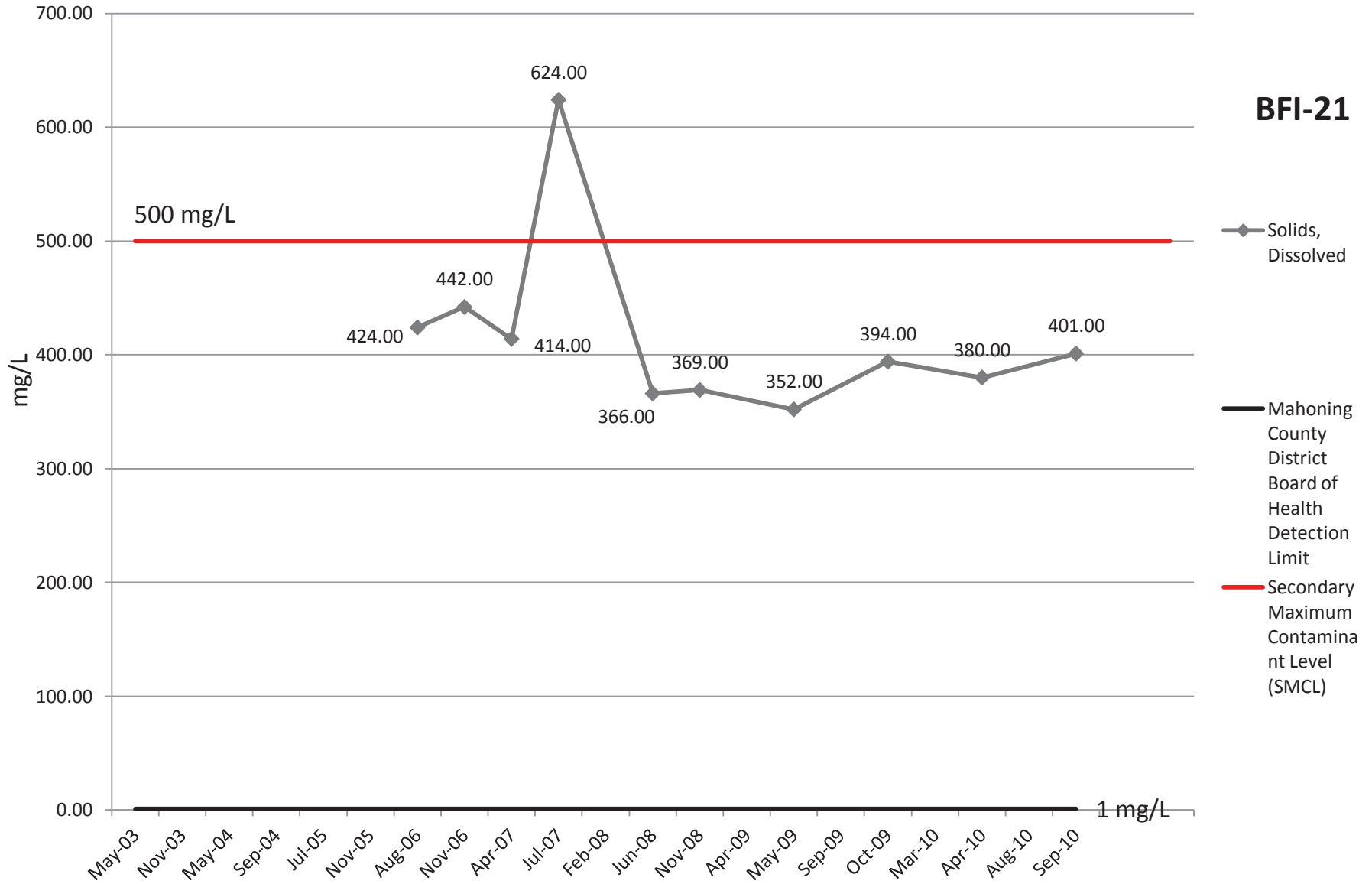
# pH

**BFI-21**

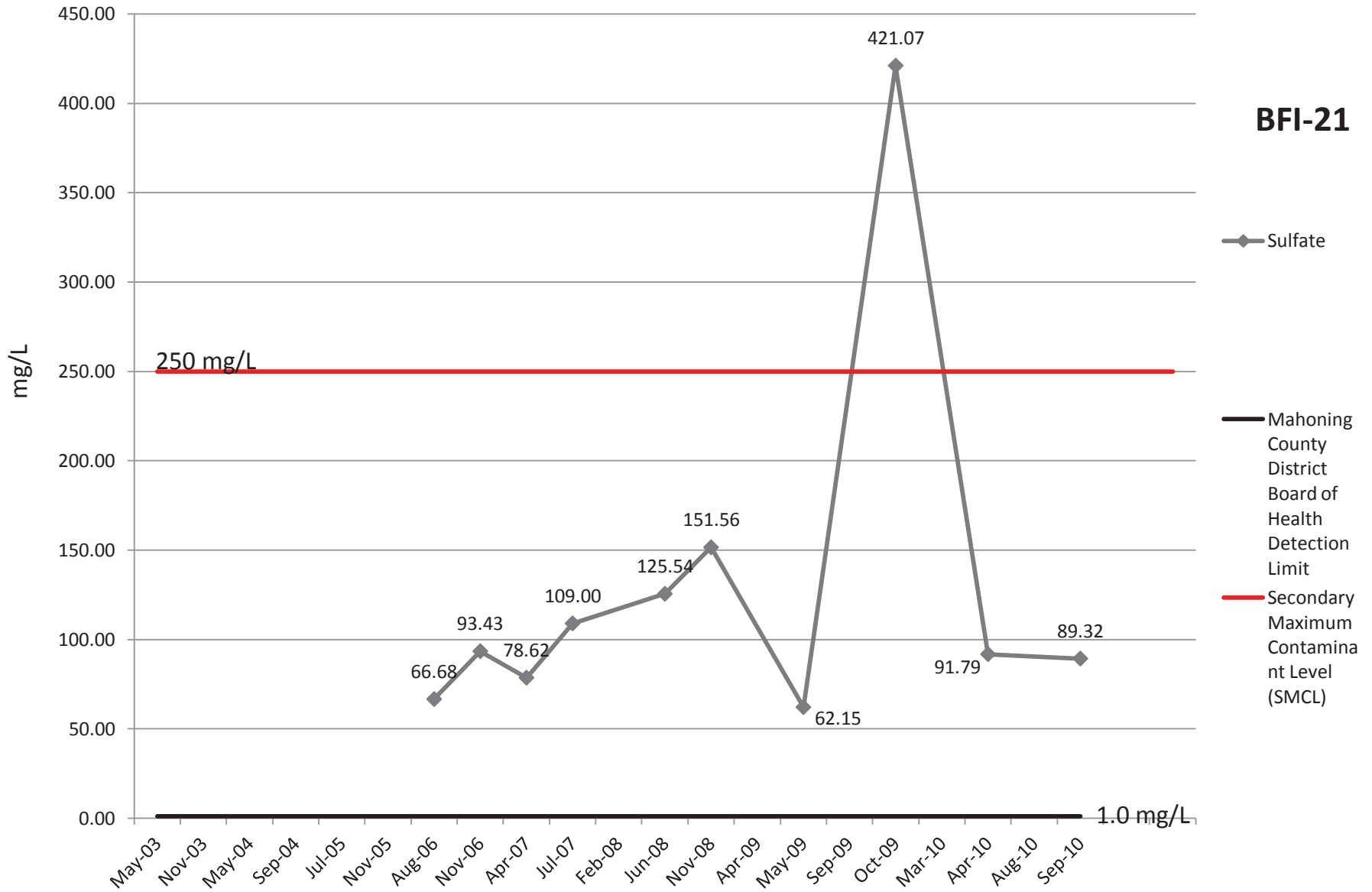


# Solids, Dissolved

**BFI-21**



# Sulfate



# Bacteria

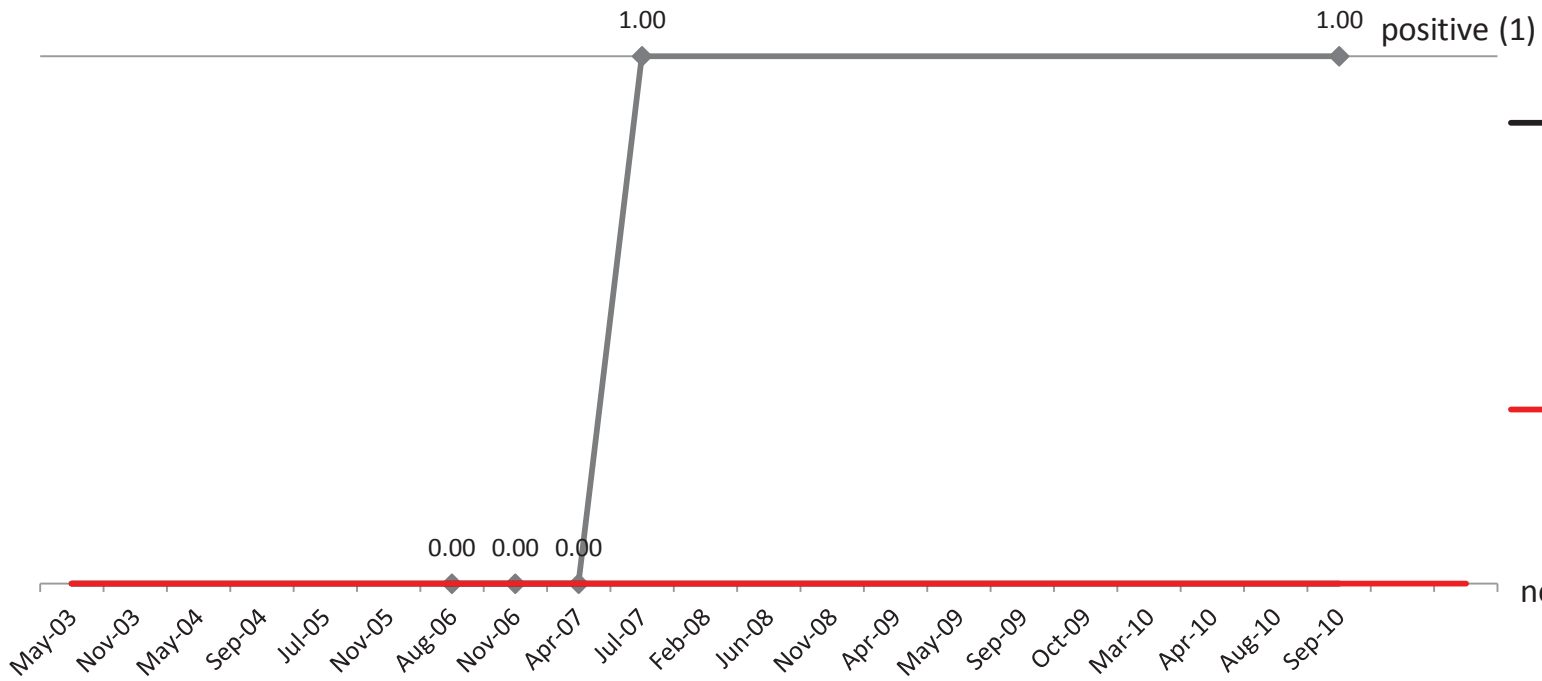
**BFI-21**

Positive/Negative

◆ Bacteria

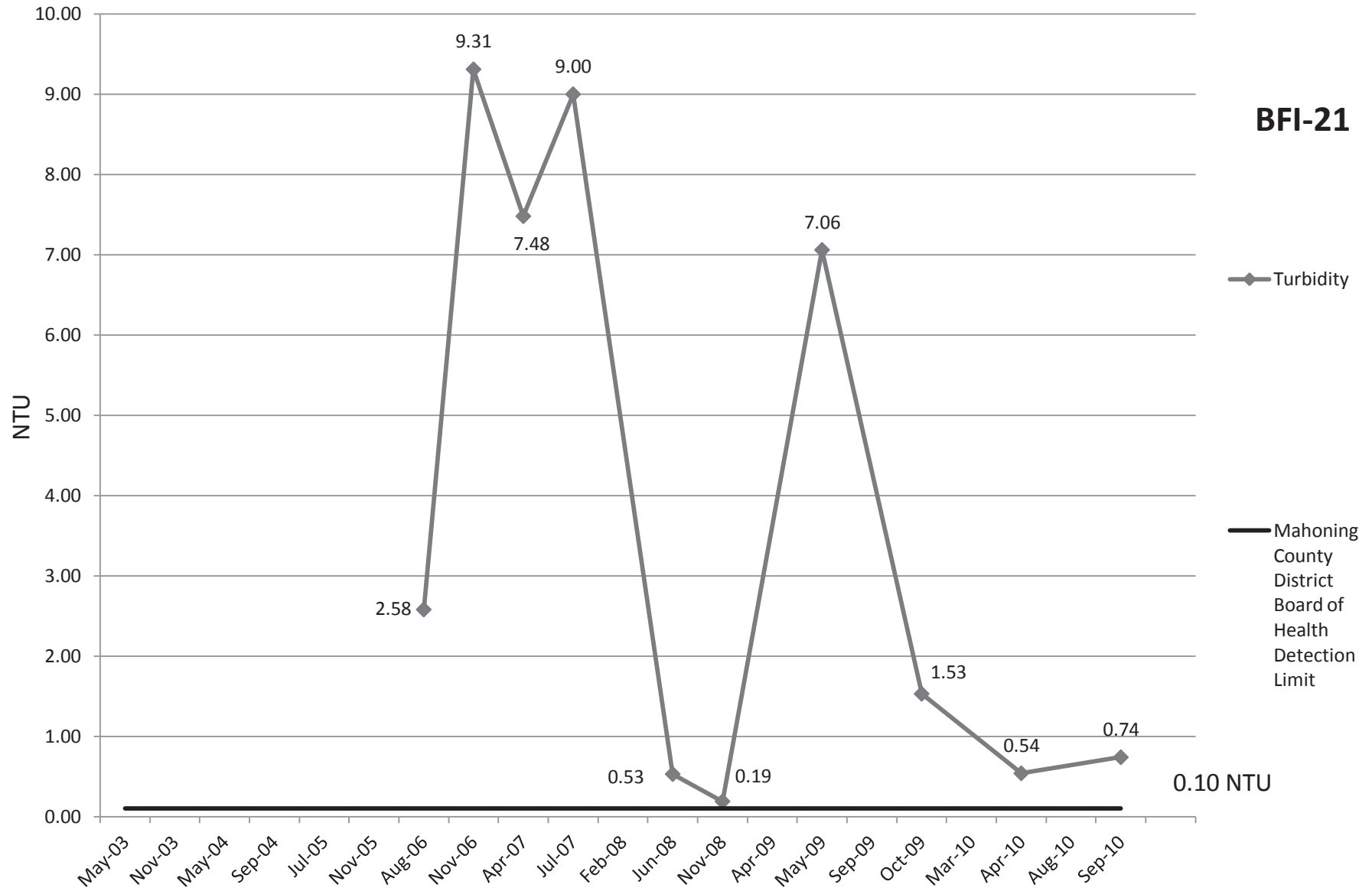
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)



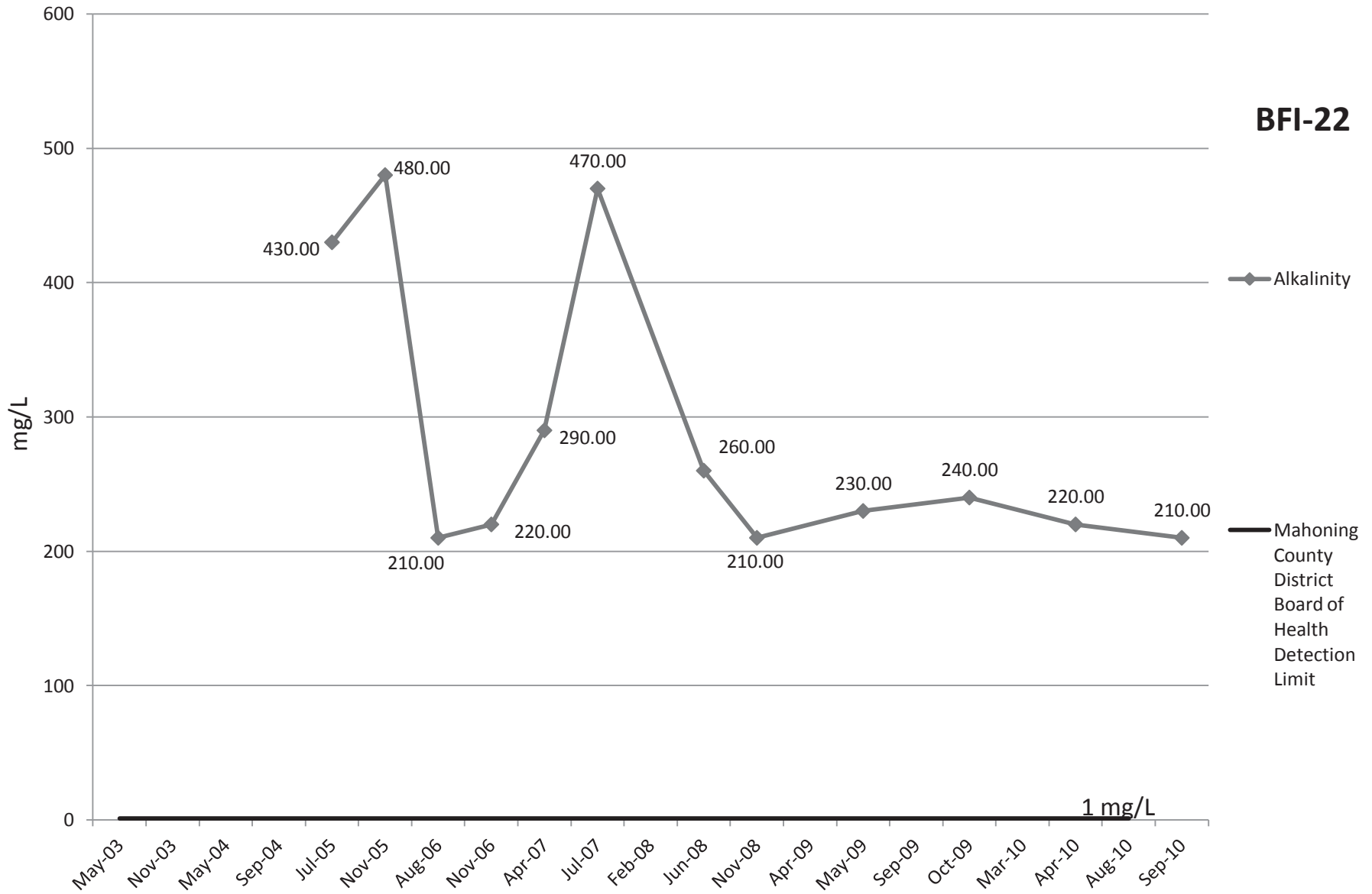
negative (0)

# Turbidity



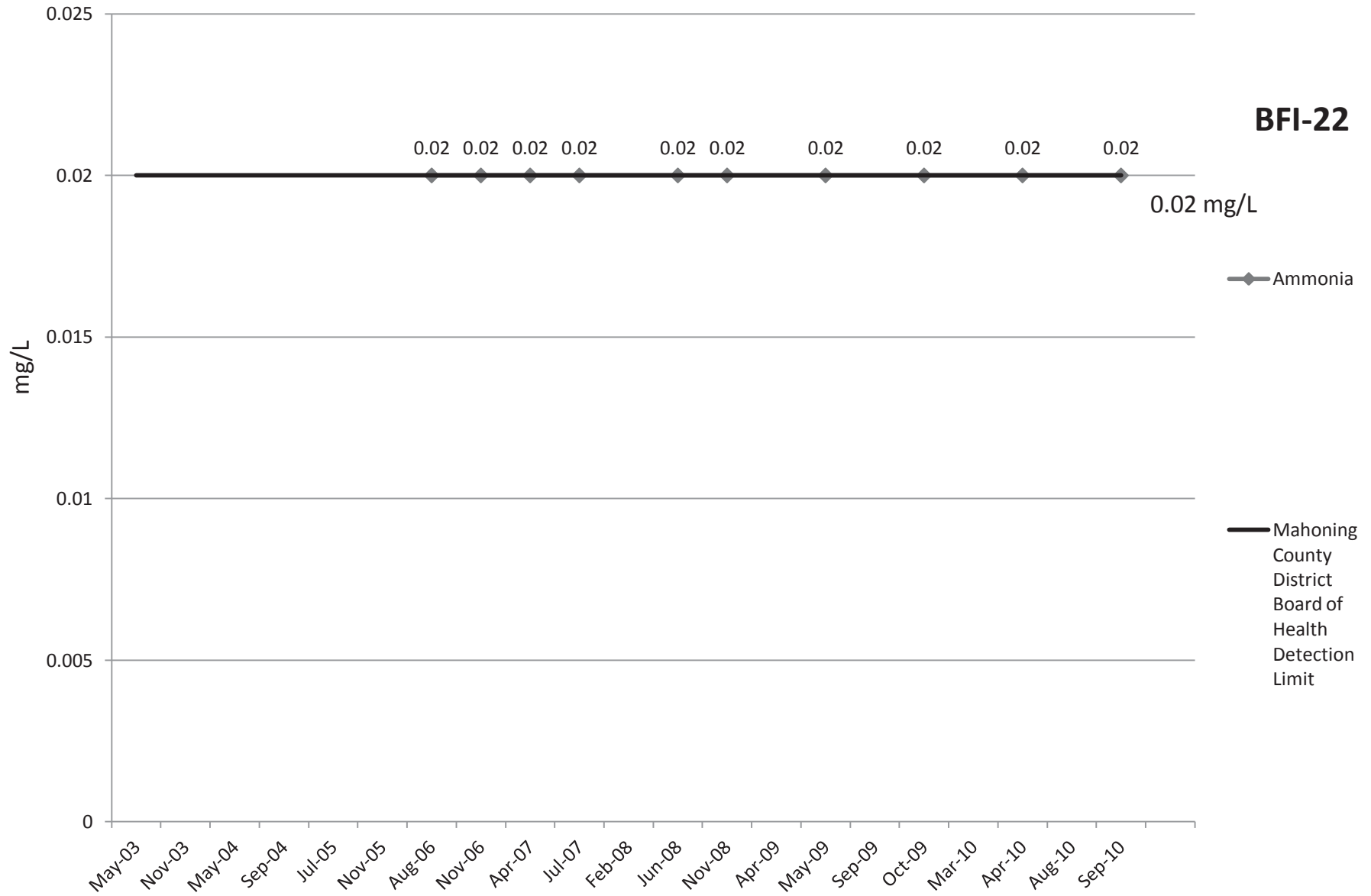
# Alkalinity

**BFI-22**

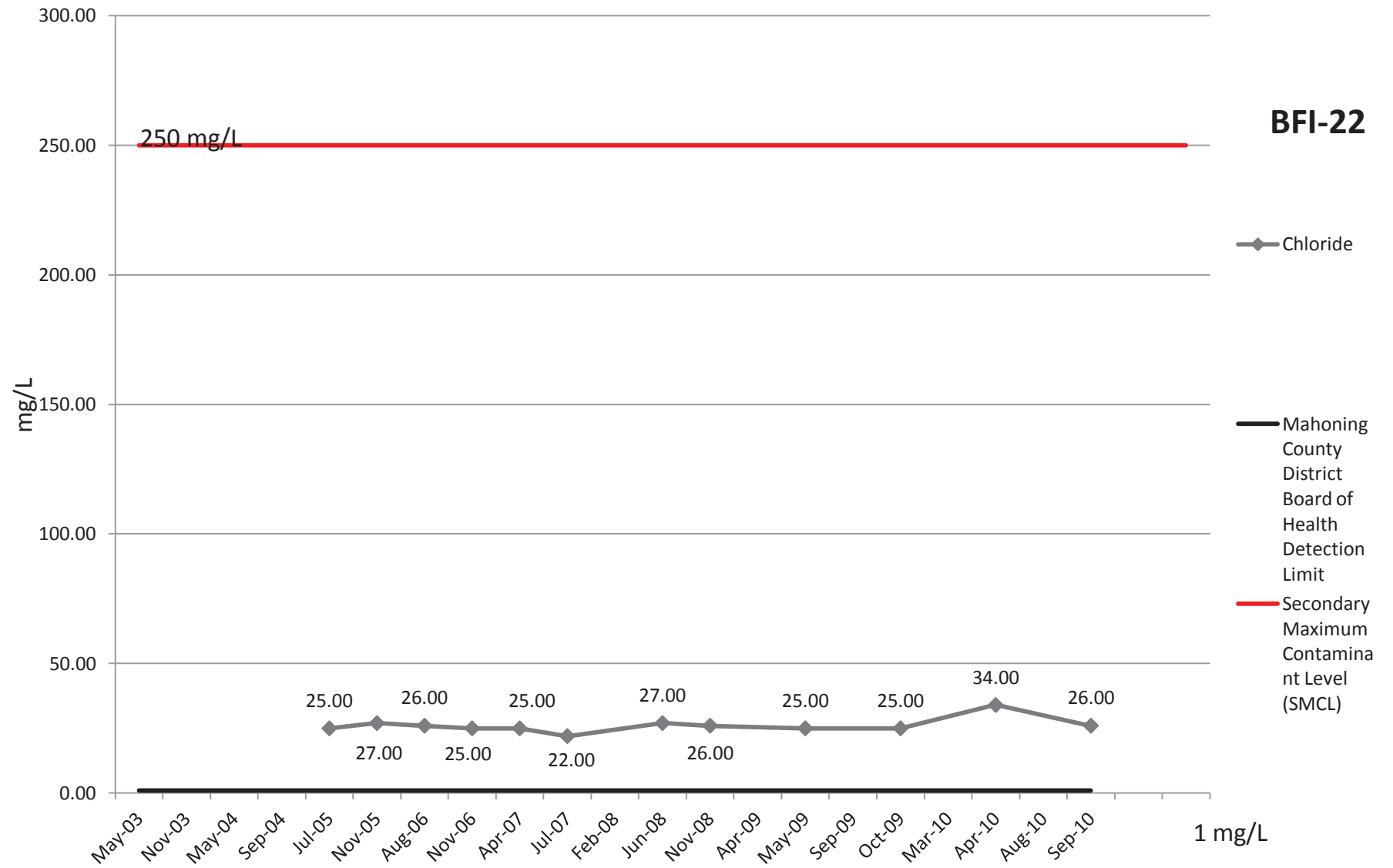


# Ammonia

**BFI-22**



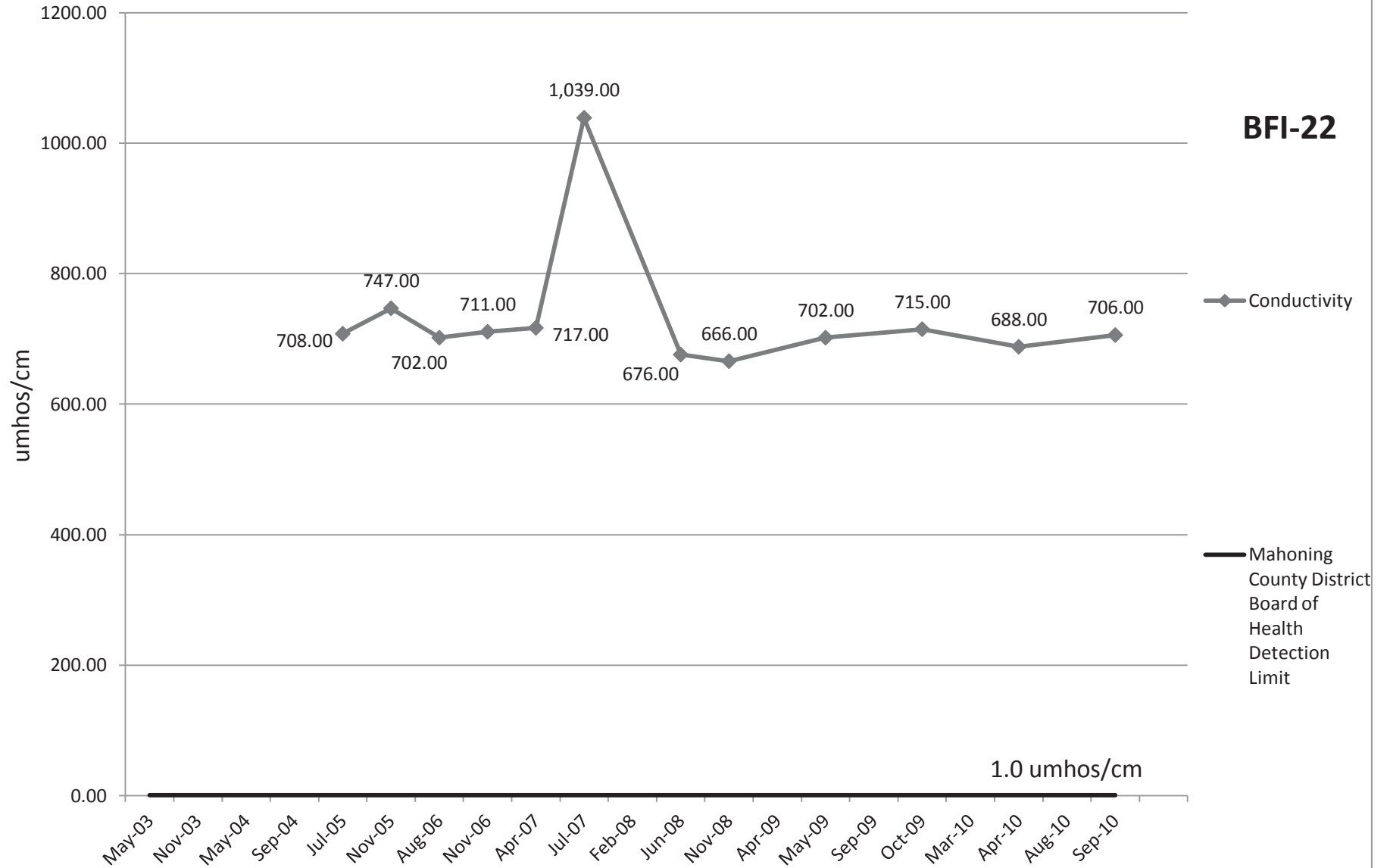
# Chloride



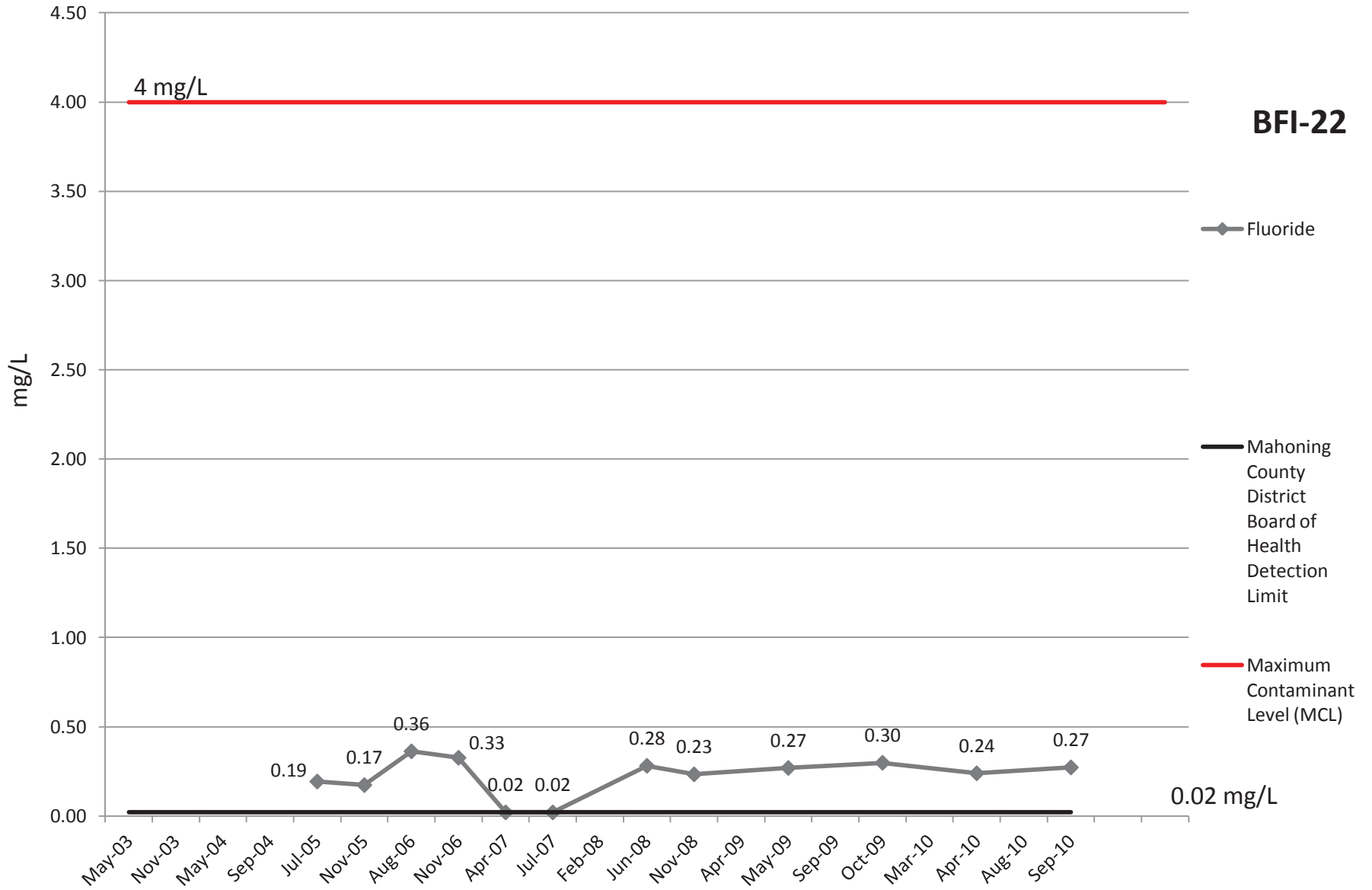


# Conductivity

**BFI-22**

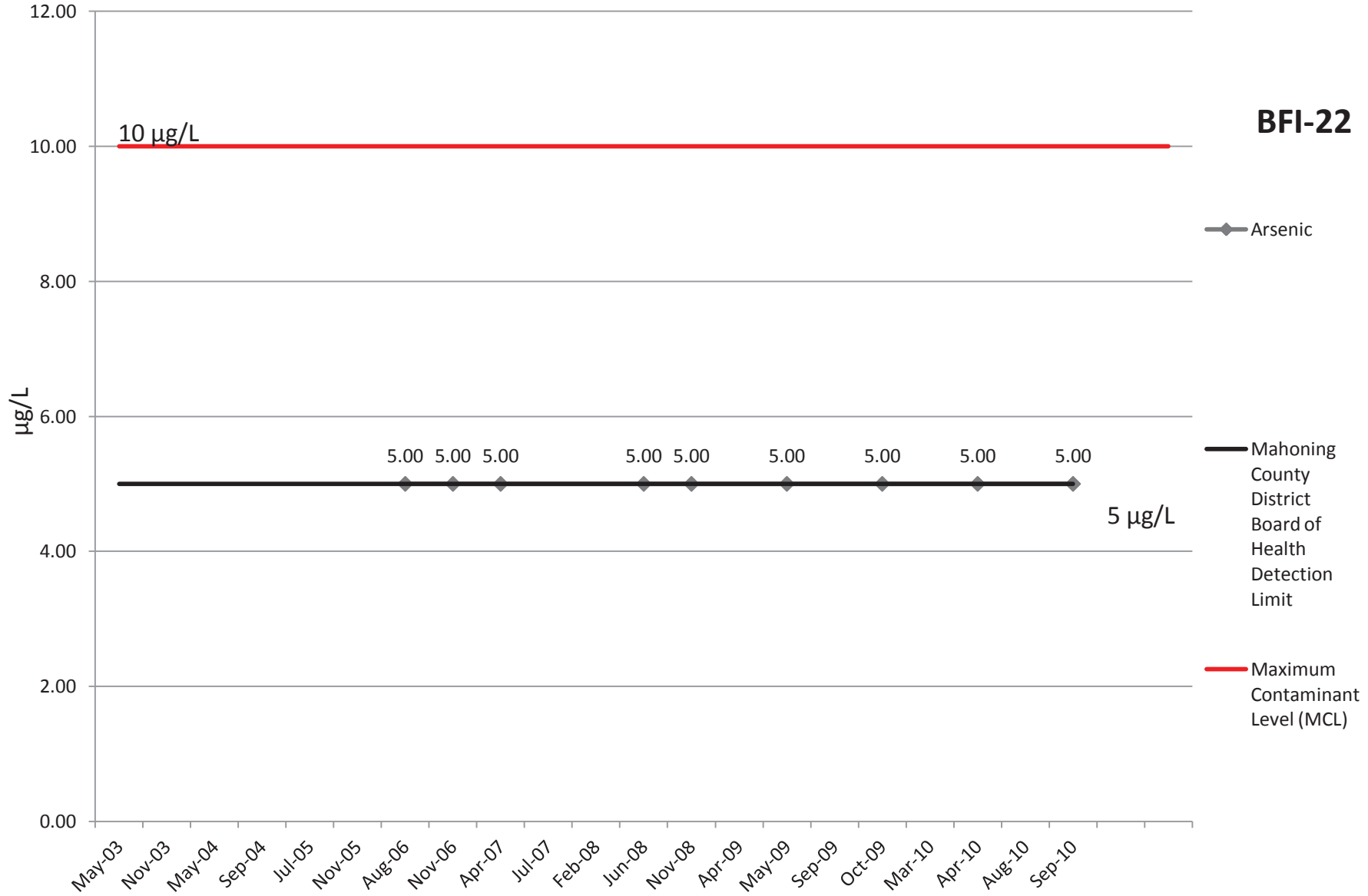


# Fluoride



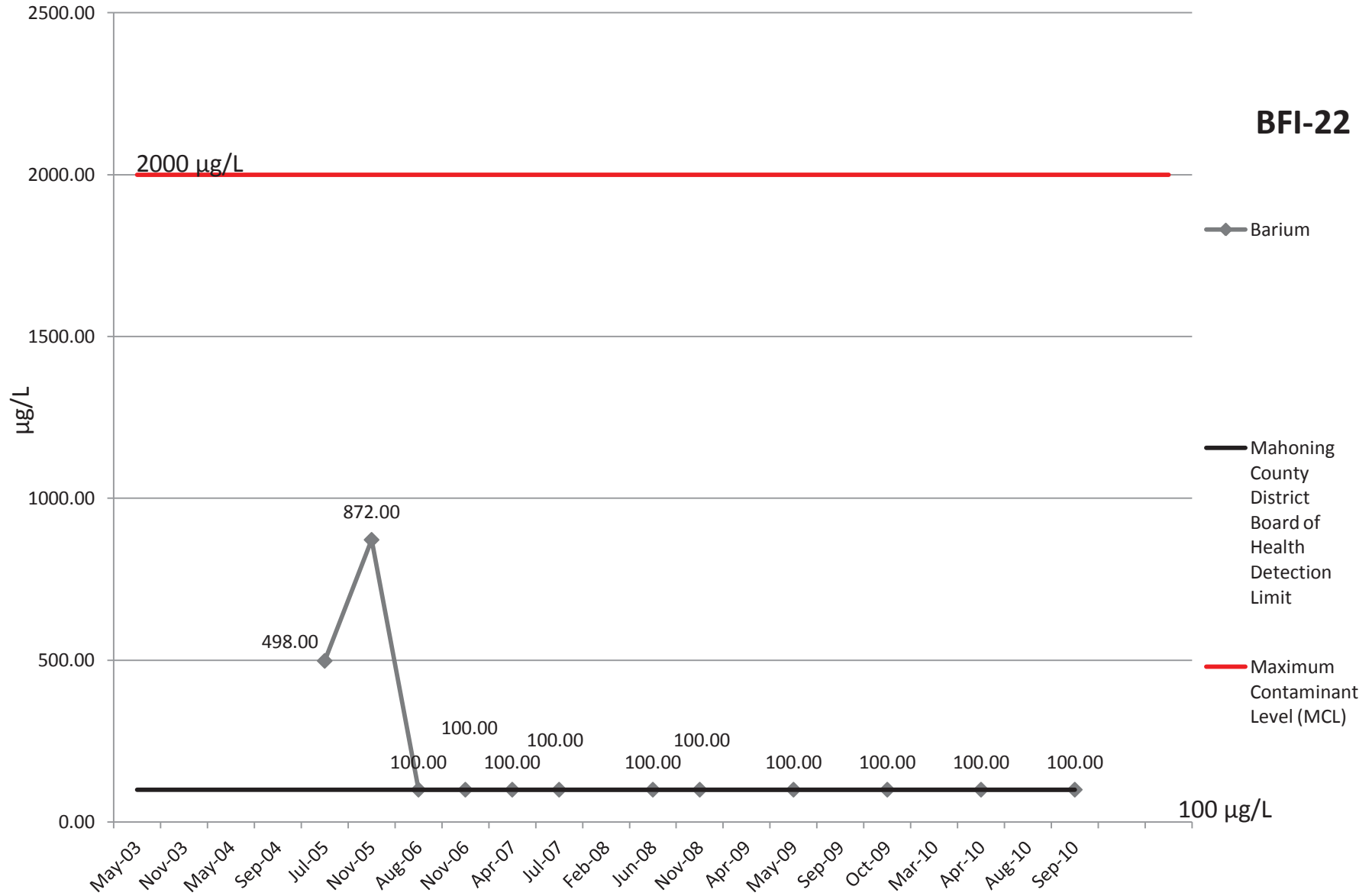
# Arsenic

**BFI-22**



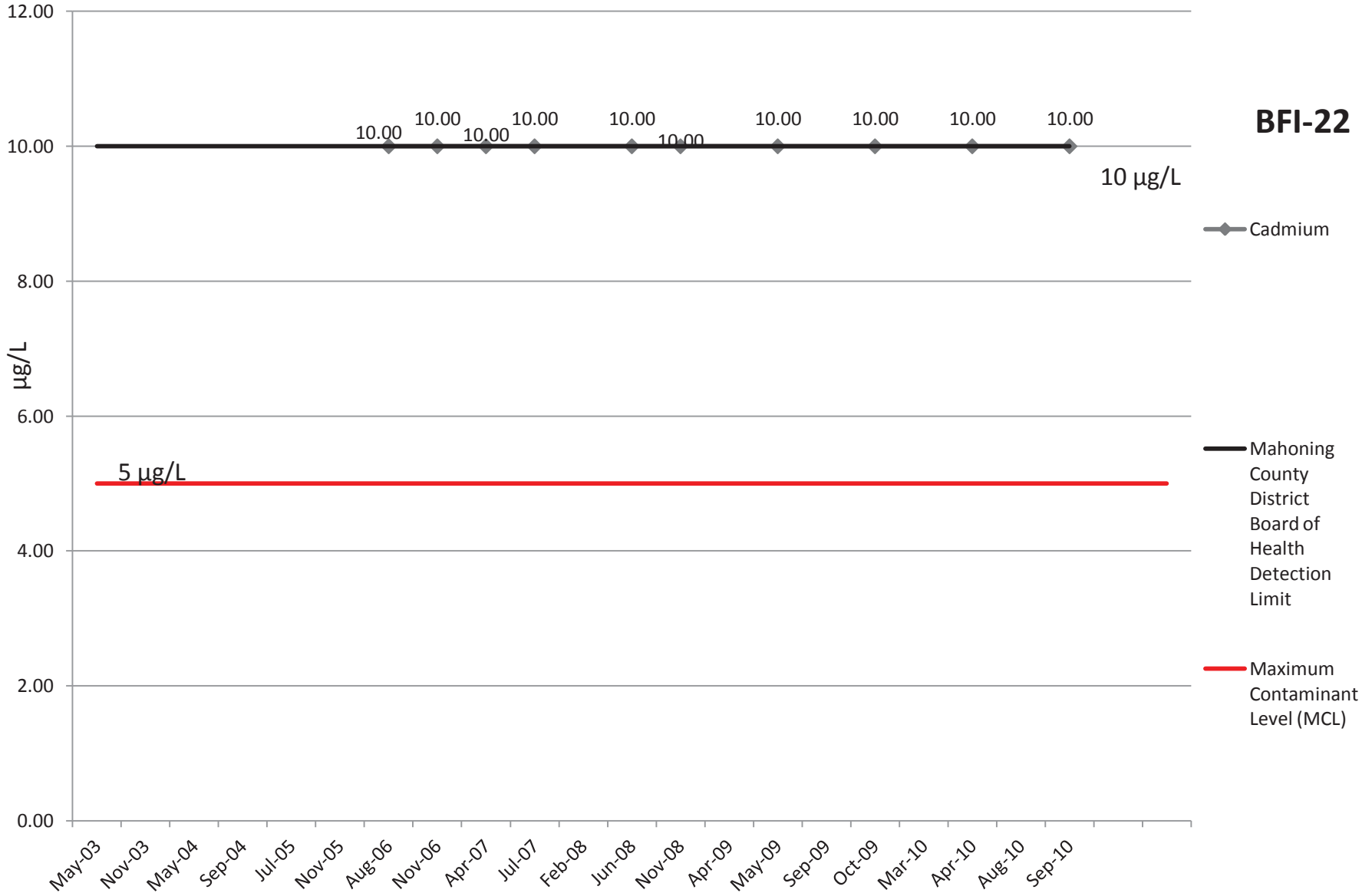
# Barium

**BFI-22**



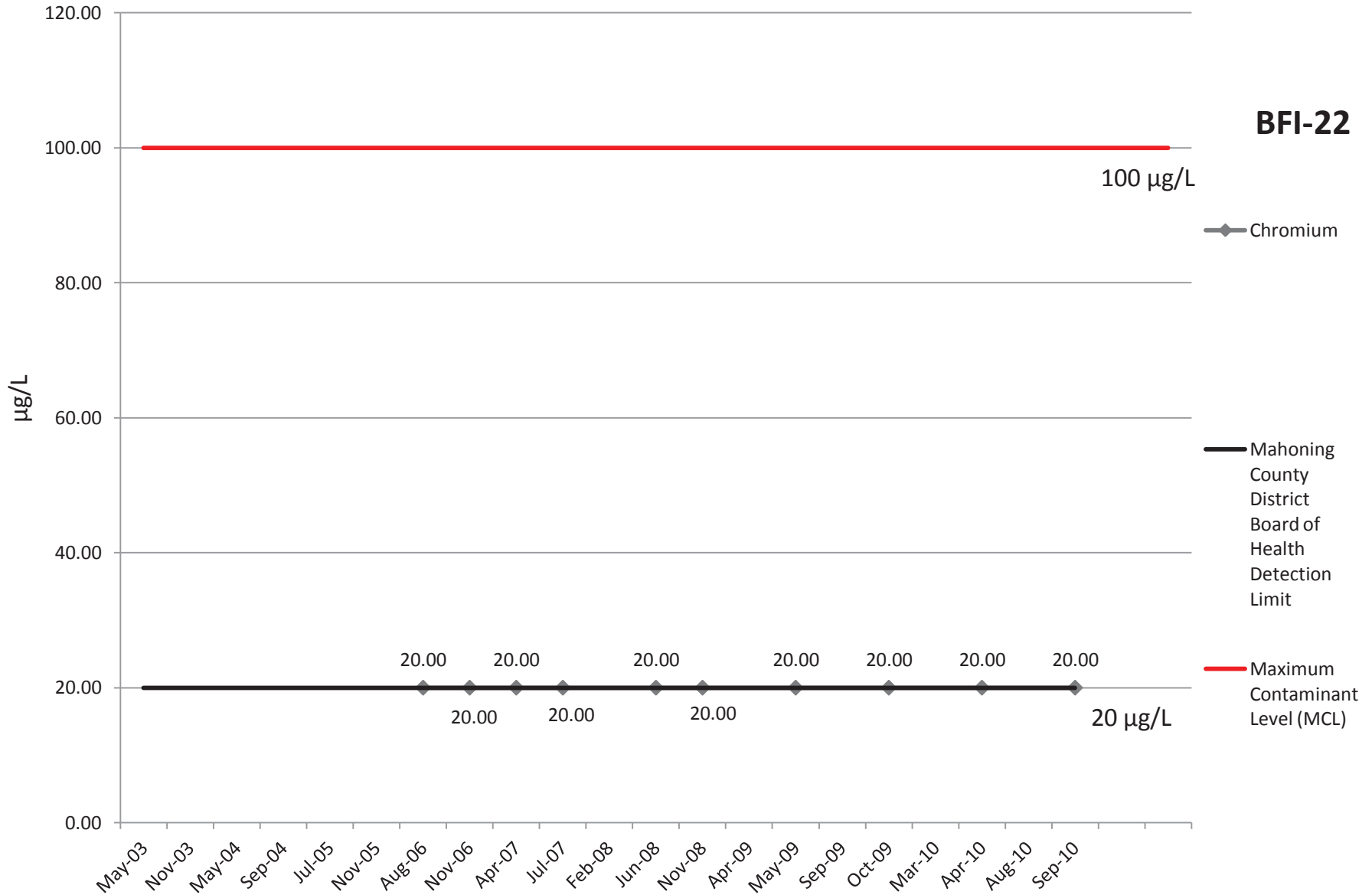
# Cadmium

**BFI-22**

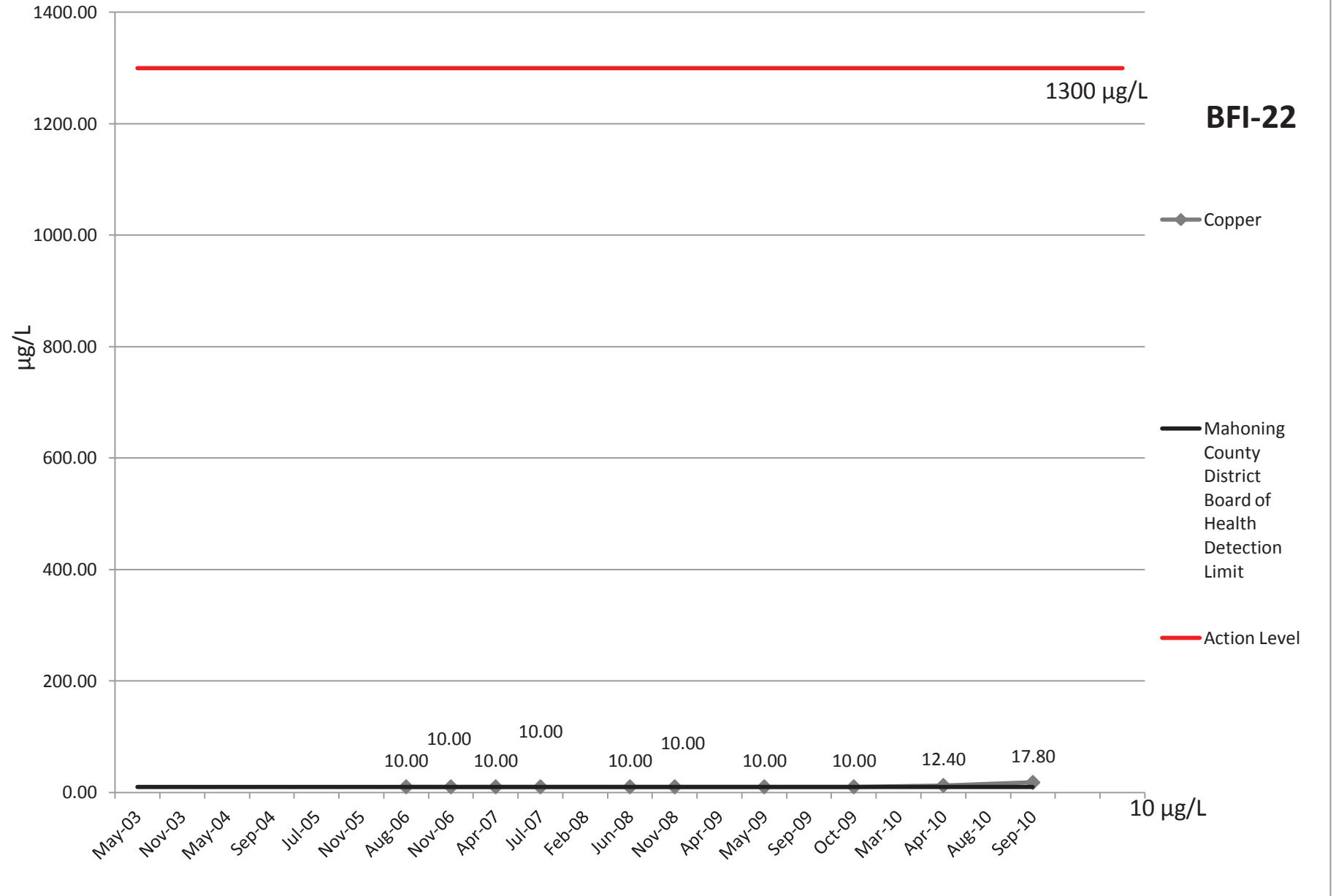


# Chromium

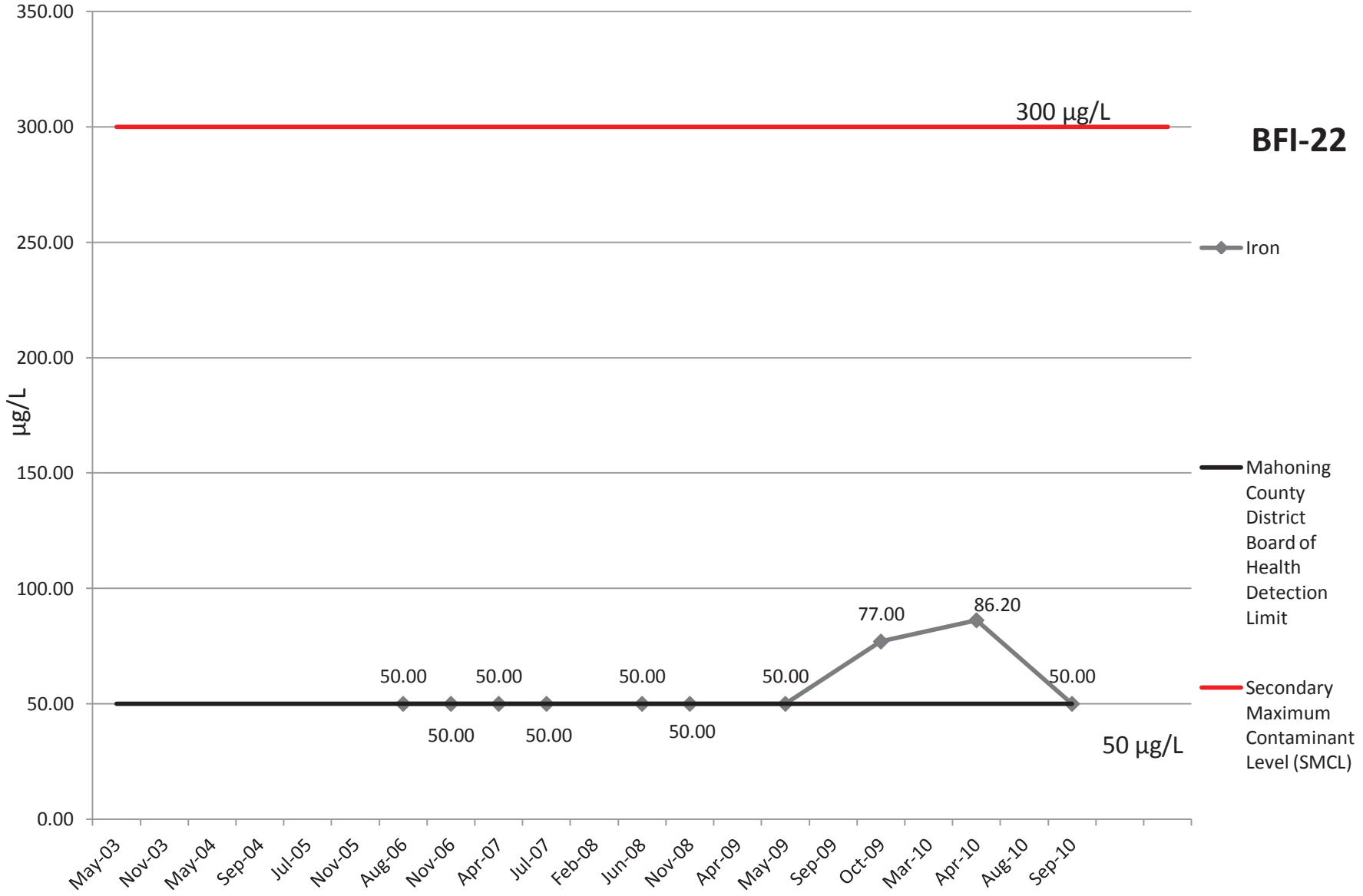
**BFI-22**



# Copper



# Iron



**BFI-22**

Iron

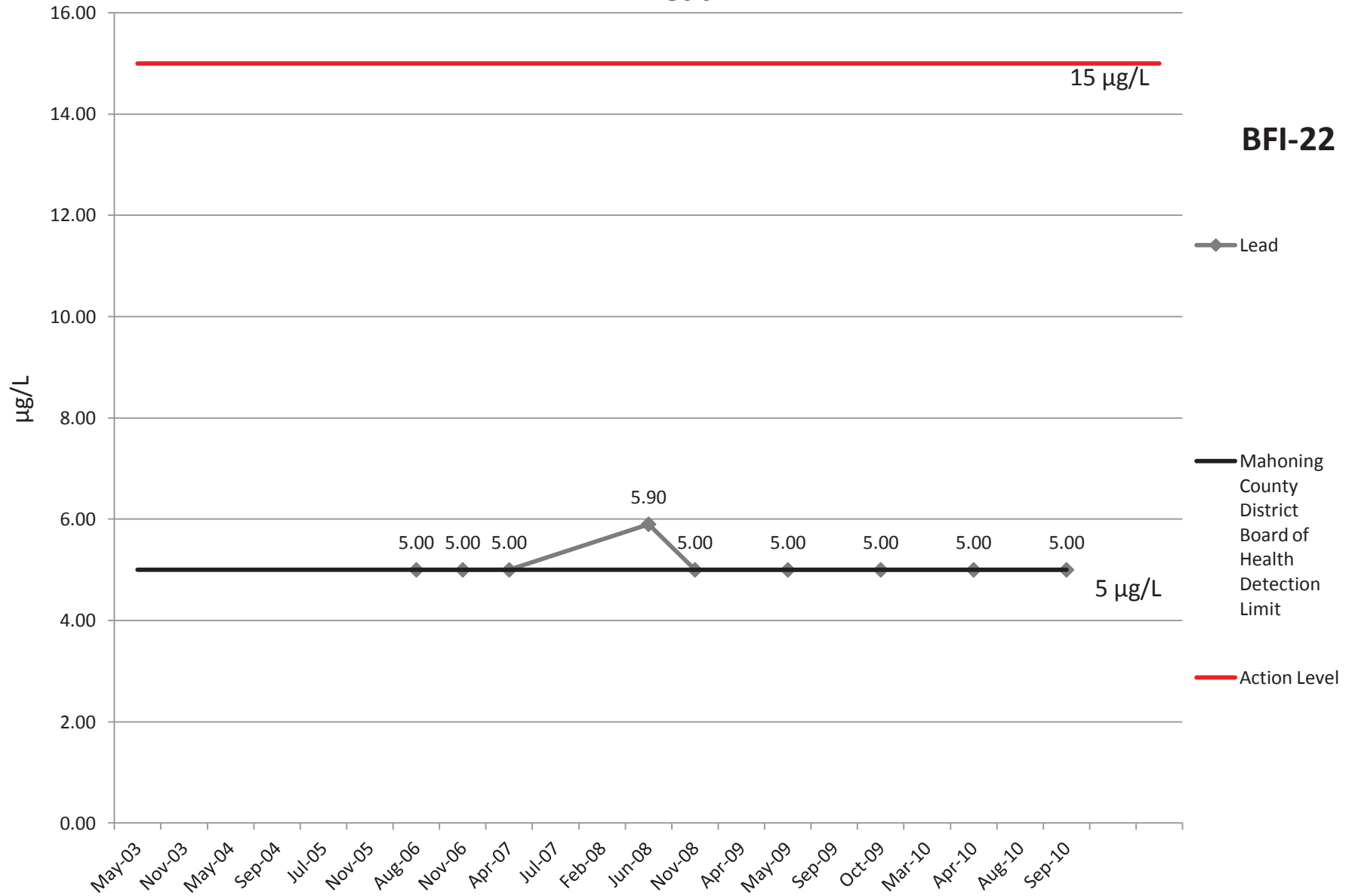
Mahoning County District Board of Health Detection Limit

Secondary Maximum Contaminant Level (SMCL)

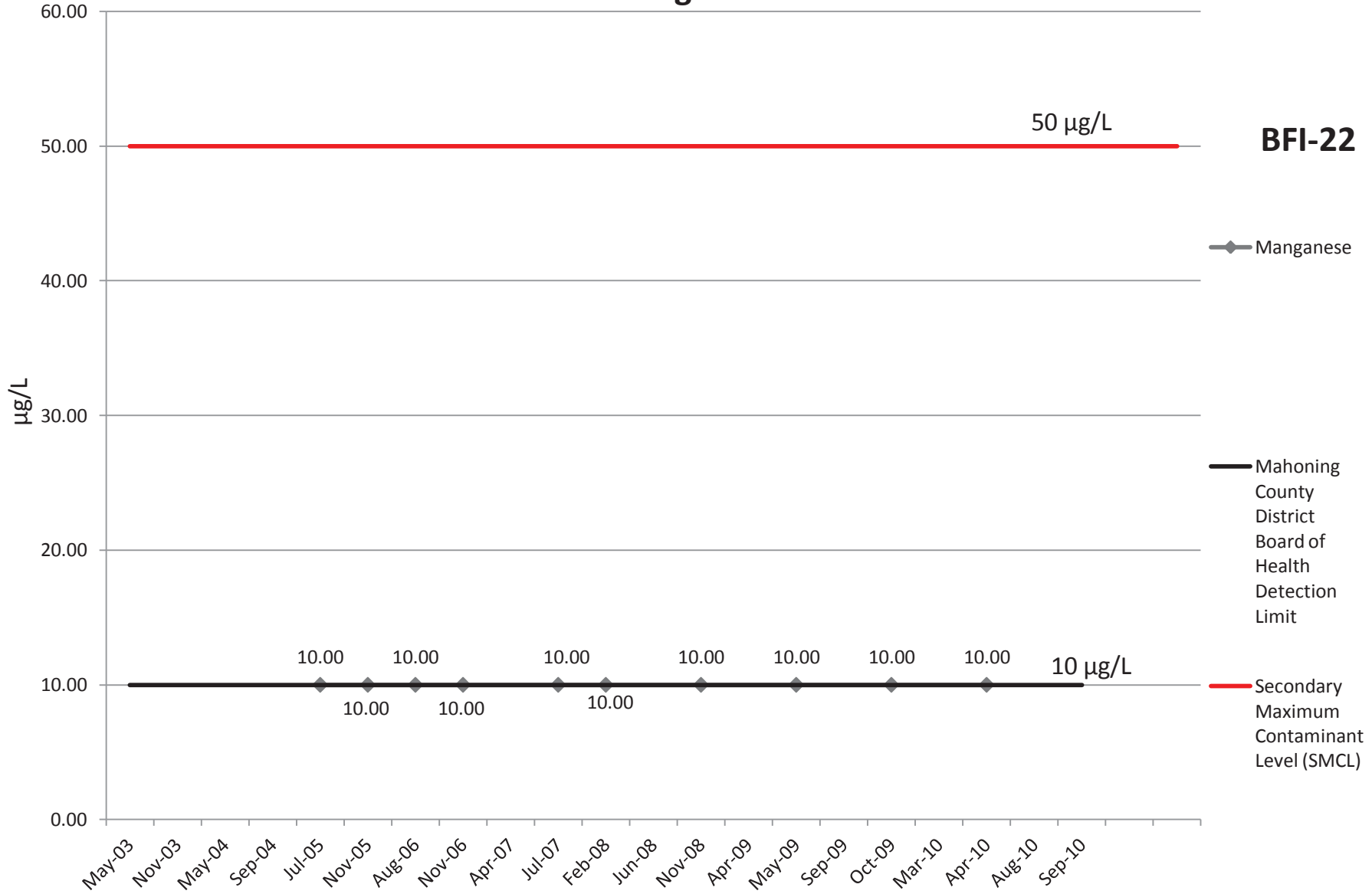


# Lead

**BFI-22**



# Manganese



**BFI-22**

◆ Manganese

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

# Mercury

**BFI-22**

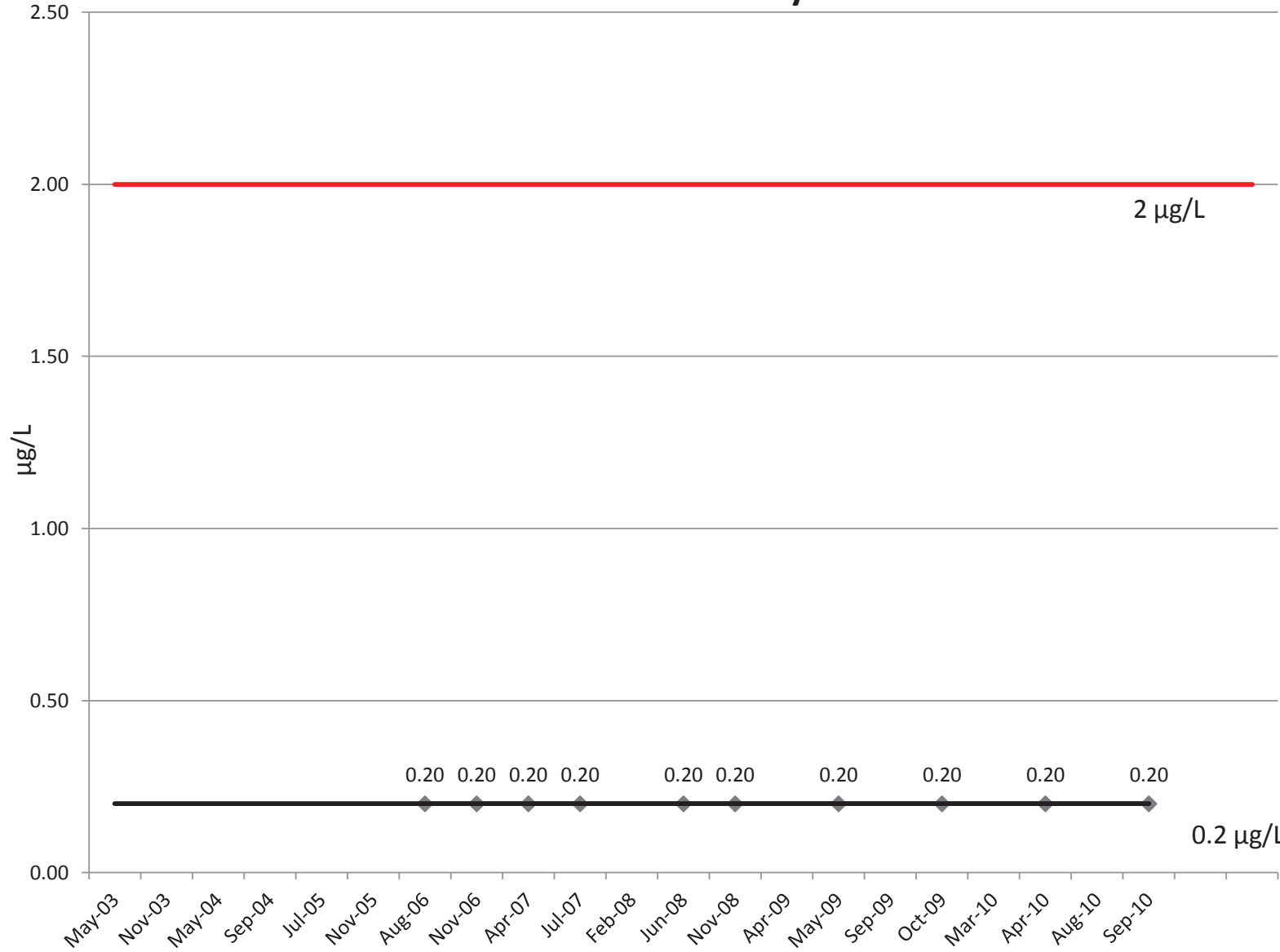
2 µg/L

Mercury

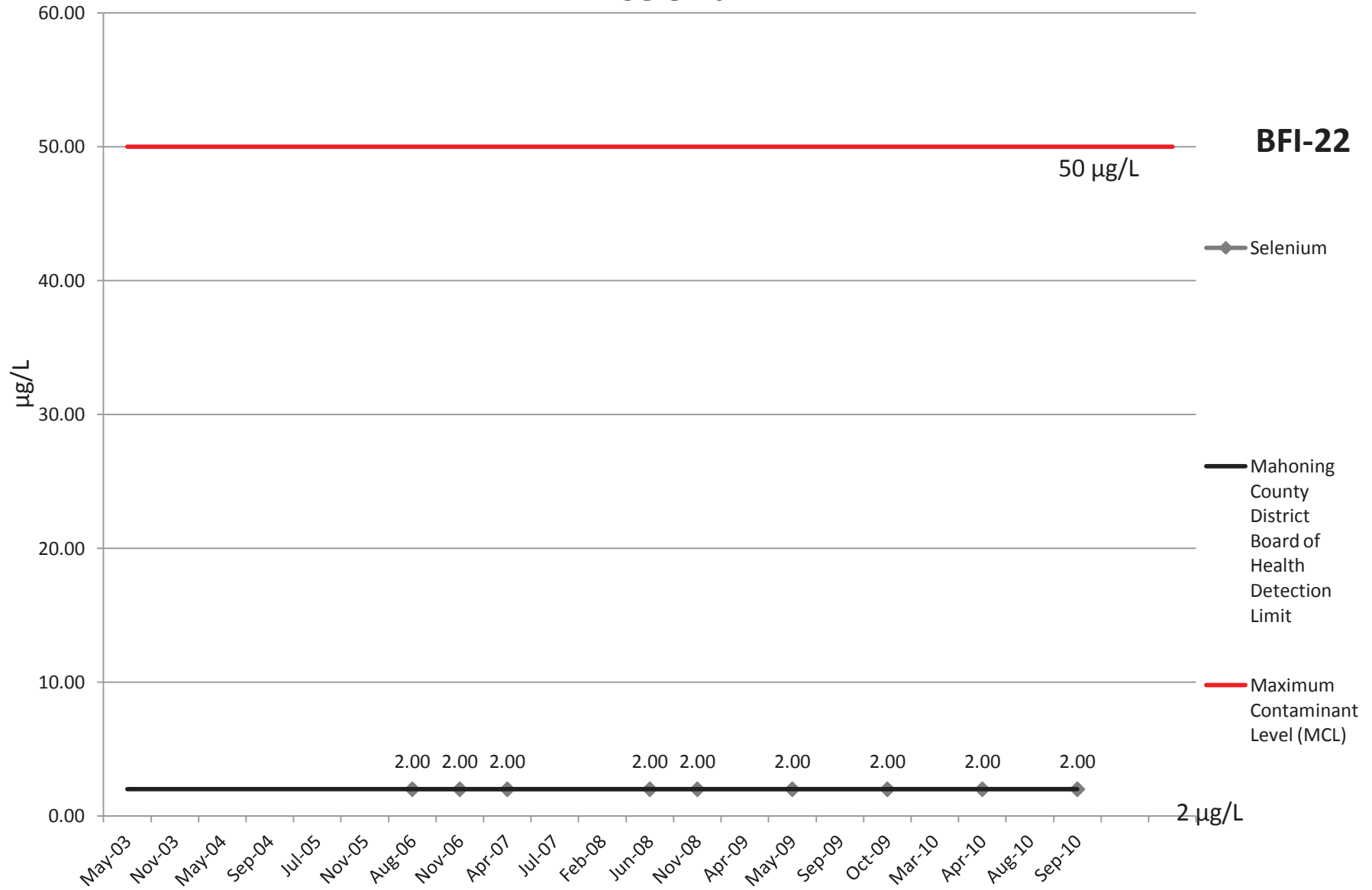
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

0.2 µg/L

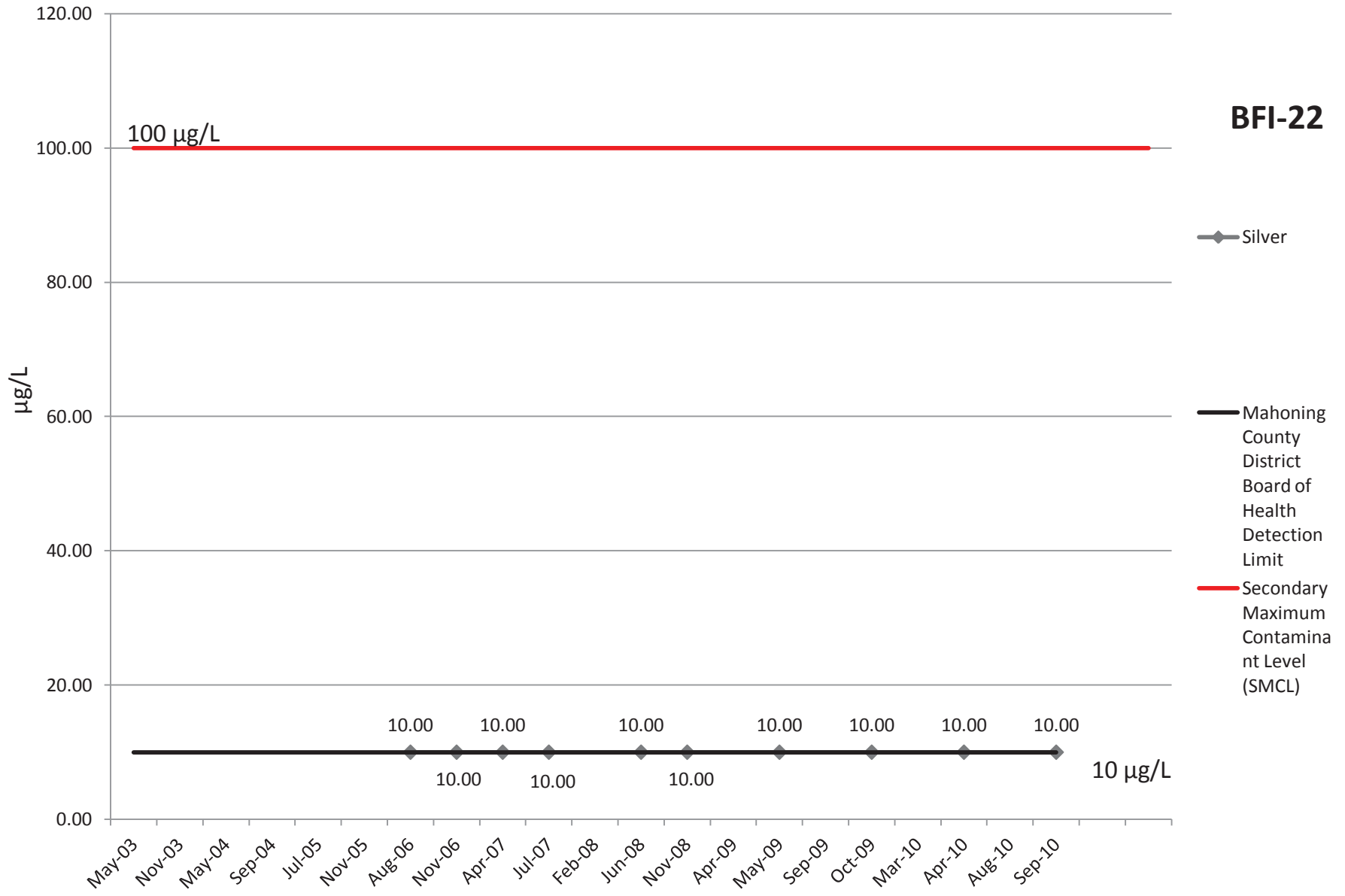


# Selenium

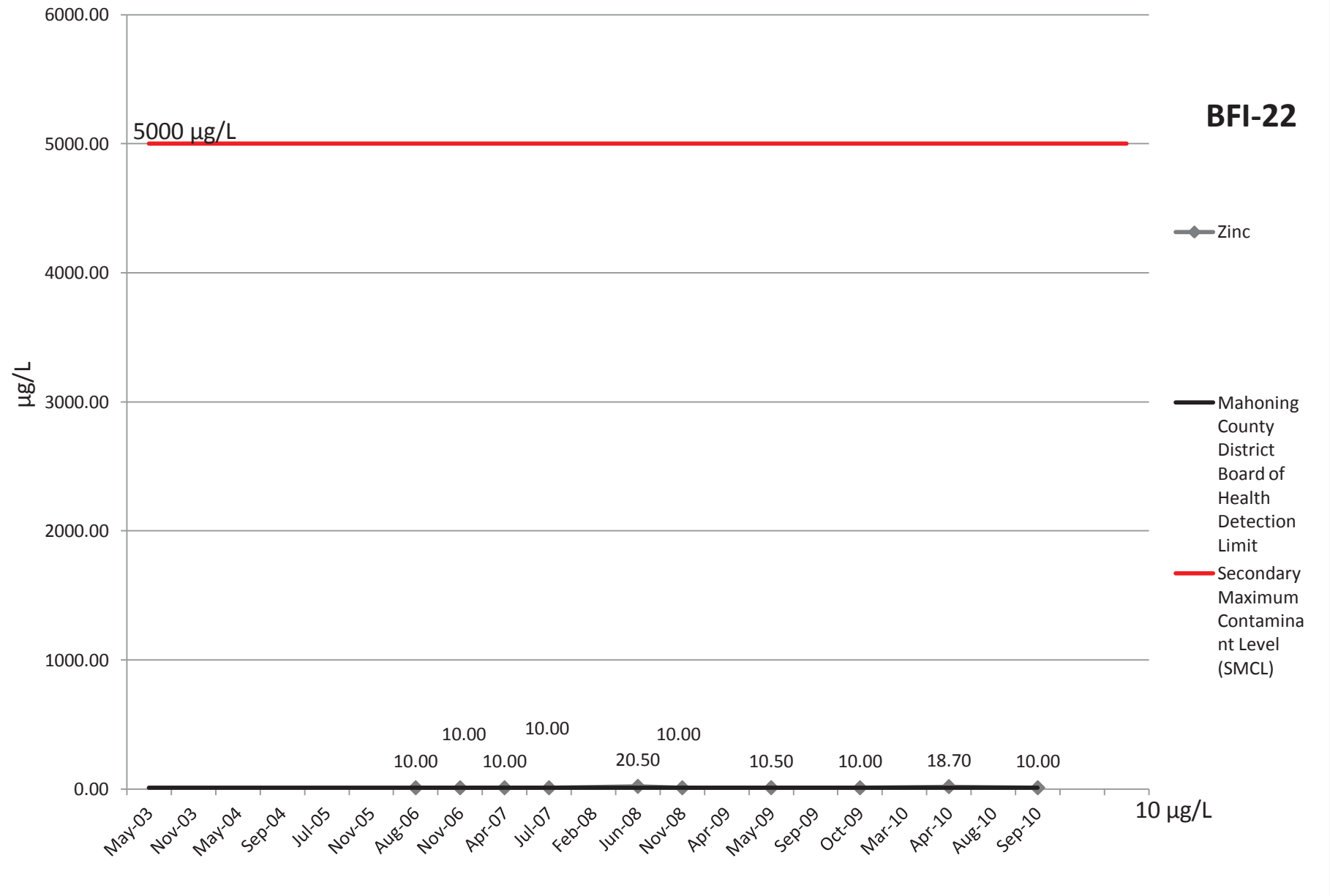


# Silver

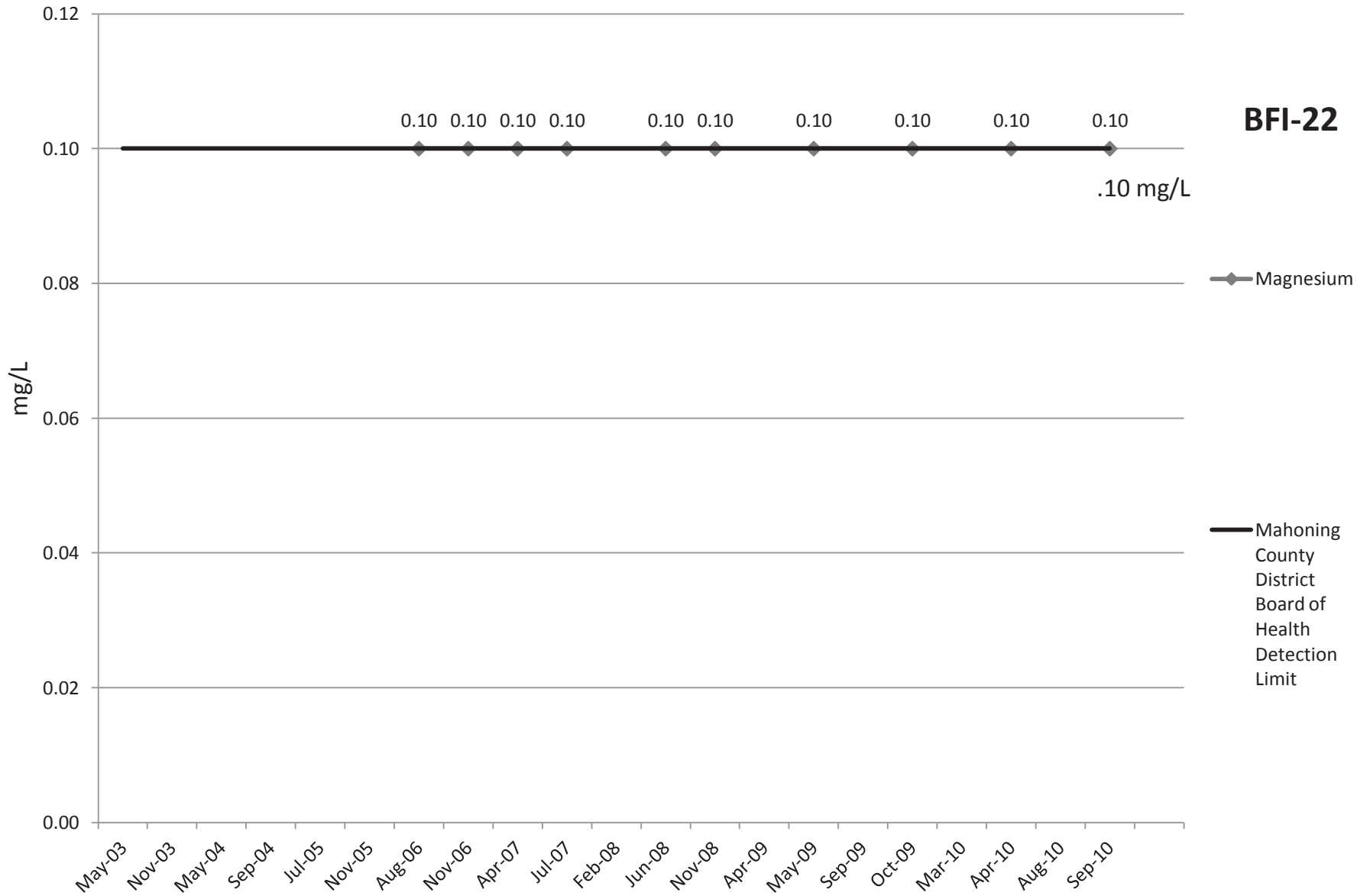
**BFI-22**



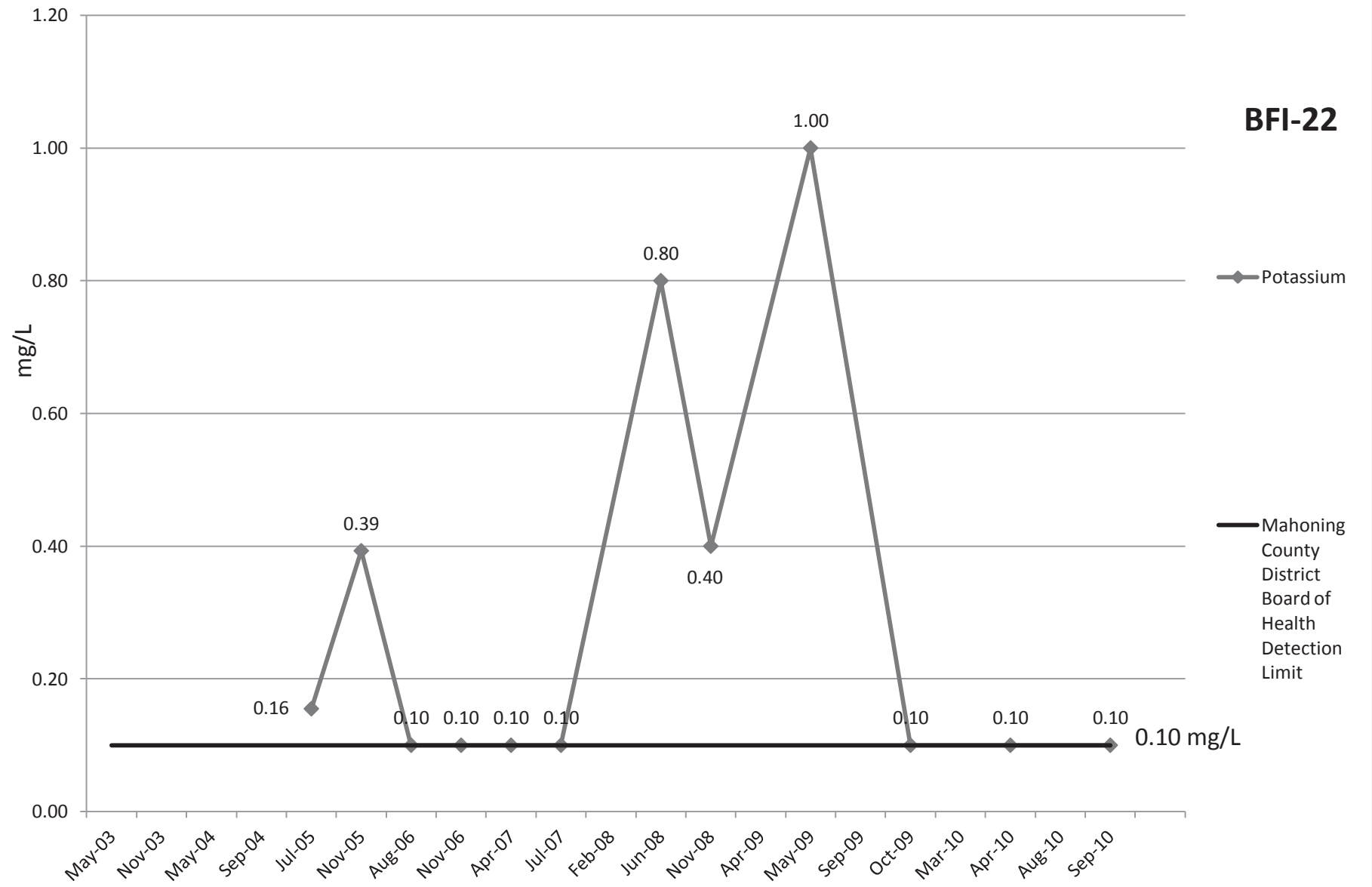
# Zinc



# Magnesium



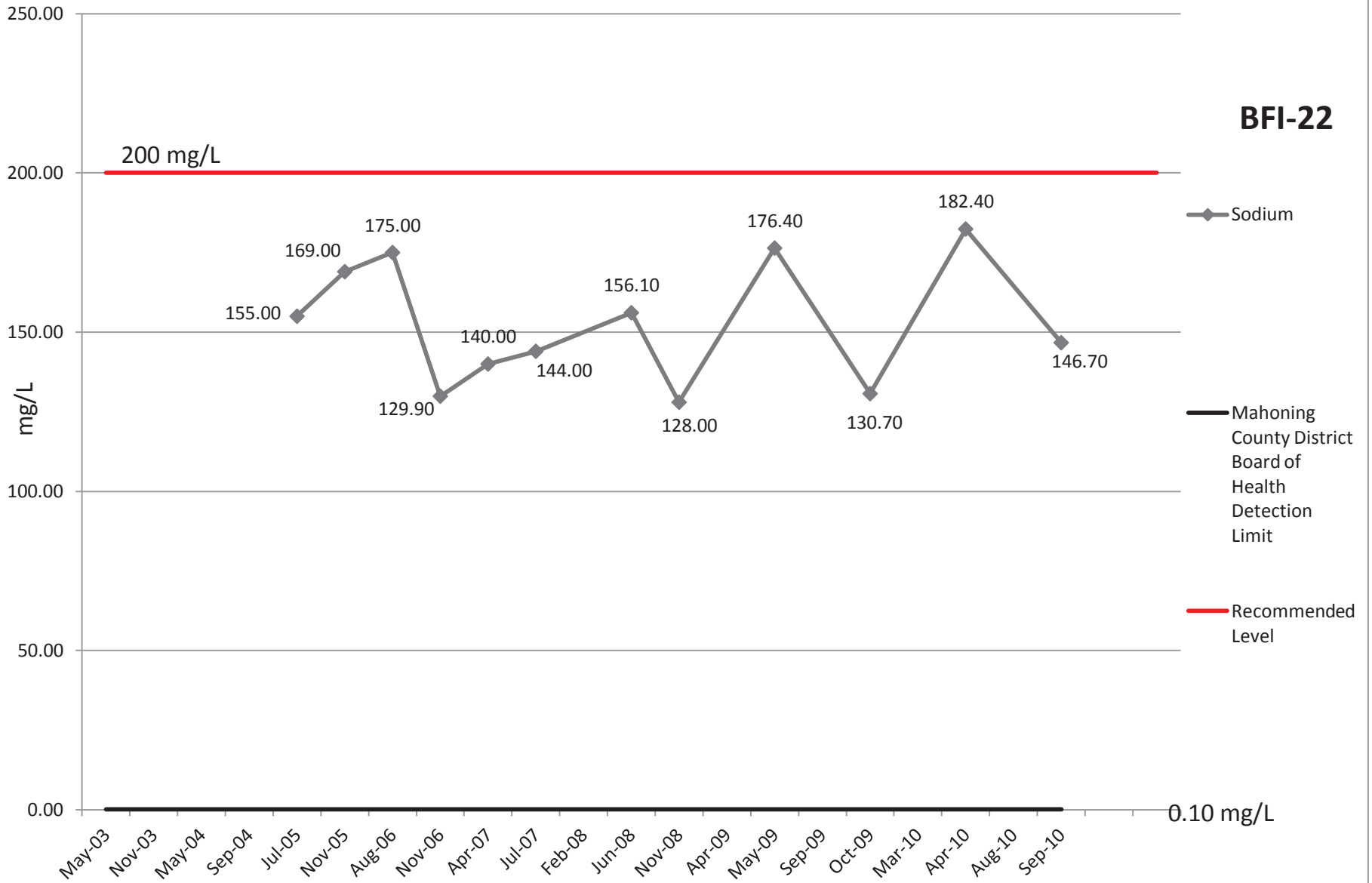
# Potassium



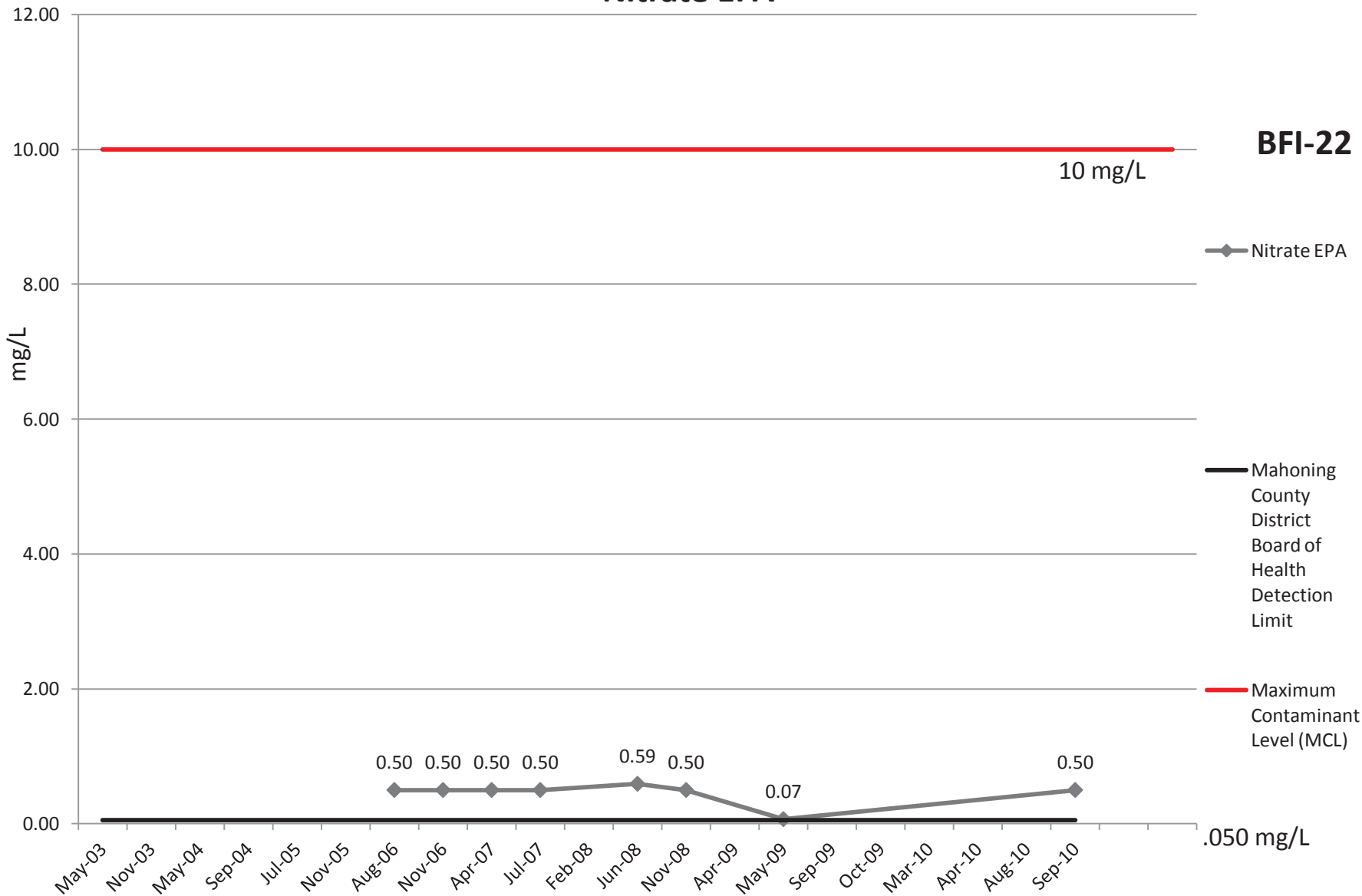


# Sodium

**BFI-22**

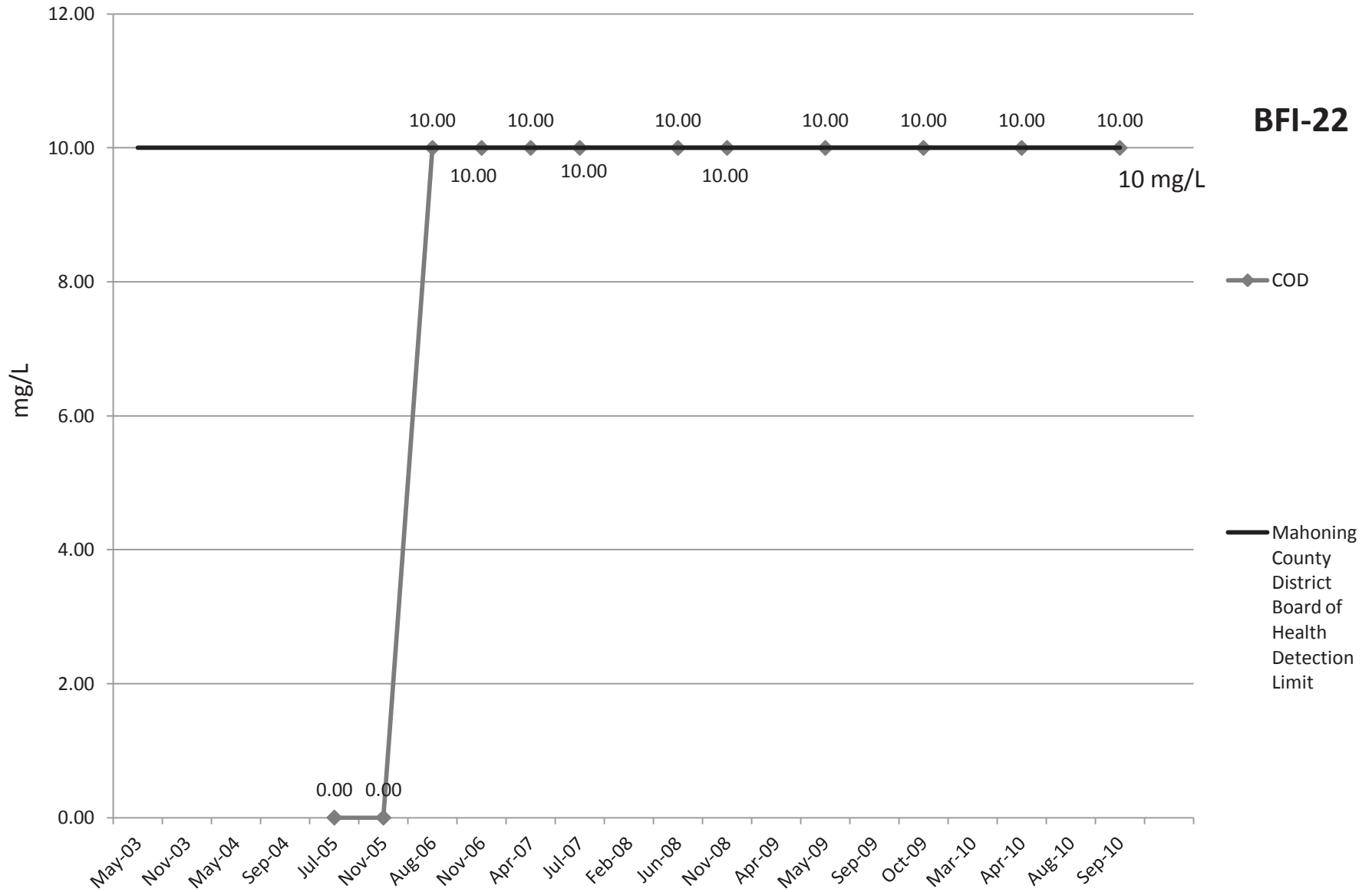


# Nitrate EPA



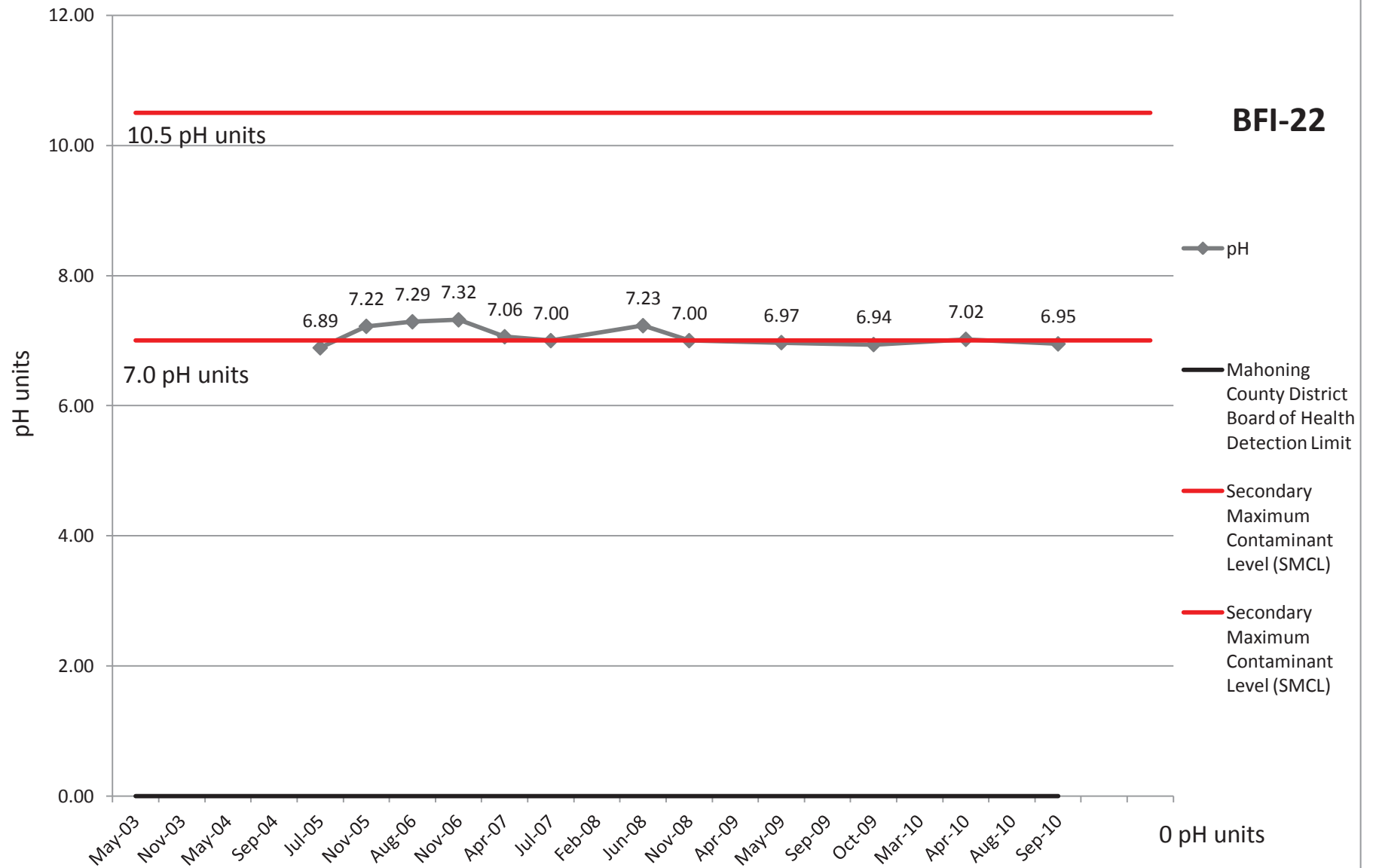
# COD

**BFI-22**



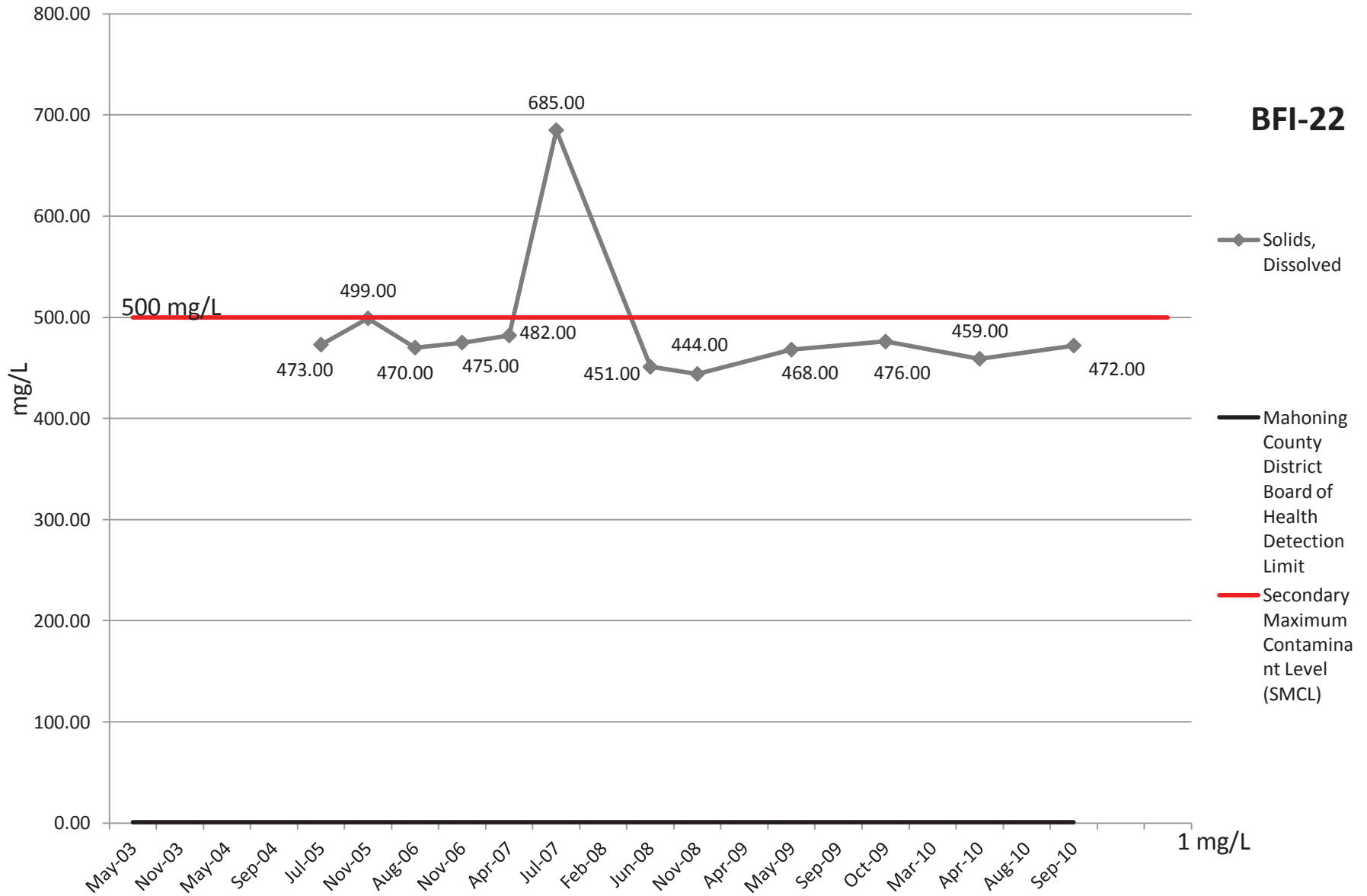
# pH

**BFI-22**



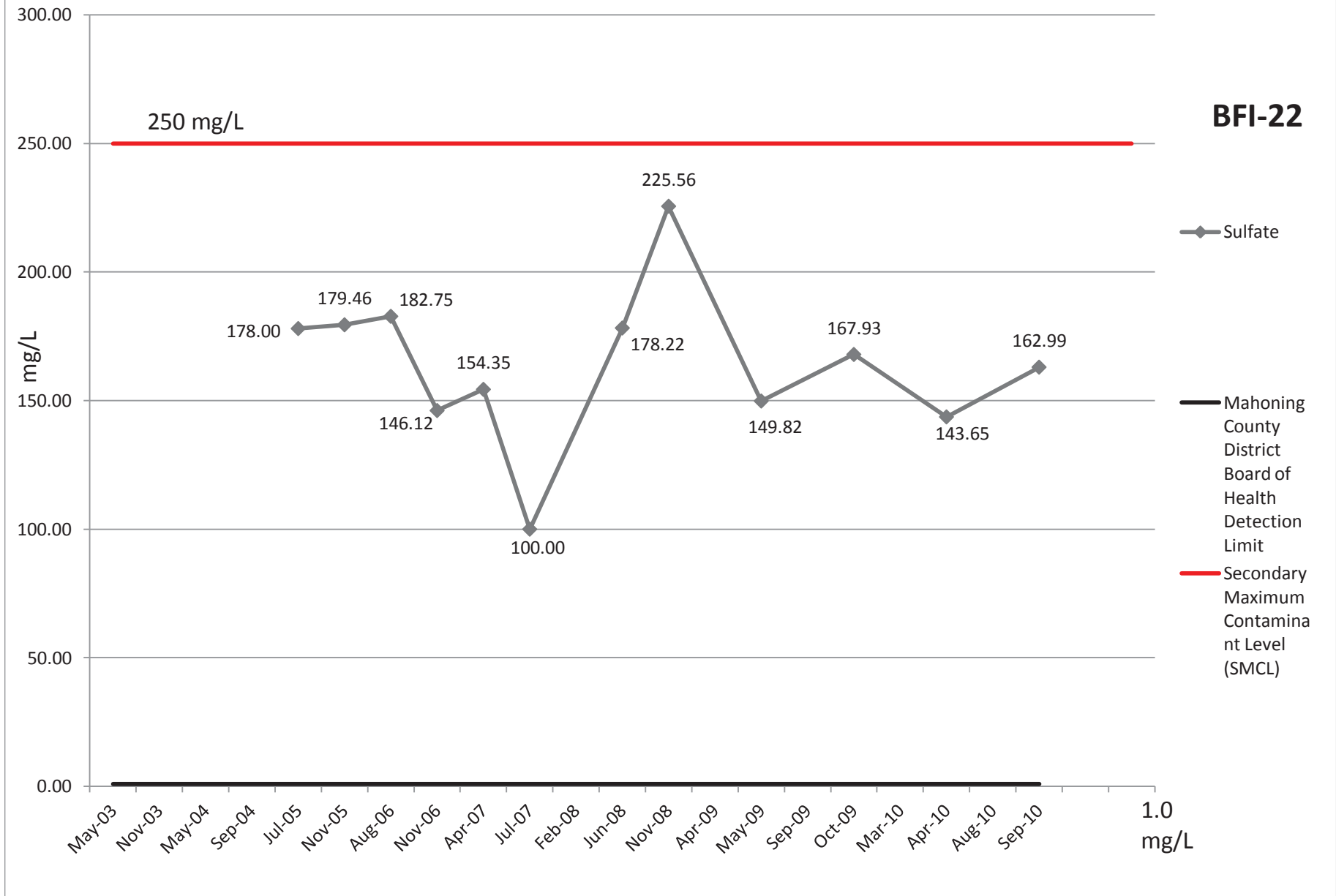
# Solids, Dissolved

**BFI-22**



# Sulfate

**BFI-22**



# Bacteria

positive (1)

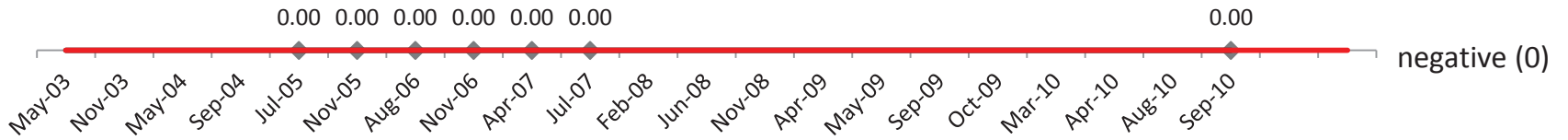
**BFI-22**

Positive/Negative

◆ Bacteria

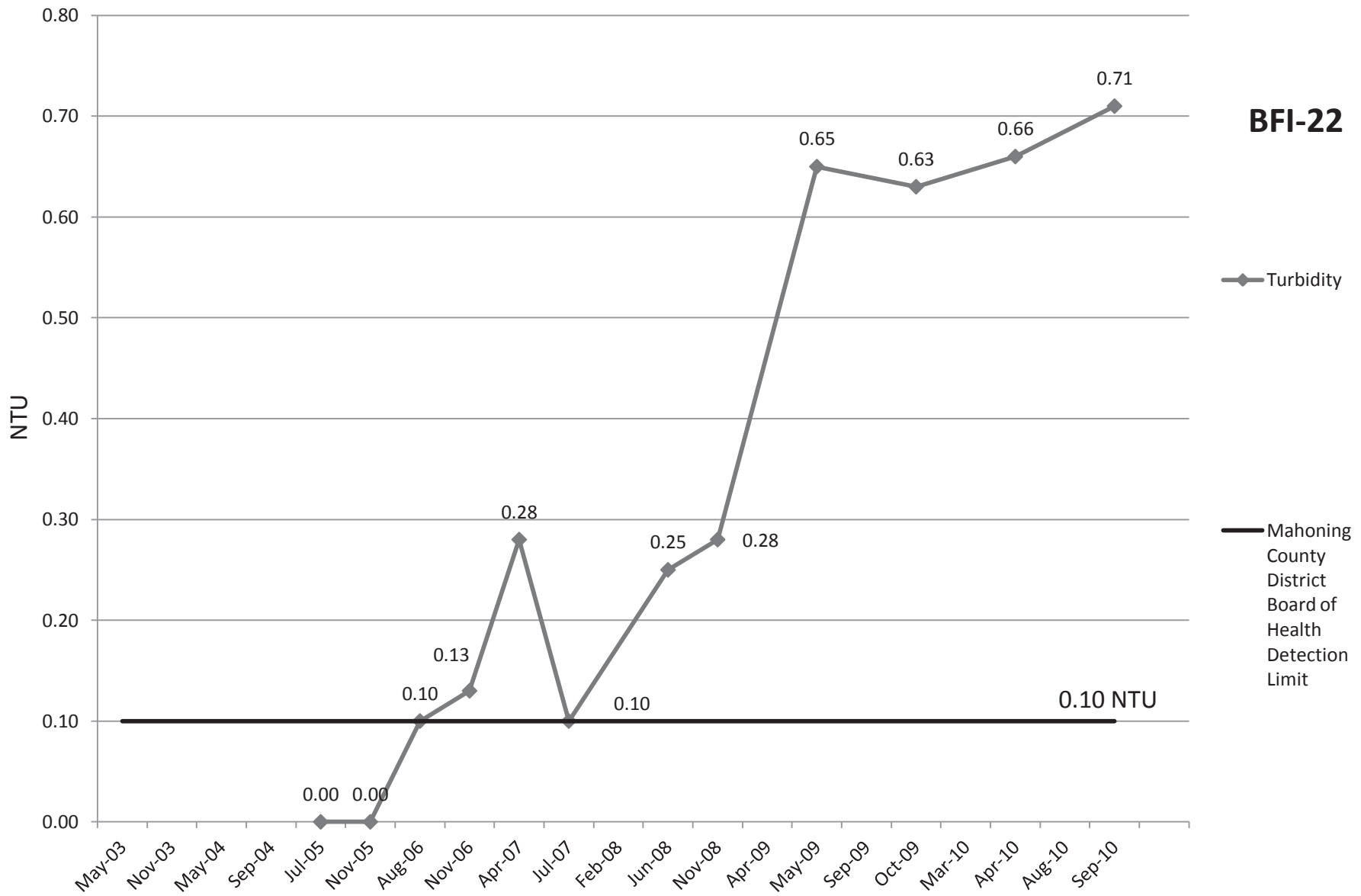
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)



negative (0)

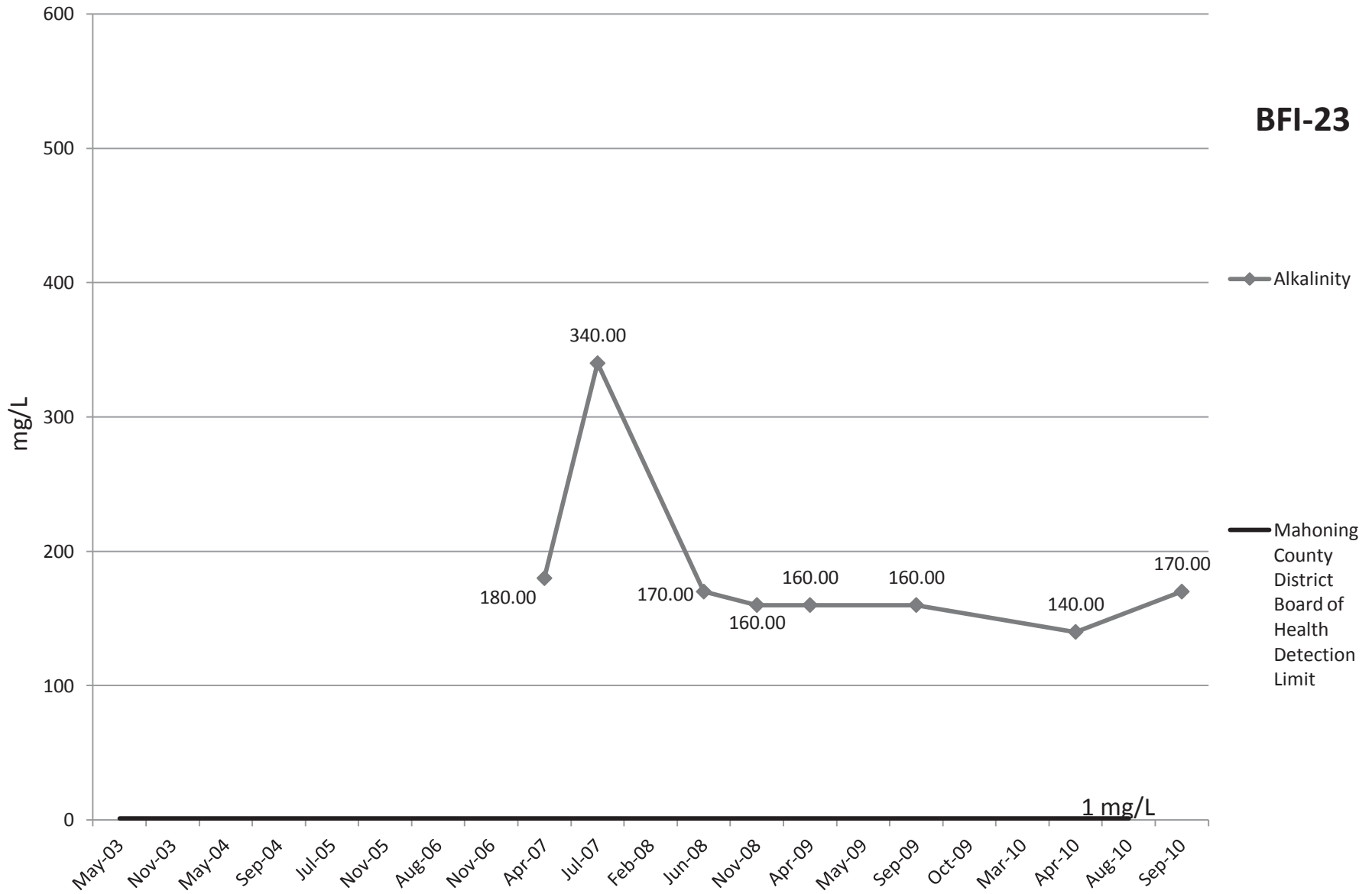
# Turbidity





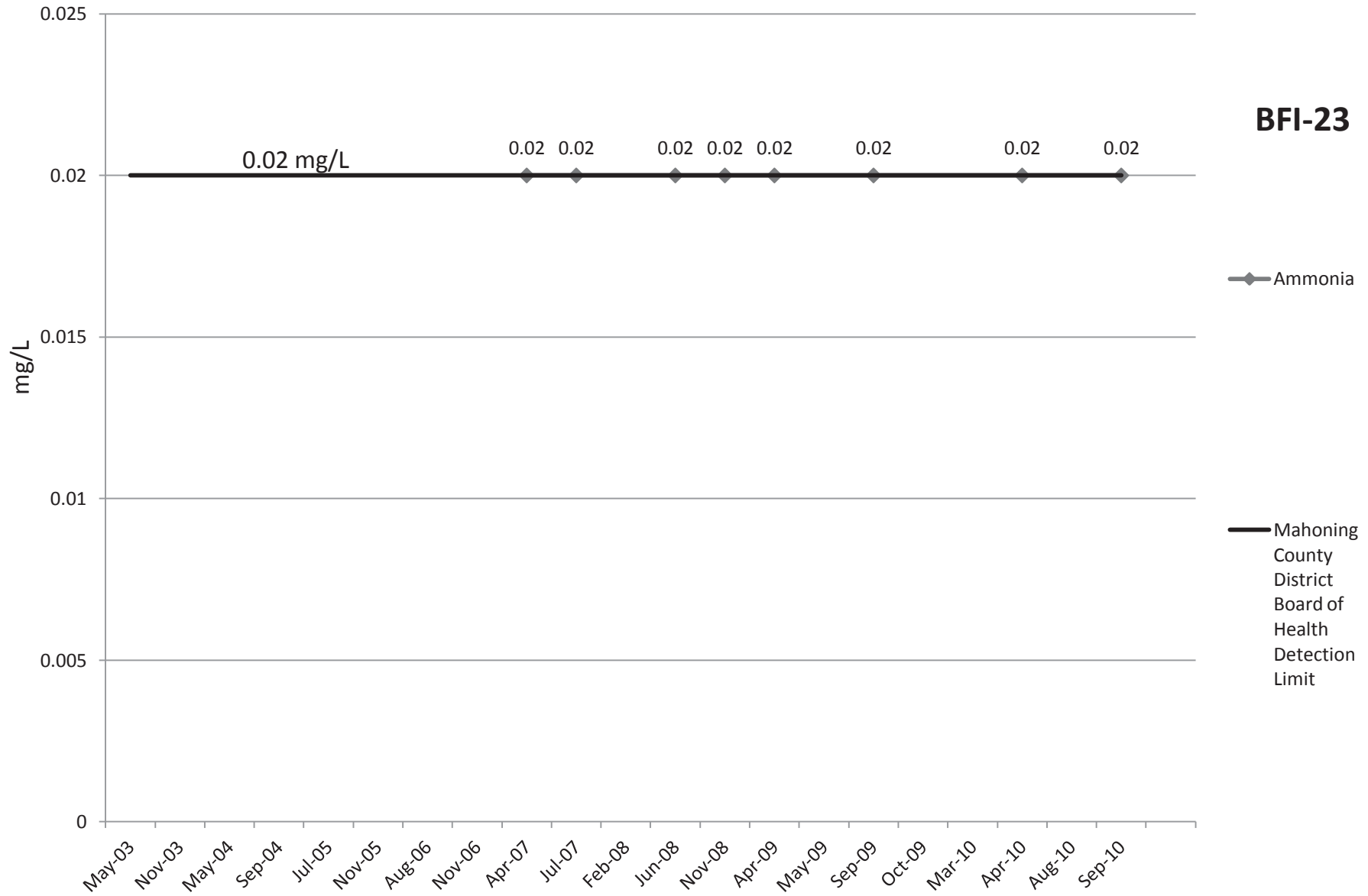
# Alkalinity

**BFI-23**

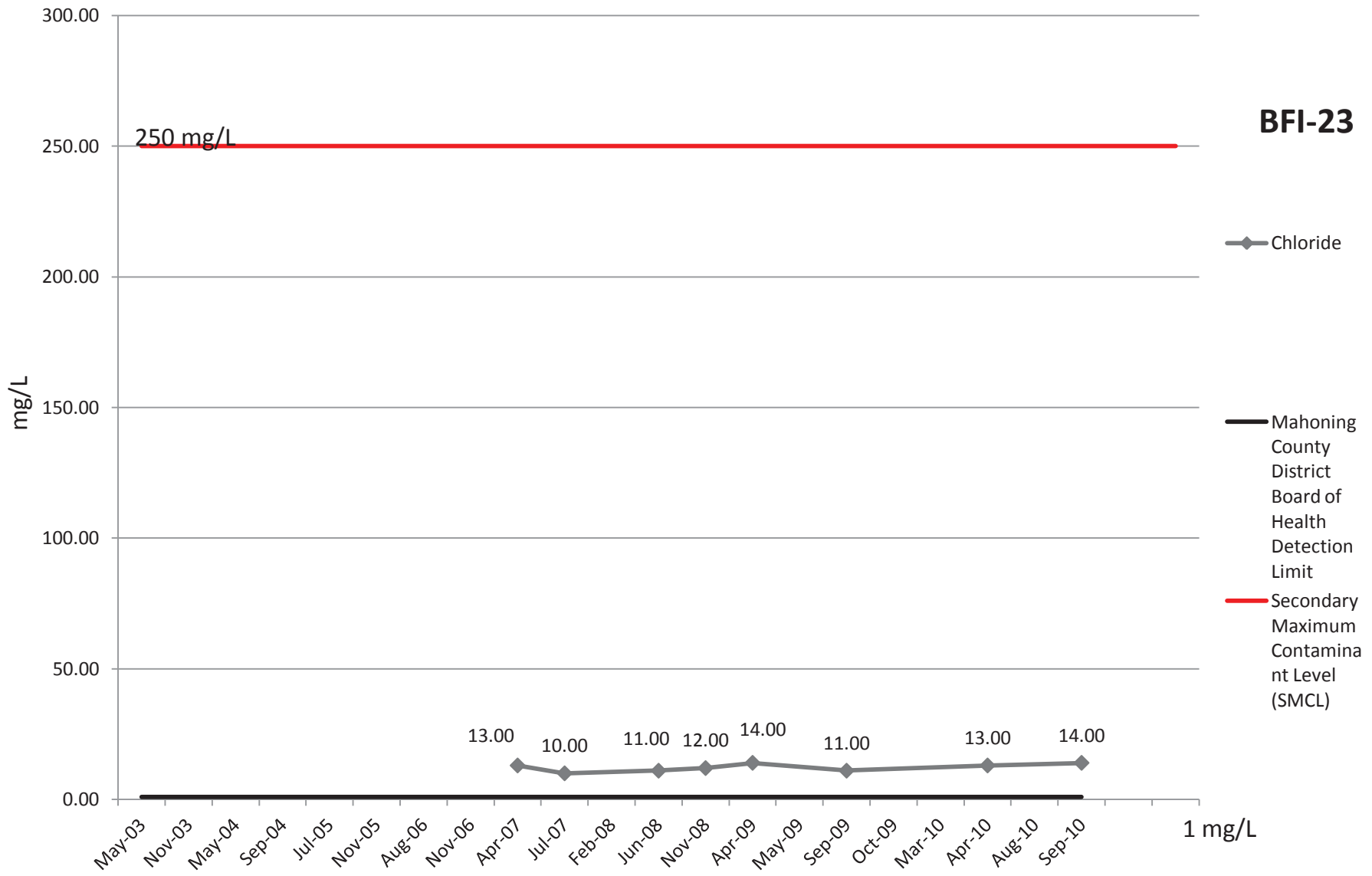


# Ammonia

**BFI-23**

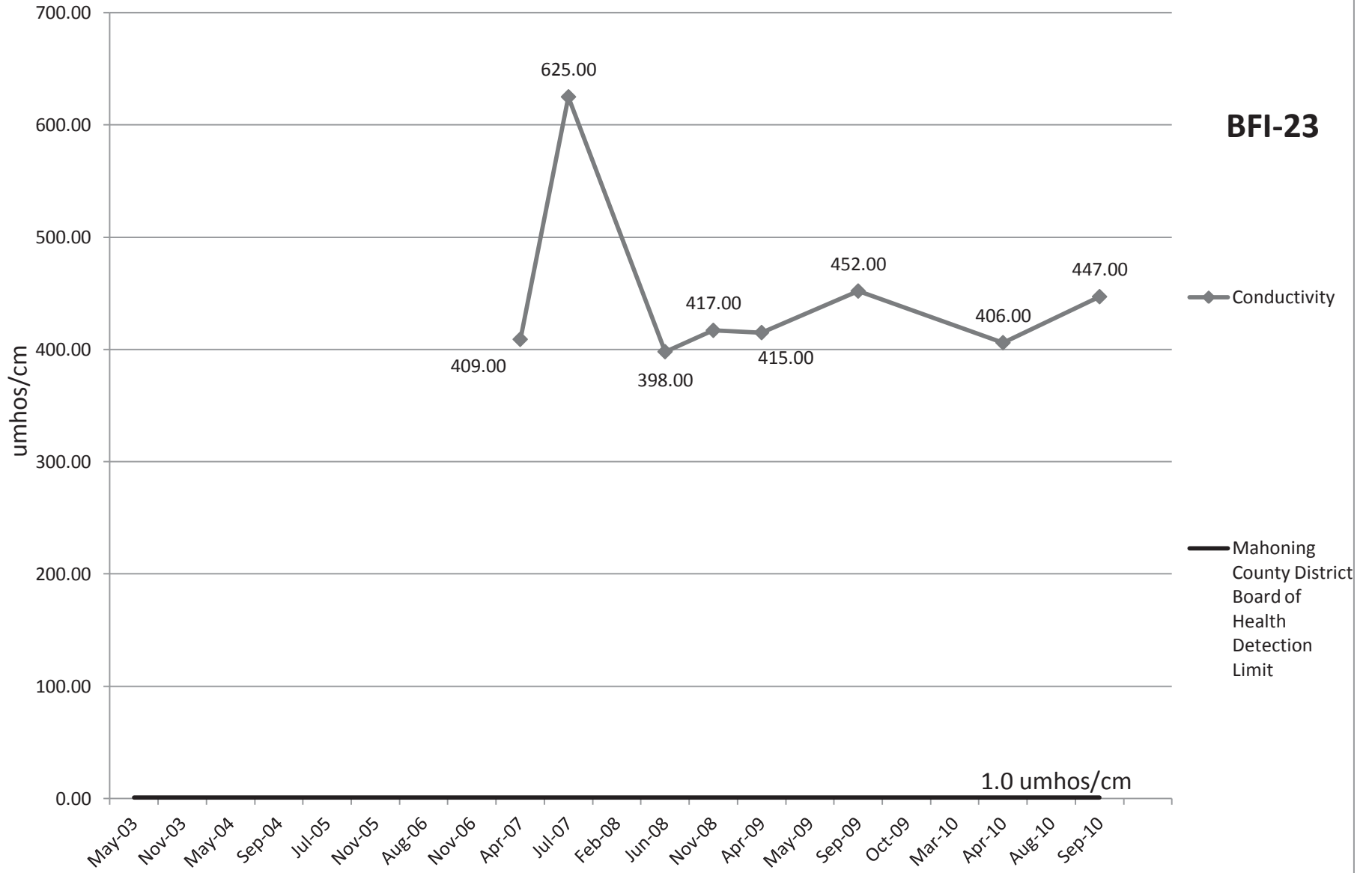


# Chloride

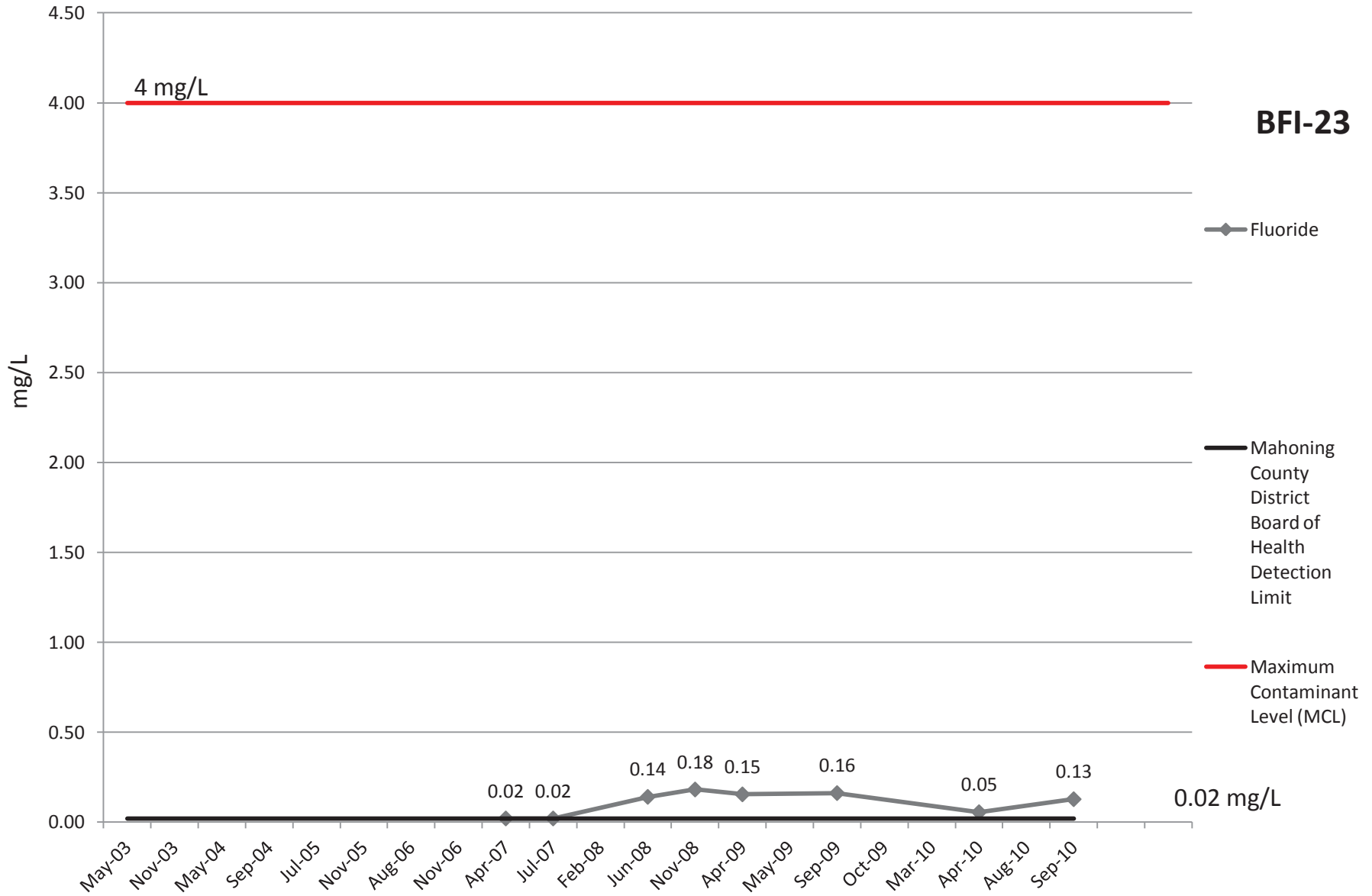


# Conductivity

**BFI-23**

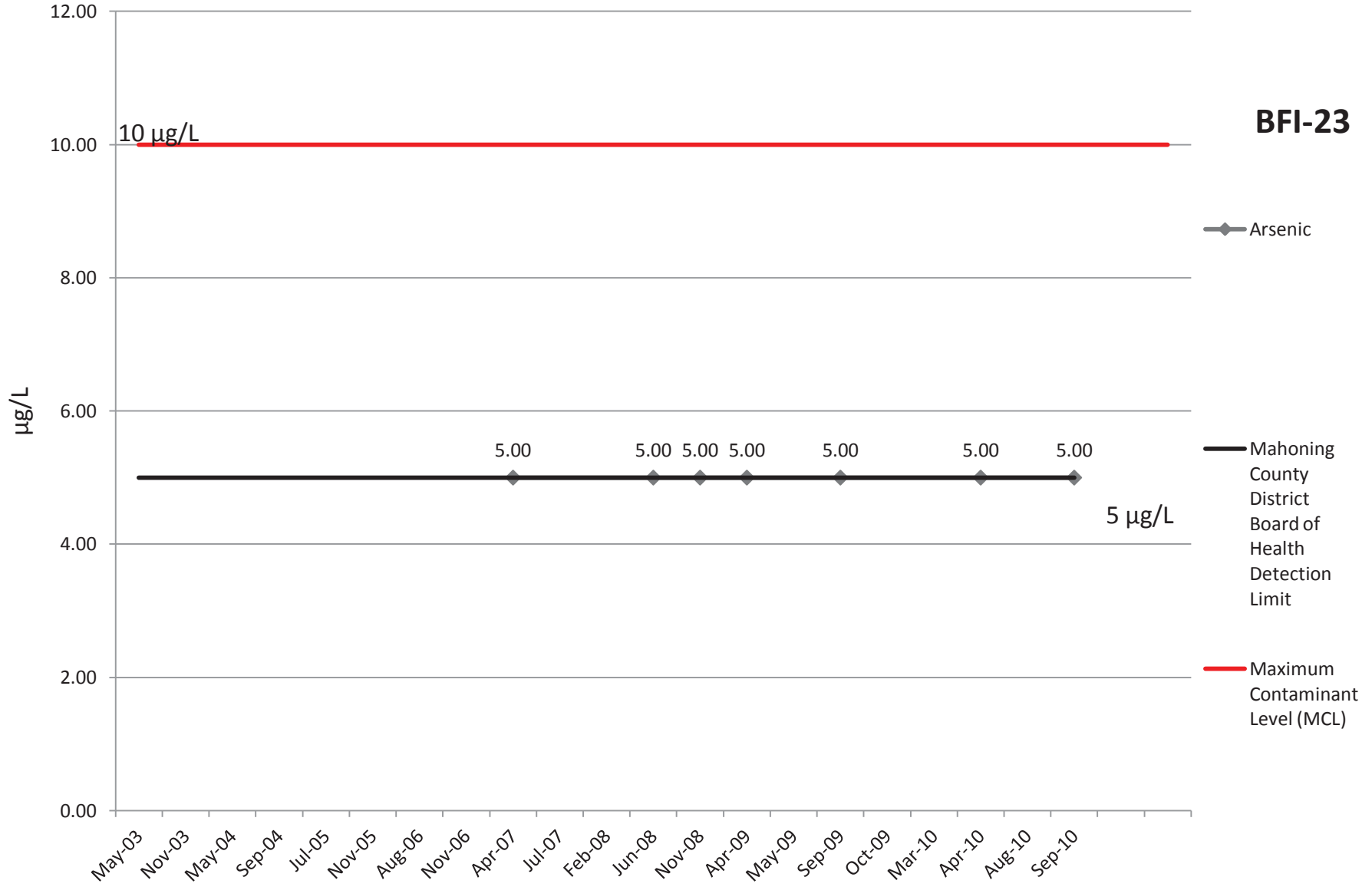


# Fluoride



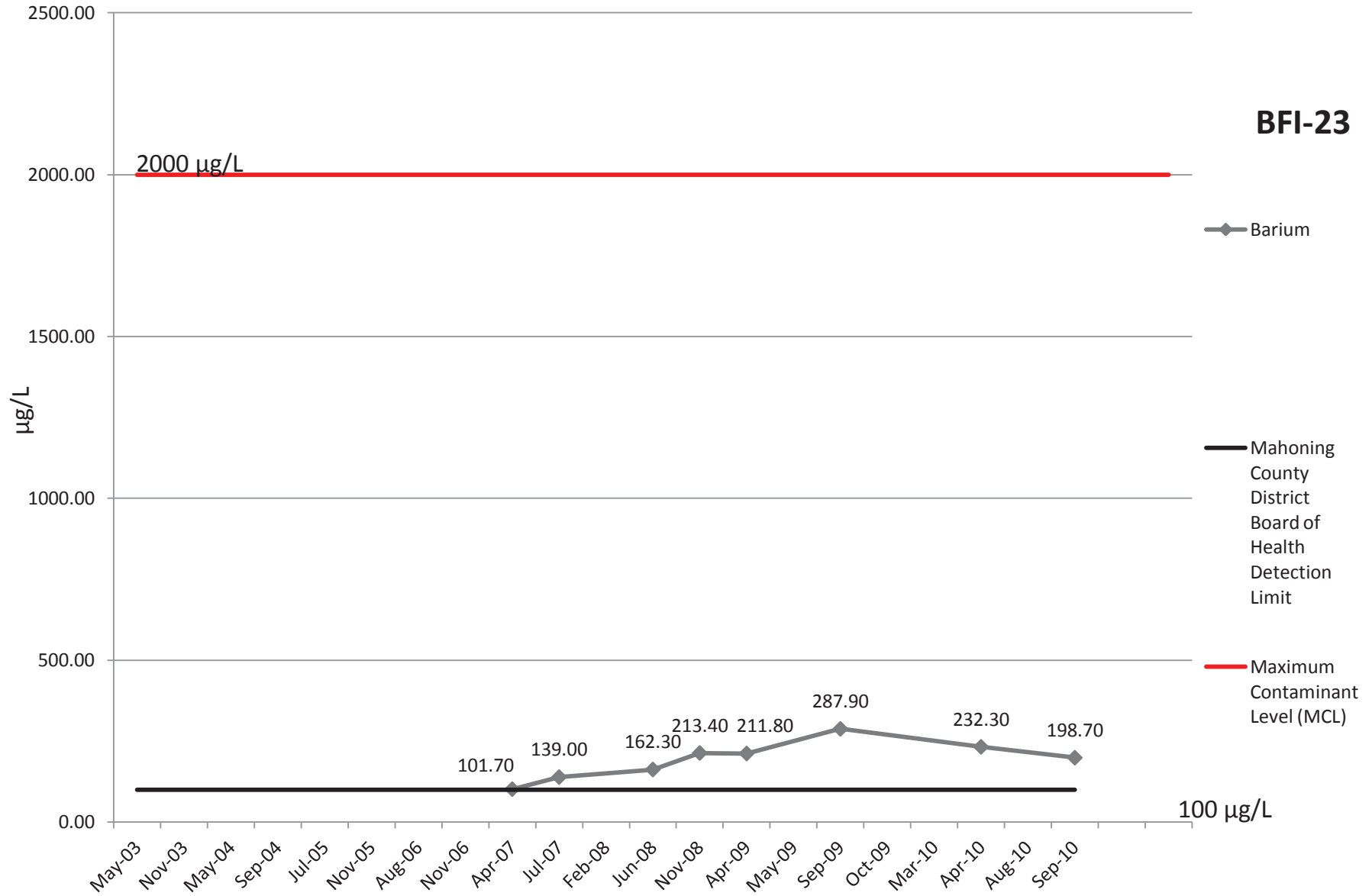
# Arsenic

**BFI-23**



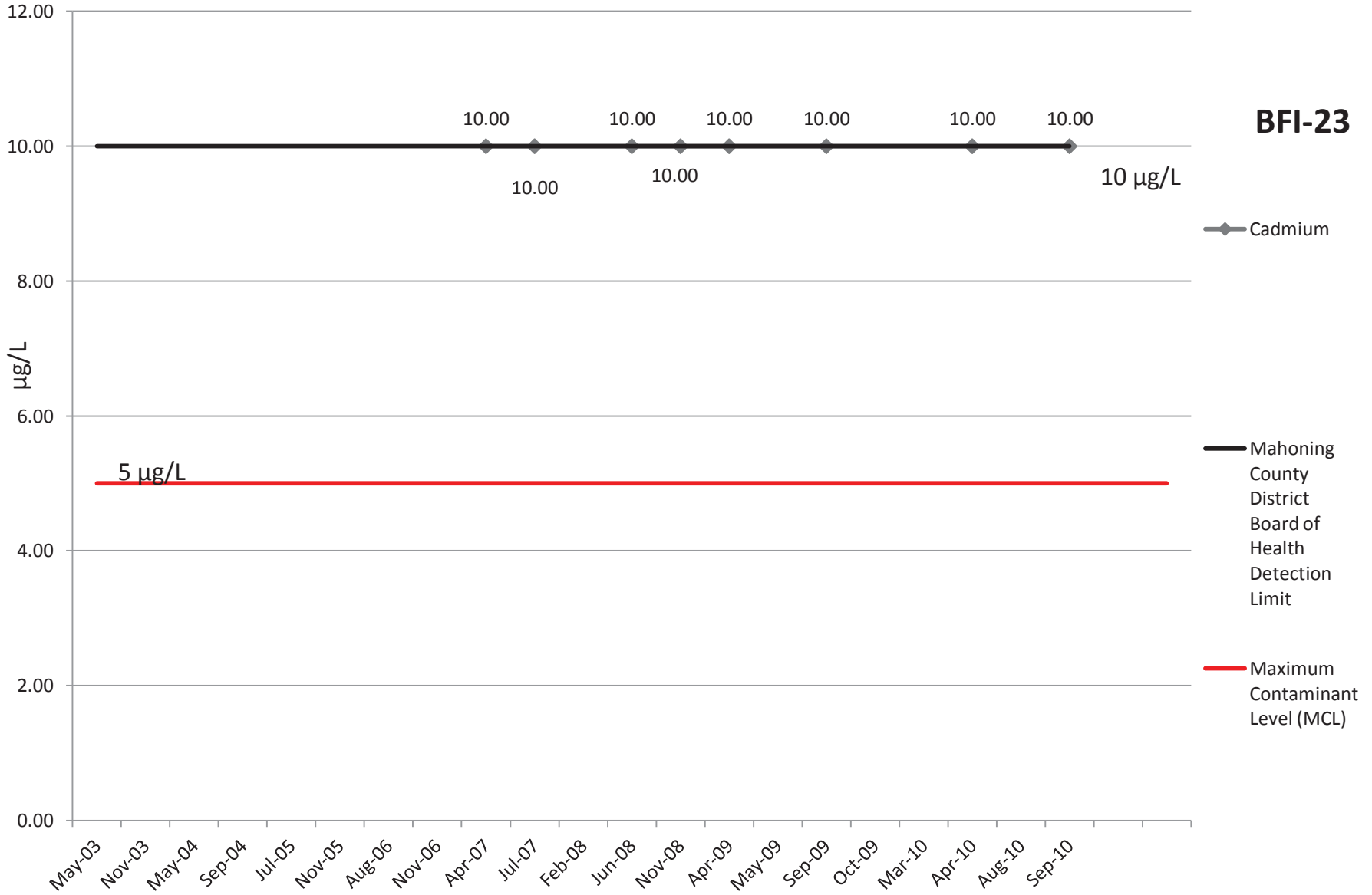
# Barium

**BFI-23**



# Cadmium

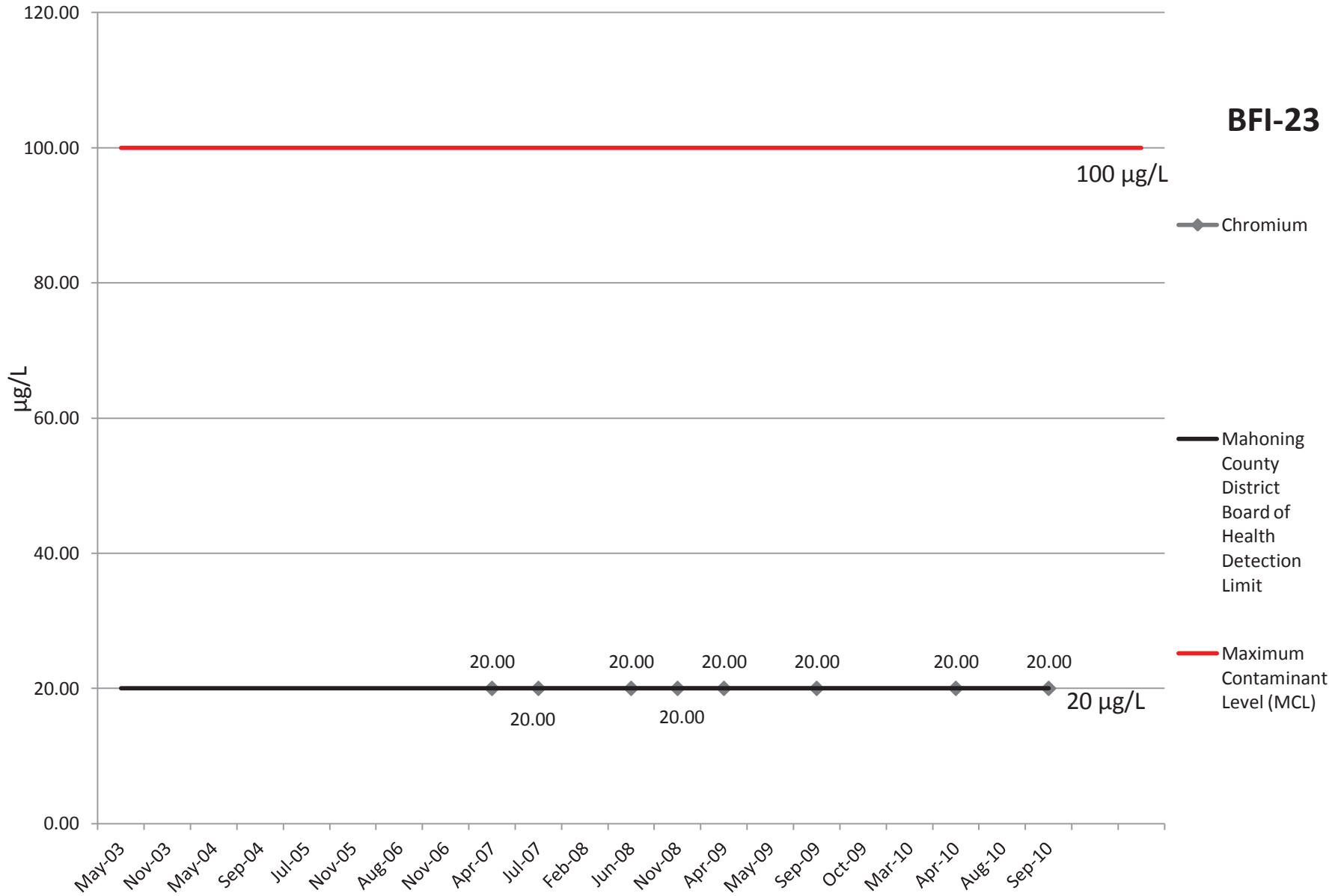
**BFI-23**



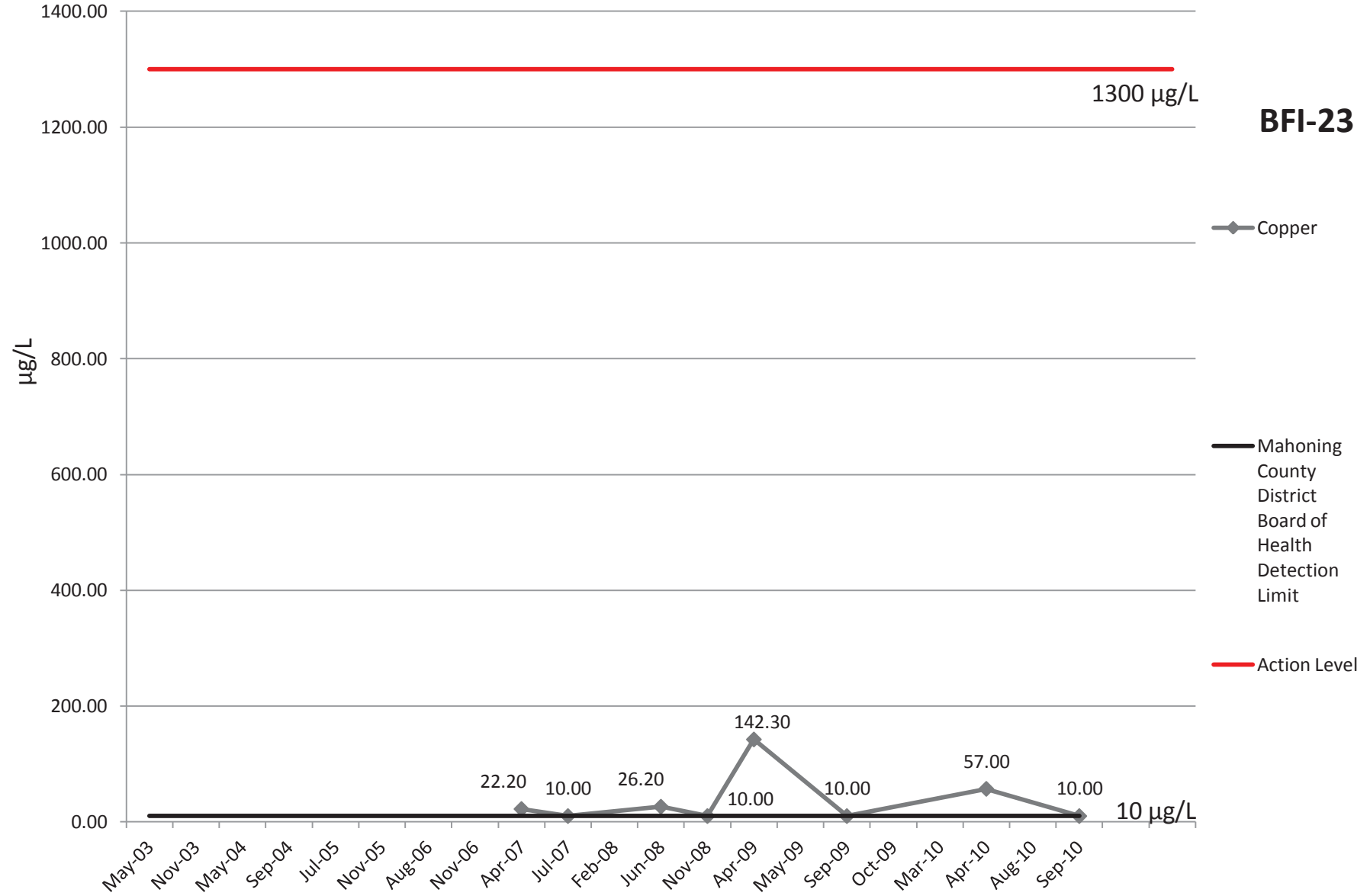


# Chromium

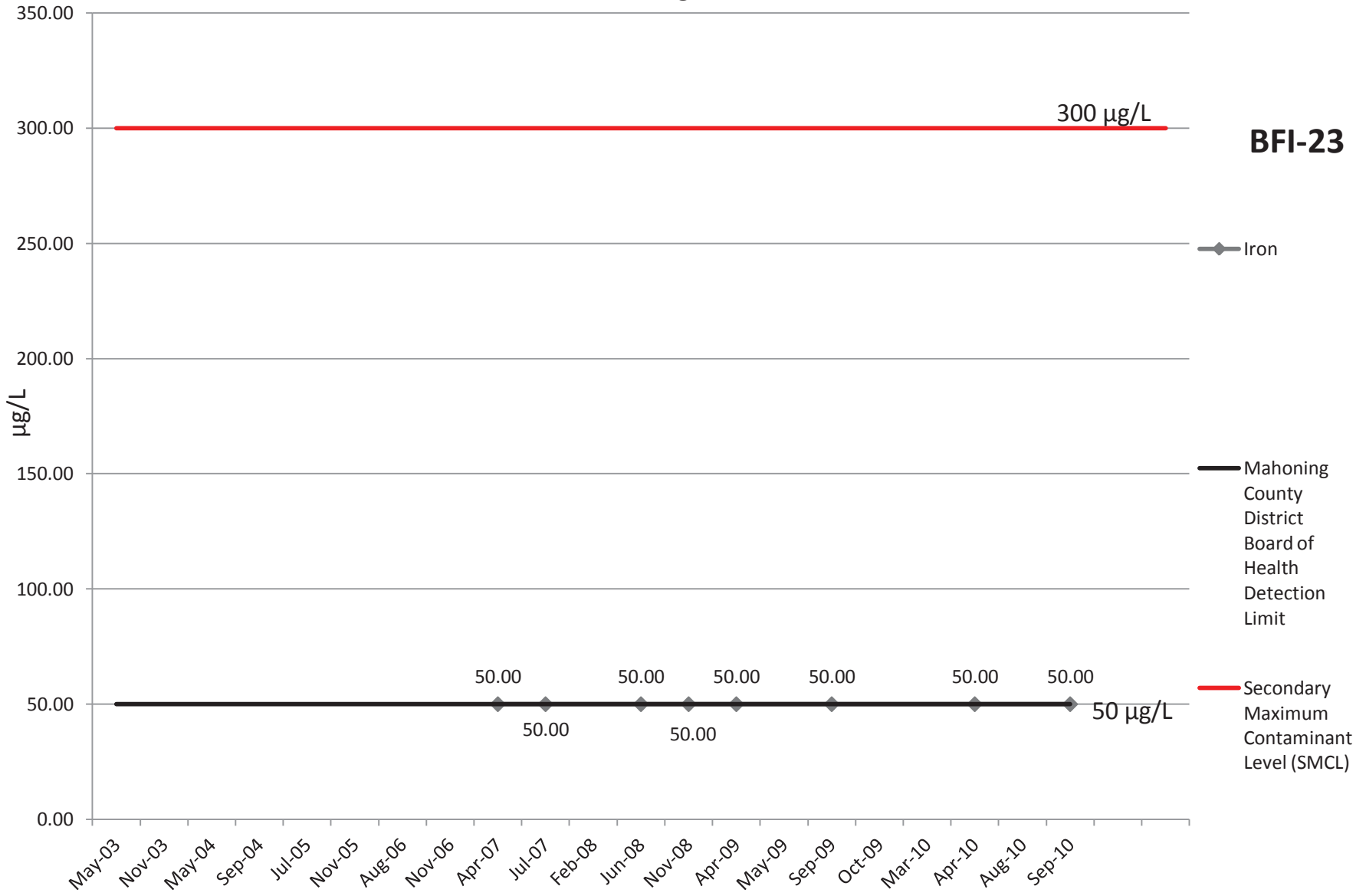
**BFI-23**



# Copper

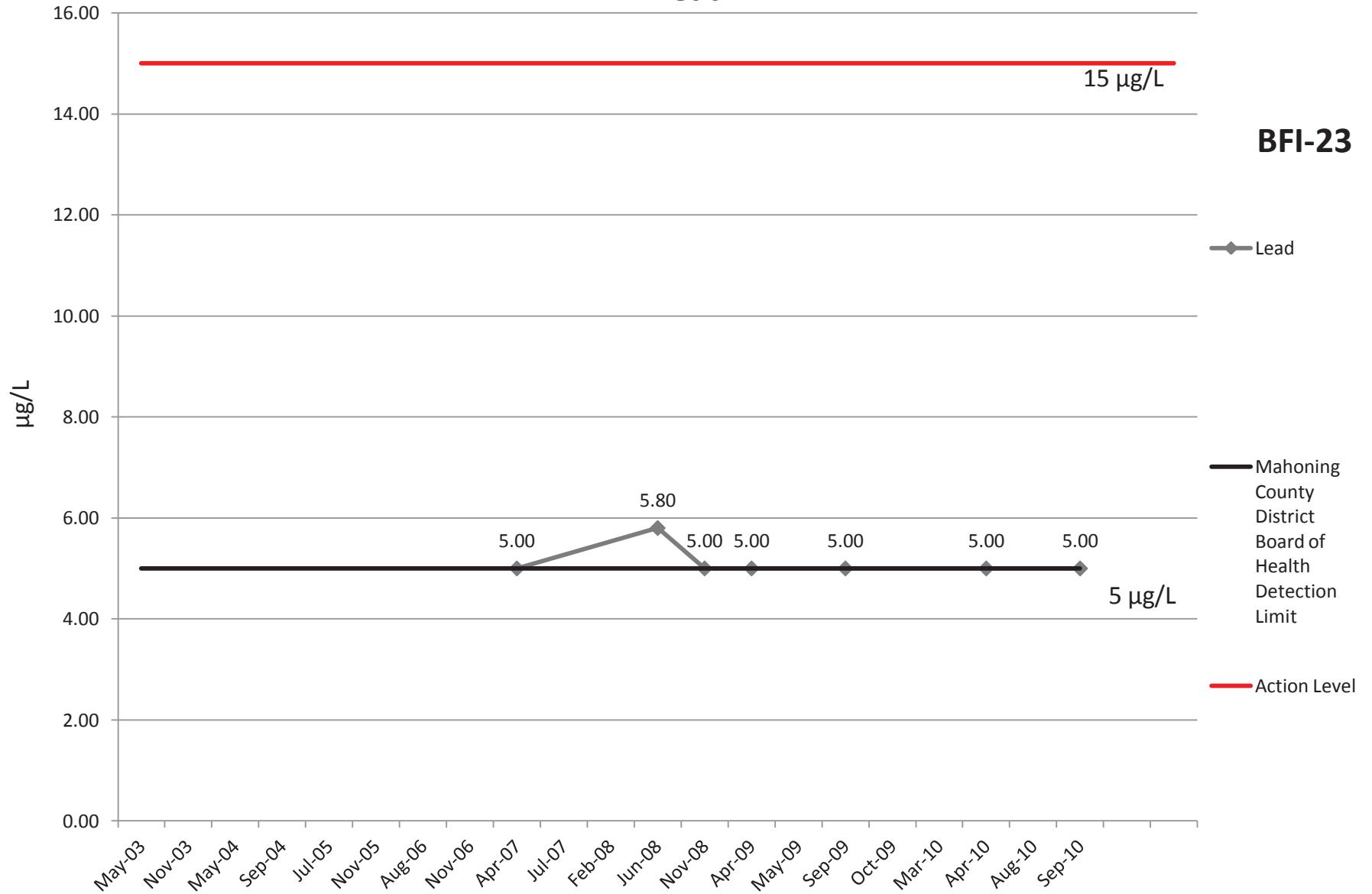


# Iron



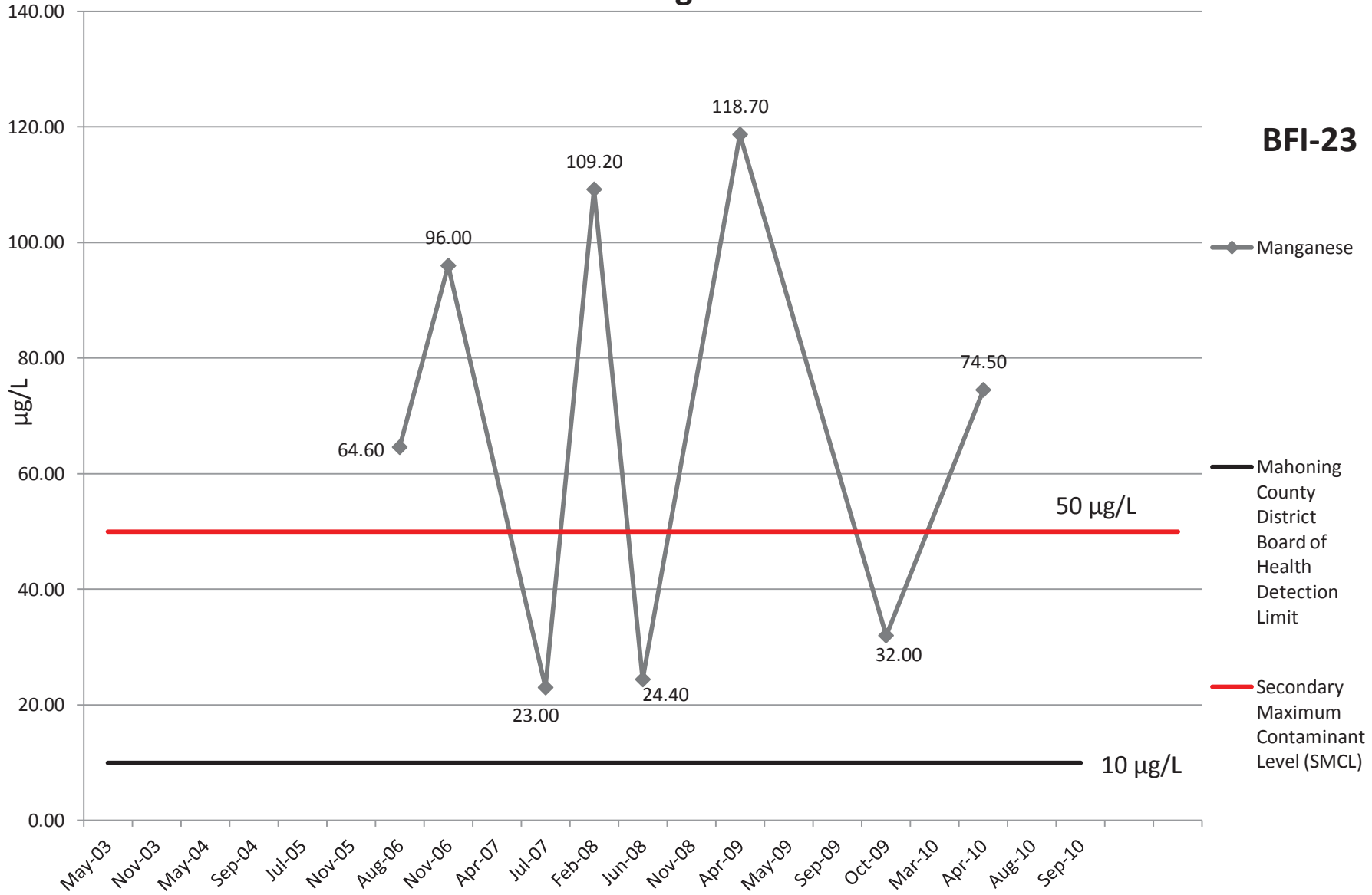
# Lead

**BFI-23**



# Manganese

**BFI-23**

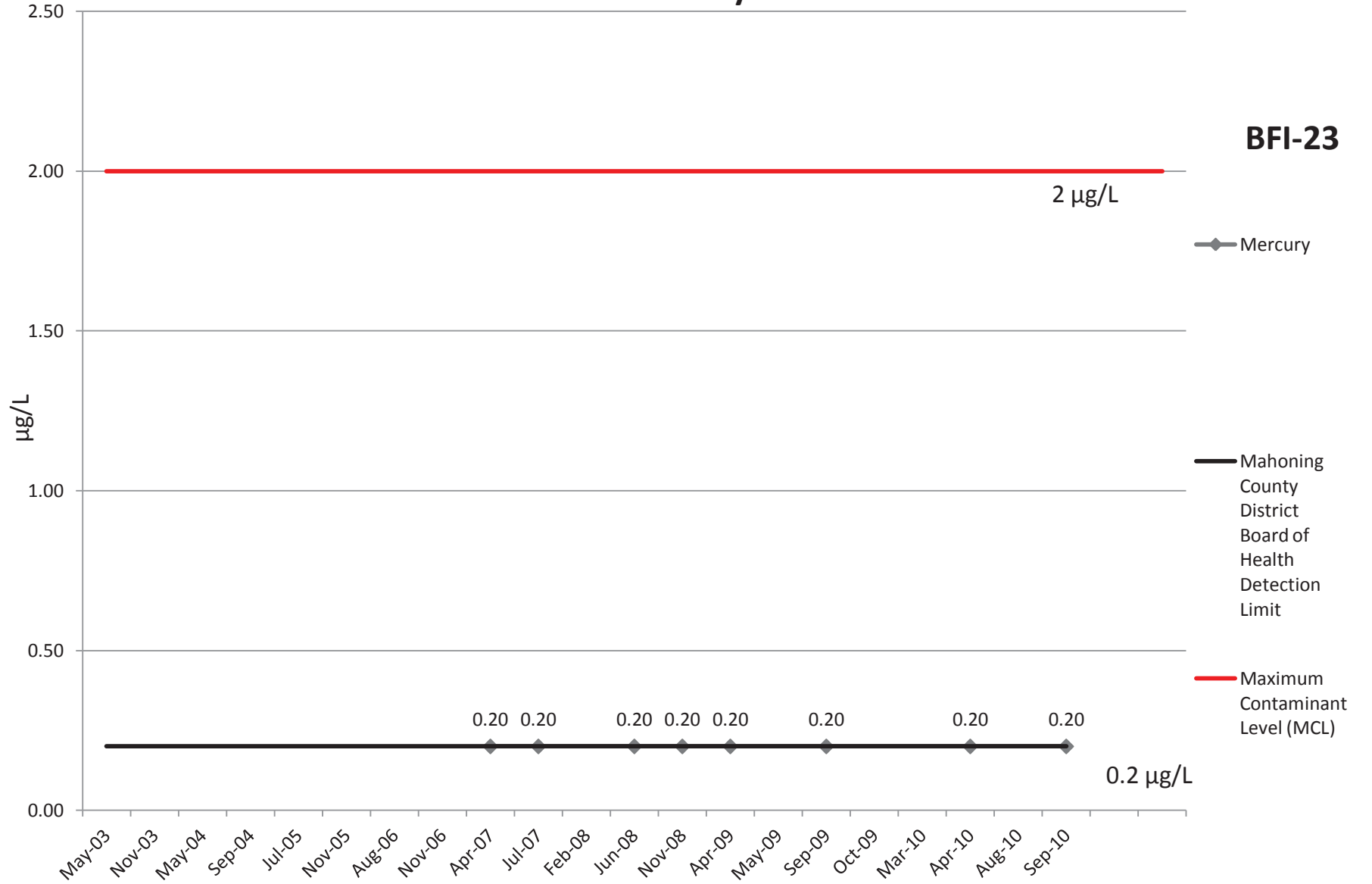


# Mercury

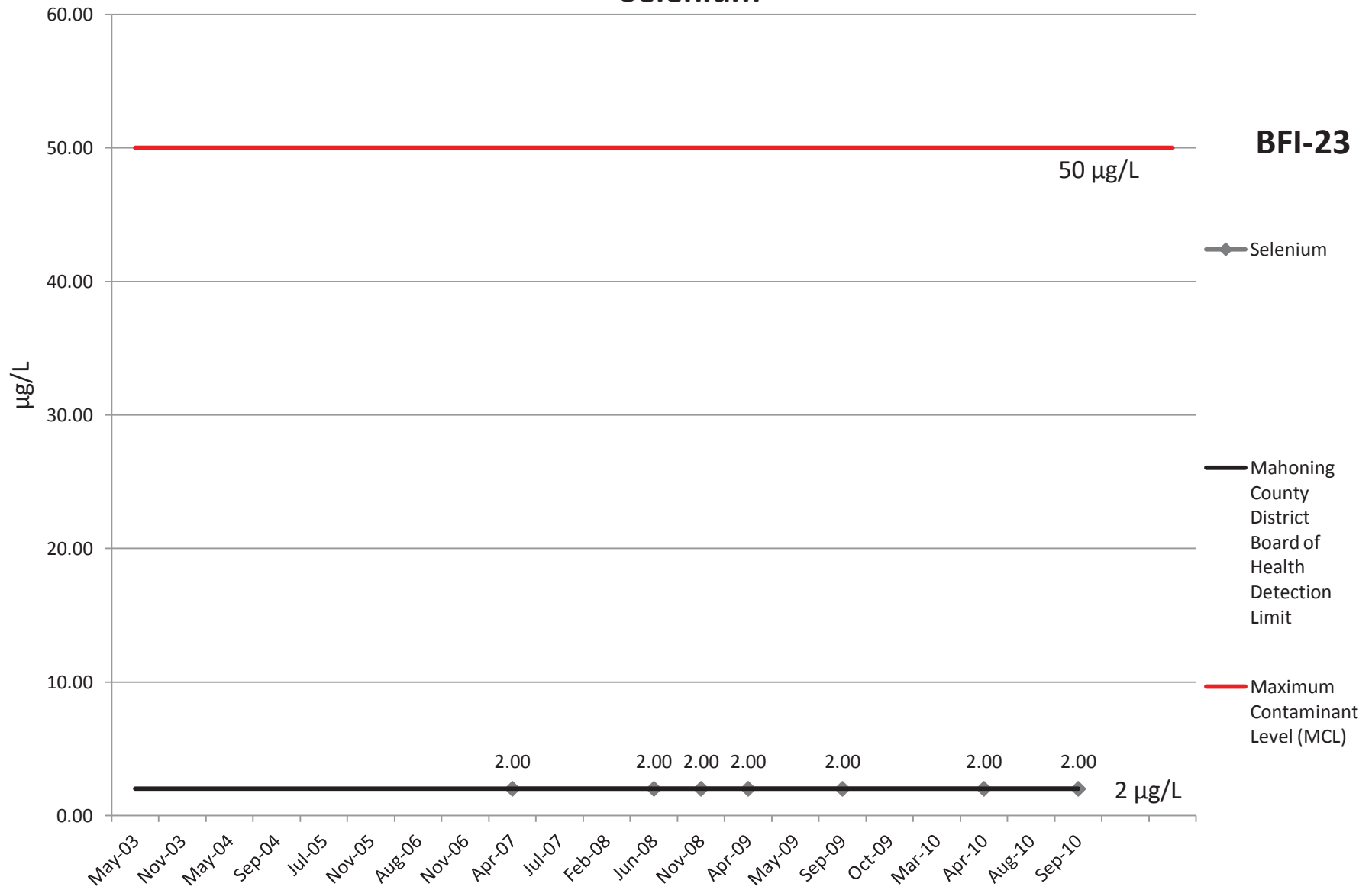
**BFI-23**

2 µg/L

0.2 µg/L

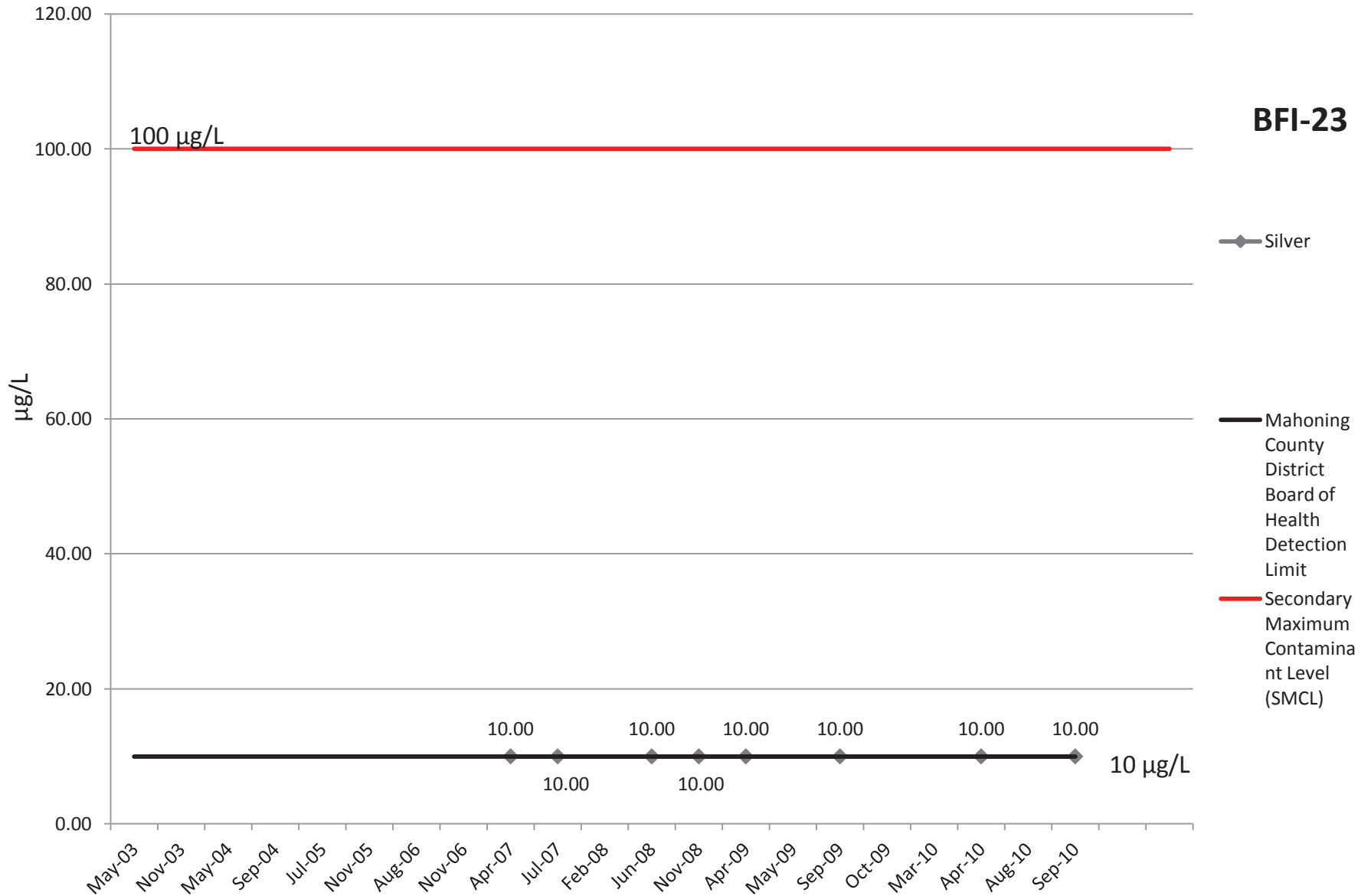


# Selenium



# Silver

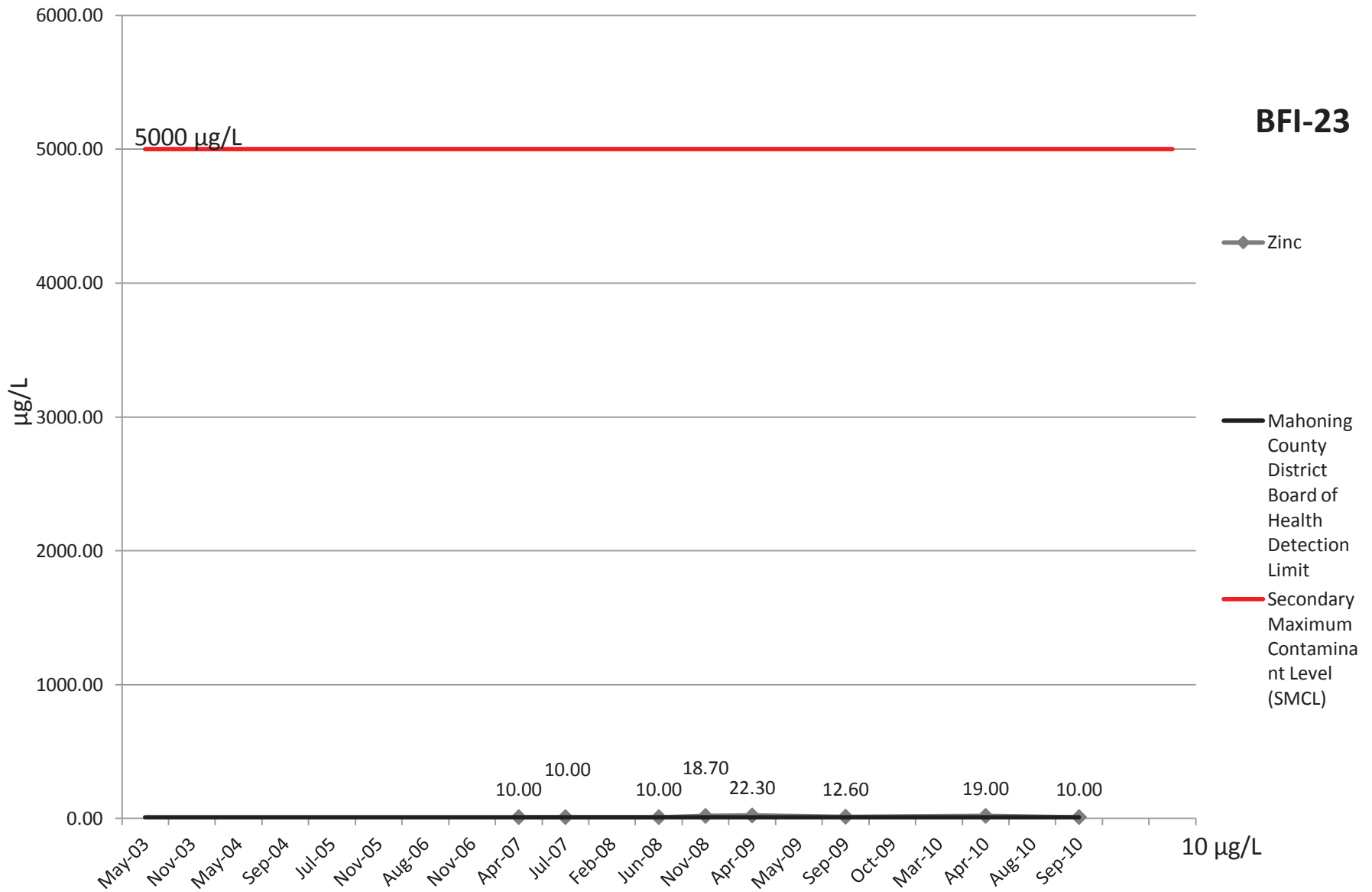
**BFI-23**





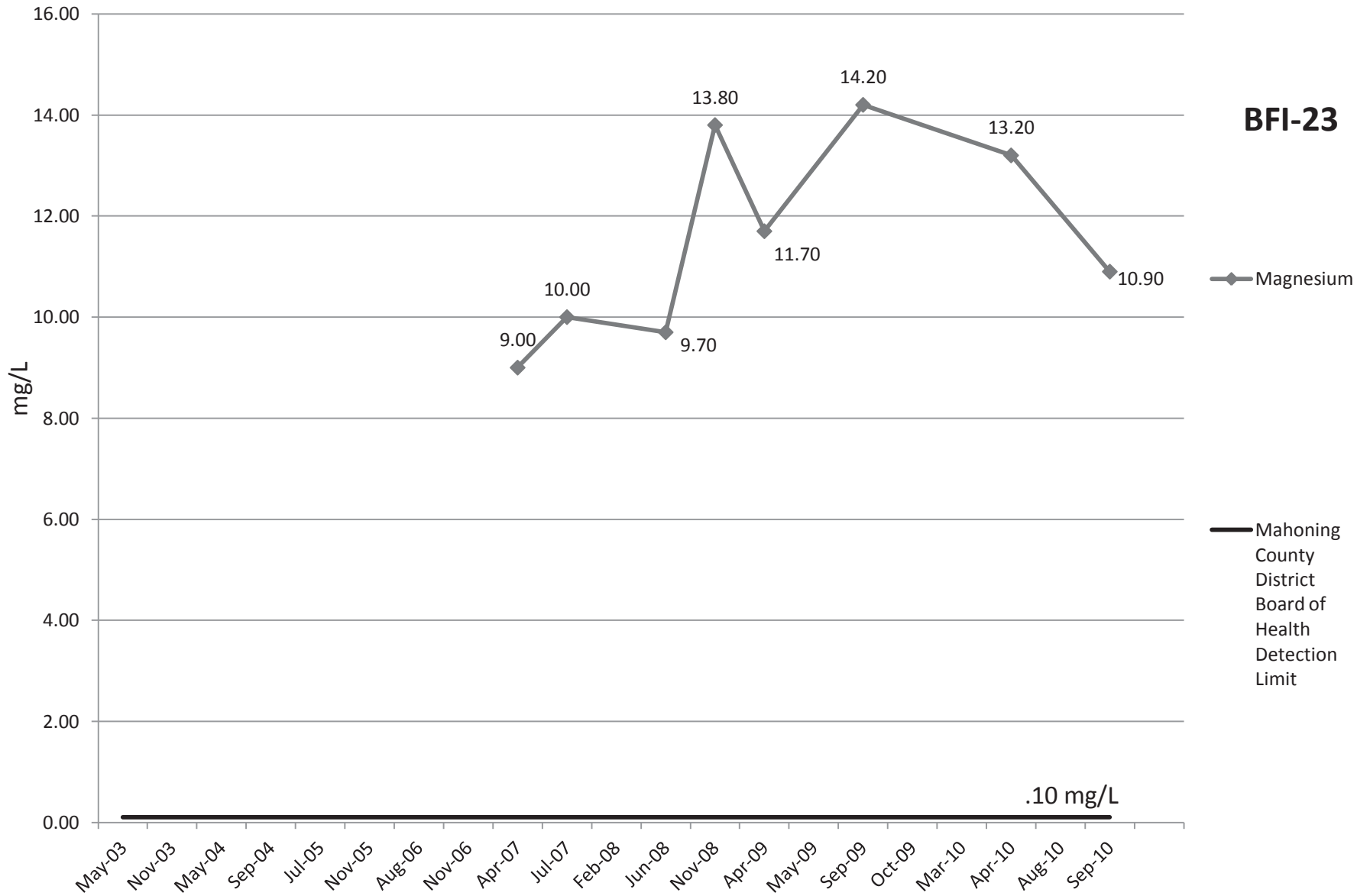
# Zinc

**BFI-23**

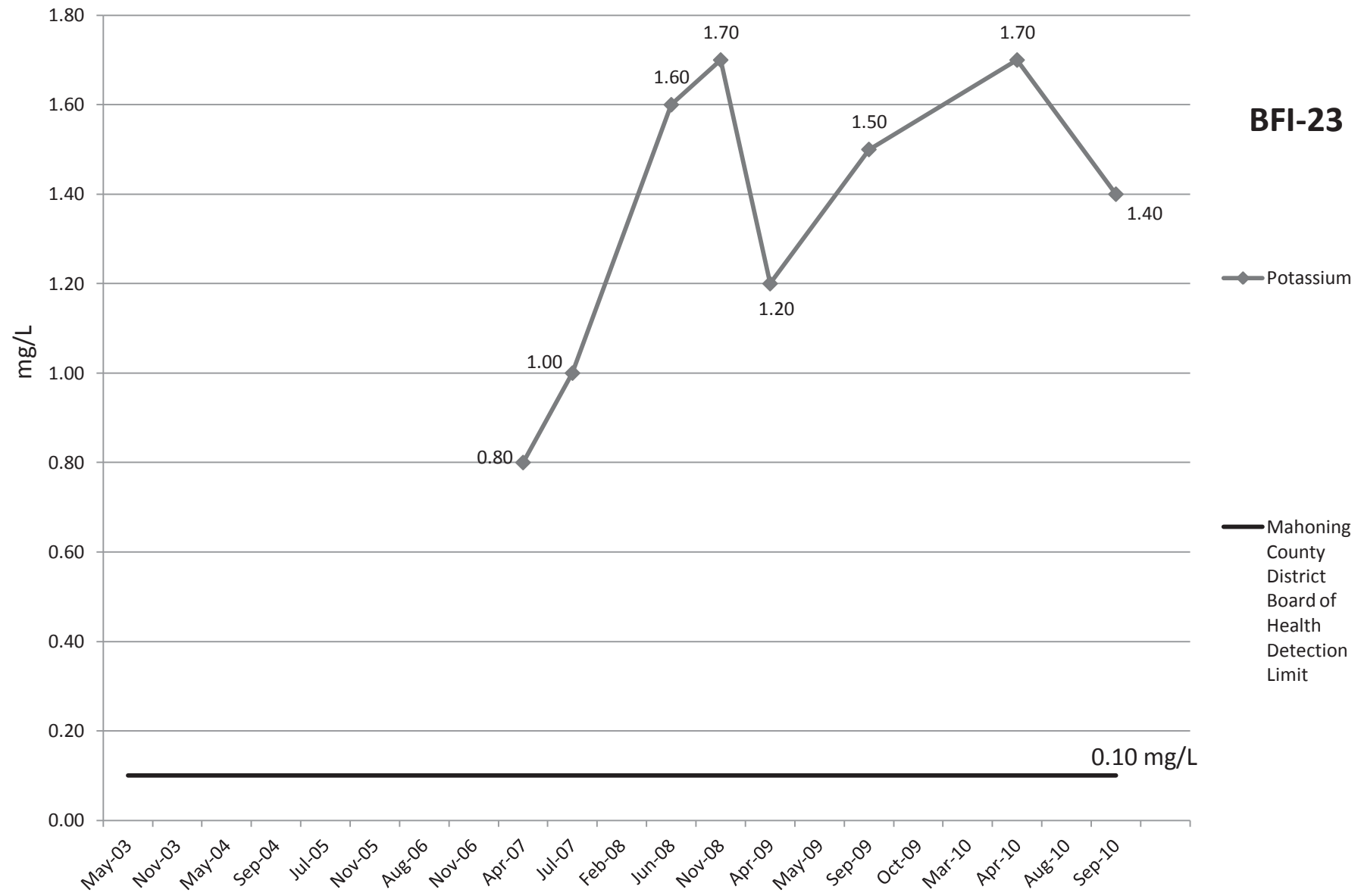


# Magnesium

**BFI-23**

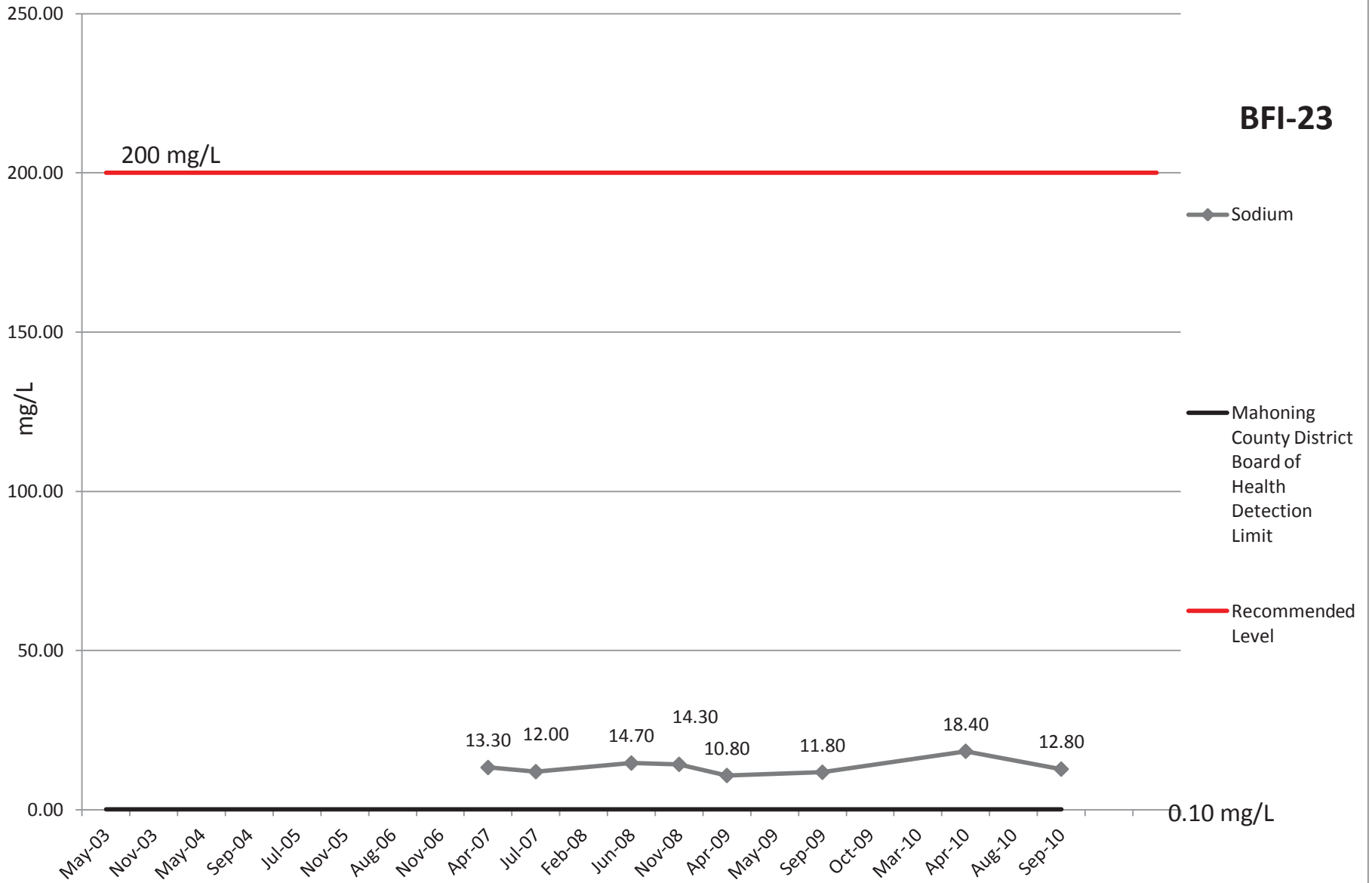


# Potassium



# Sodium

**BFI-23**



# Nitrate EPA

**BFI-23**

10 mg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00  
mg/L

◆ Nitrate EPA

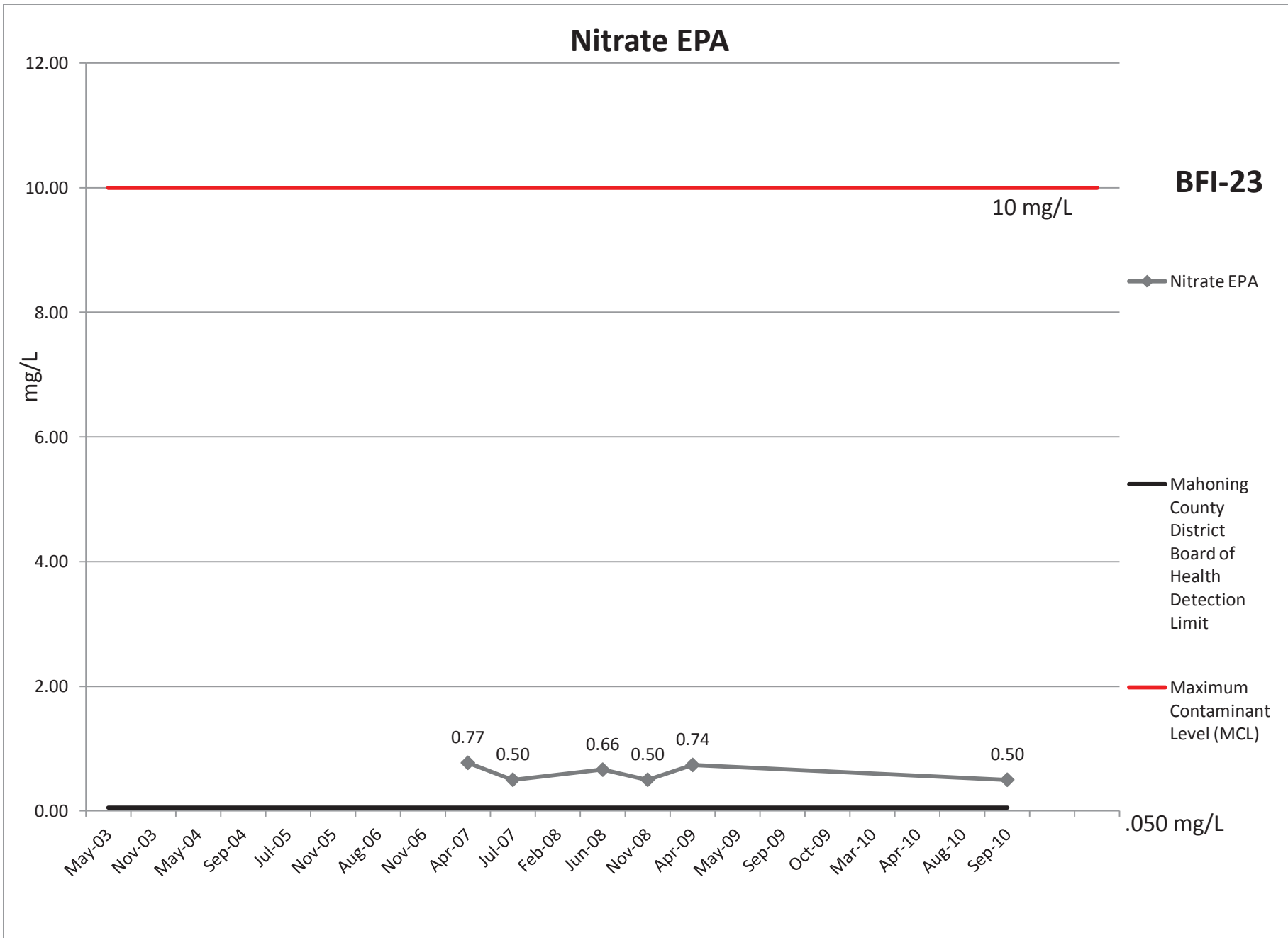
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

.050 mg/L

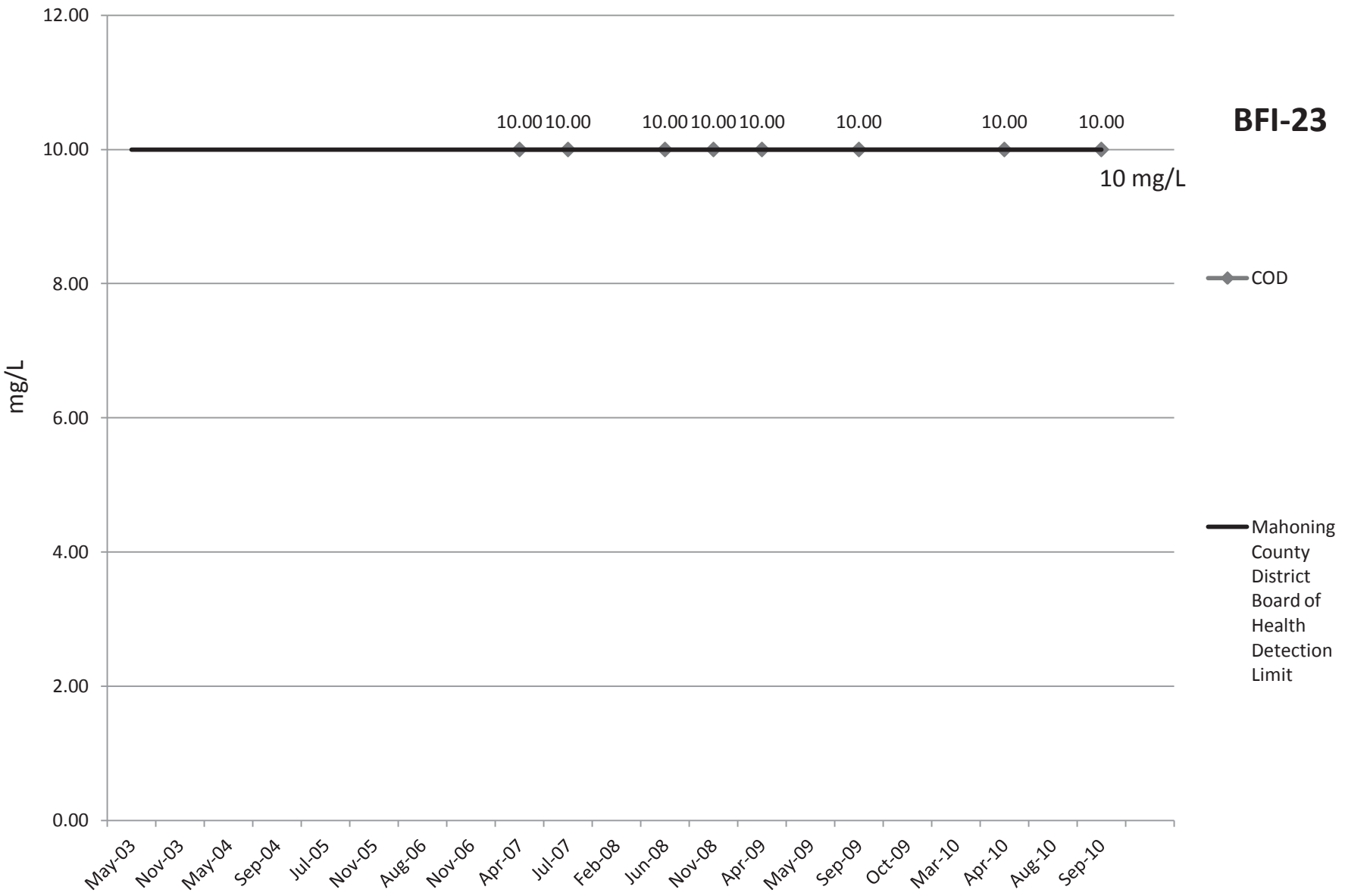
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

0.77  
0.50  
0.66  
0.50  
0.74  
0.50



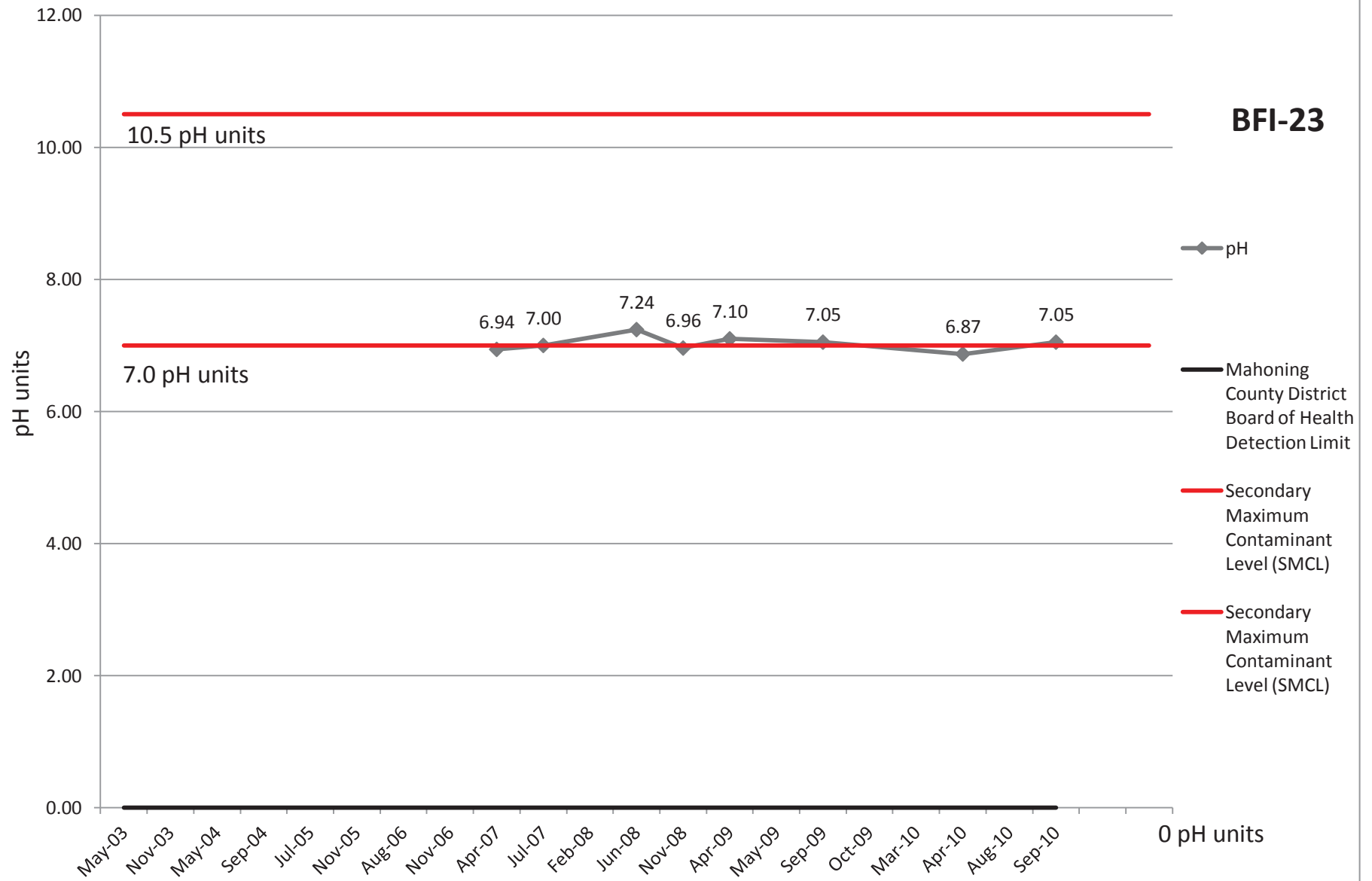
# COD

**BFI-23**



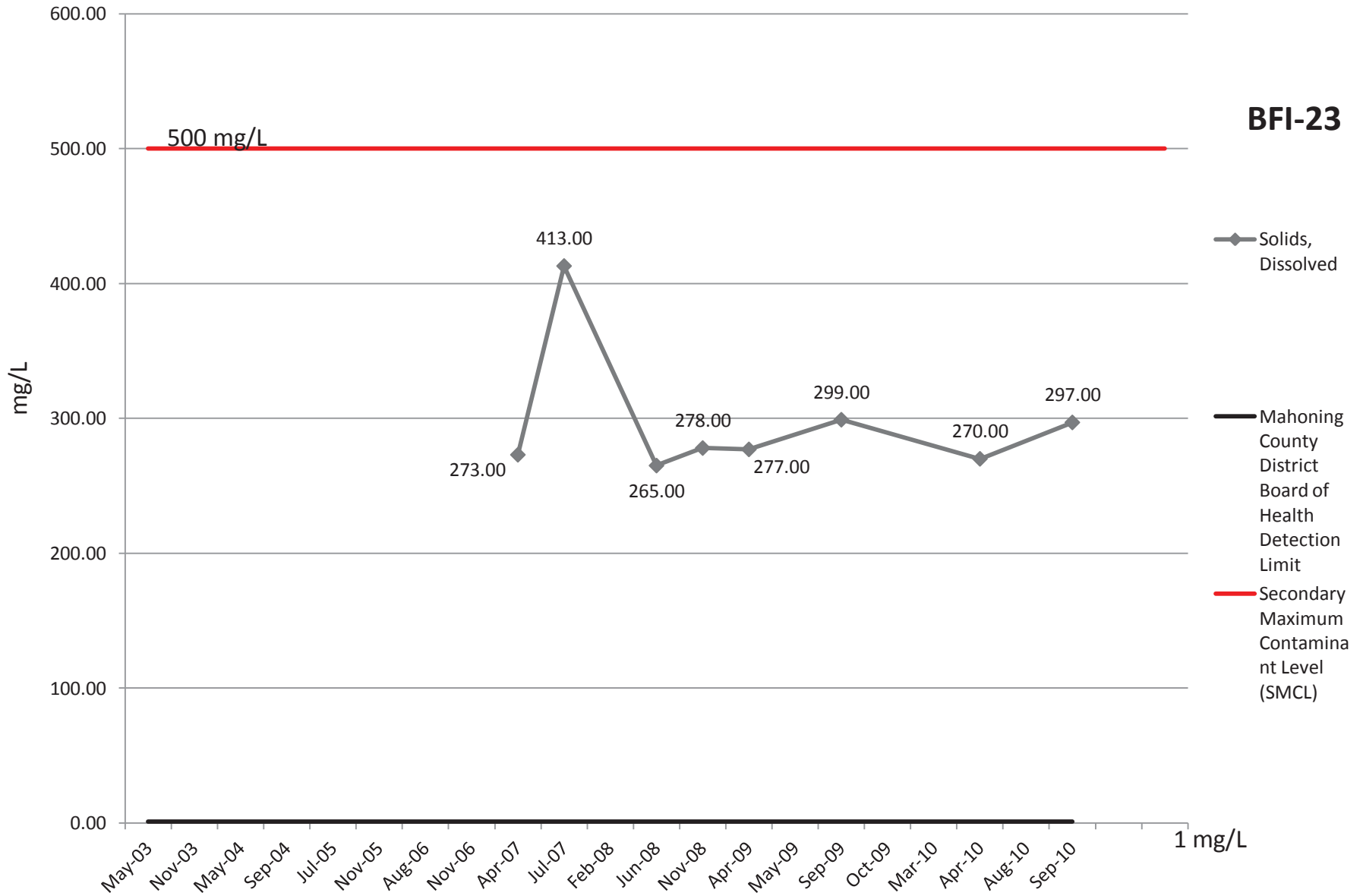
# pH

**BFI-23**



# Solids, Dissolved

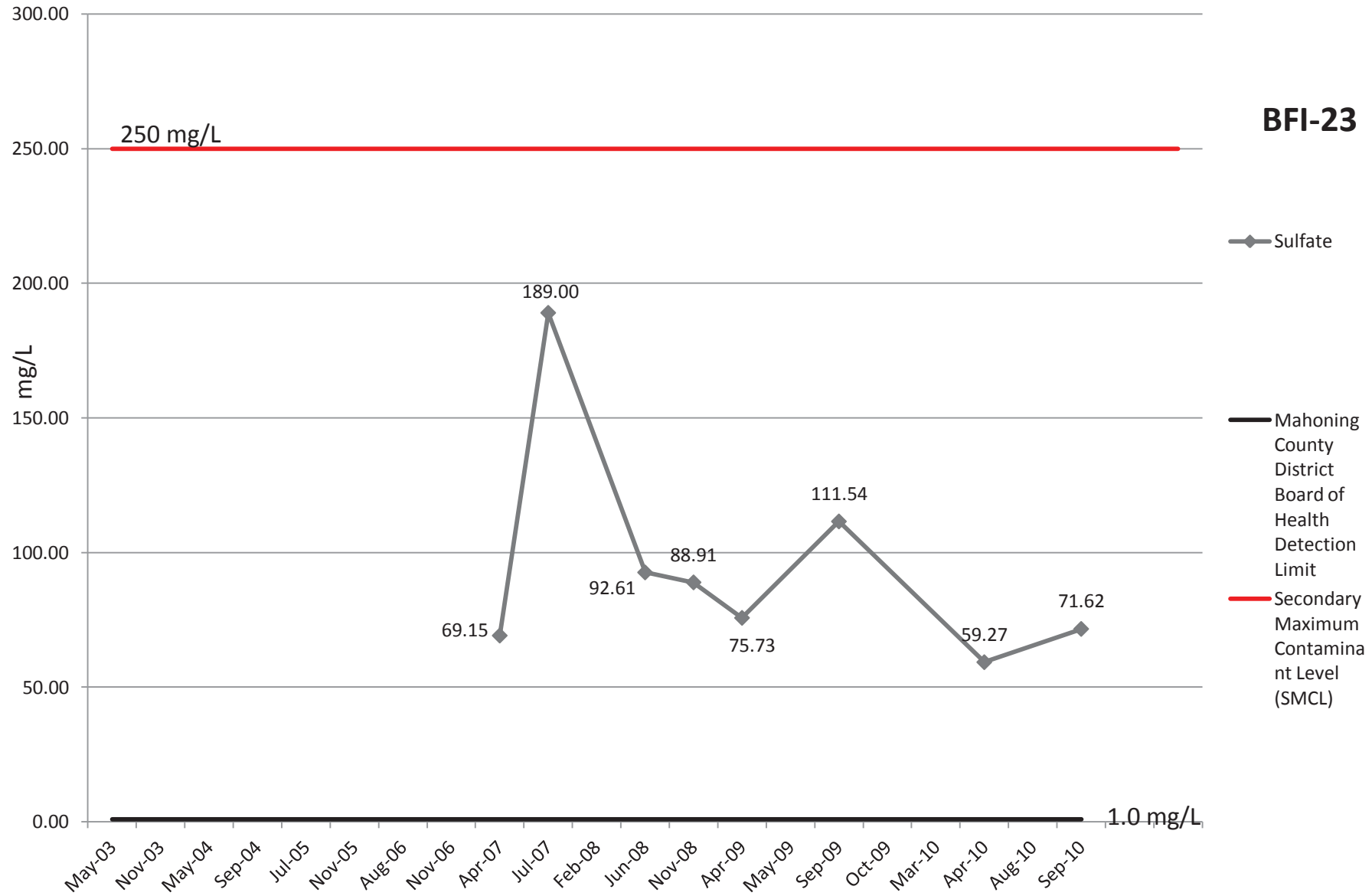
**BFI-23**





# Sulfate

**BFI-23**



# Bacteria

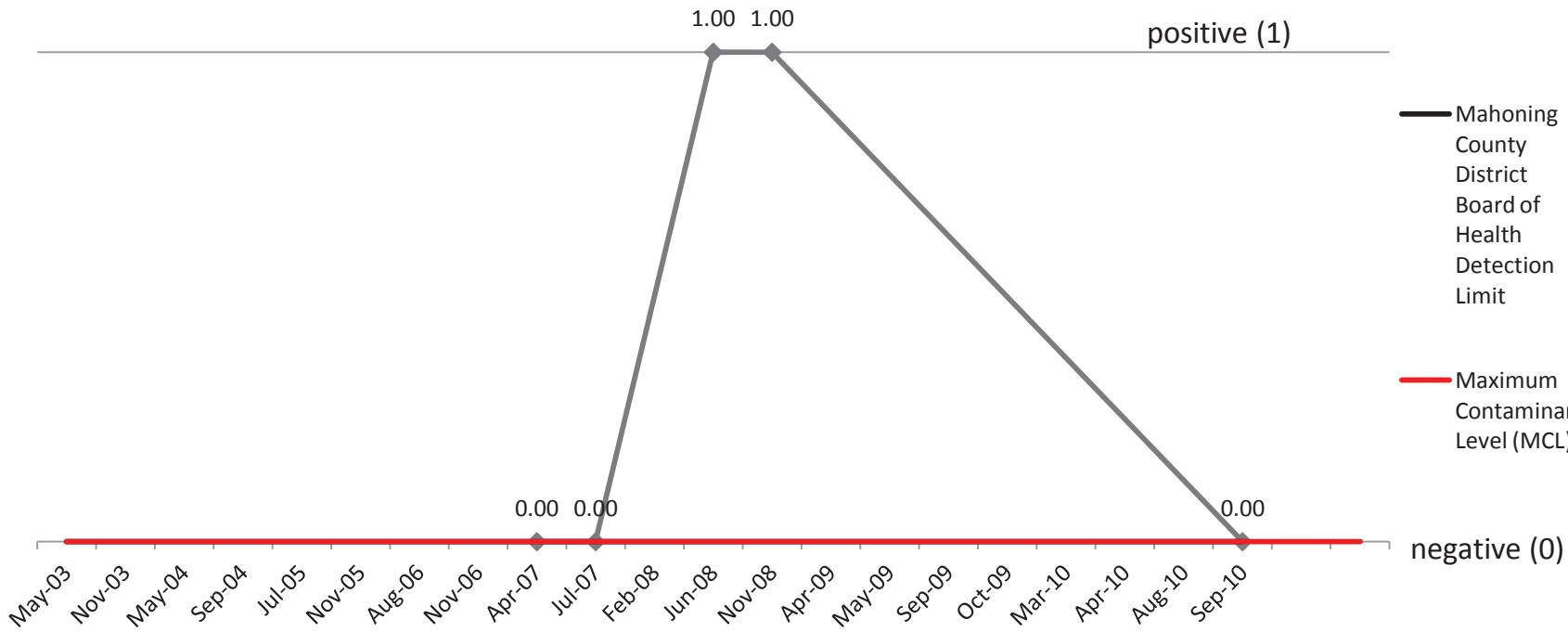
## BFI-23

Positive/Negative

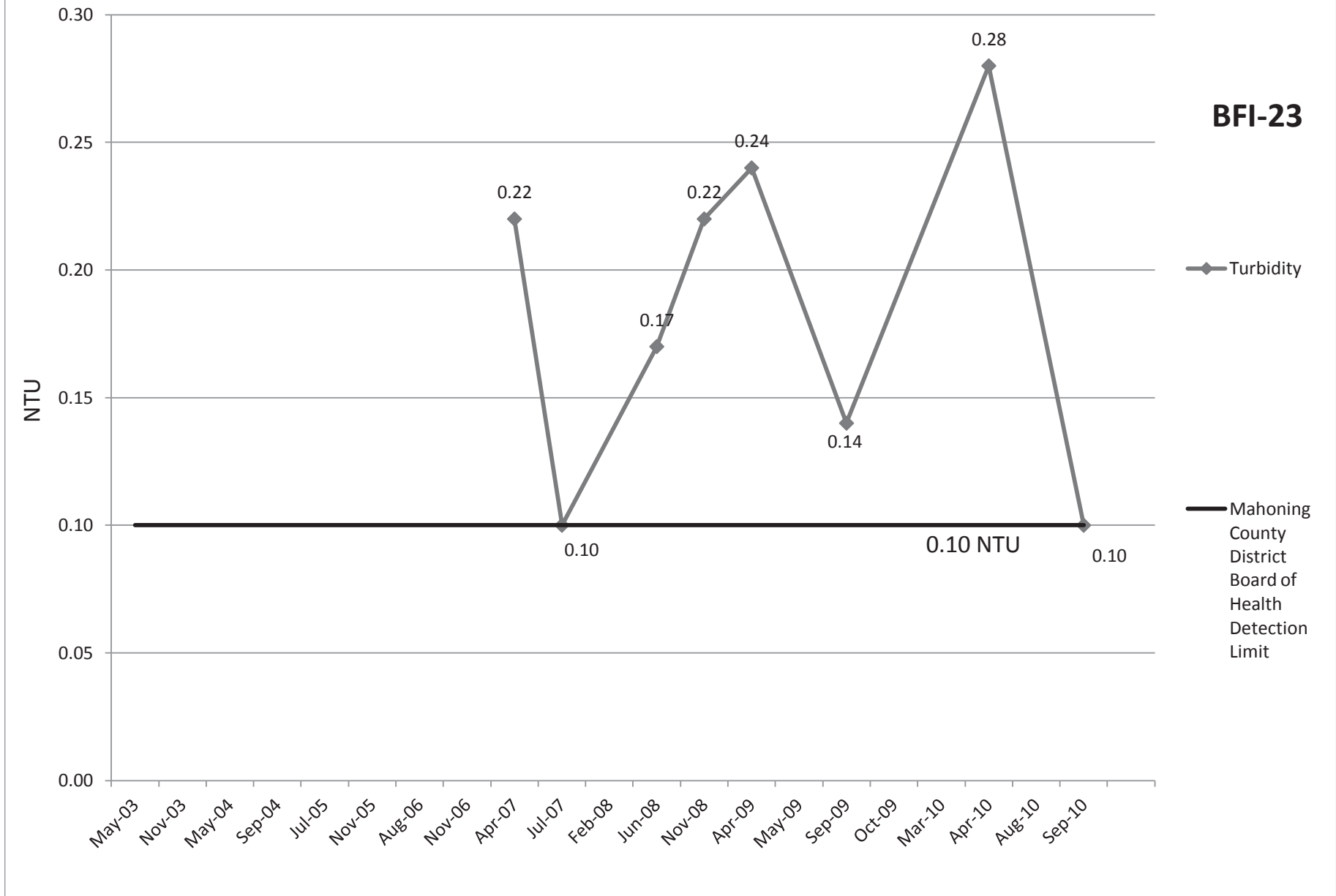
◆ Bacteria

— Mahoning County District Board of Health Detection Limit

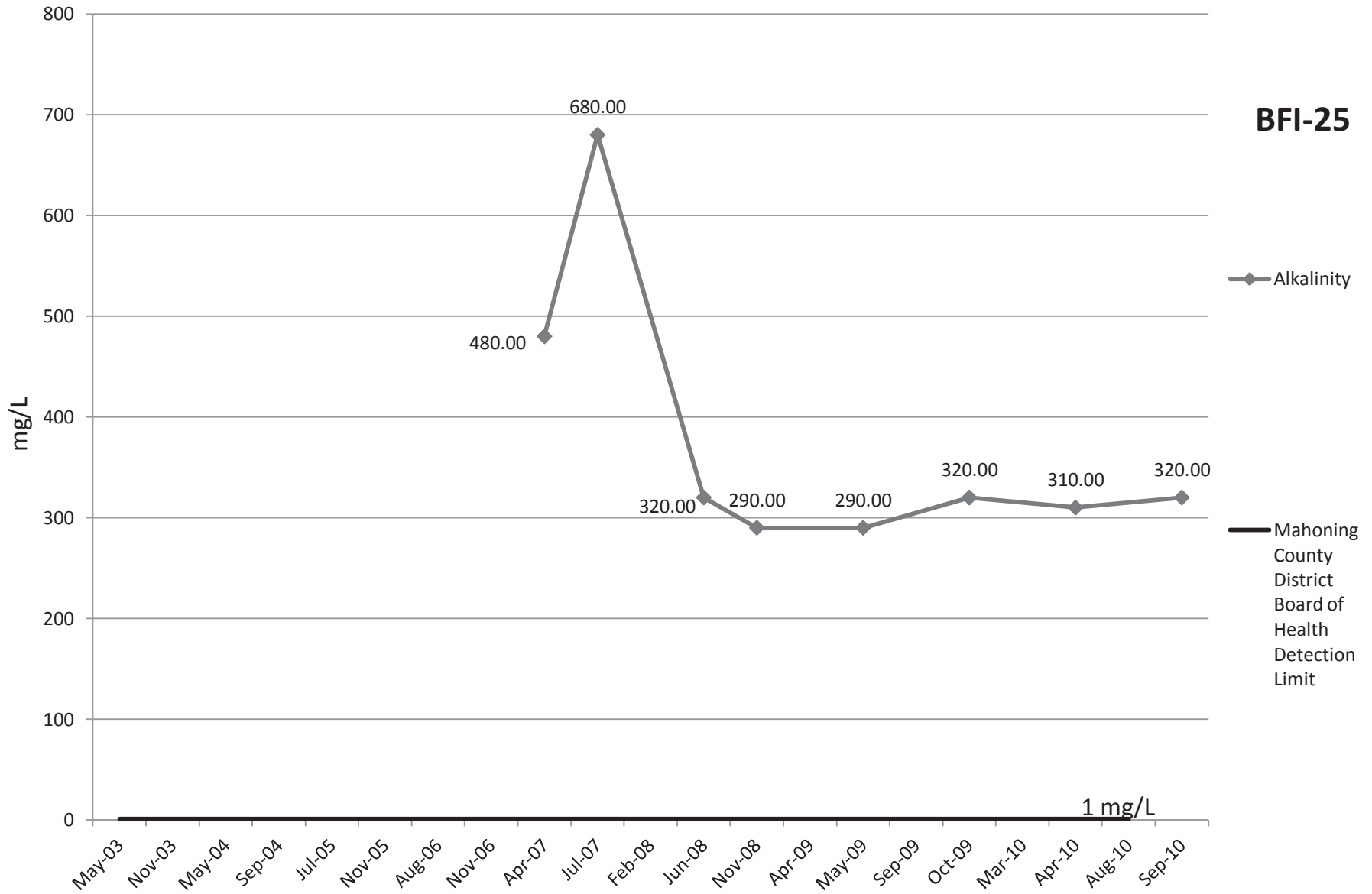
— Maximum Contaminant Level (MCL)



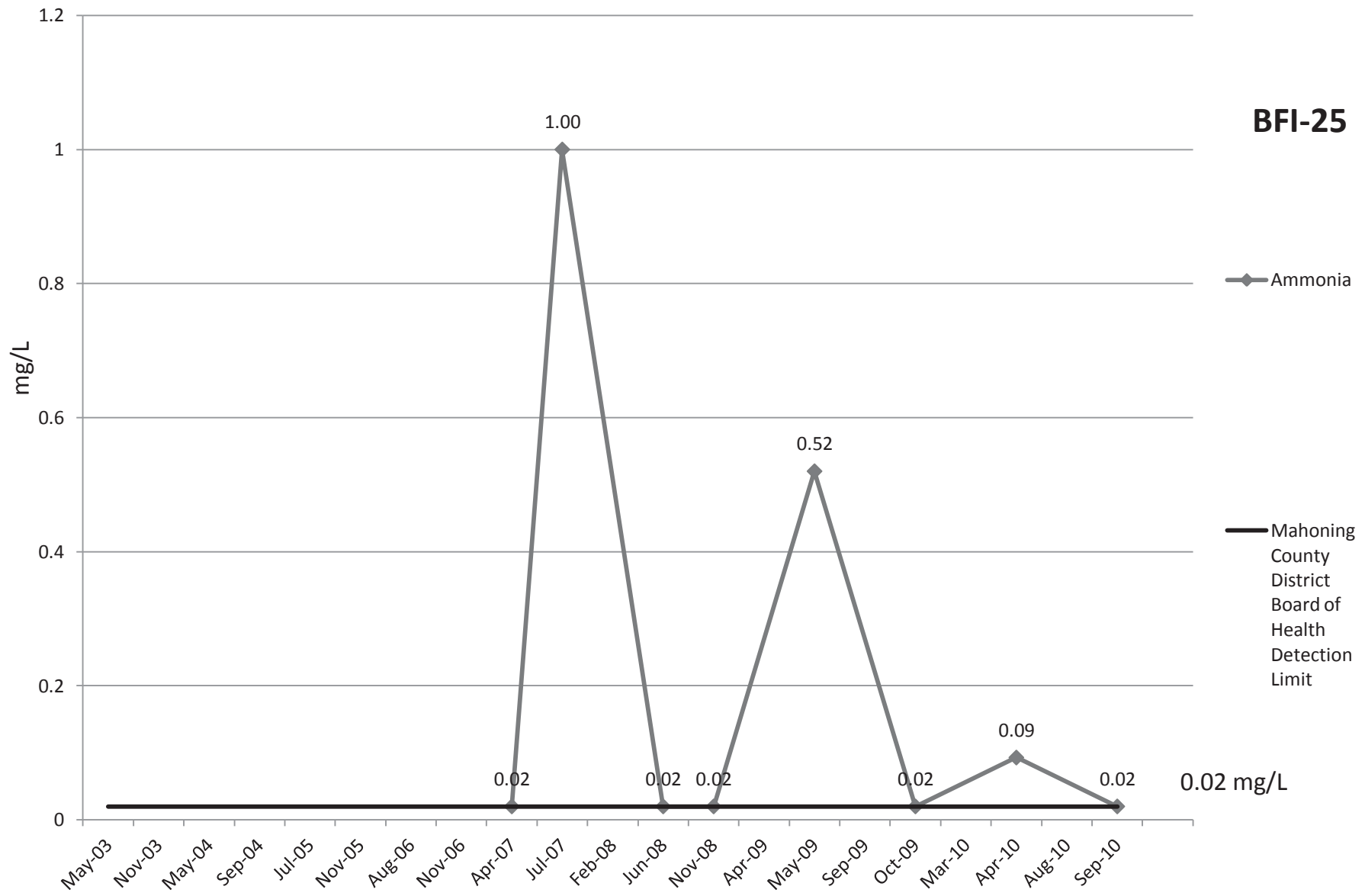
# Turbidity



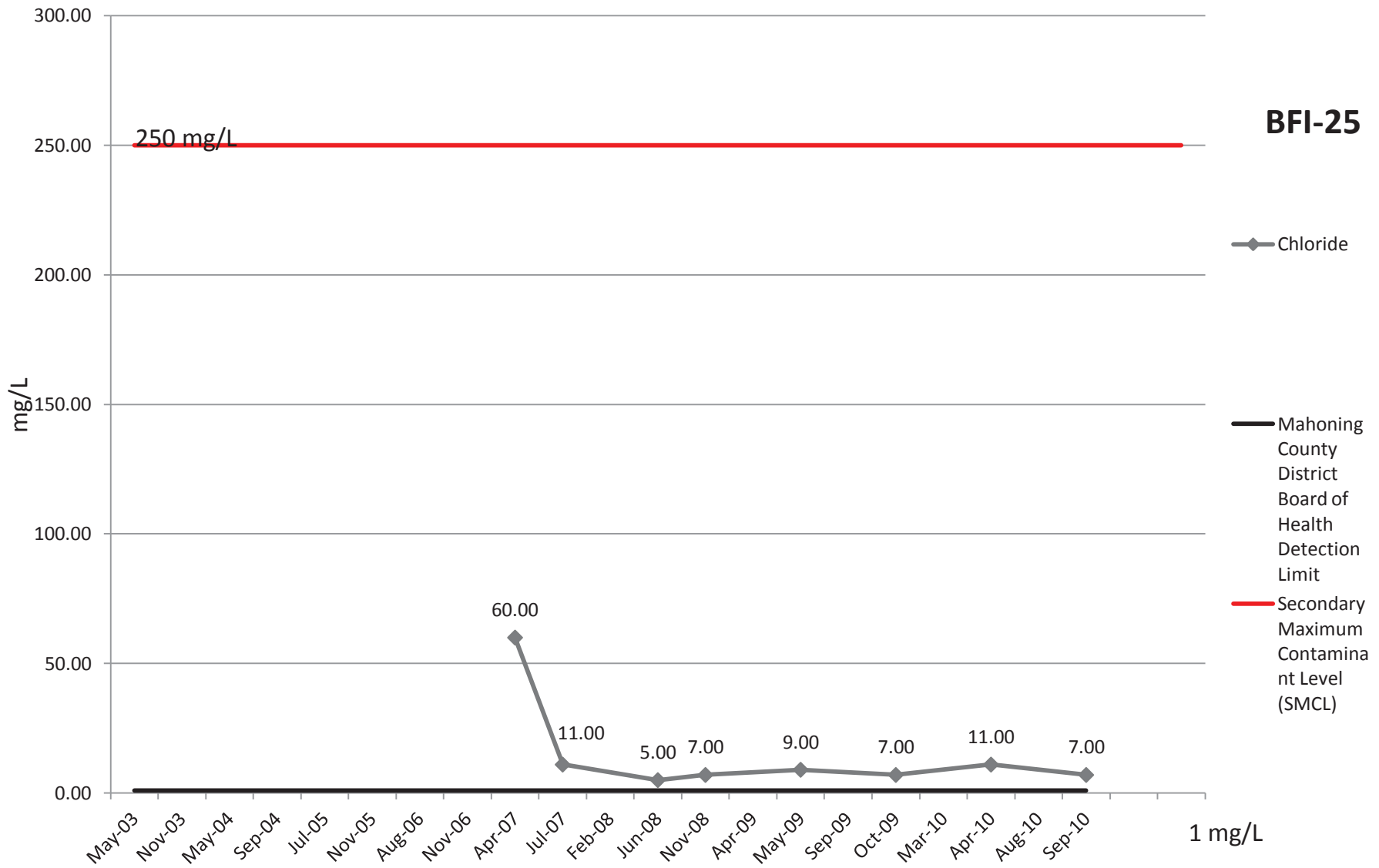
# Alkalinity



# Ammonia

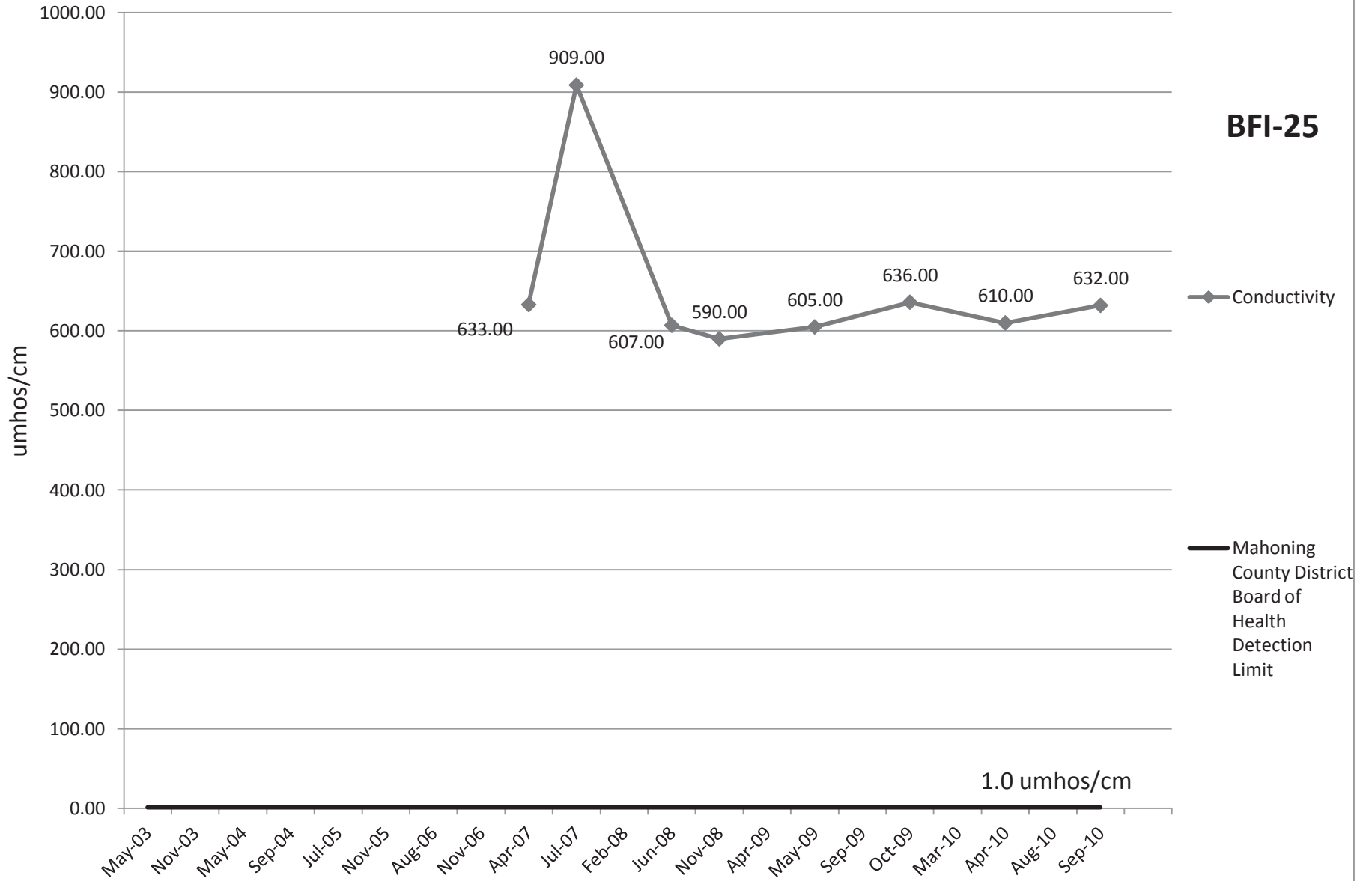


# Chloride

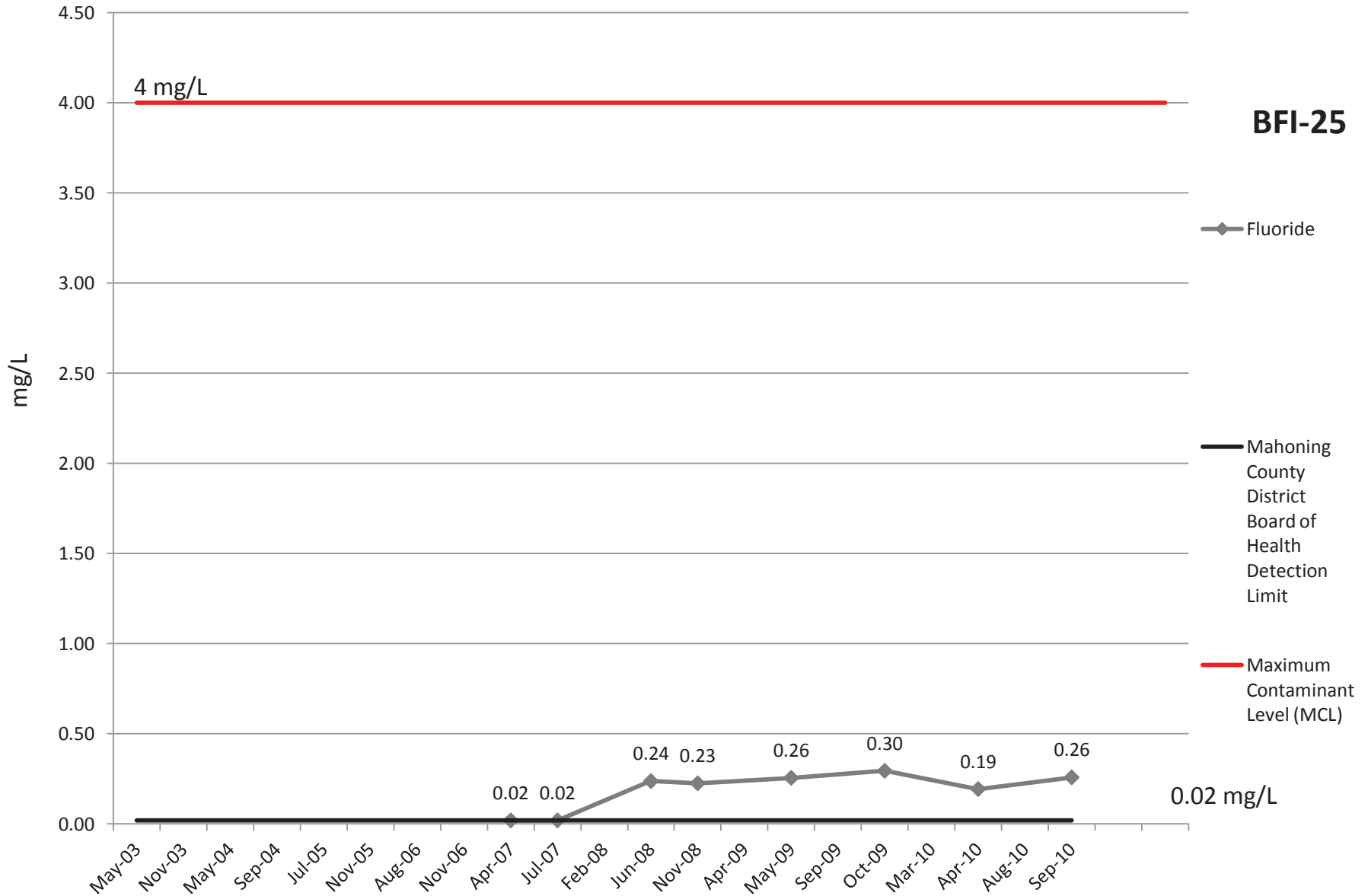


# Conductivity

**BFI-25**

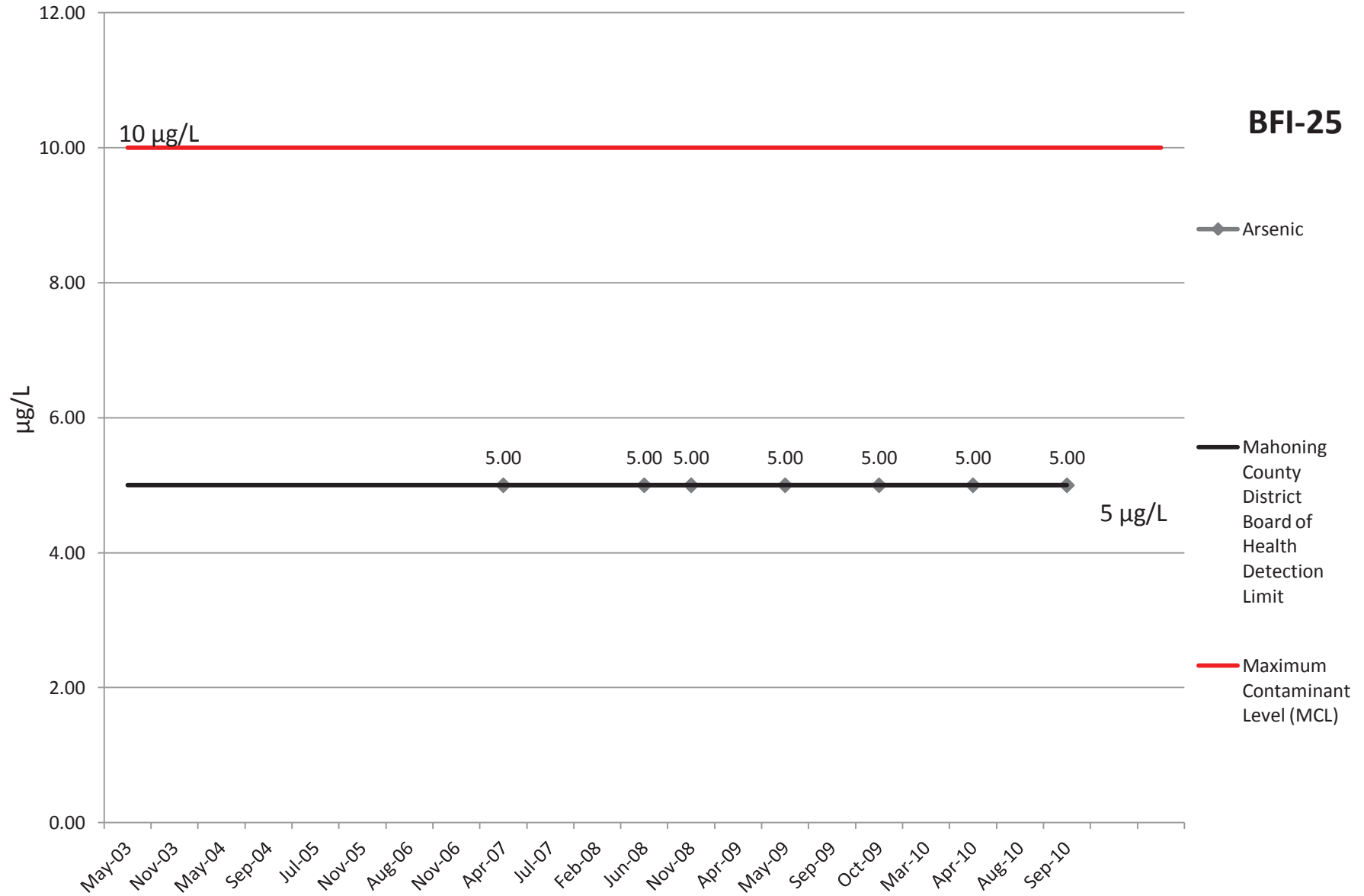


# Fluoride

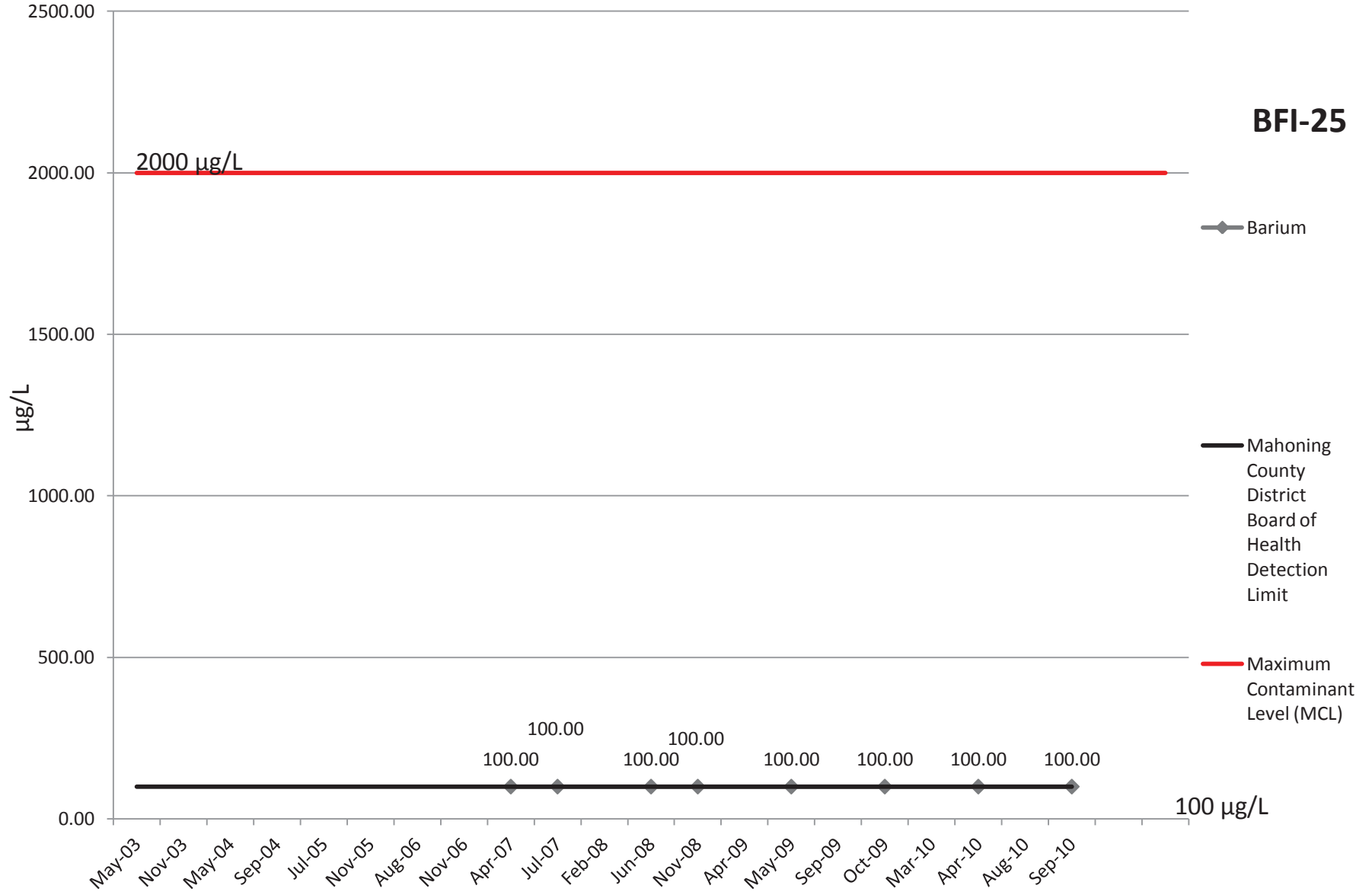




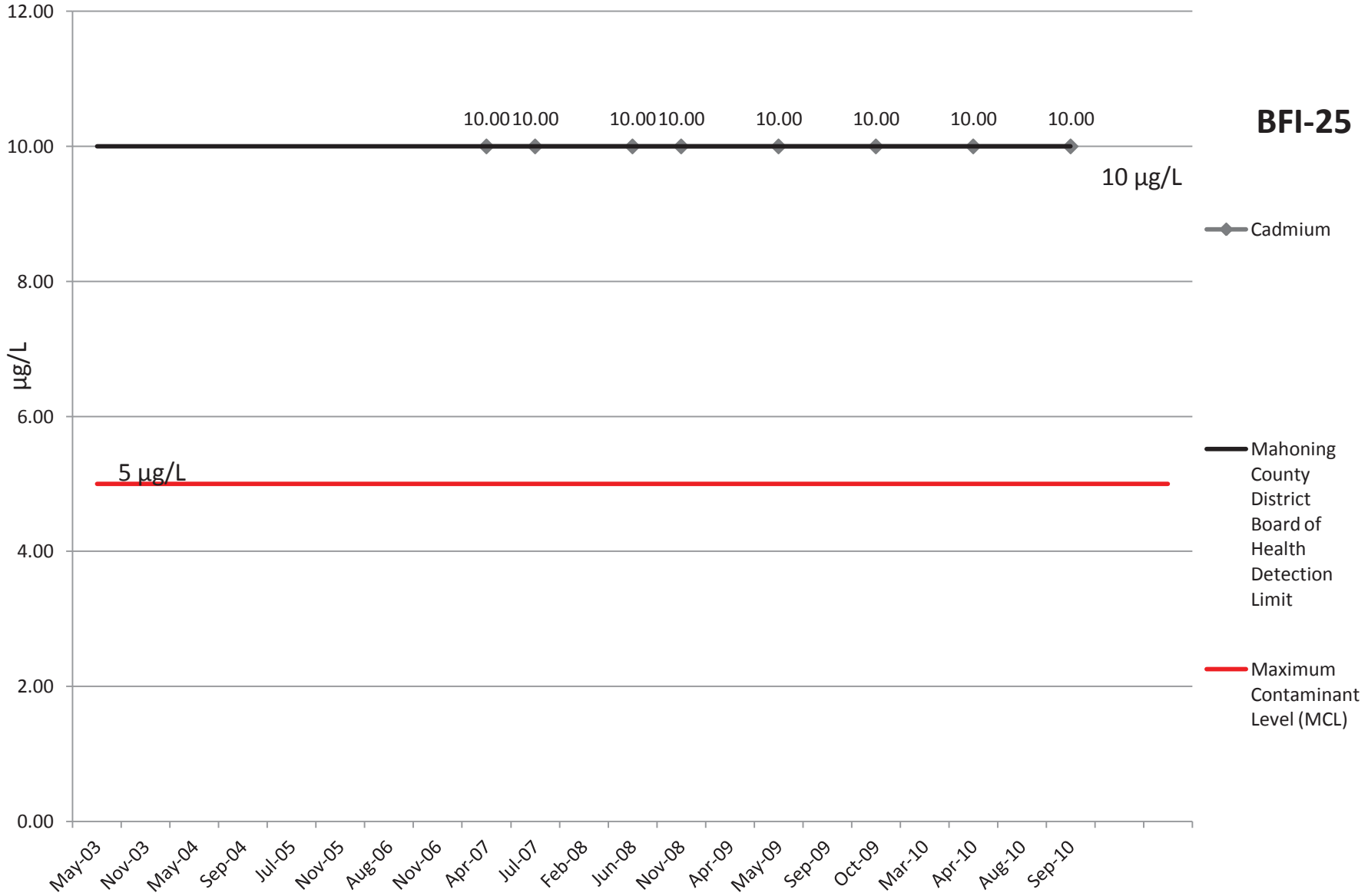
# Arsenic



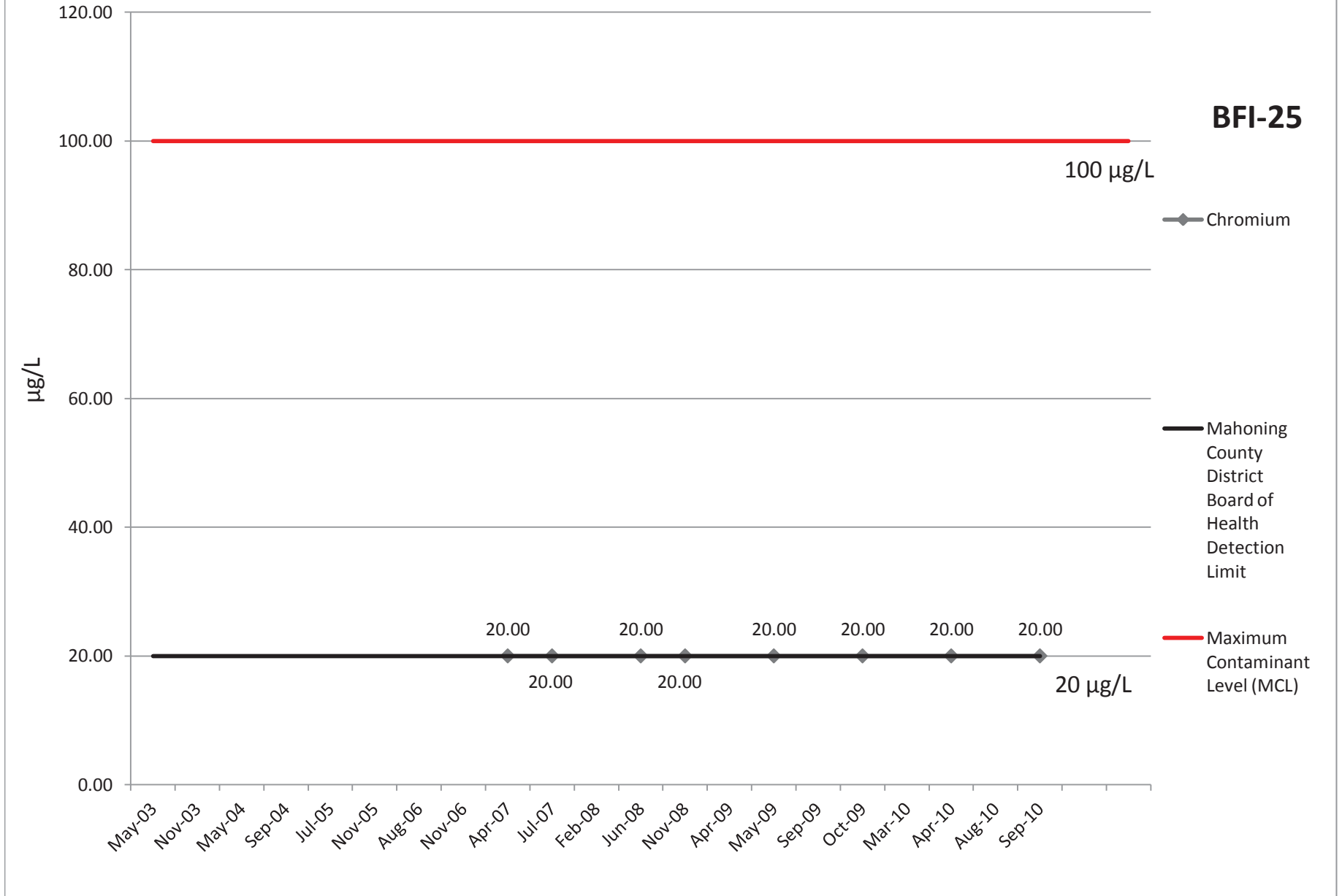
# Barium



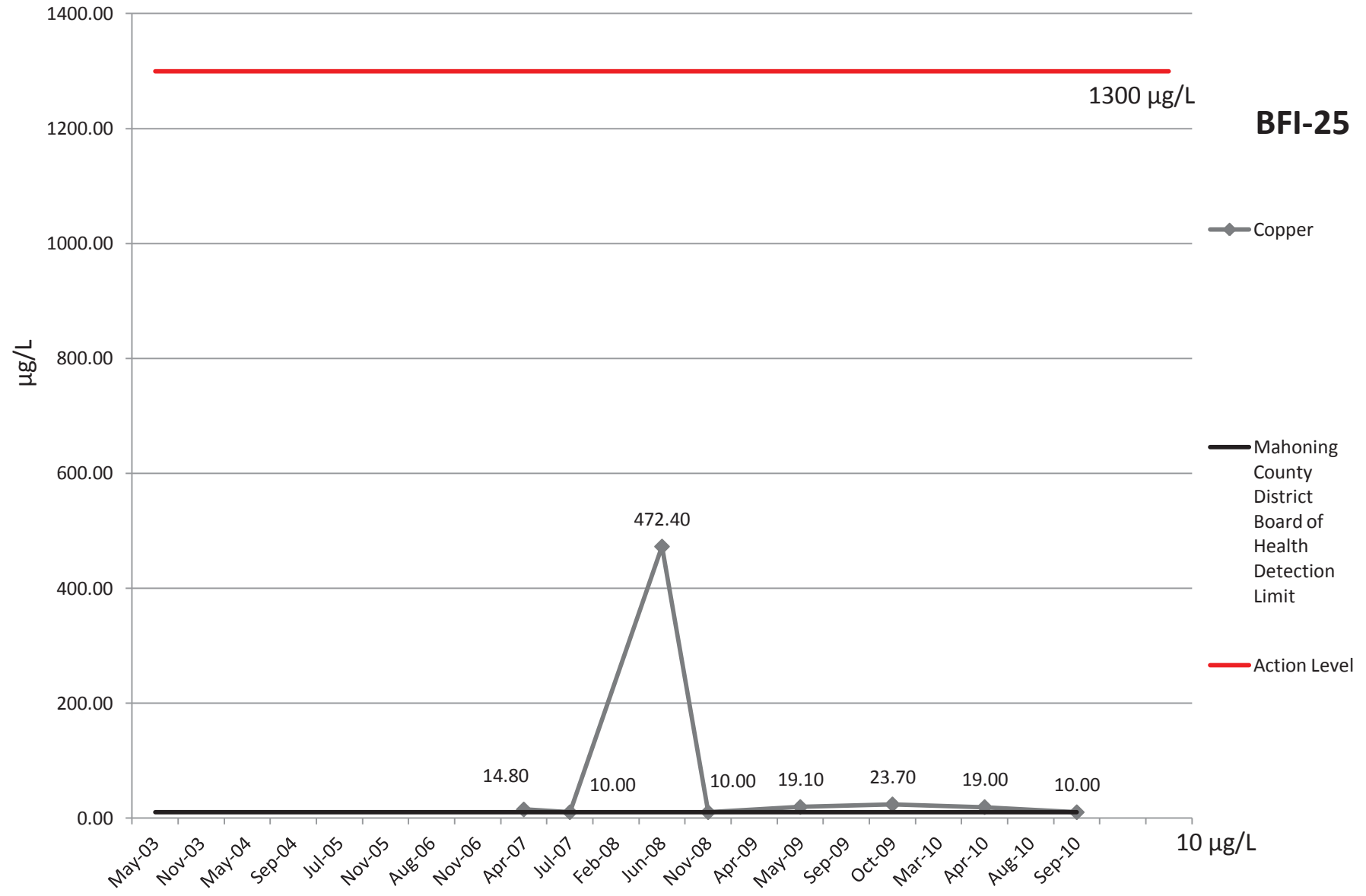
# Cadmium



# Chromium

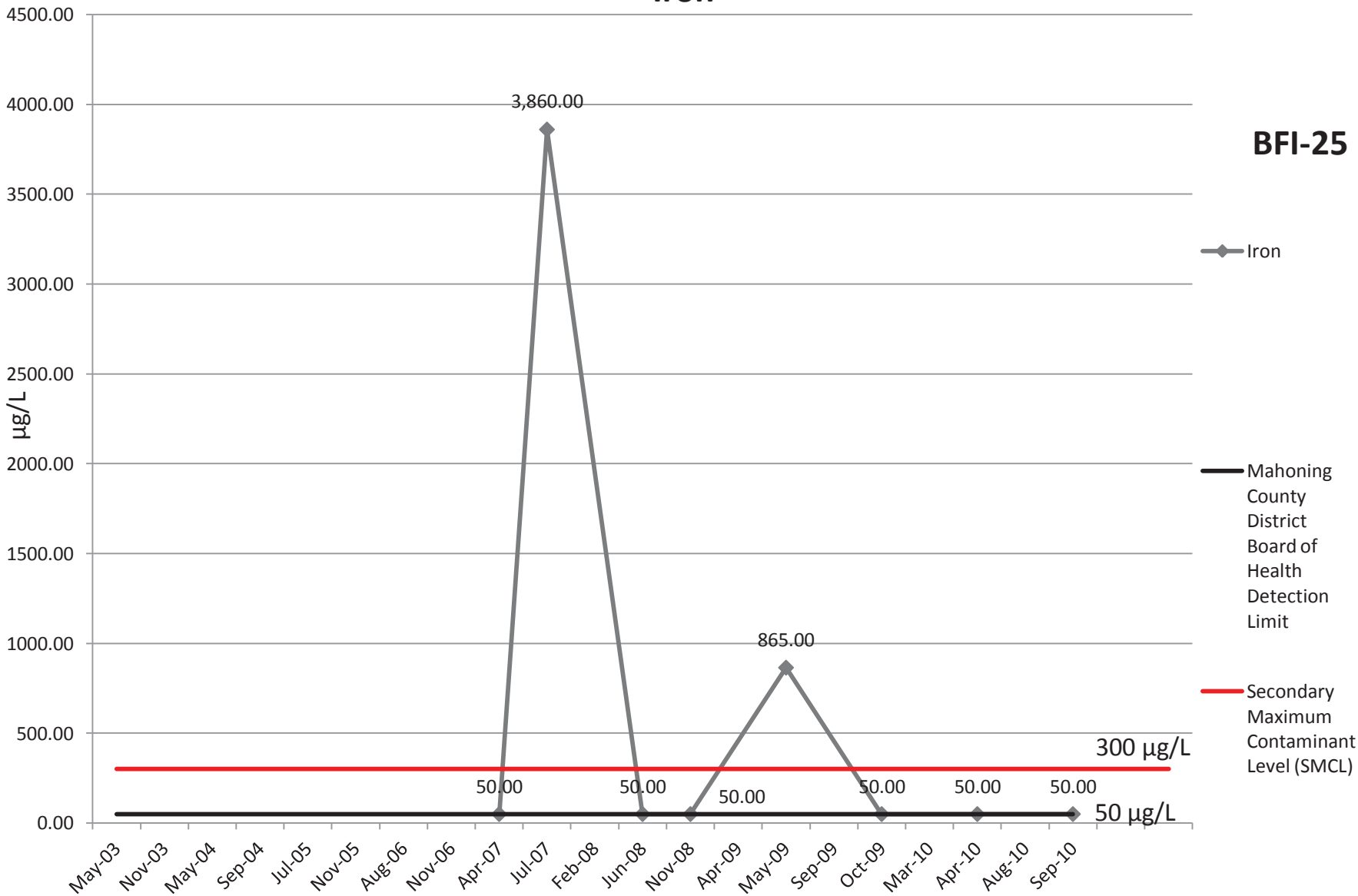


# Copper



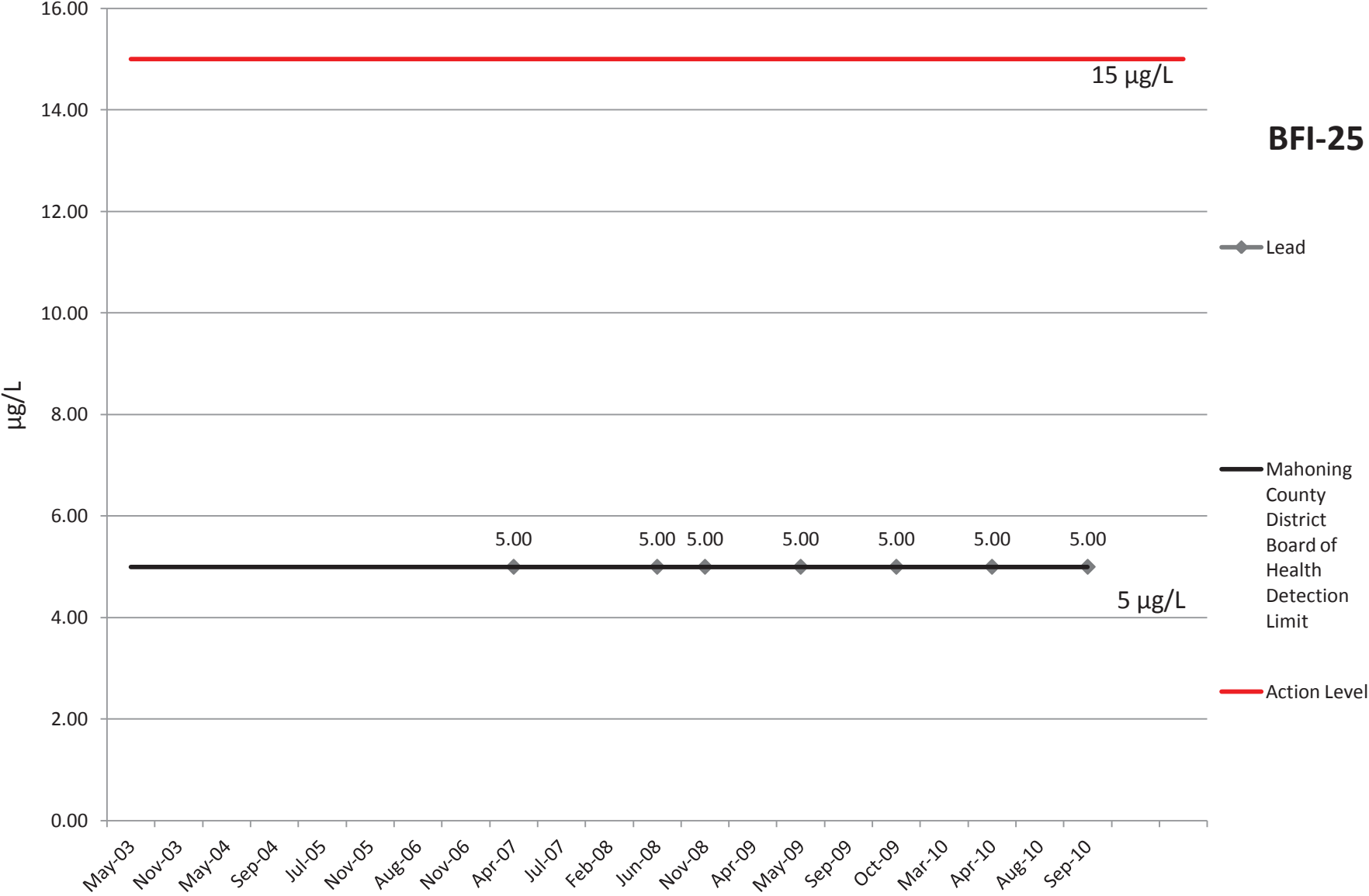
# Iron

## BFI-25

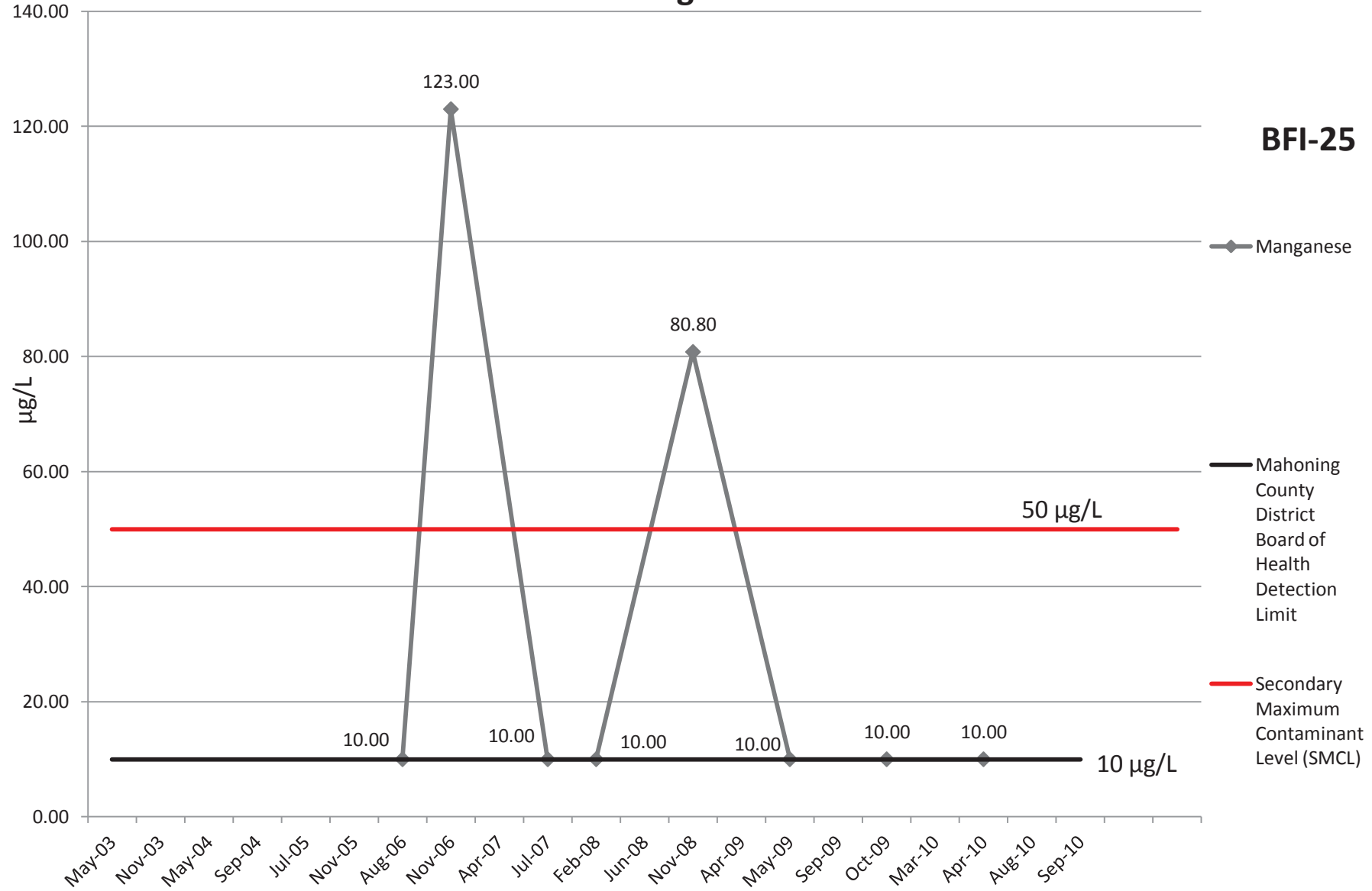


# Lead

**BFI-25**



# Manganese



**BFI-25**

◆ Manganese

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)



# Mercury

**BFI-25**

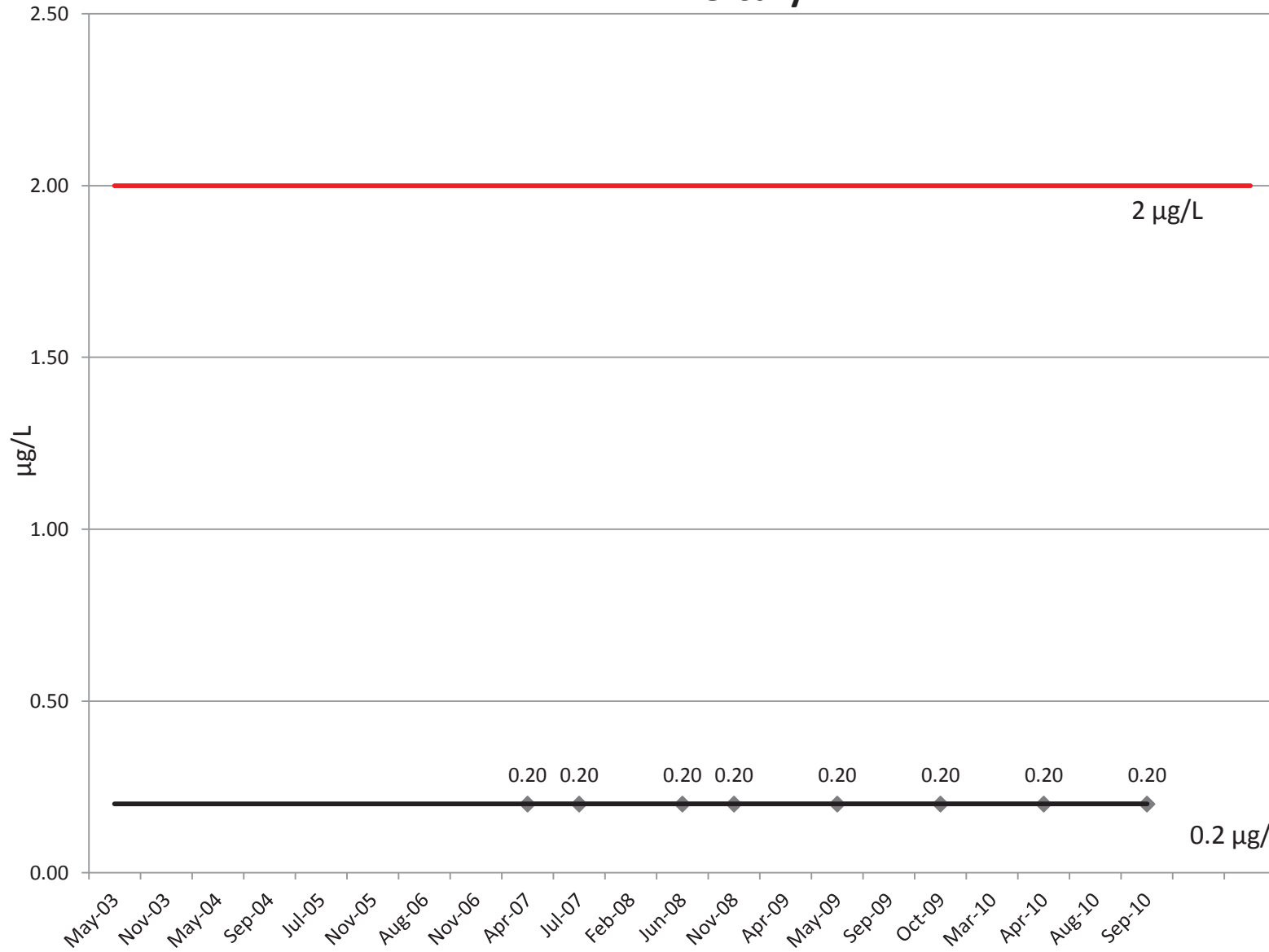
2 µg/L

Mercury

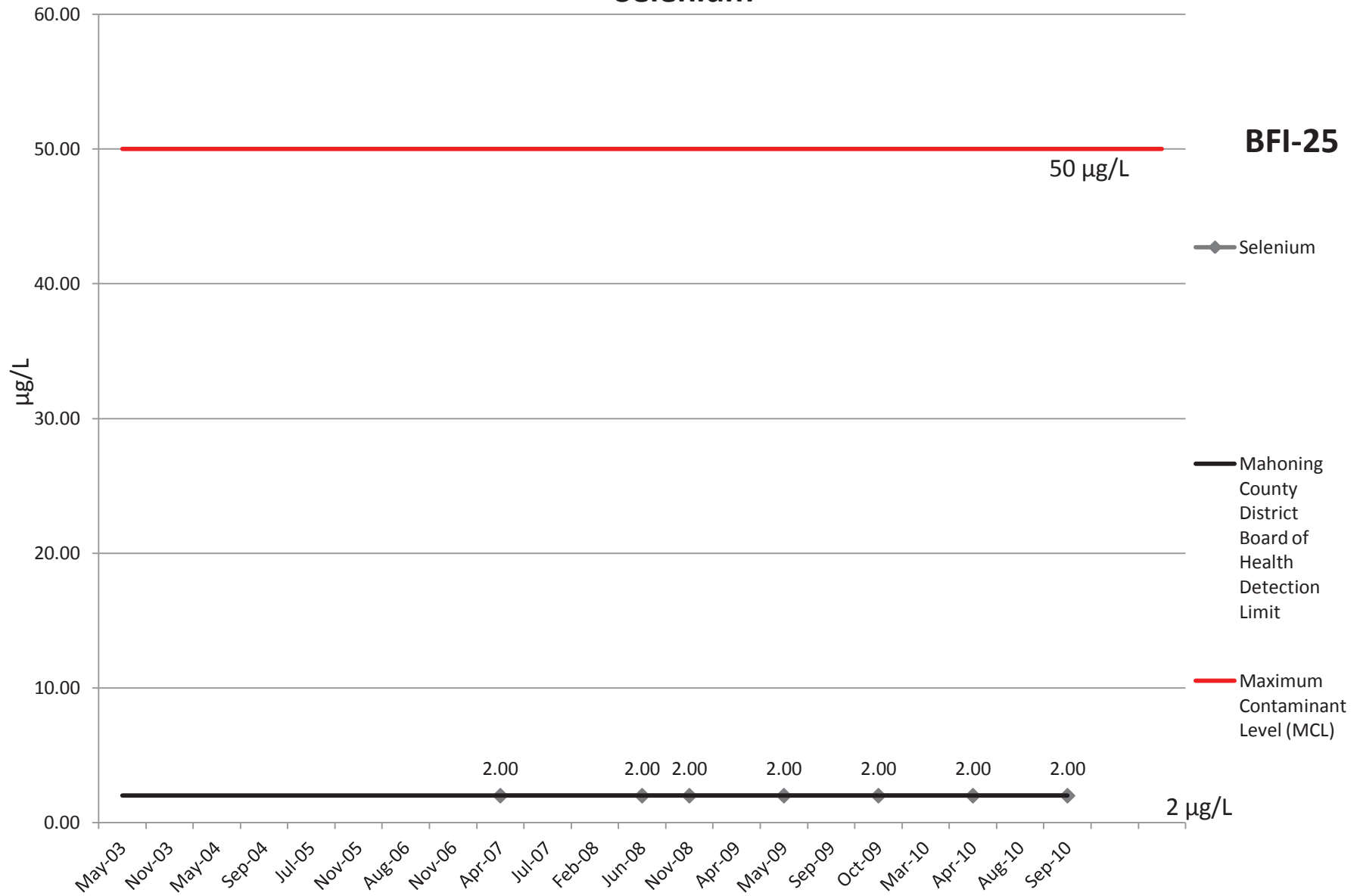
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

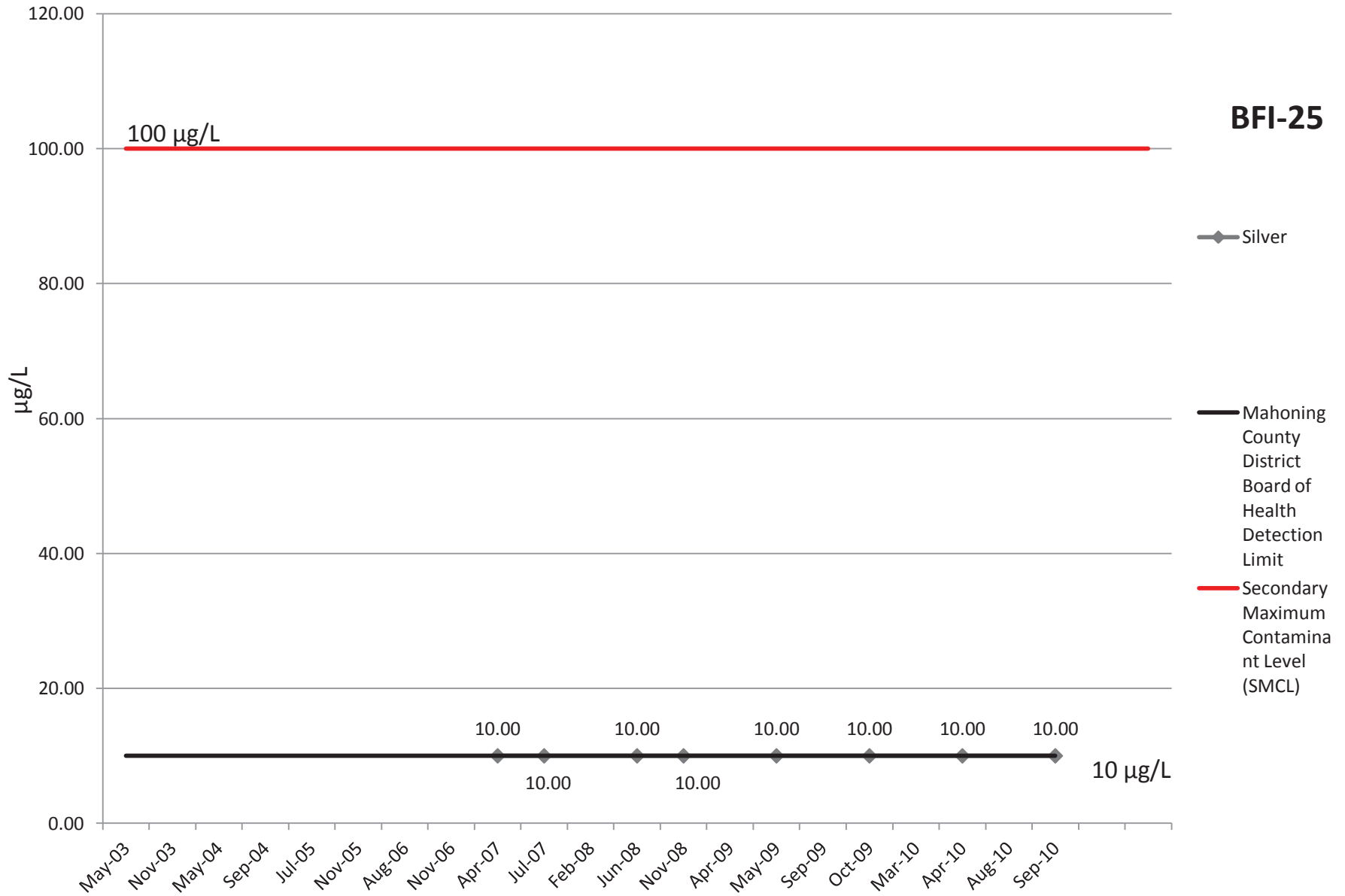
0.2 µg/L



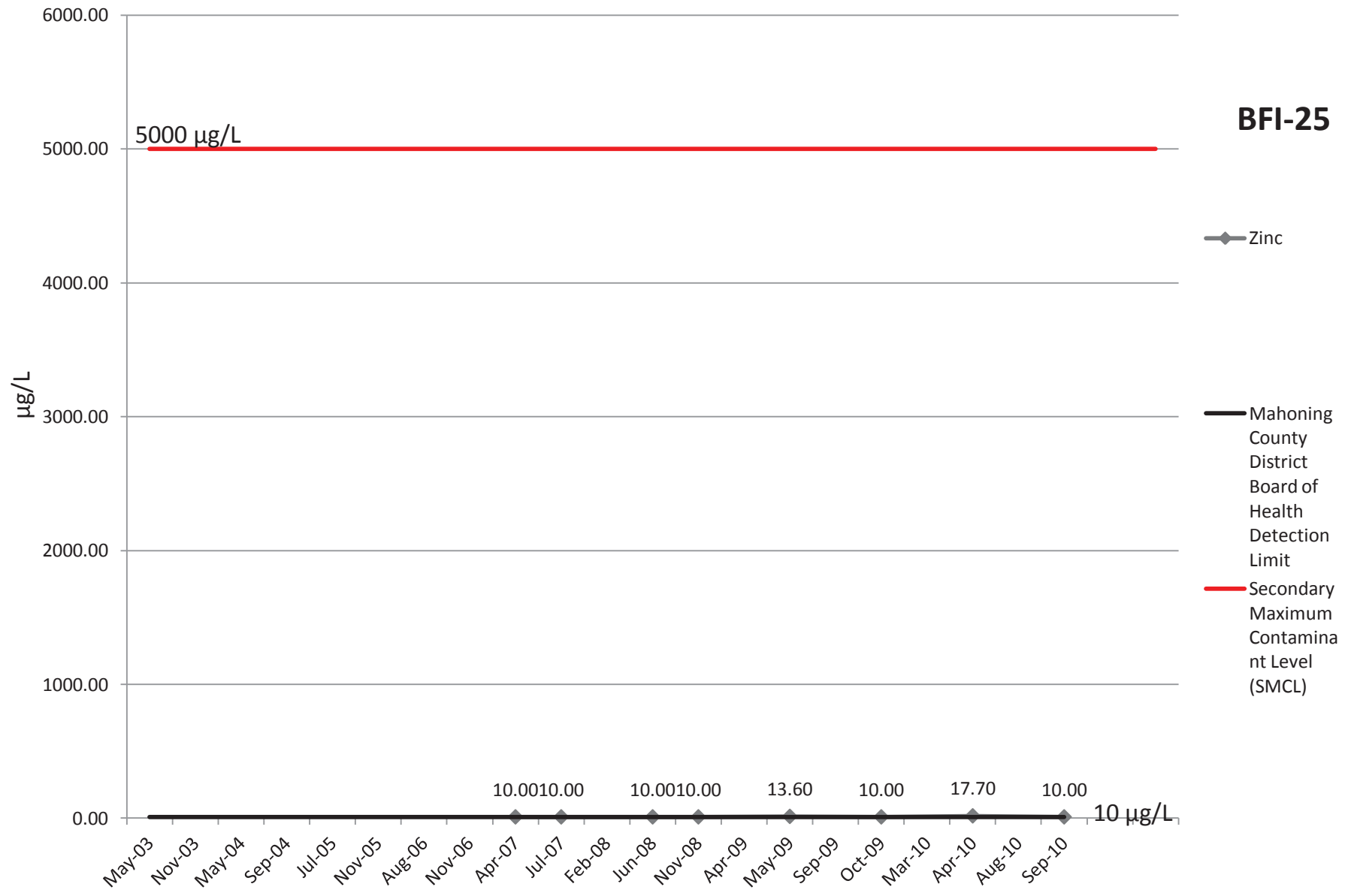
# Selenium



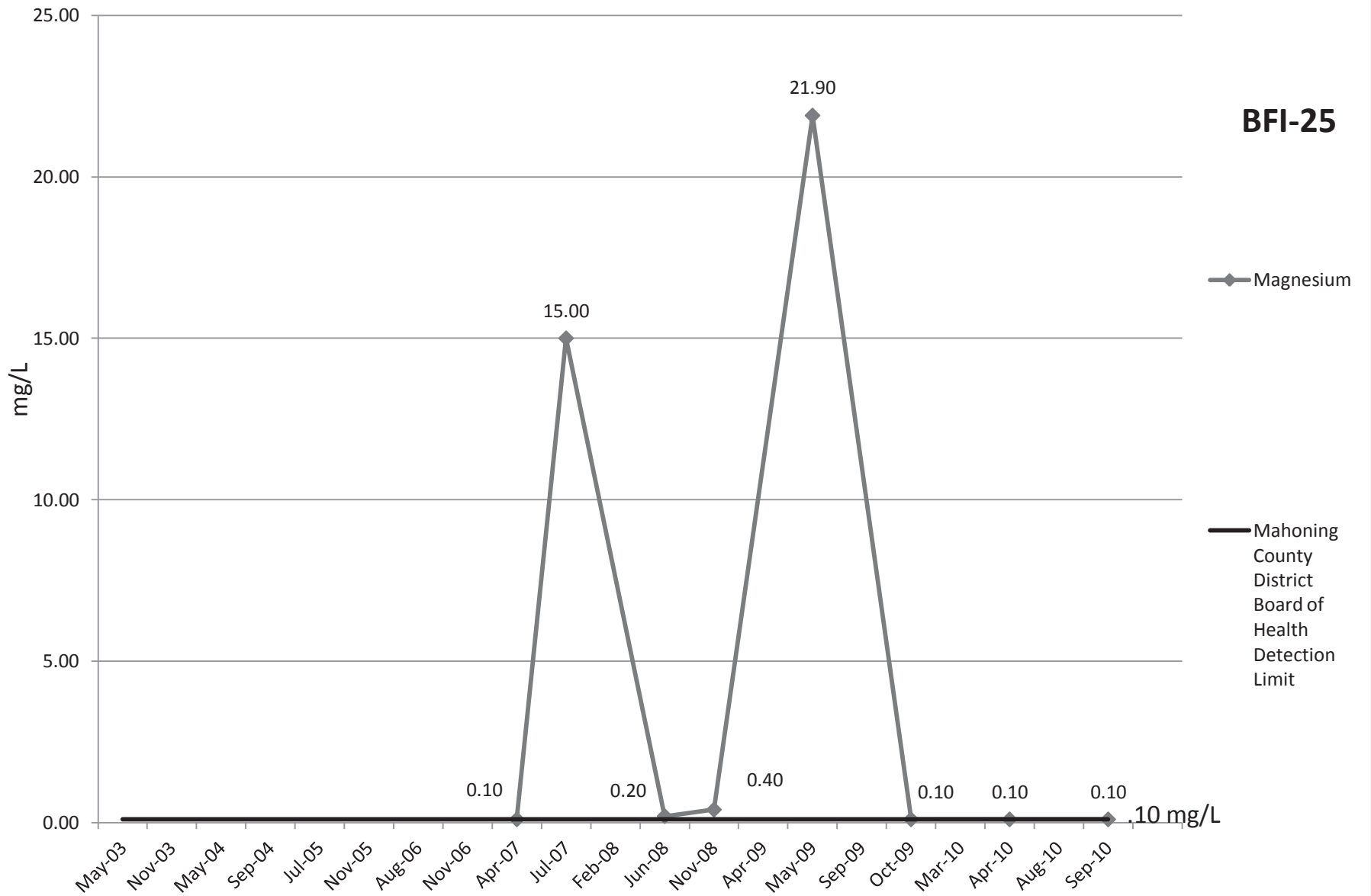
# Silver



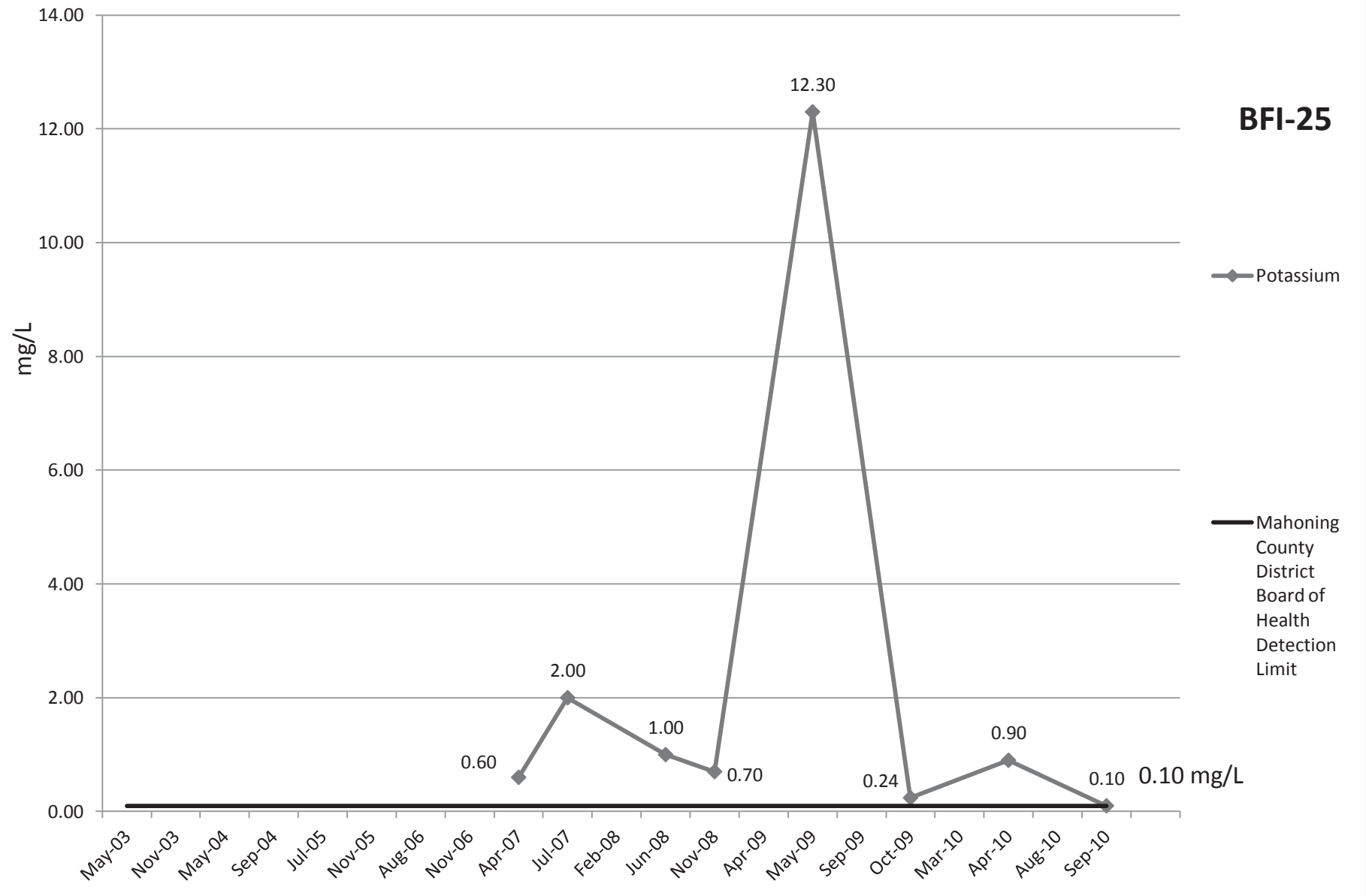
# Zinc



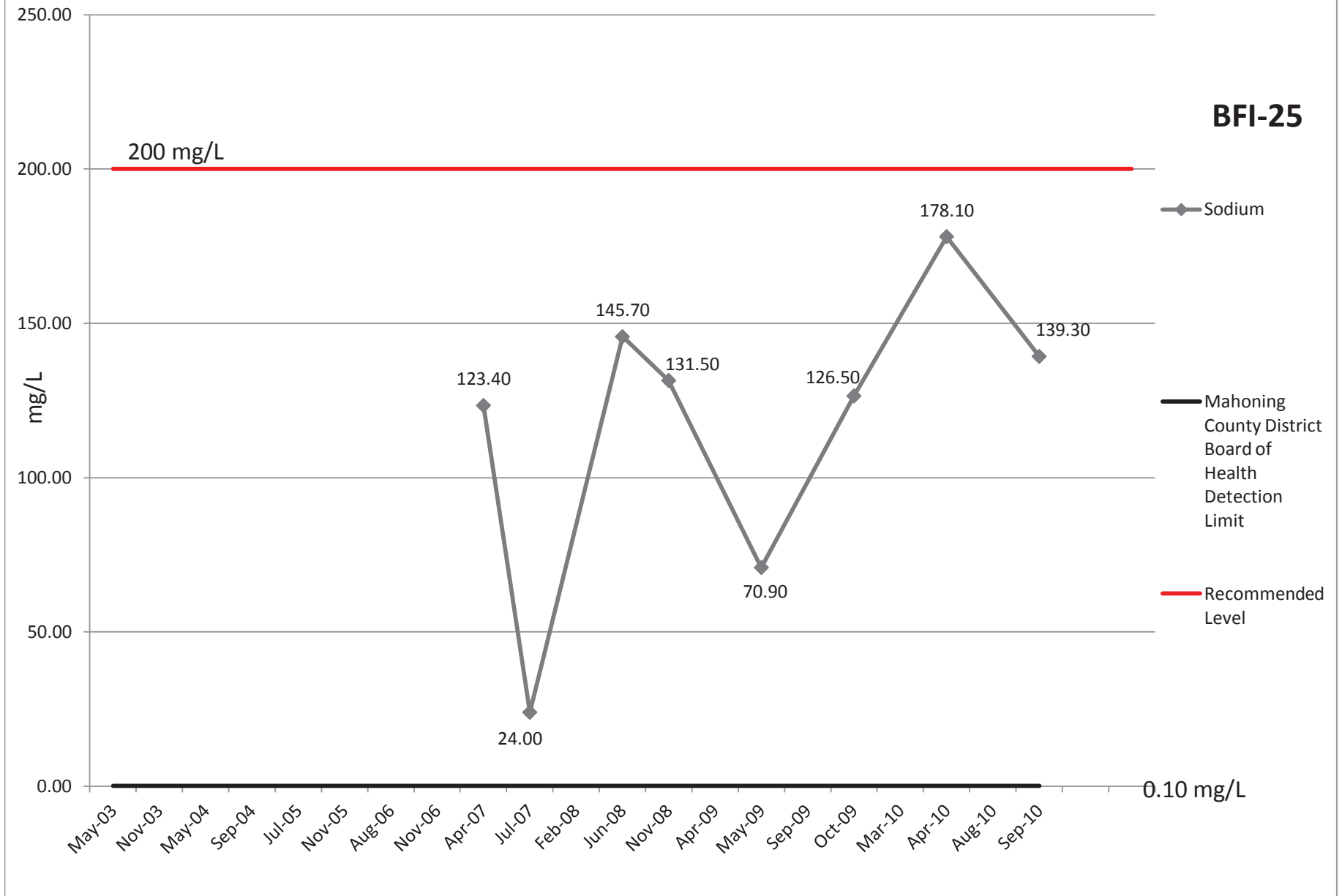
# Magnesium



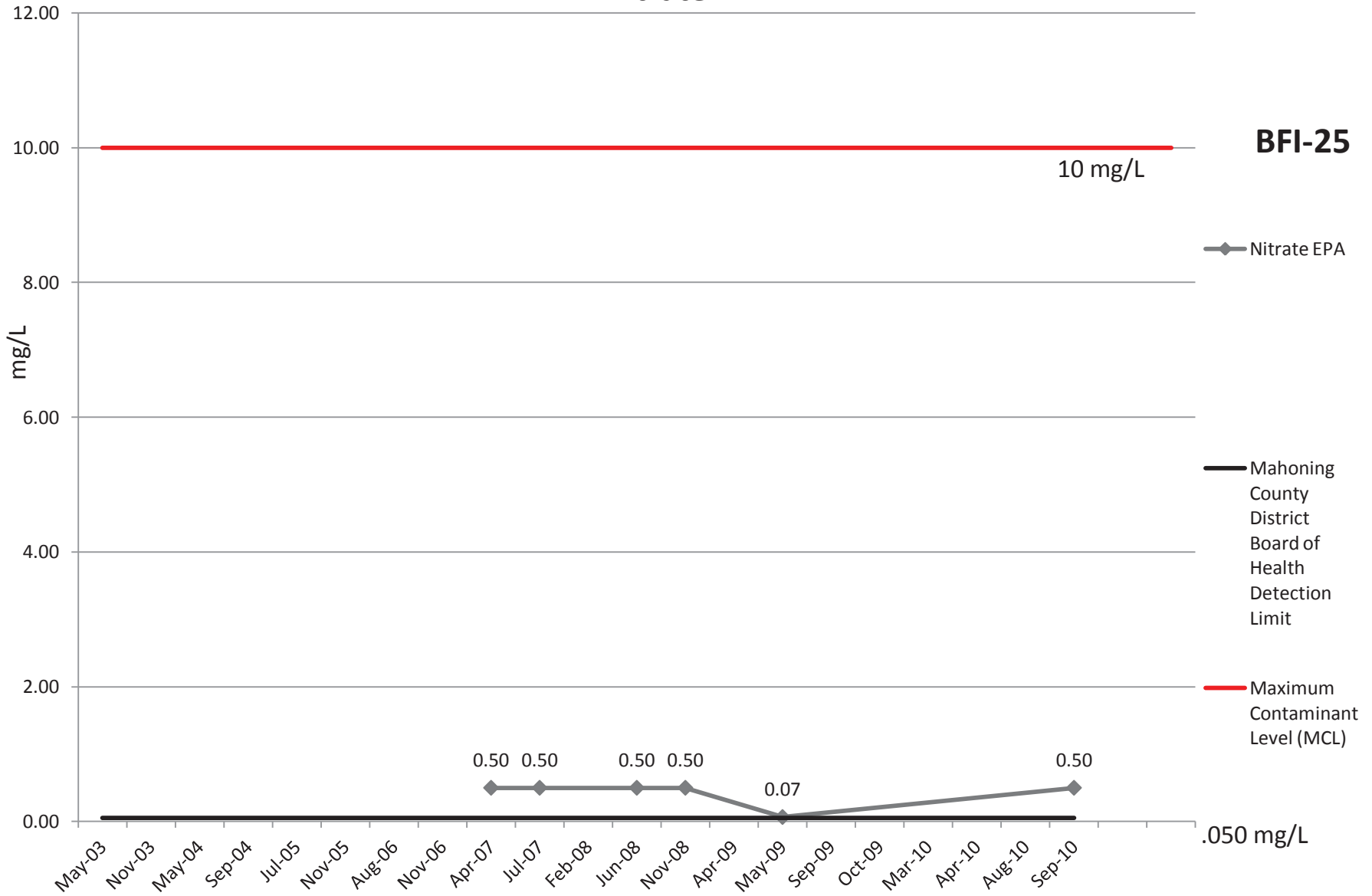
# Potassium



# Sodium

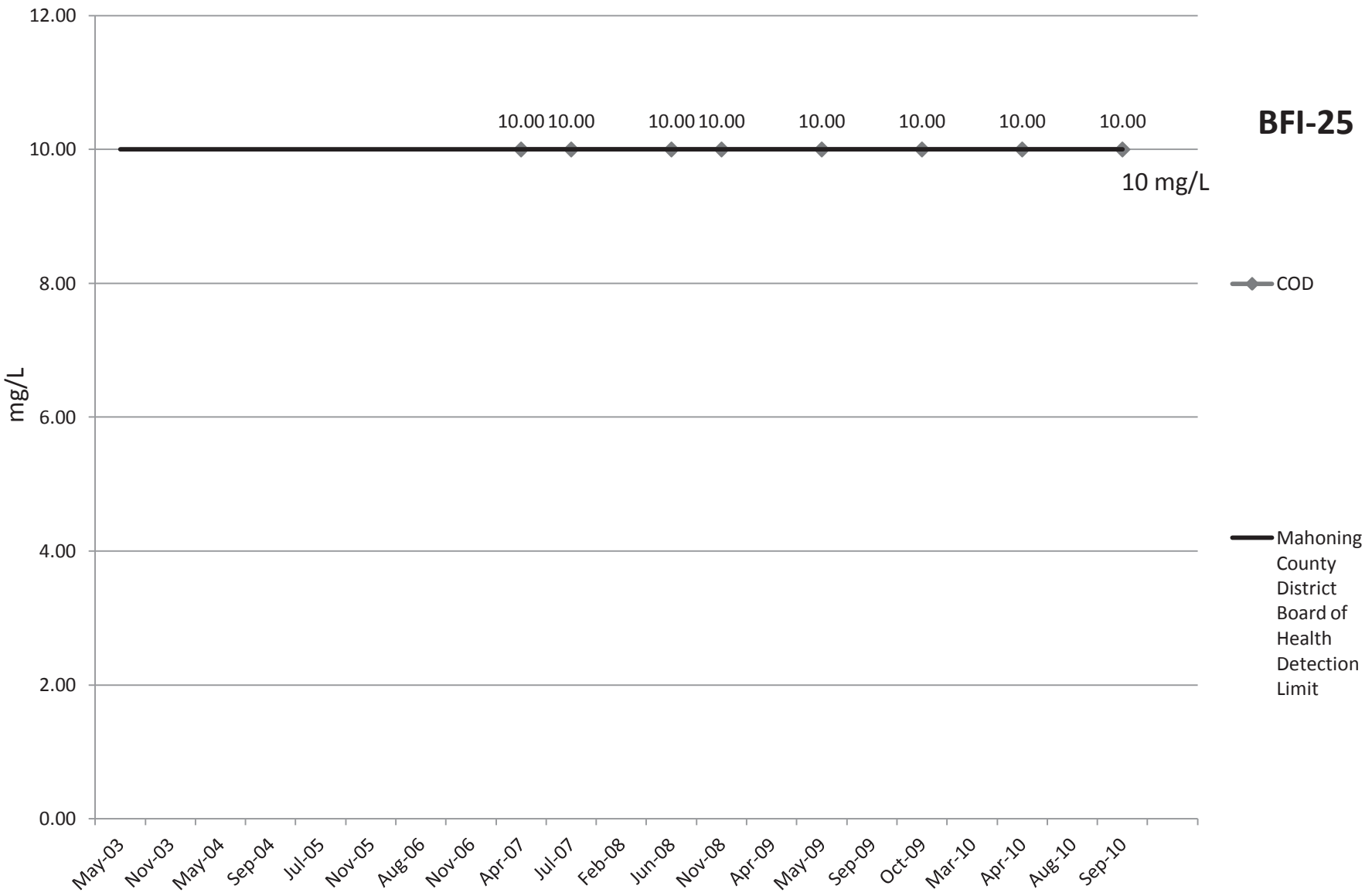


# Nitrate EPA



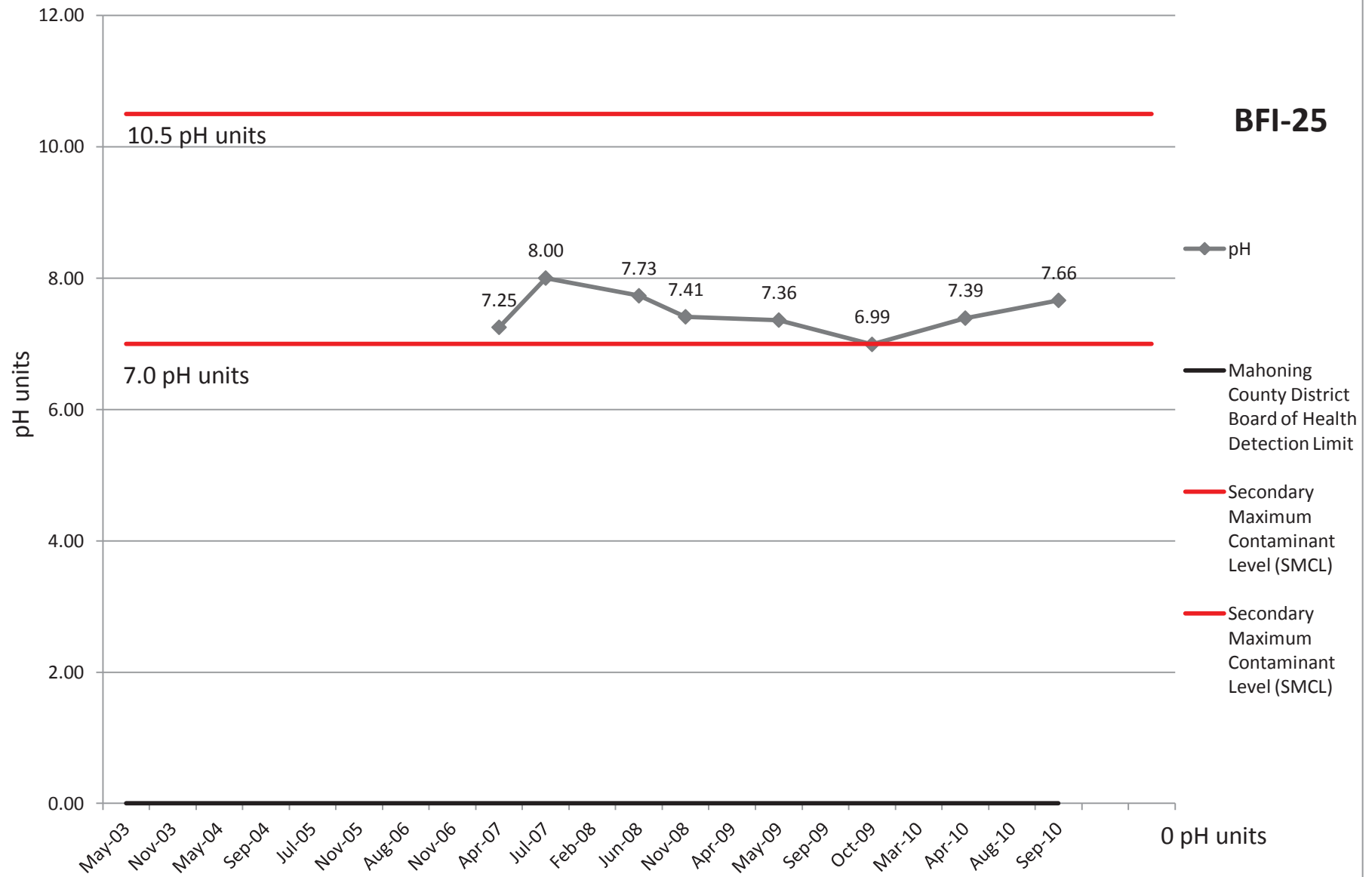


# COD



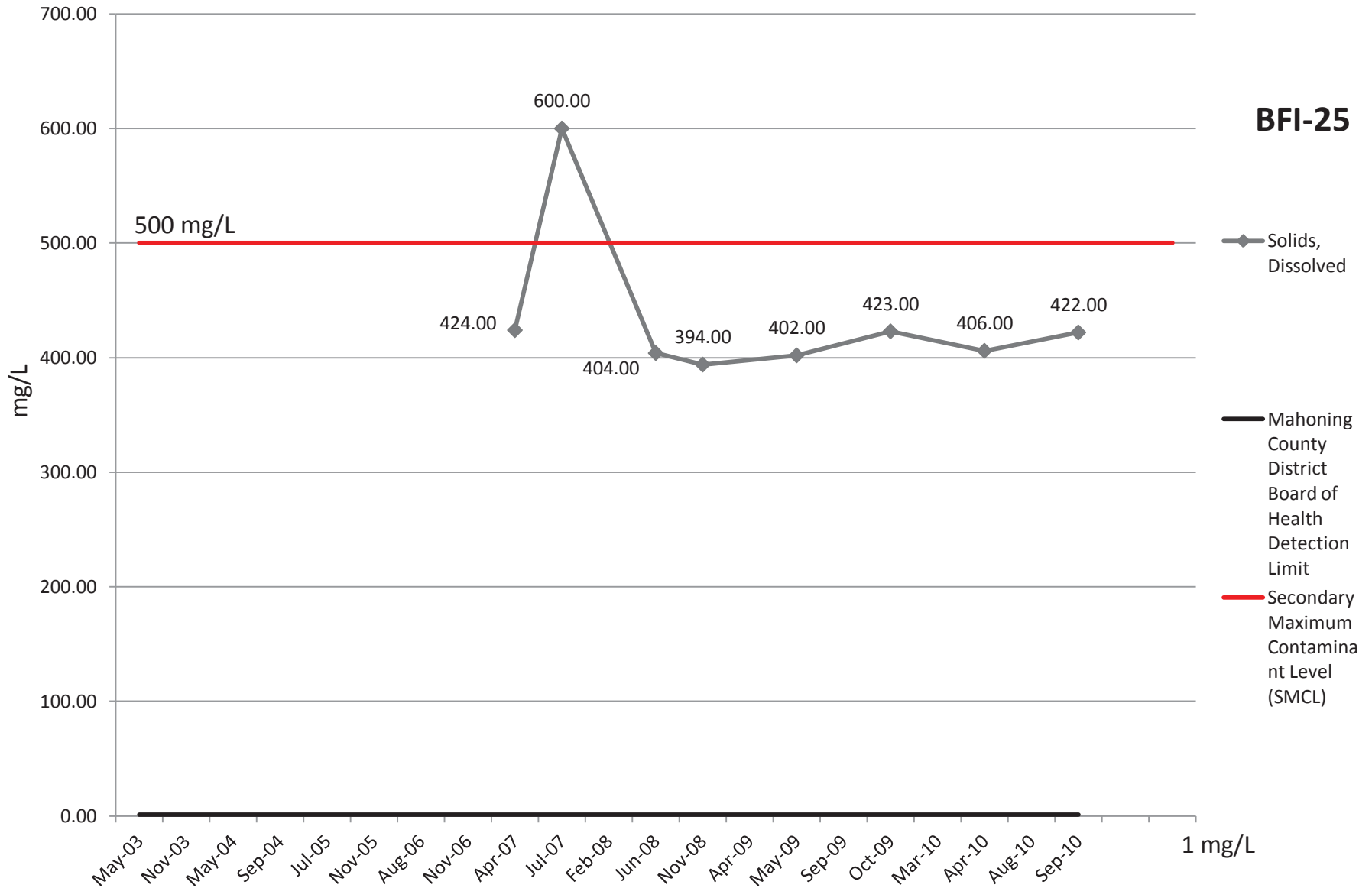
# pH

**BFI-25**

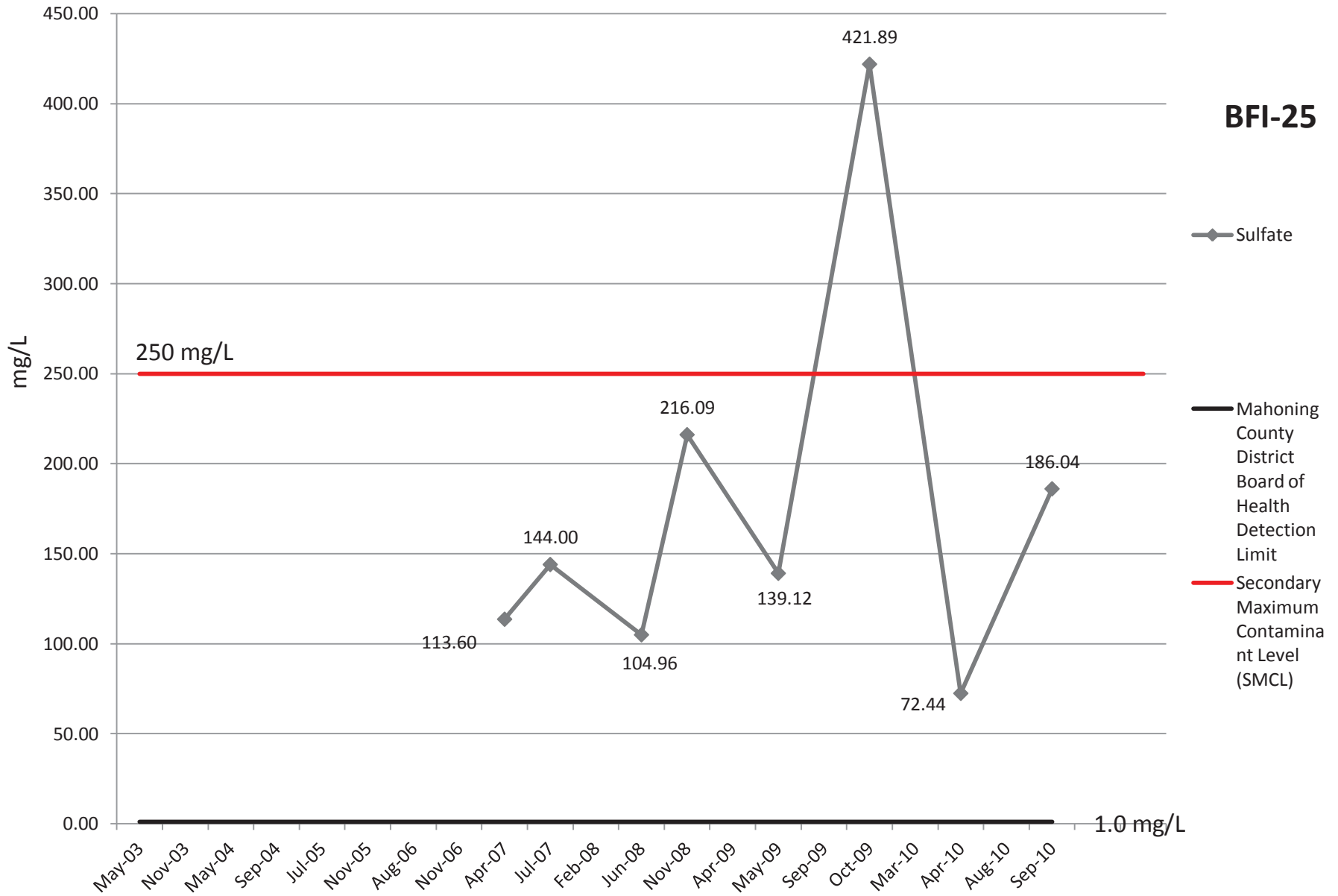


# Solids, Dissolved

**BFI-25**



# Sulfate



# Bacteria

## BFI-25

Positive/Negative

◆ Bacteria

positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

1.00

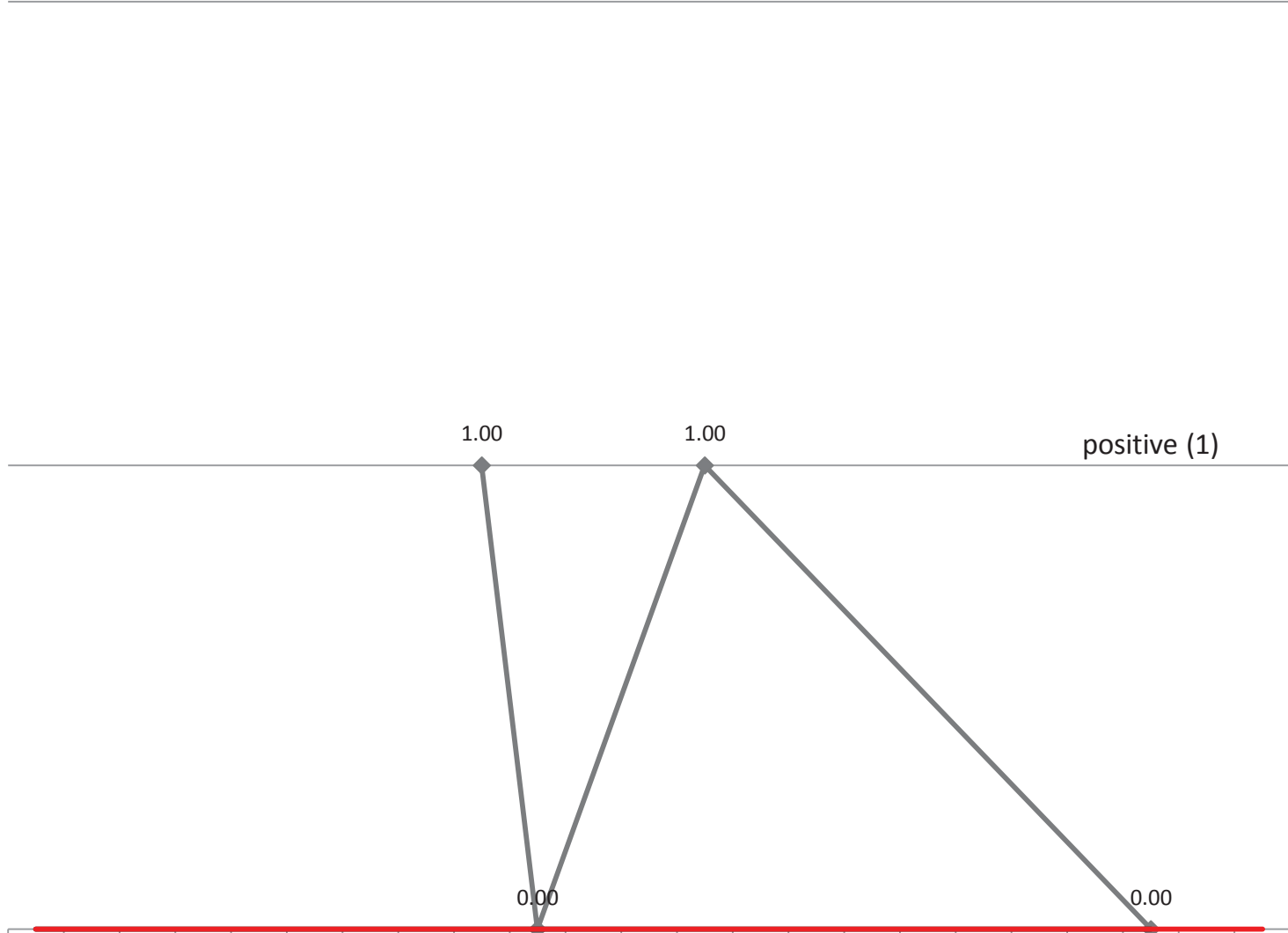
1.00

0.00

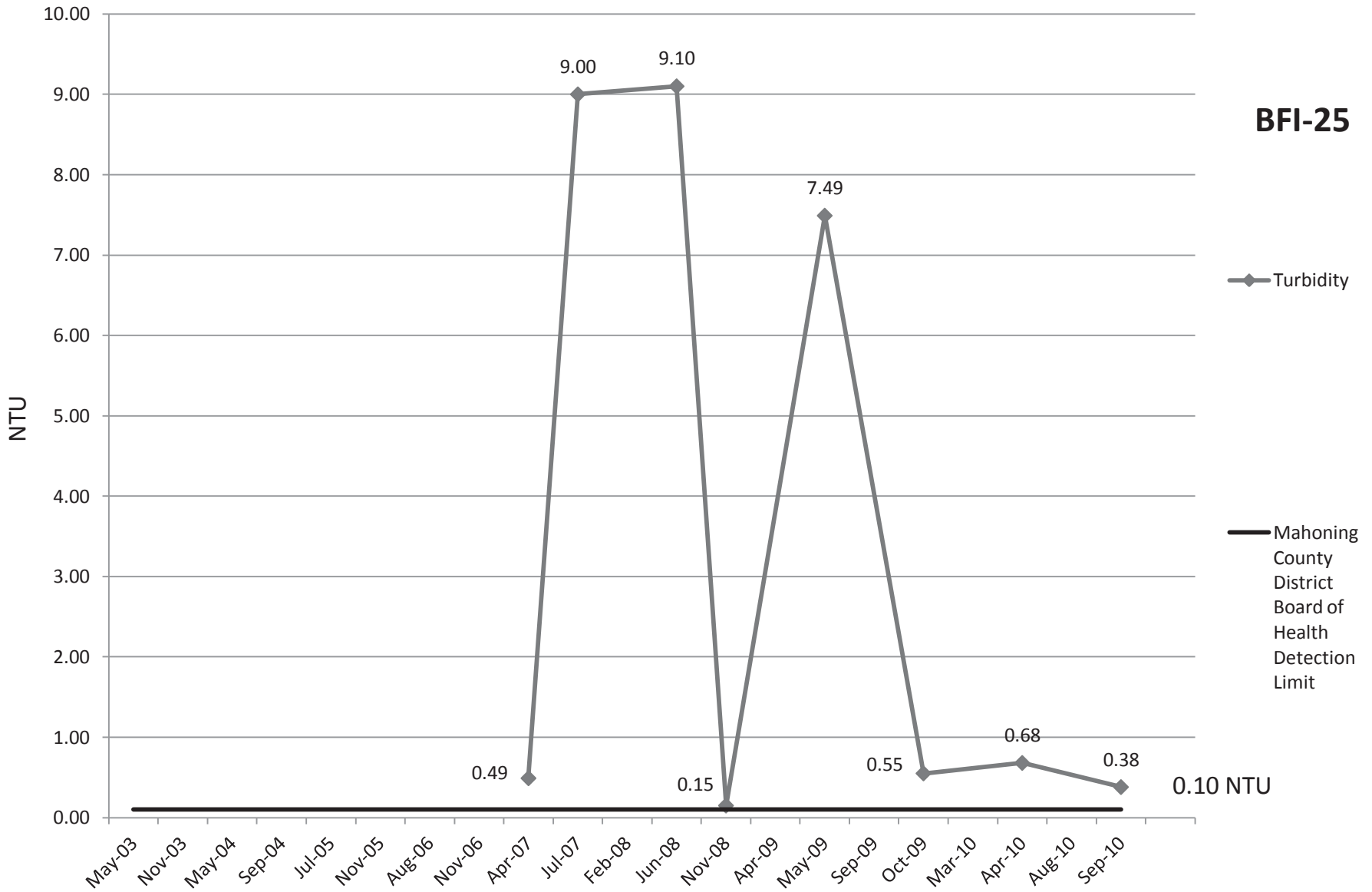
0.00

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

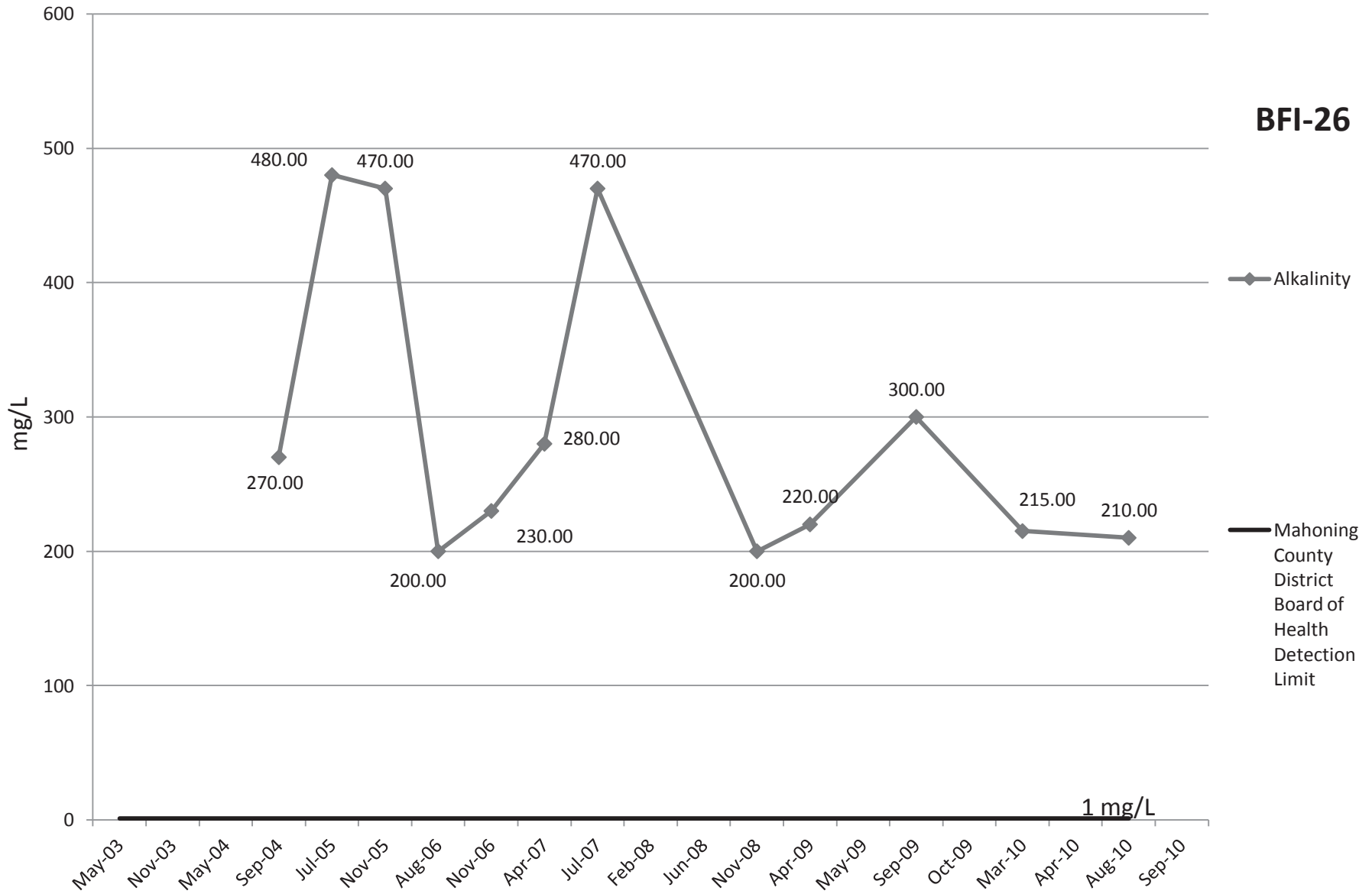


# Turbidity

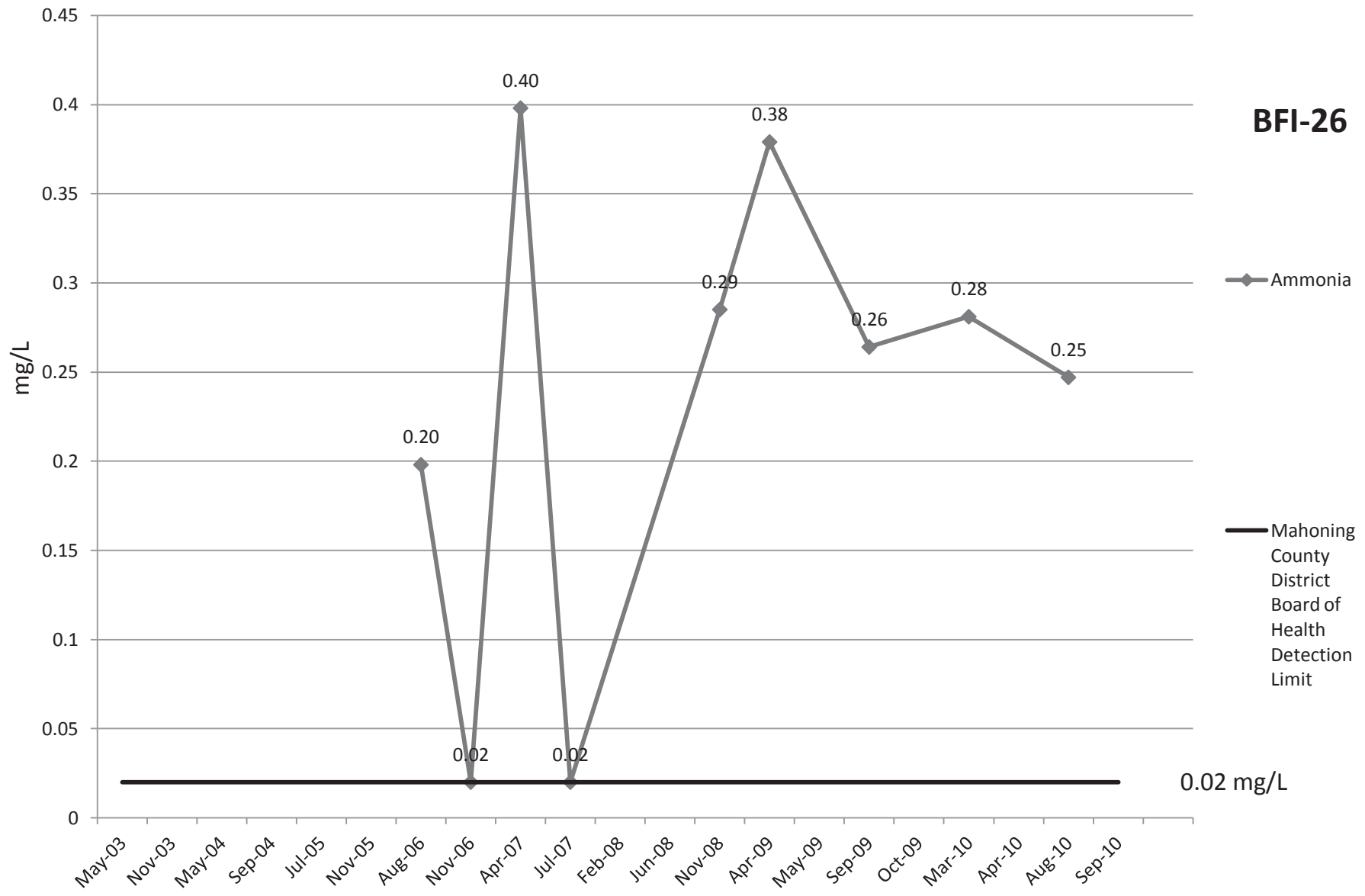


# Alkalinity

**BFI-26**

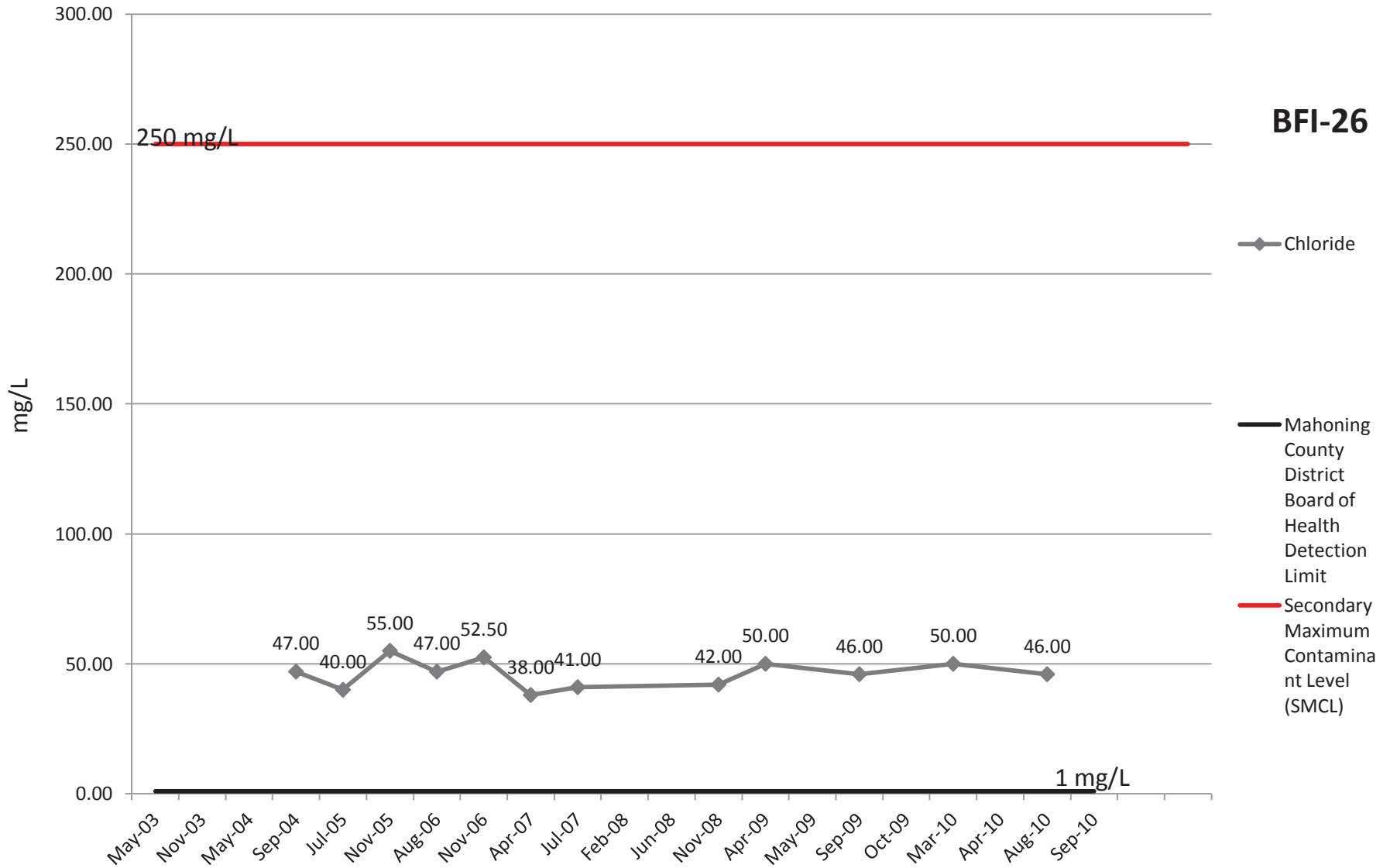


# Ammonia



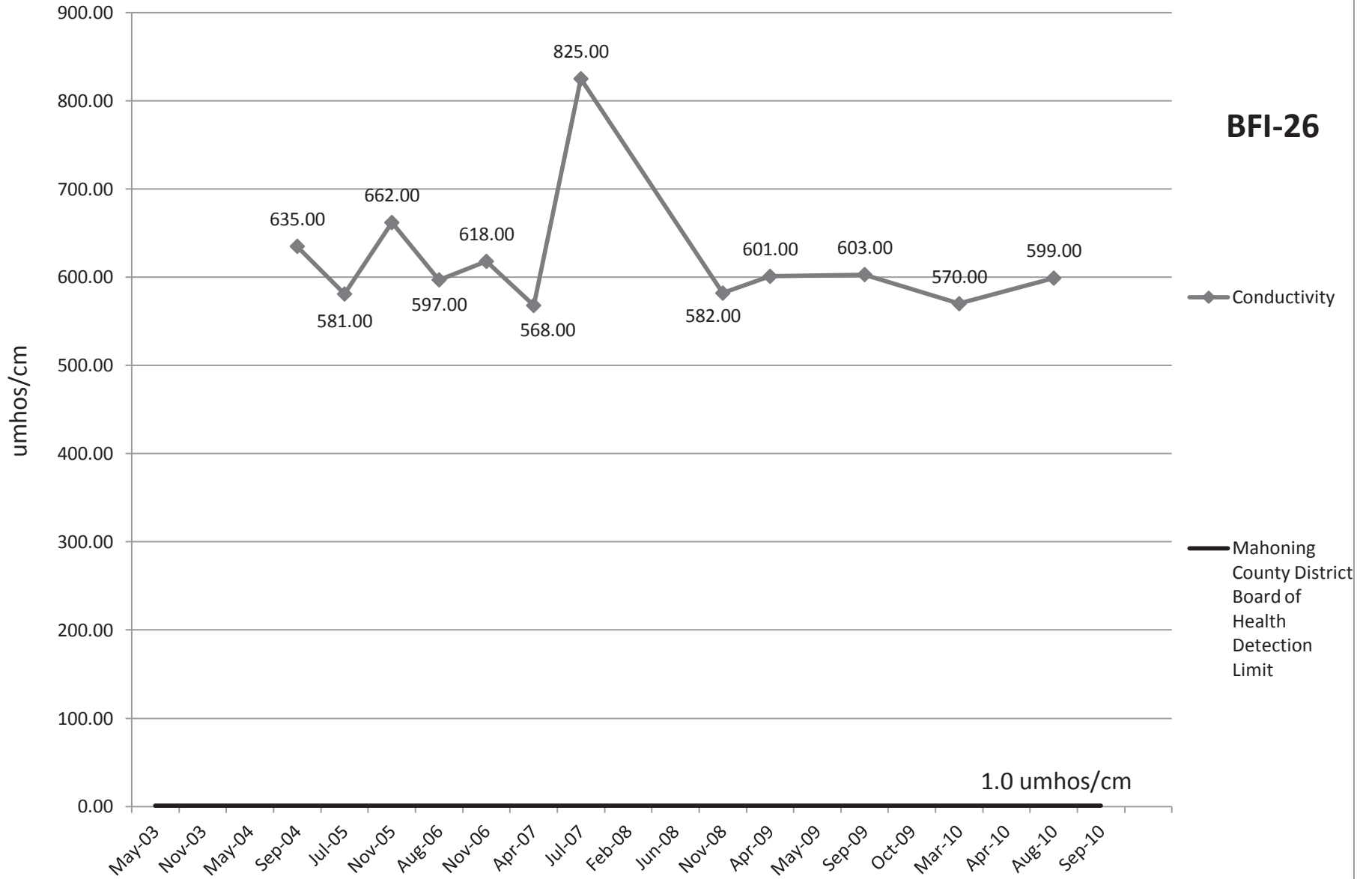


# Chloride

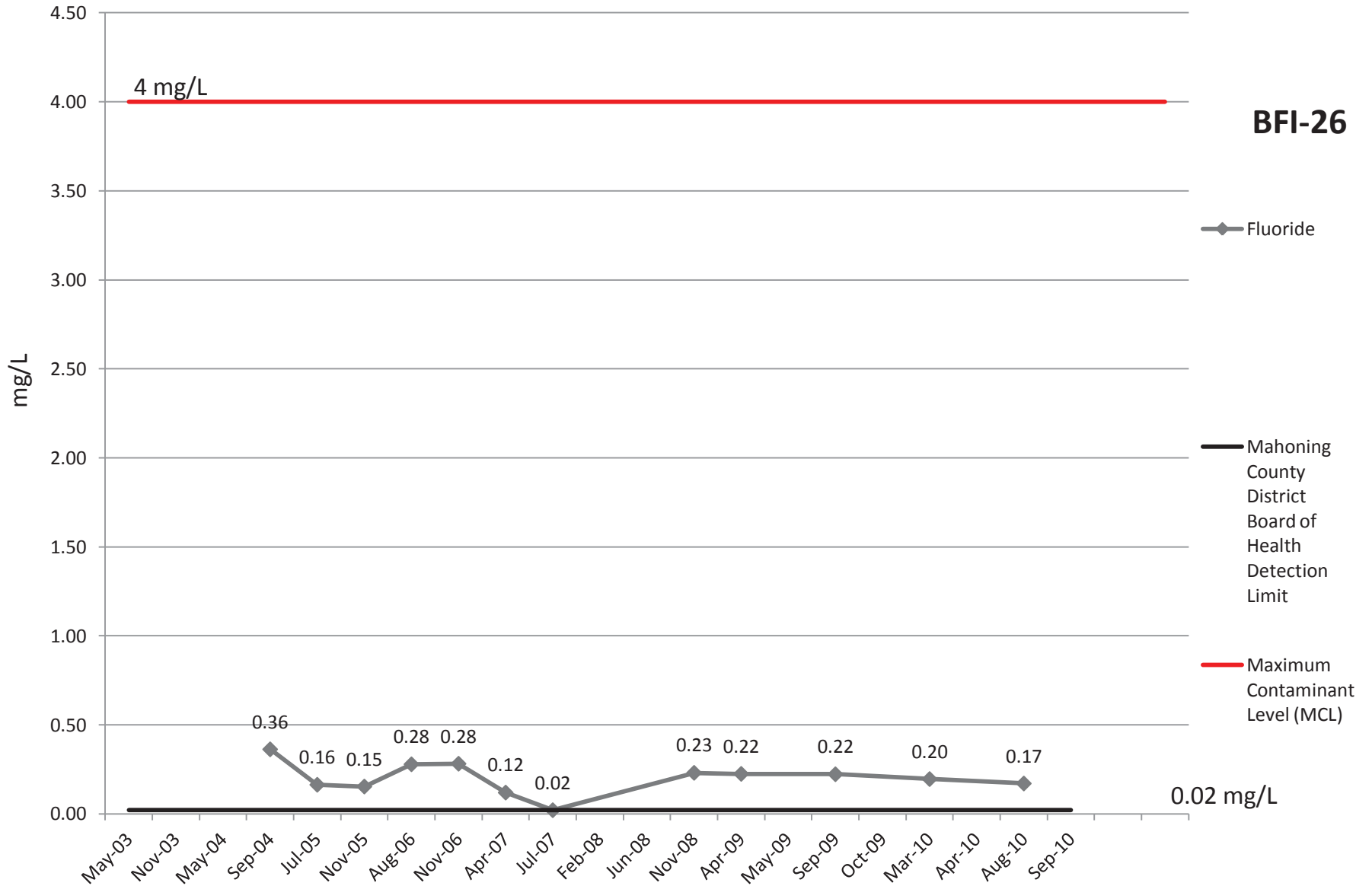


# Conductivity

**BFI-26**

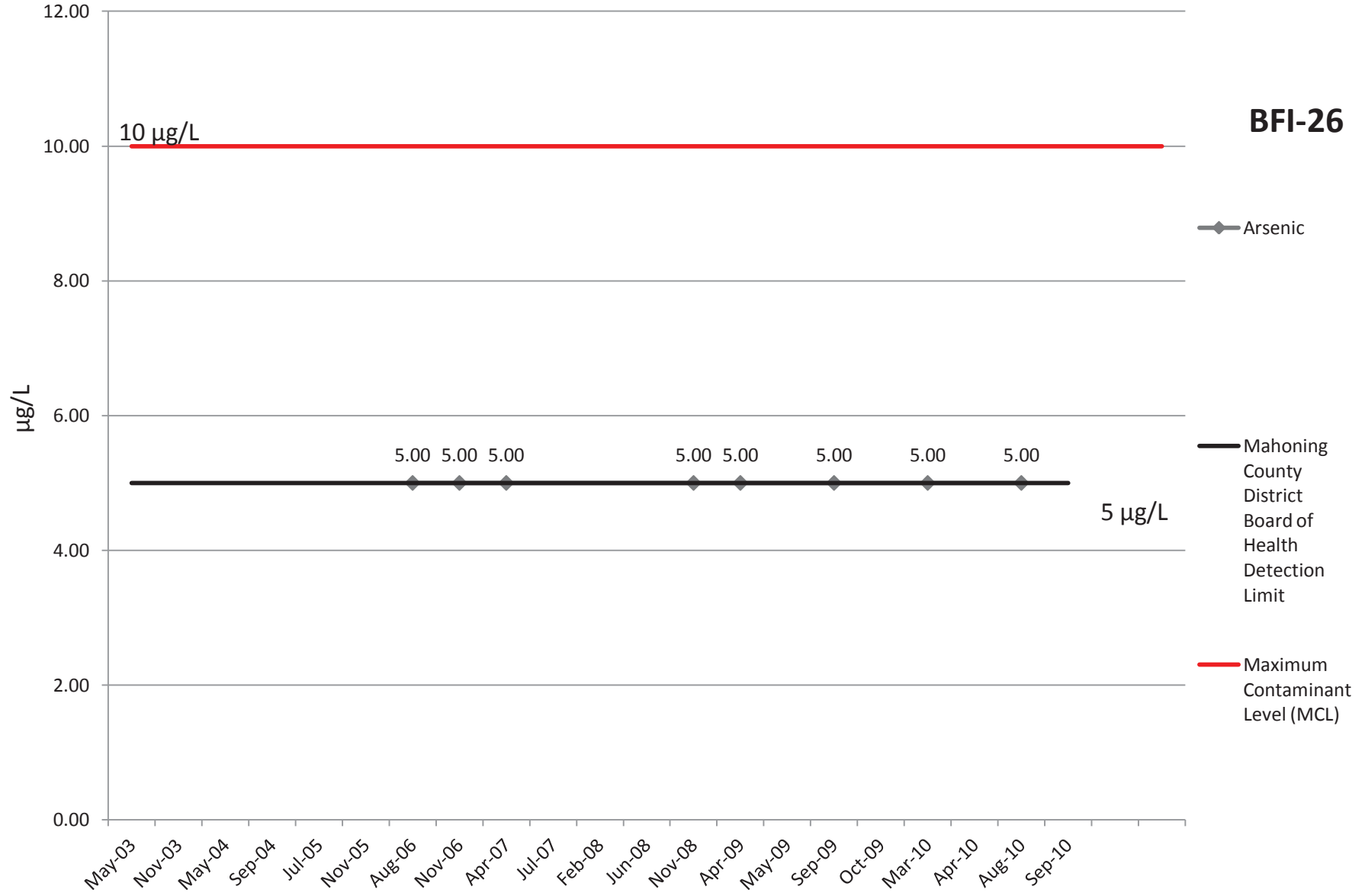


# Fluoride



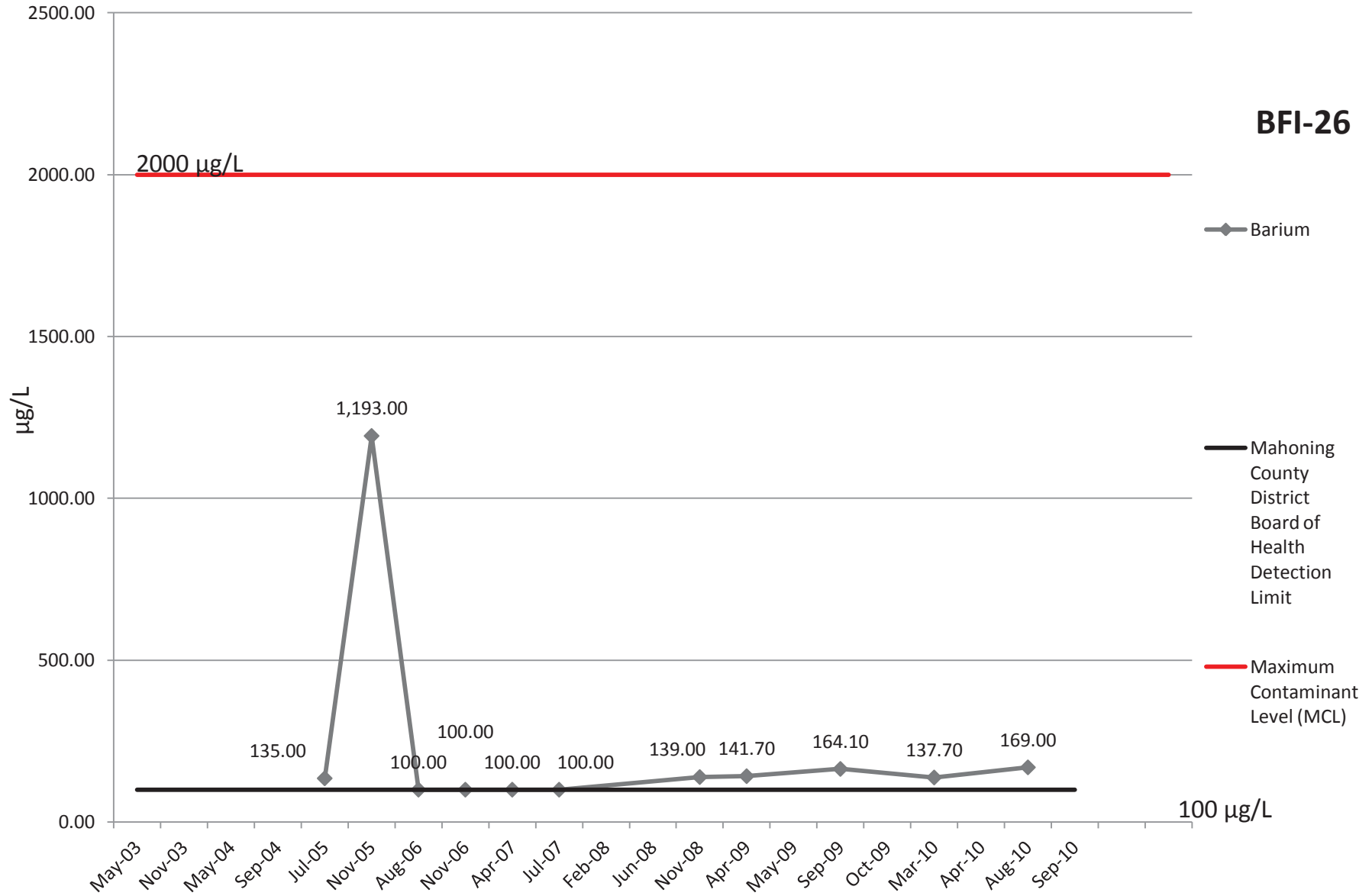
# Arsenic

**BFI-26**



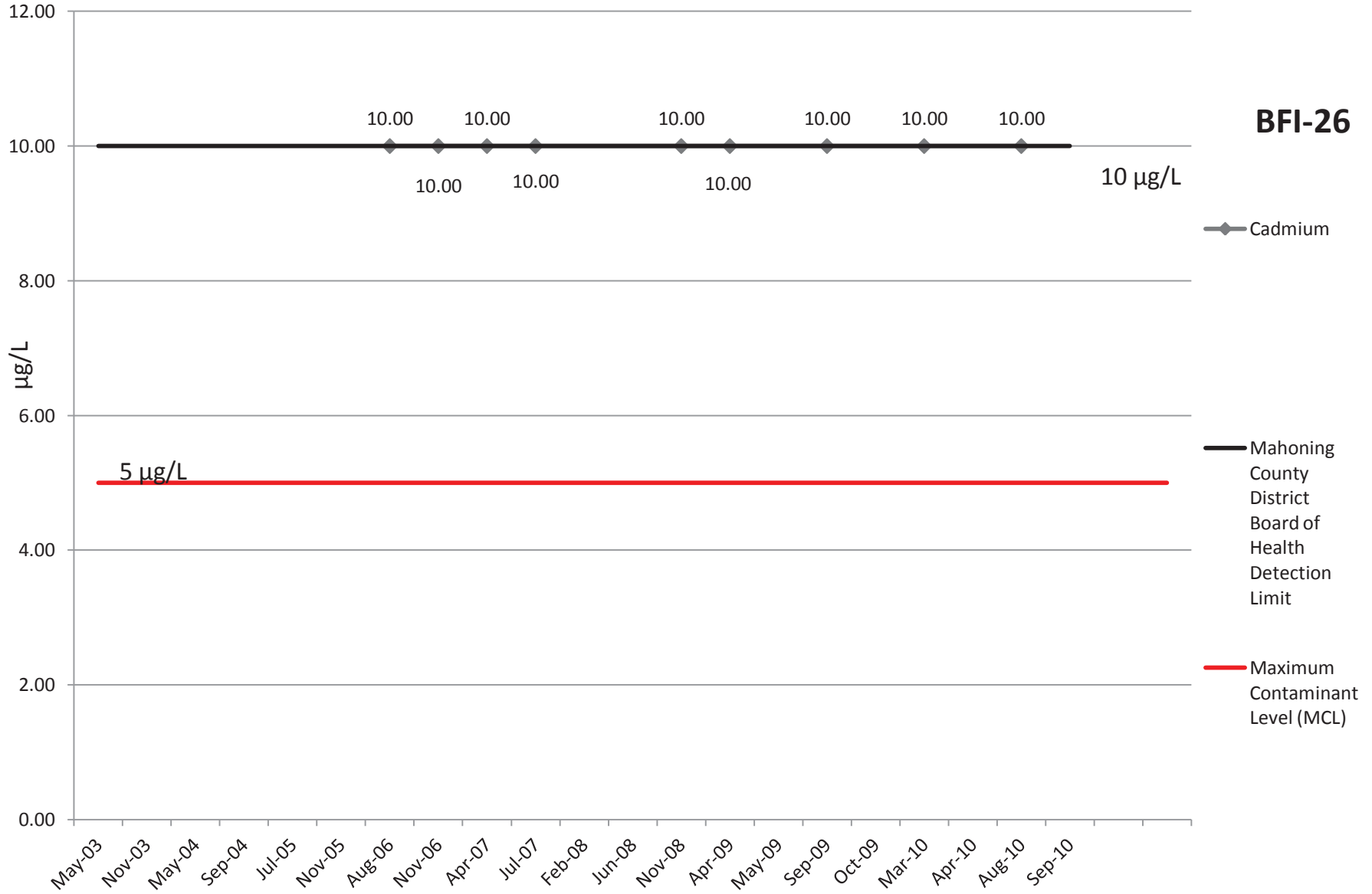
# Barium

**BFI-26**

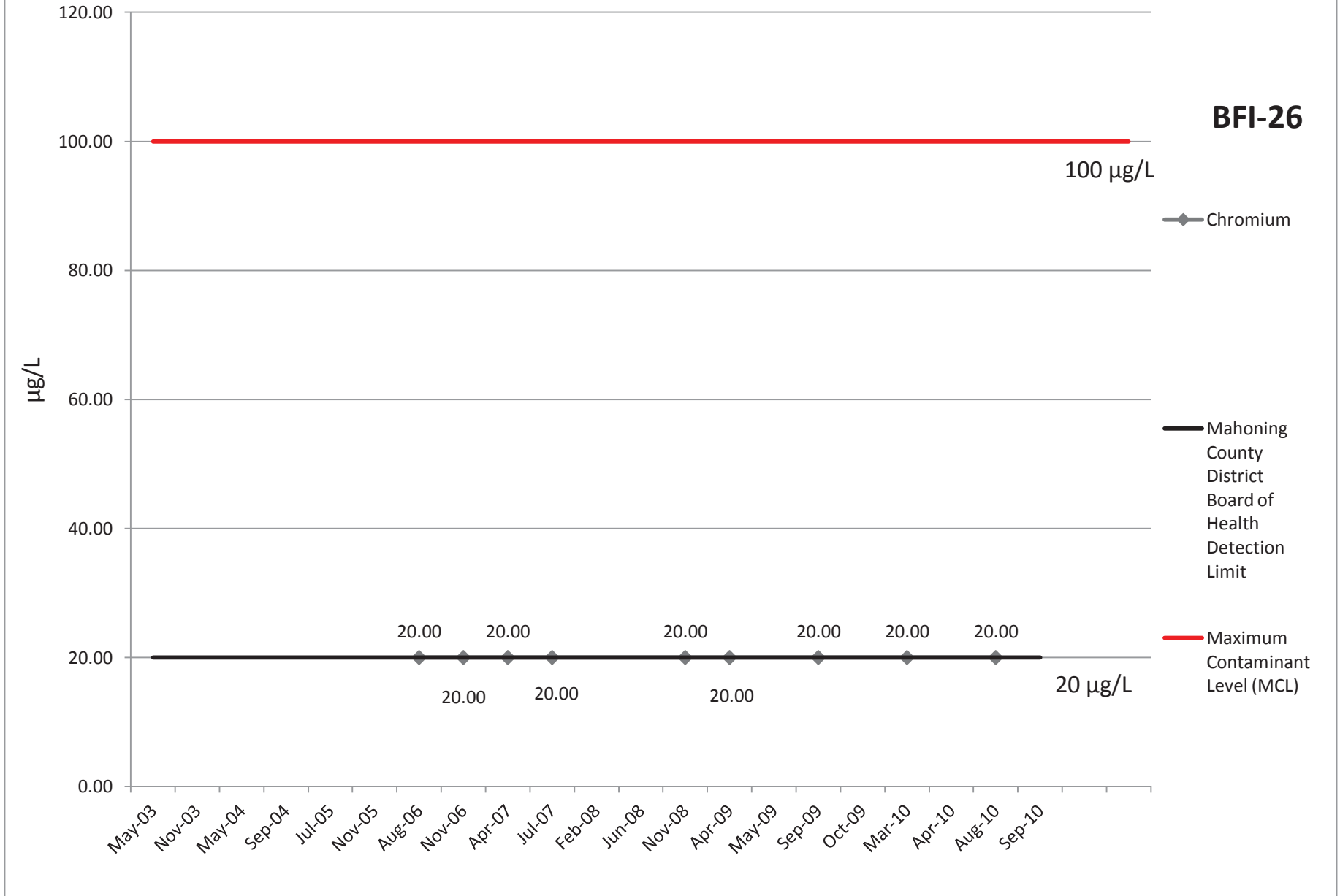


# Cadmium

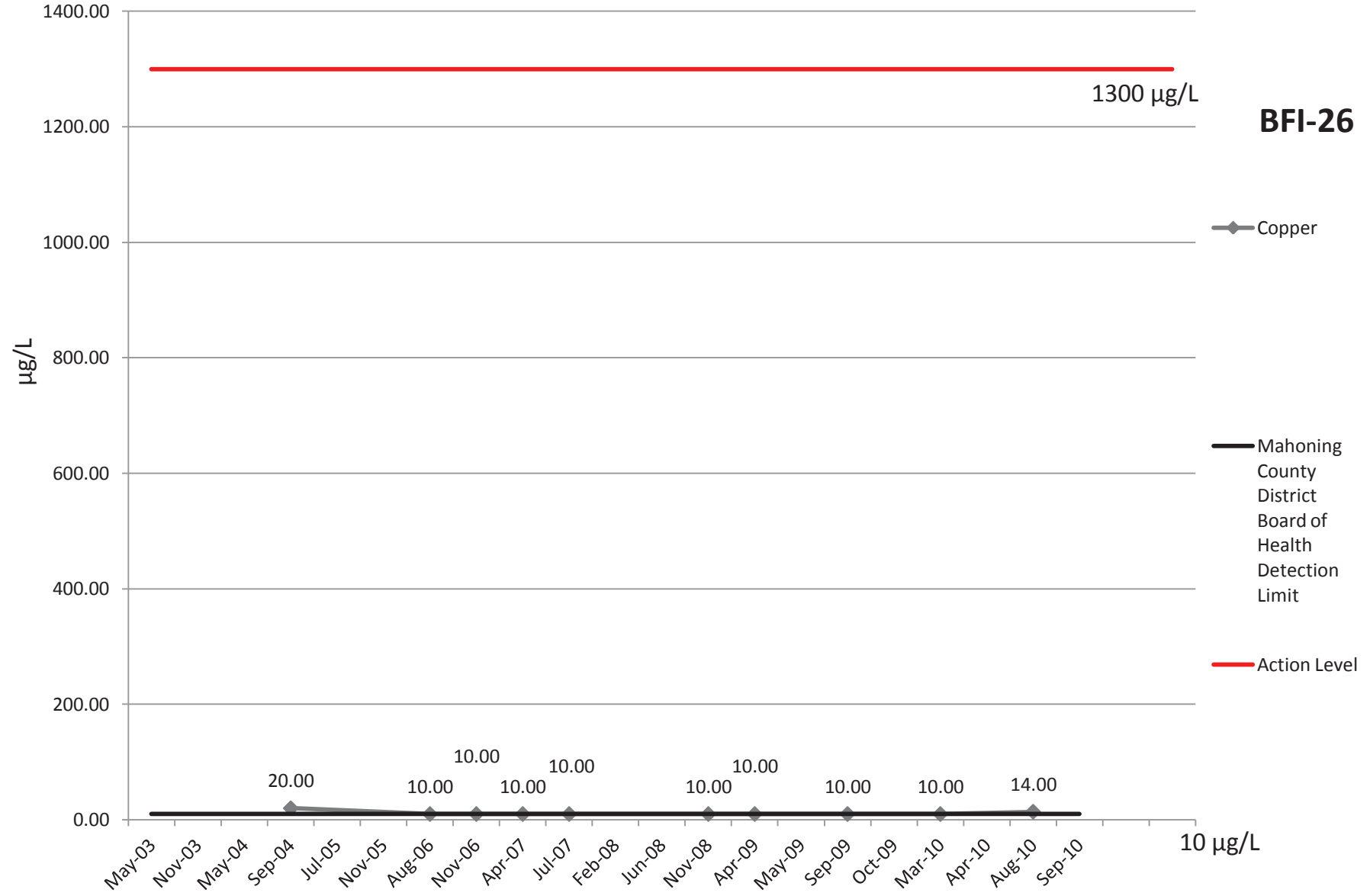
**BFI-26**



# Chromium



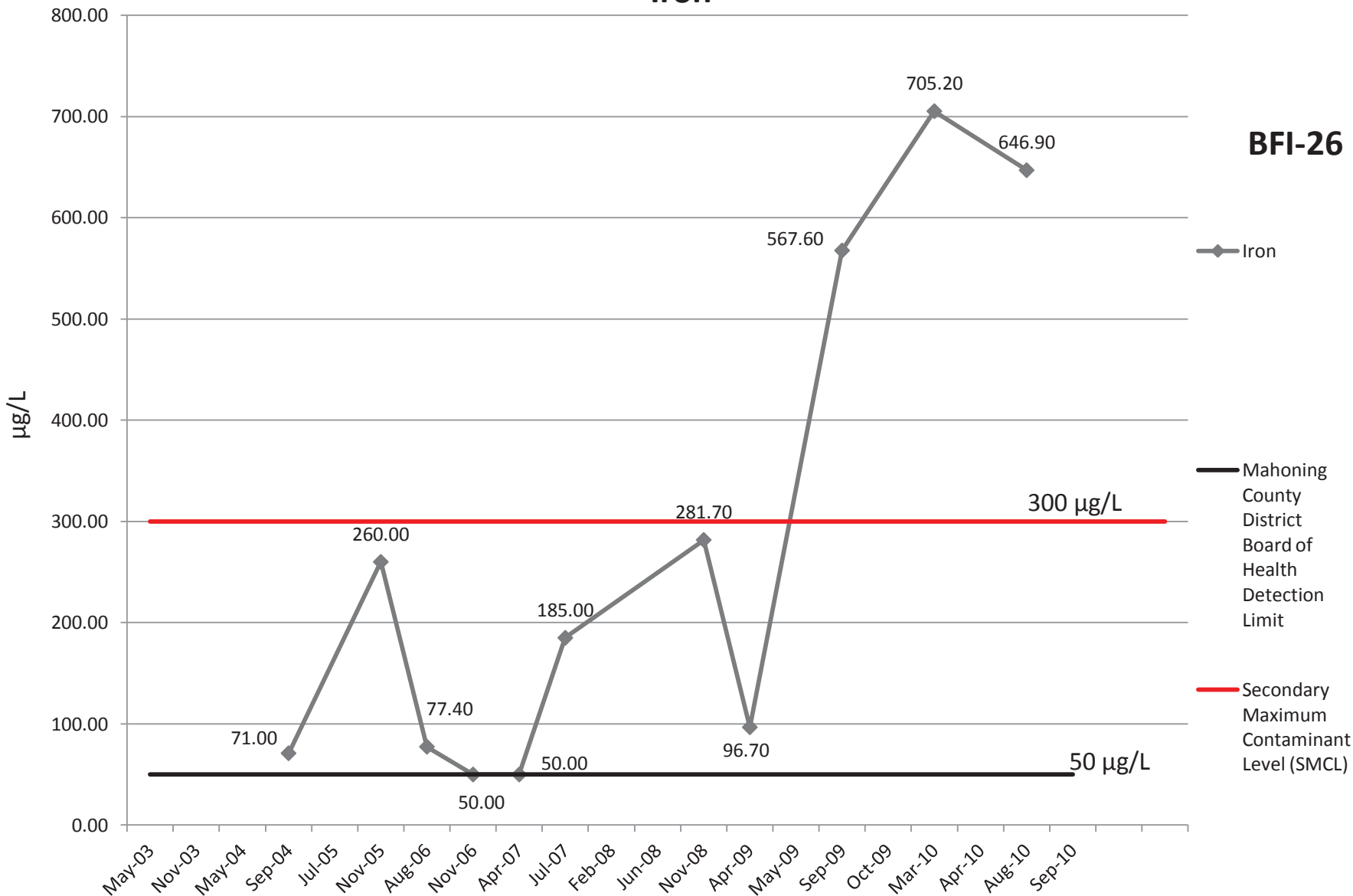
# Copper





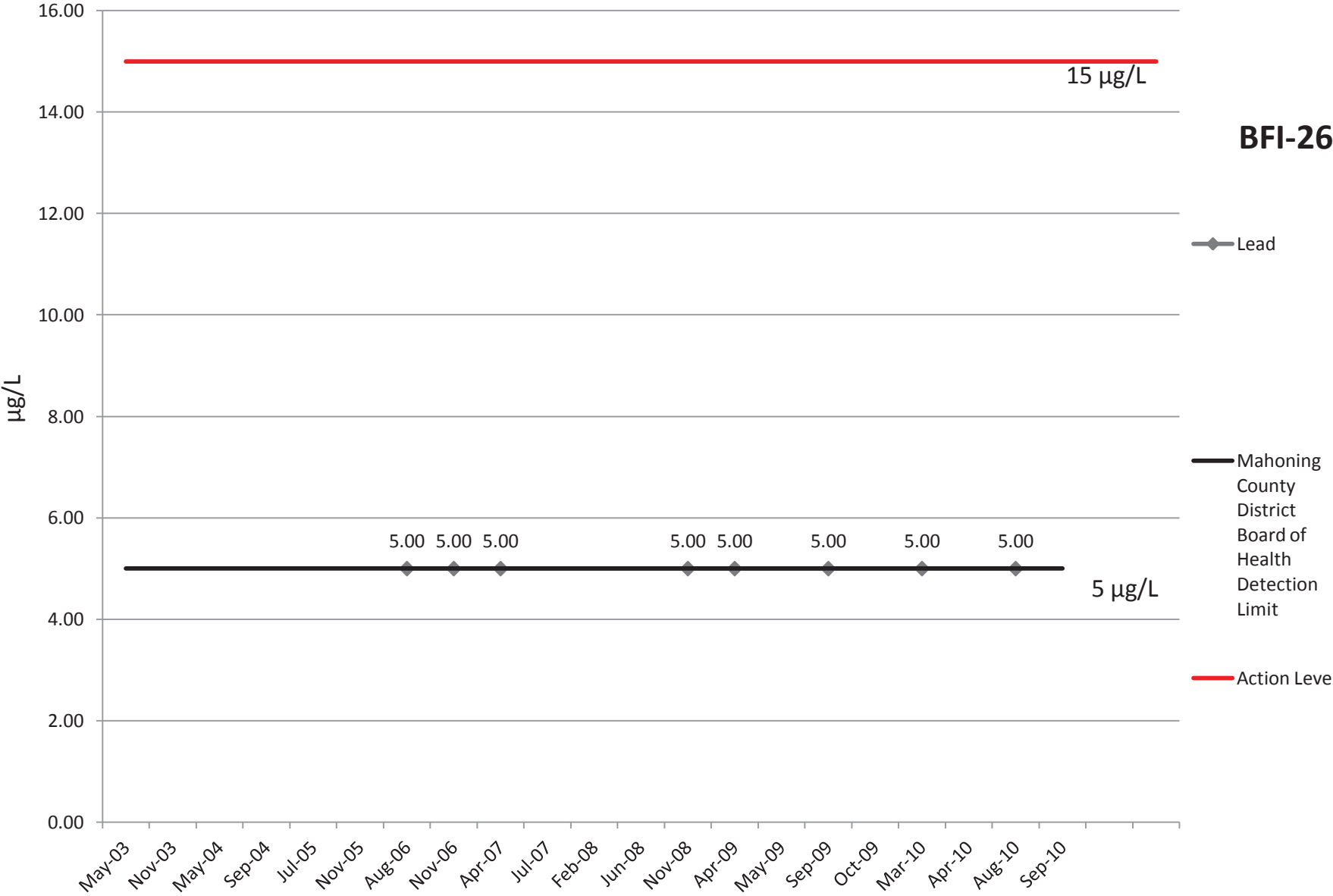
# Iron

**BFI-26**

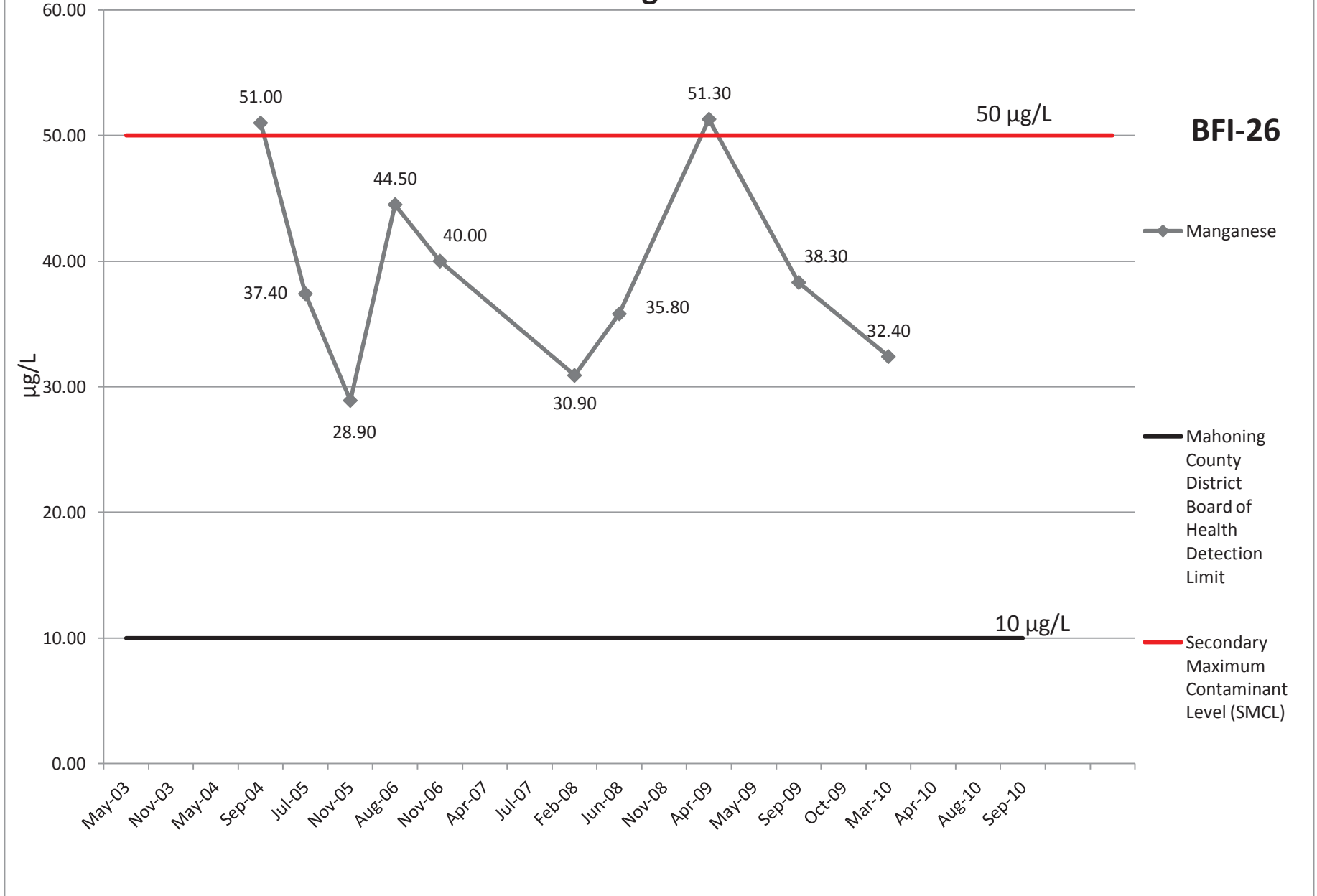


# Lead

**BFI-26**



# Manganese



# Mercury

**BFI-26**

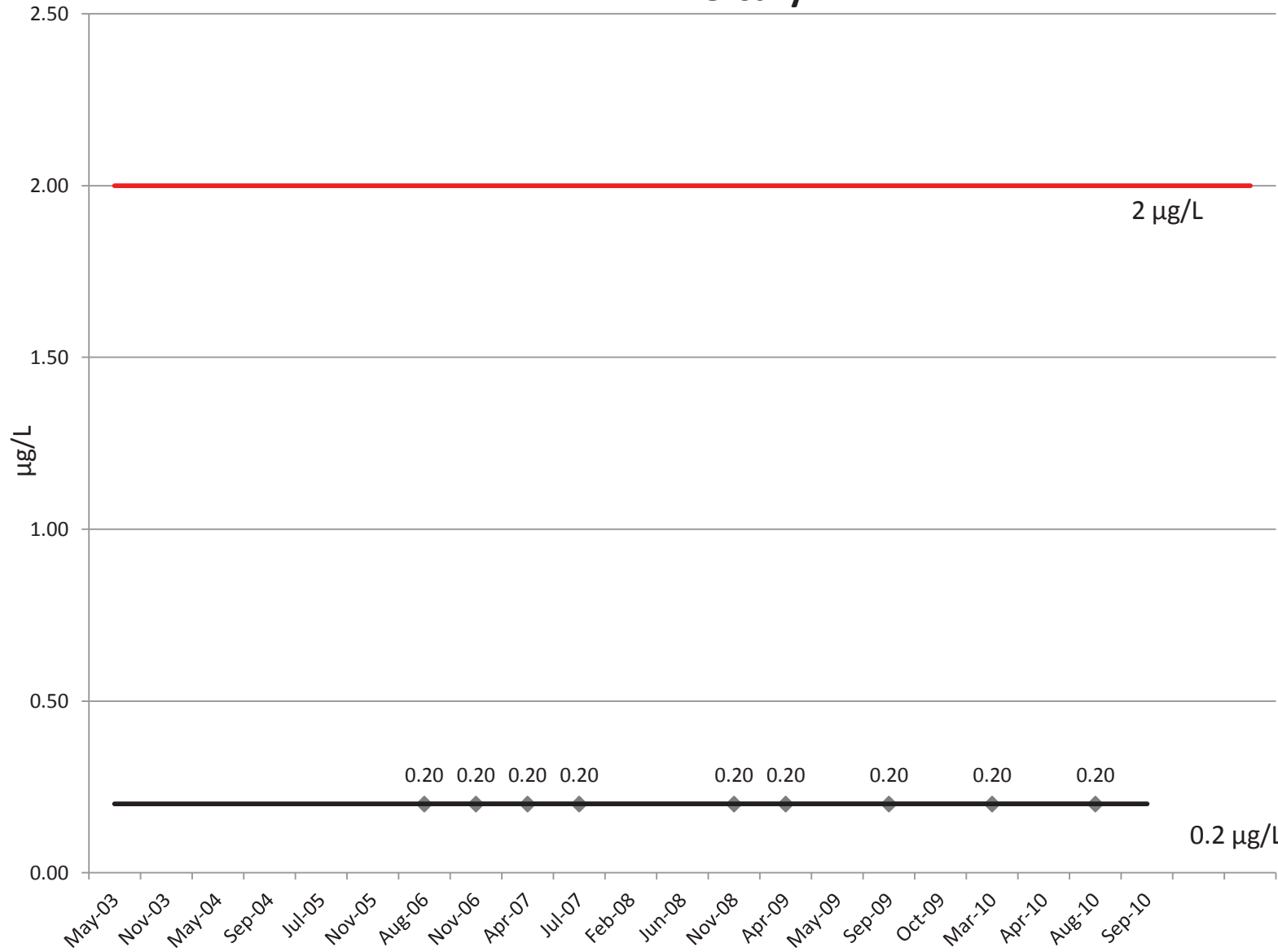
2 µg/L

Mercury

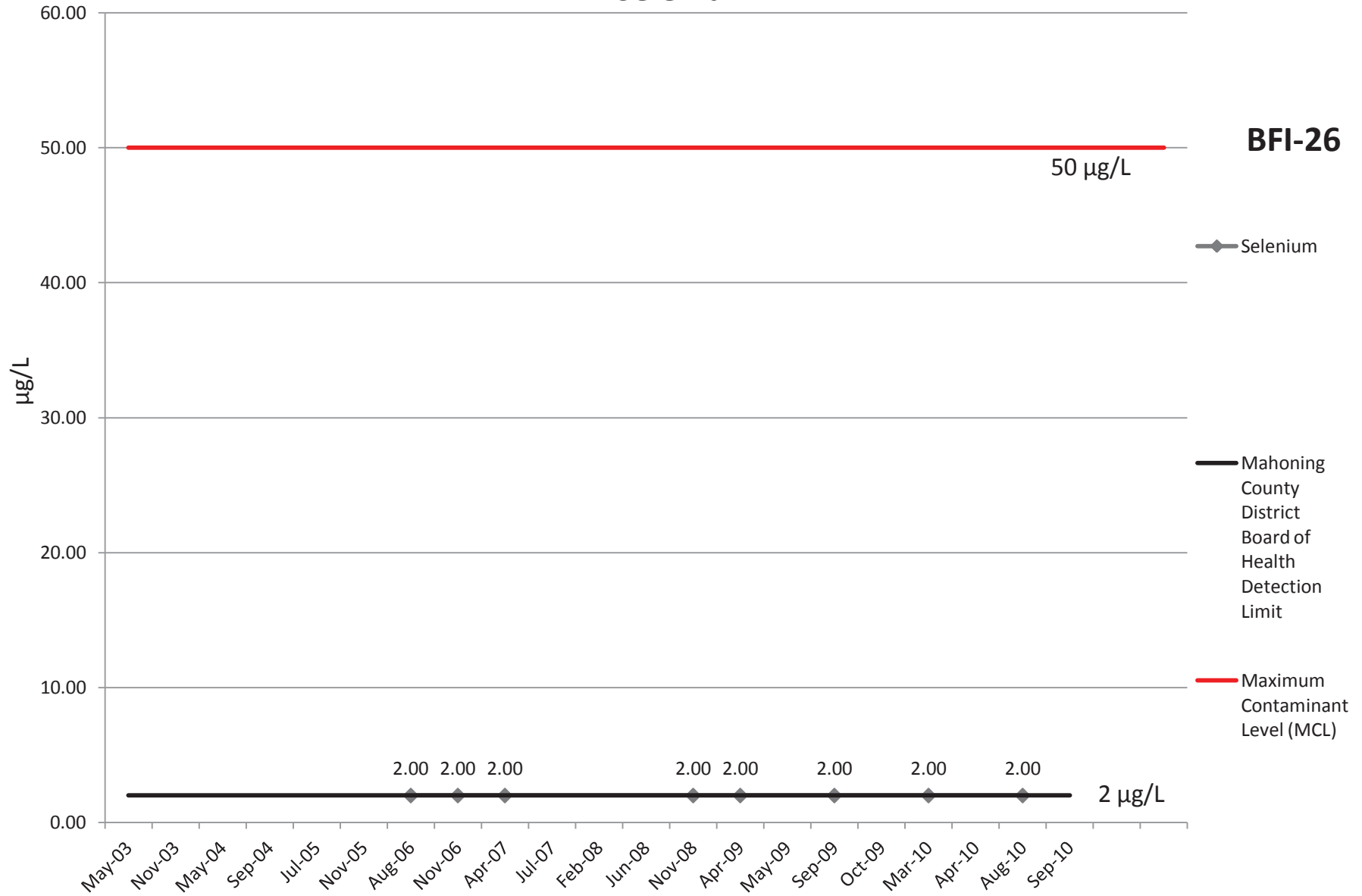
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

0.2 µg/L

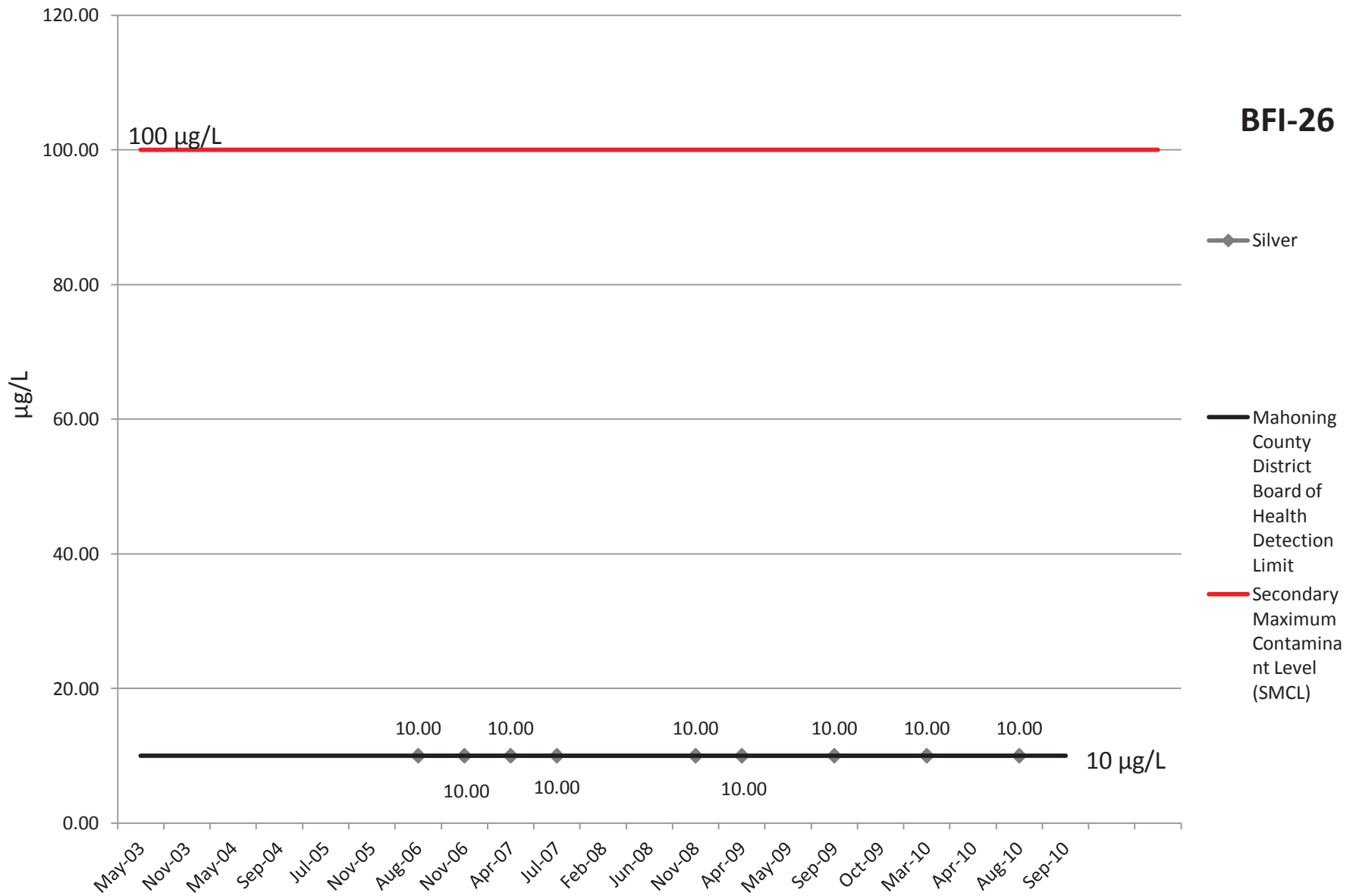


# Selenium



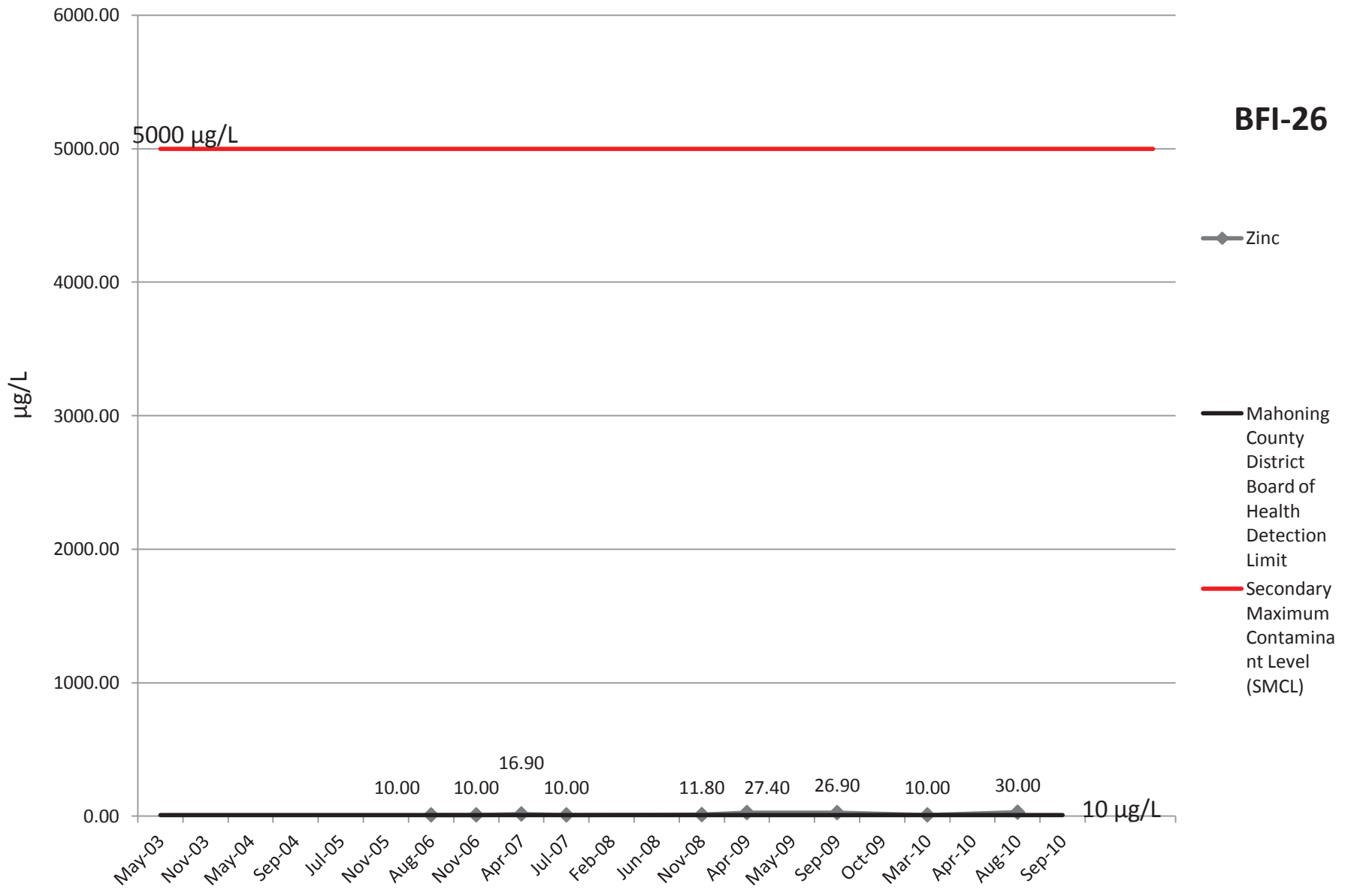
# Silver

**BFI-26**



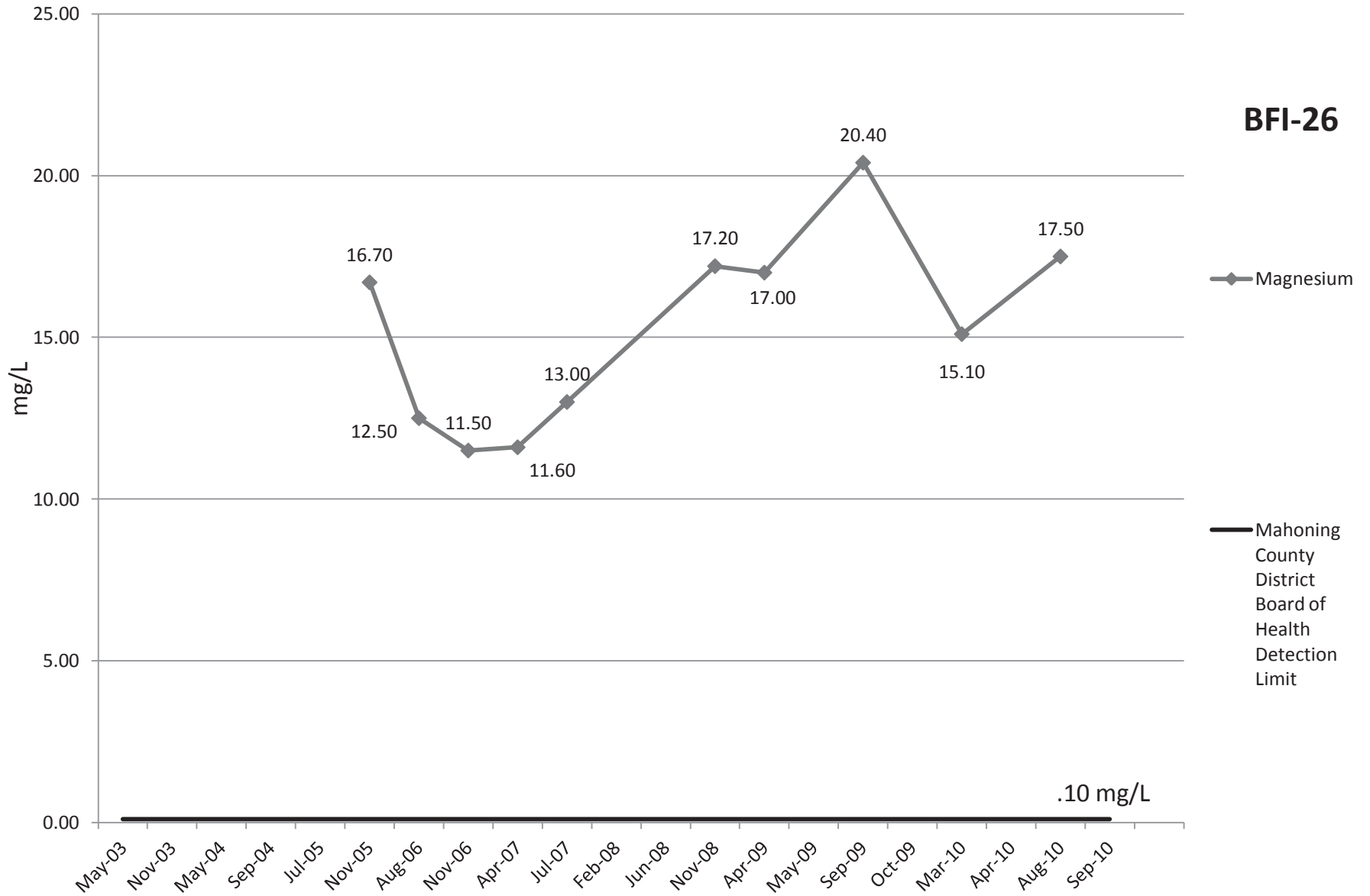
# Zinc

**BFI-26**



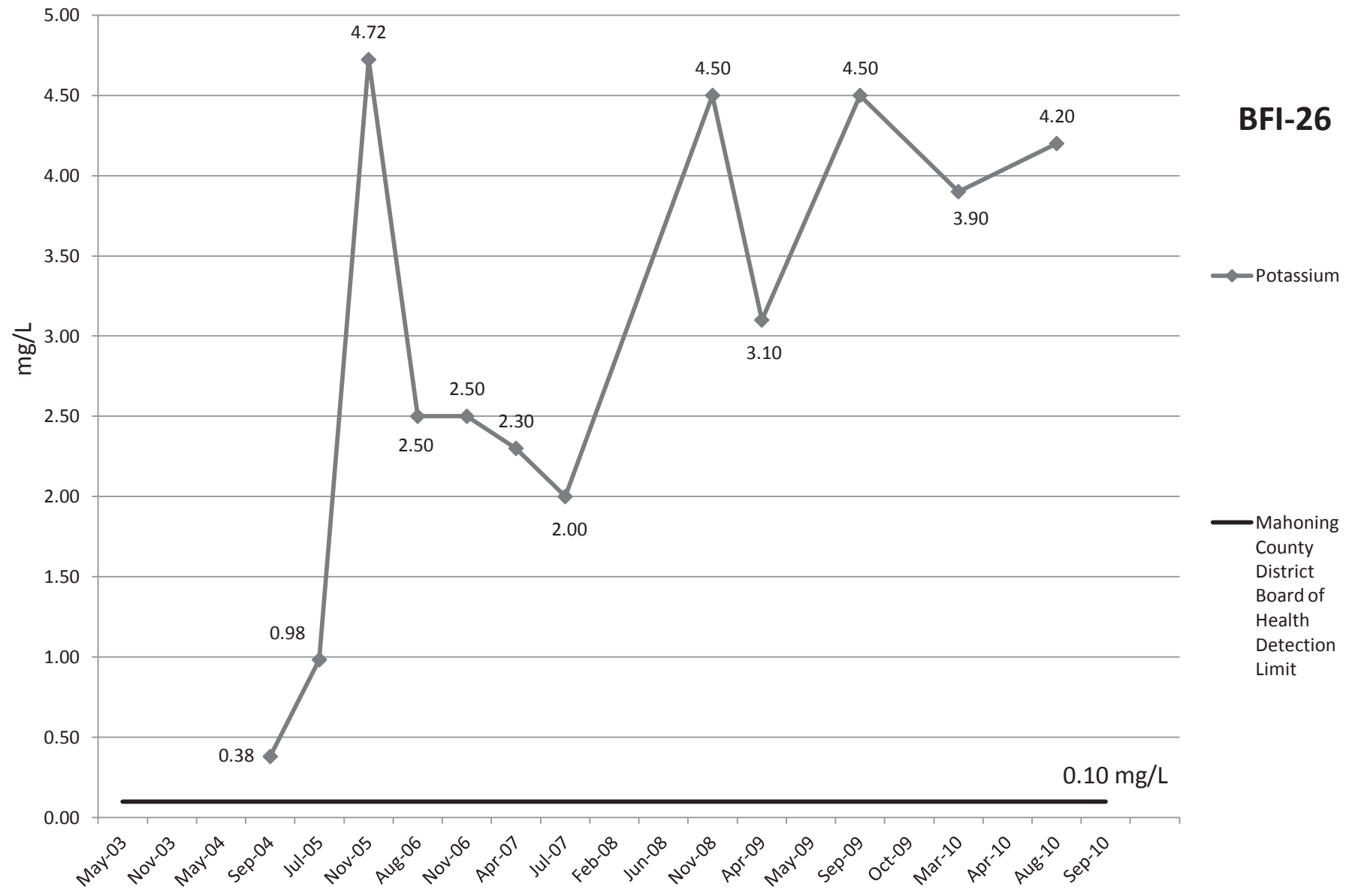
# Magnesium

**BFI-26**



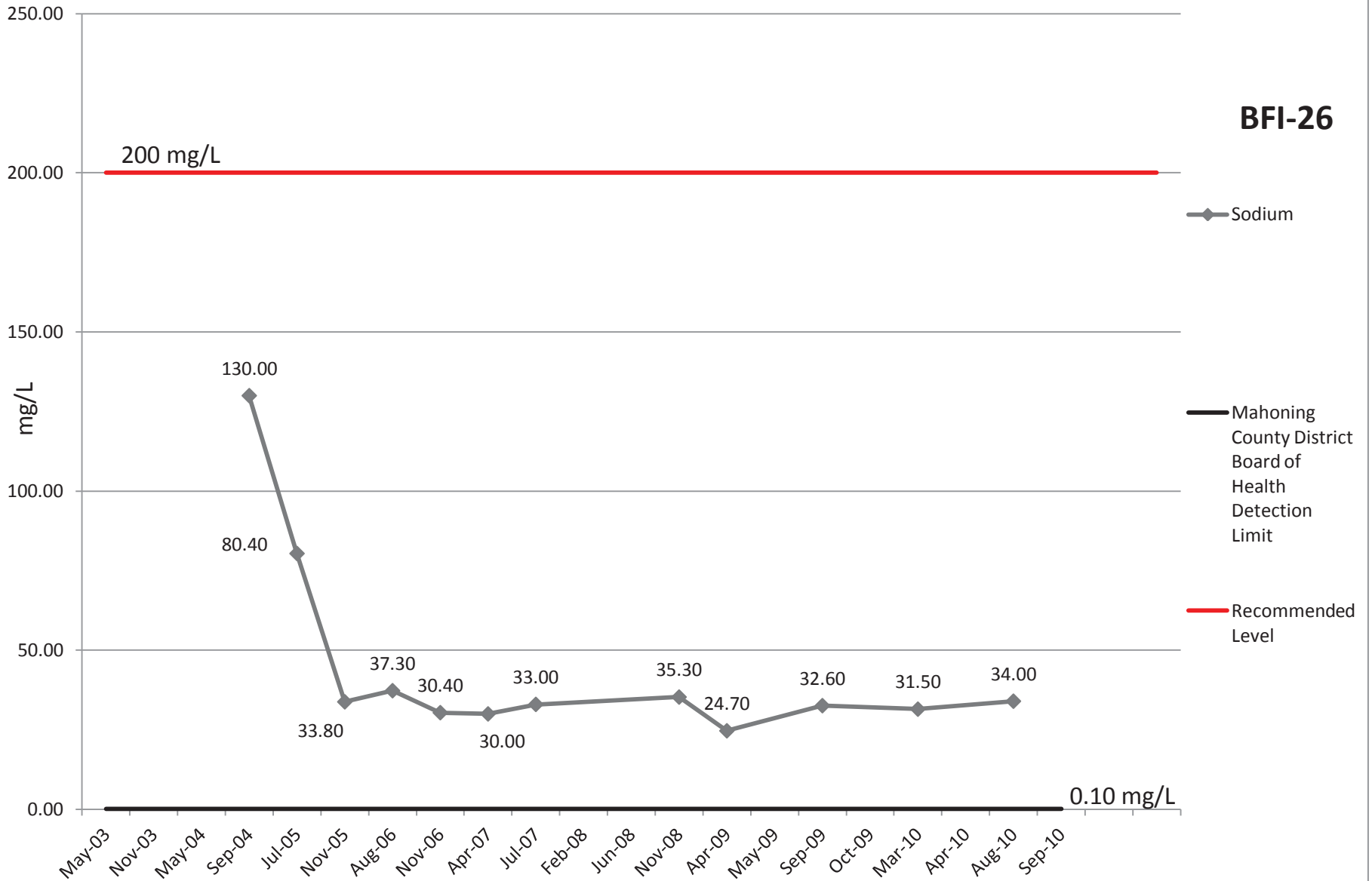


# Potassium



# Sodium

**BFI-26**



# Nitrate EPA

**BFI-26**

10 mg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

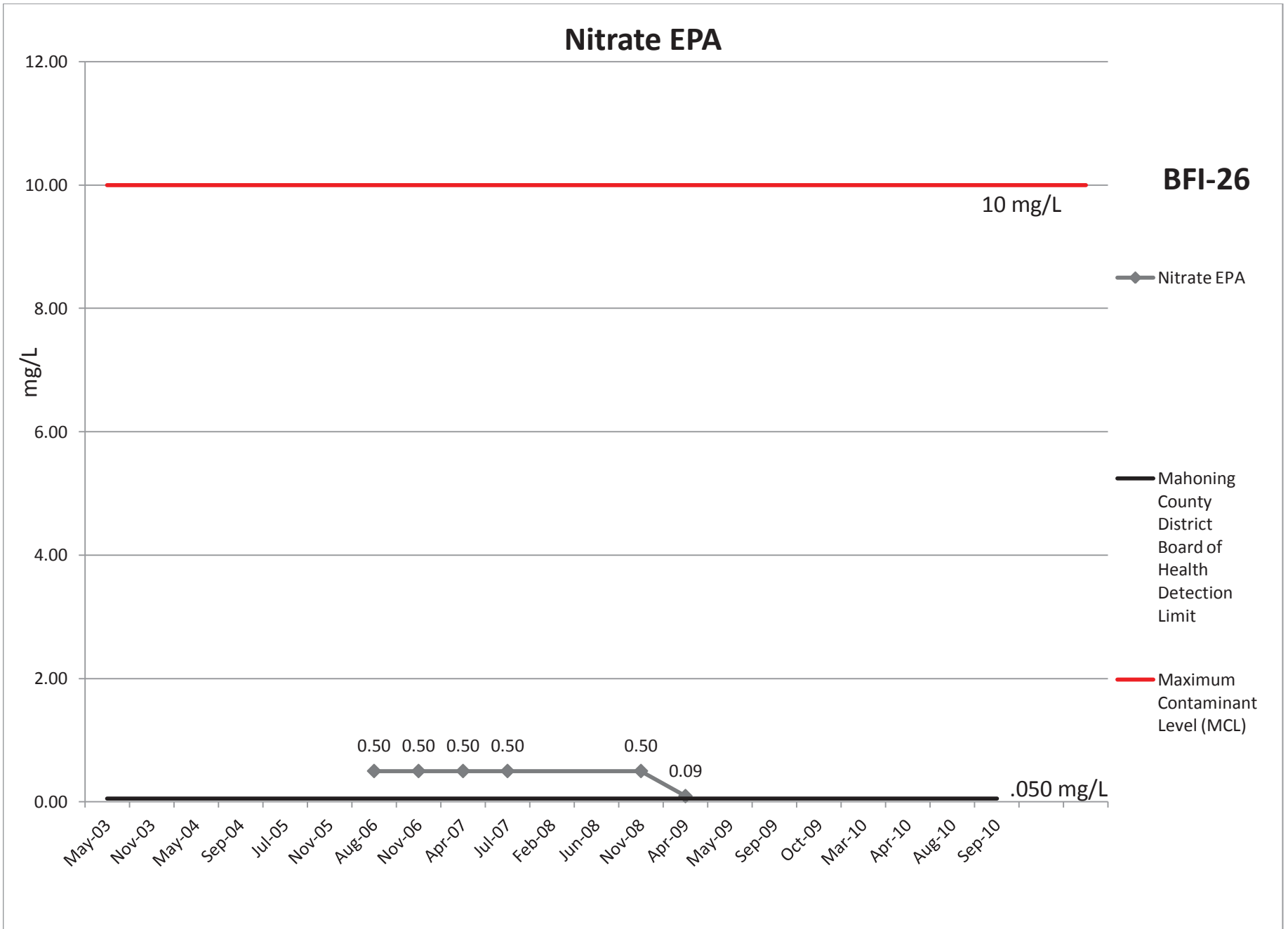
mg/L

- ◆ Nitrate EPA
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

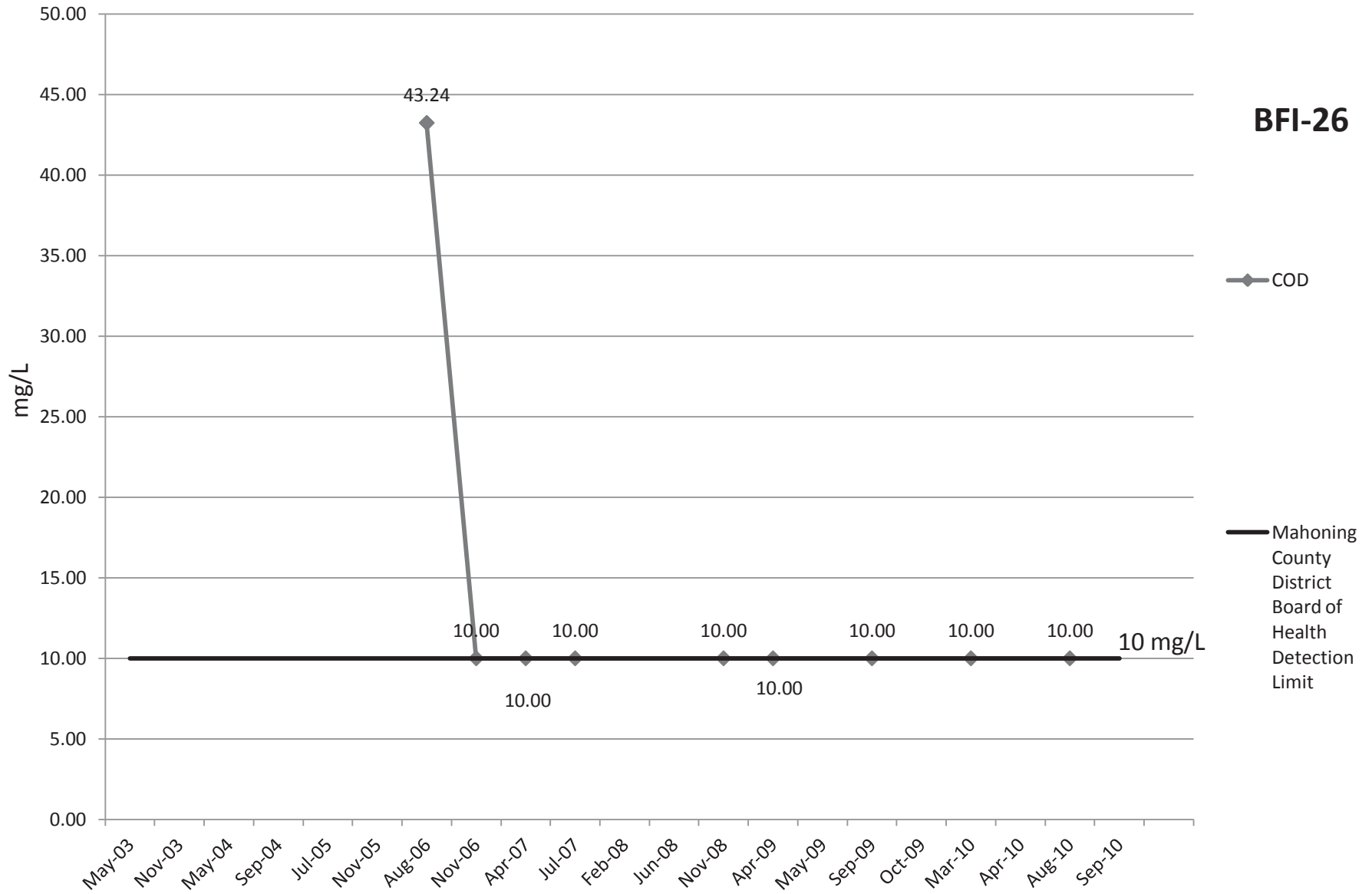
.050 mg/L

0.50 0.50 0.50 0.50 0.50 0.09



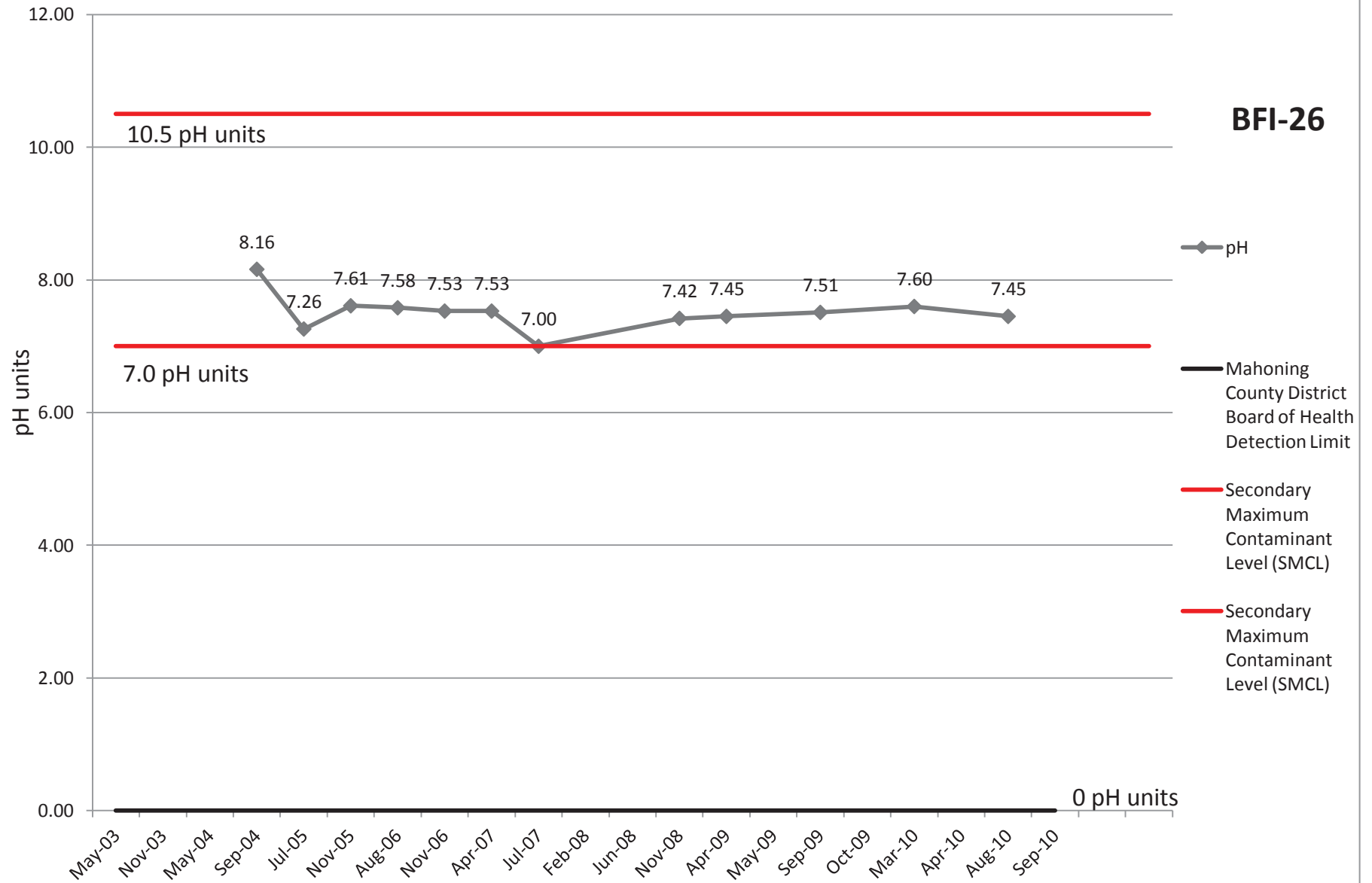
# COD

**BFI-26**



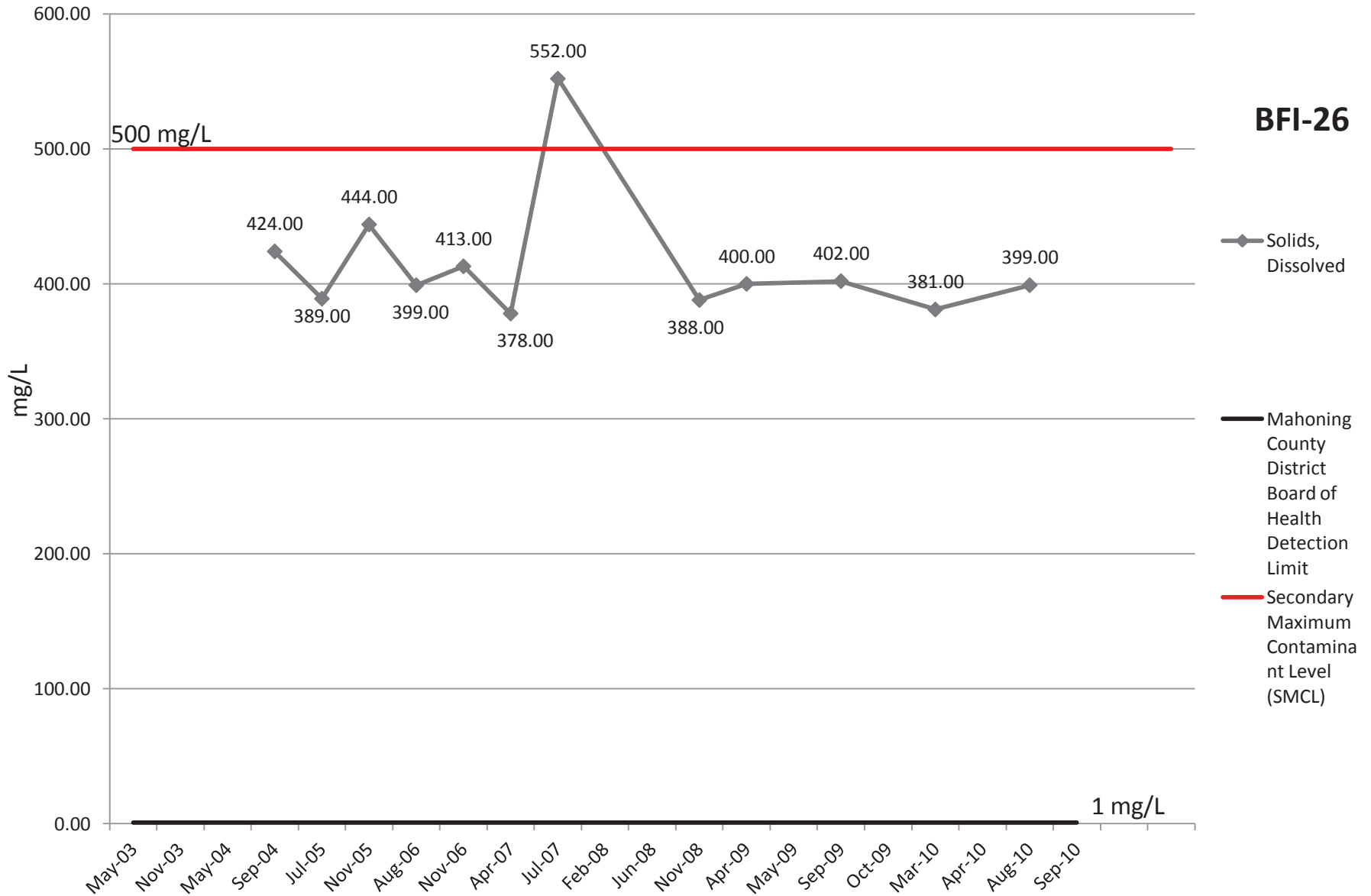
# pH

**BFI-26**



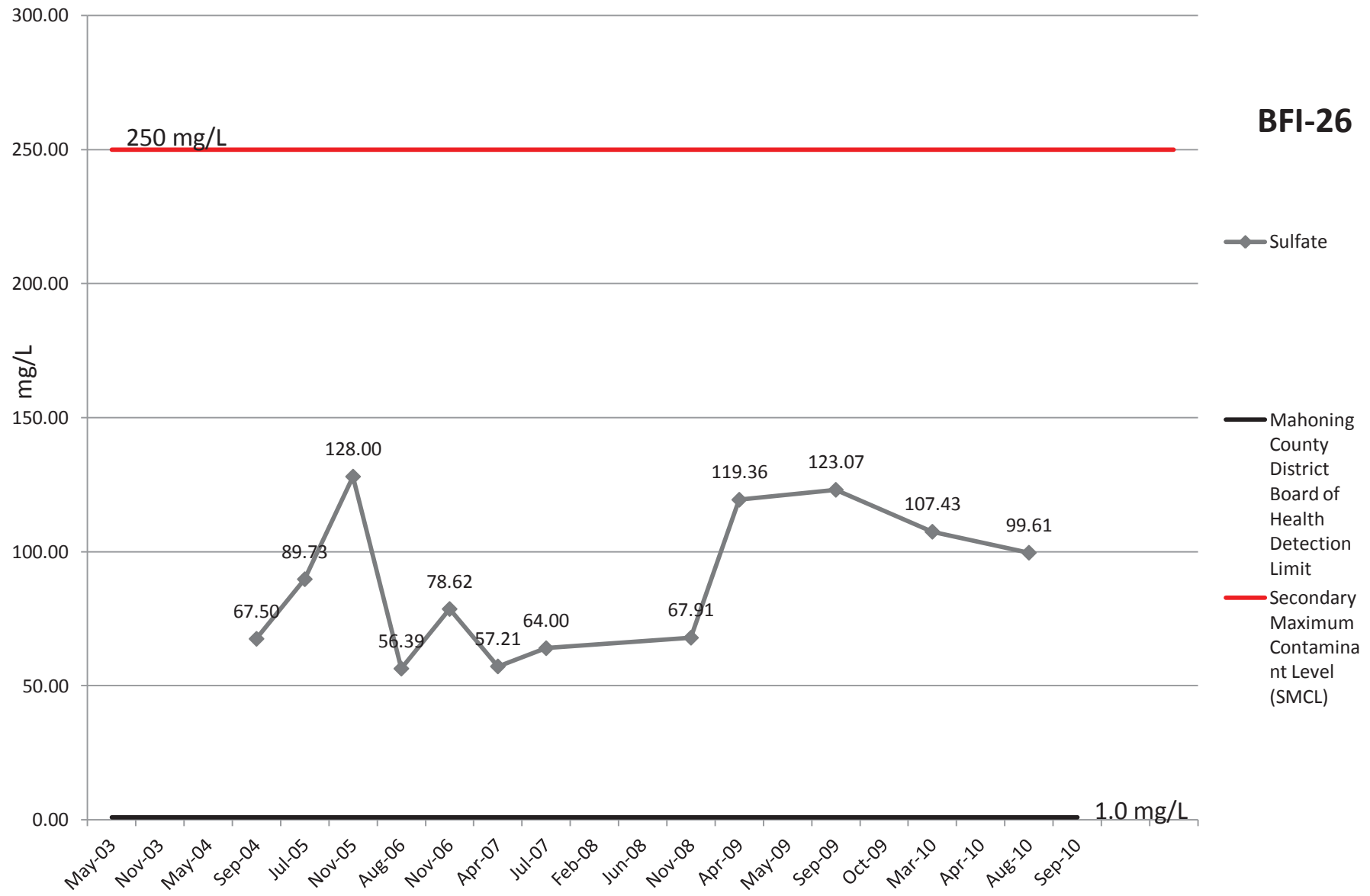
# Solids, Dissolved

**BFI-26**



# Sulfate

**BFI-26**



# Bacteria

## BFI-26

Positive/Negative

◆ Bacteria

positive (1)

1.00

1.00

1.00

1.00

1.00

1.00

0.00

0.00

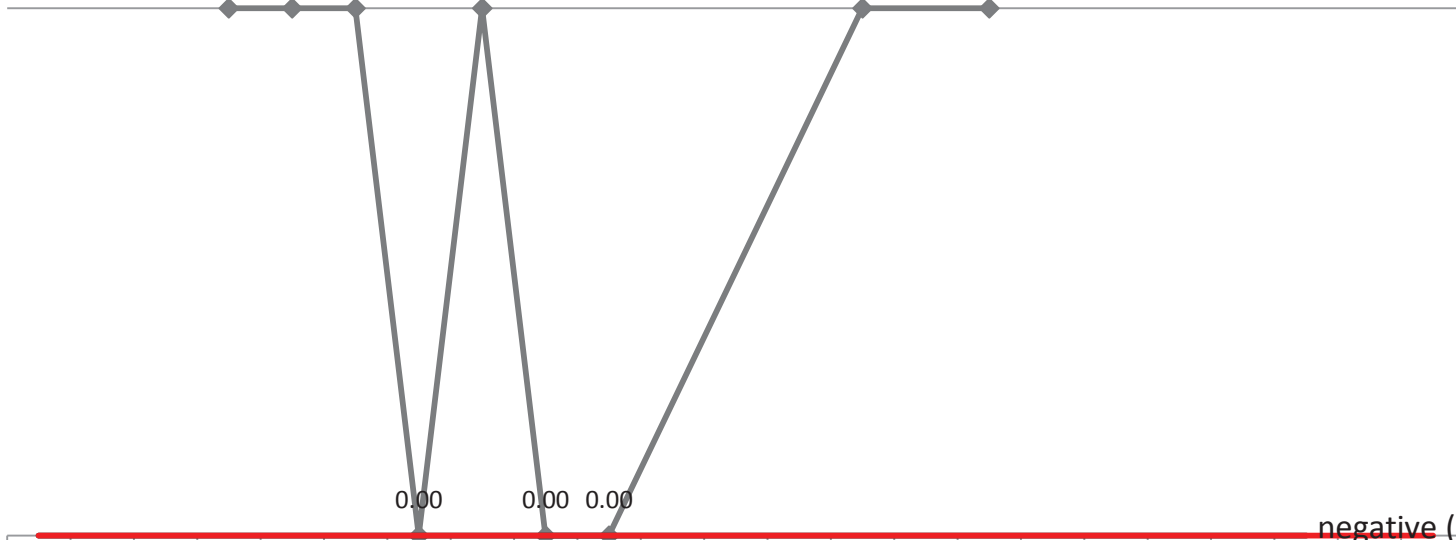
0.00

negative (0)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

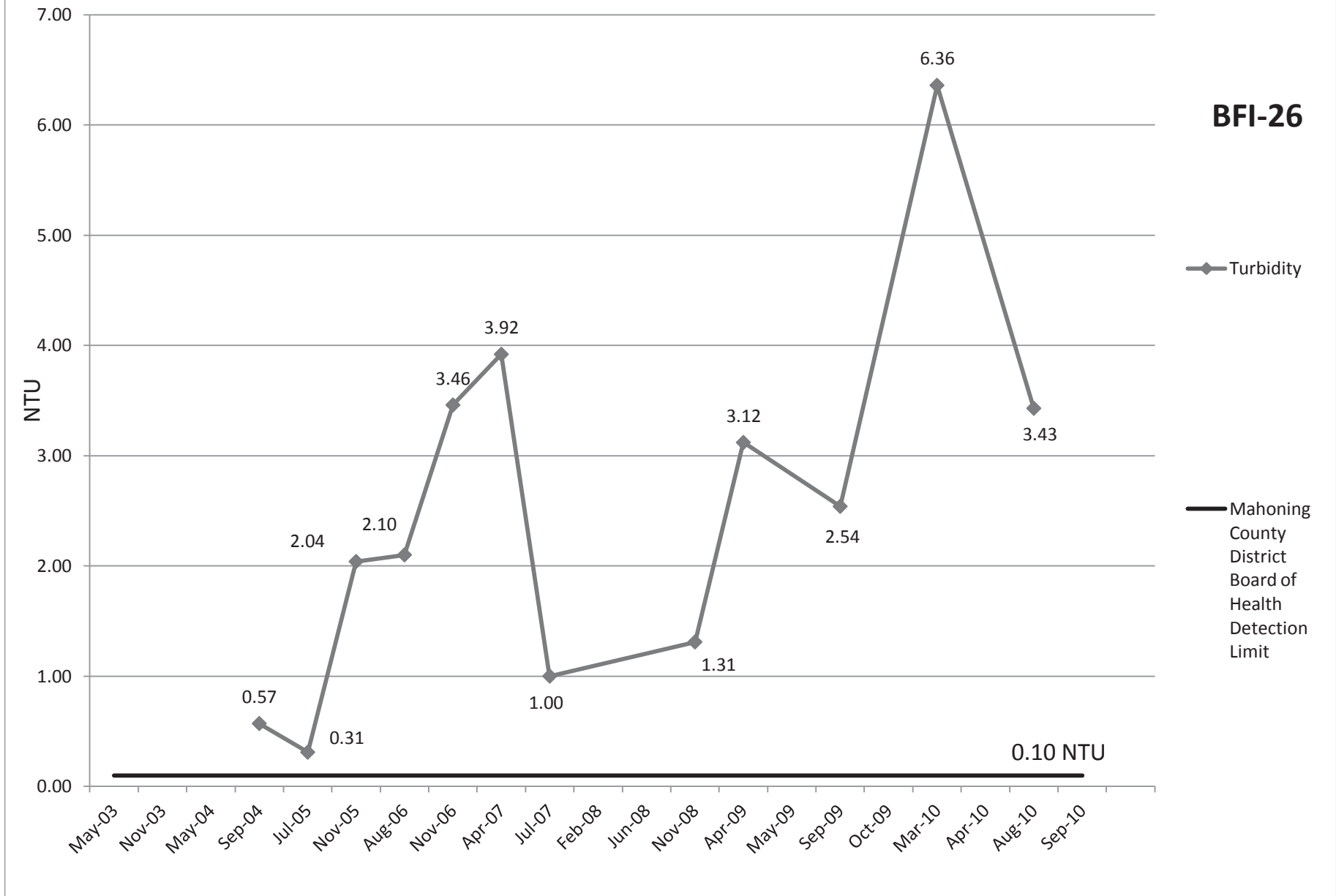
— Maximum  
Contaminant  
Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



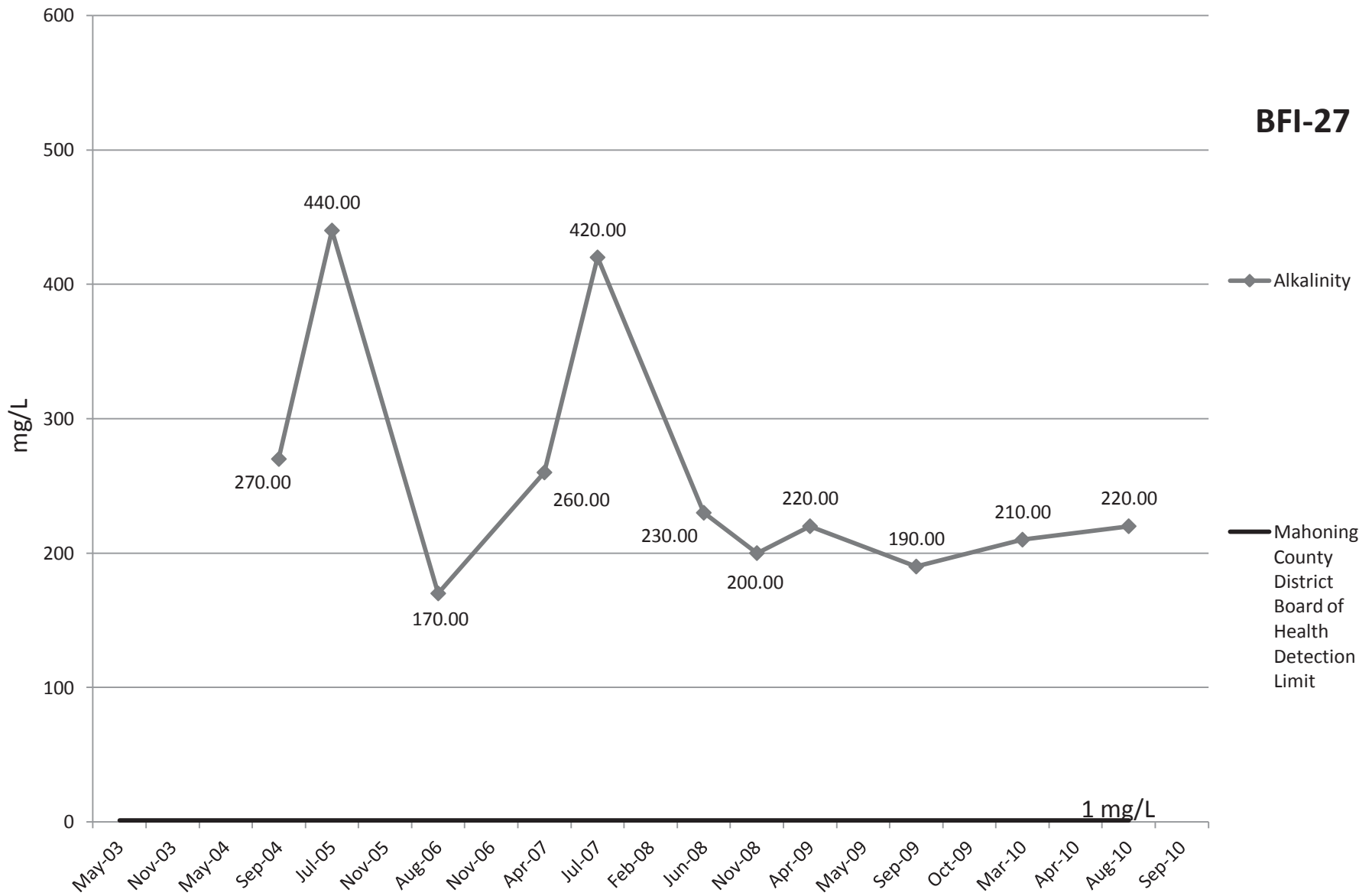


# Turbidity

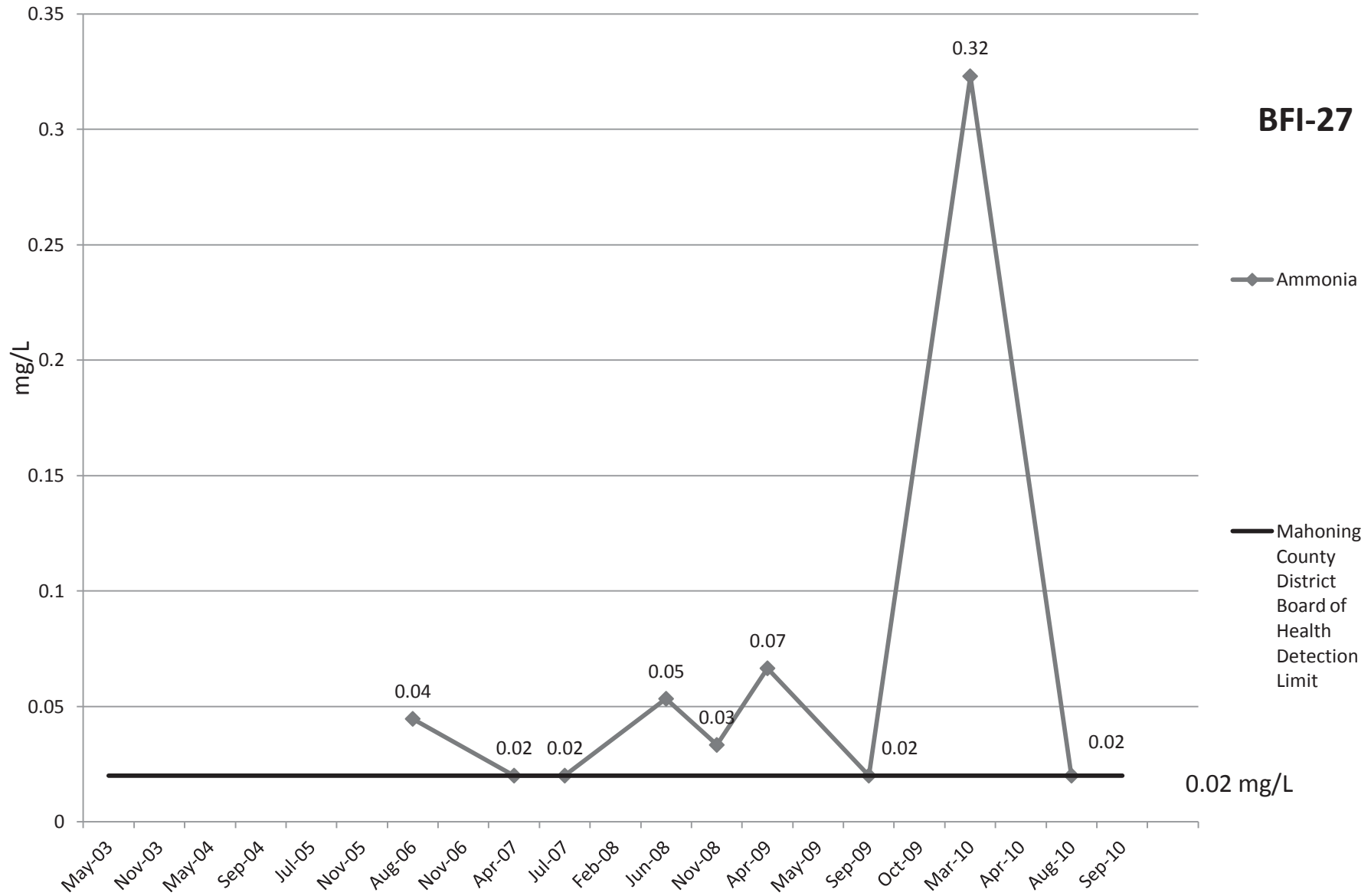


# Alkalinity

**BFI-27**



# Ammonia



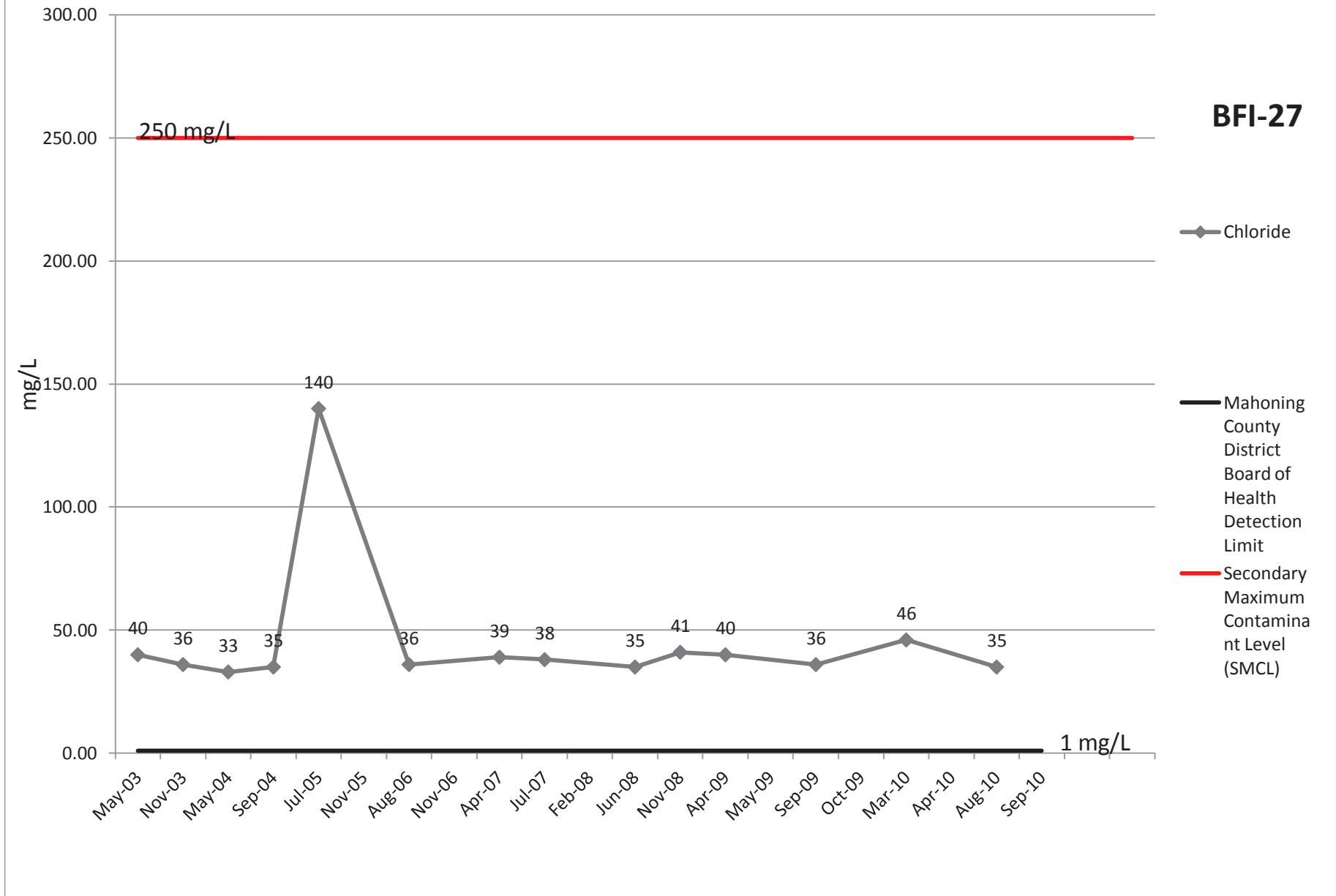
**BFI-27**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

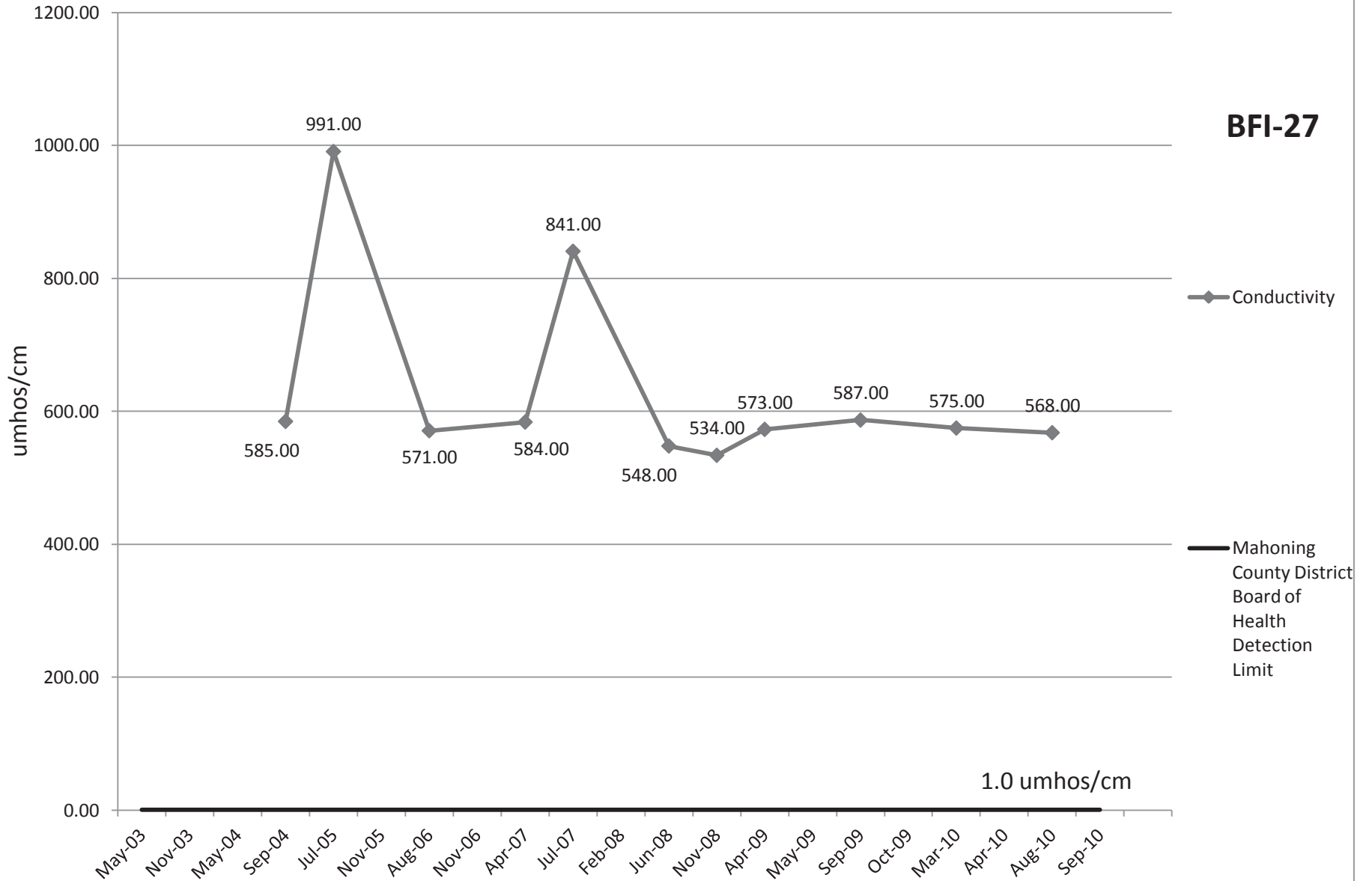
0.02 mg/L

# Chloride

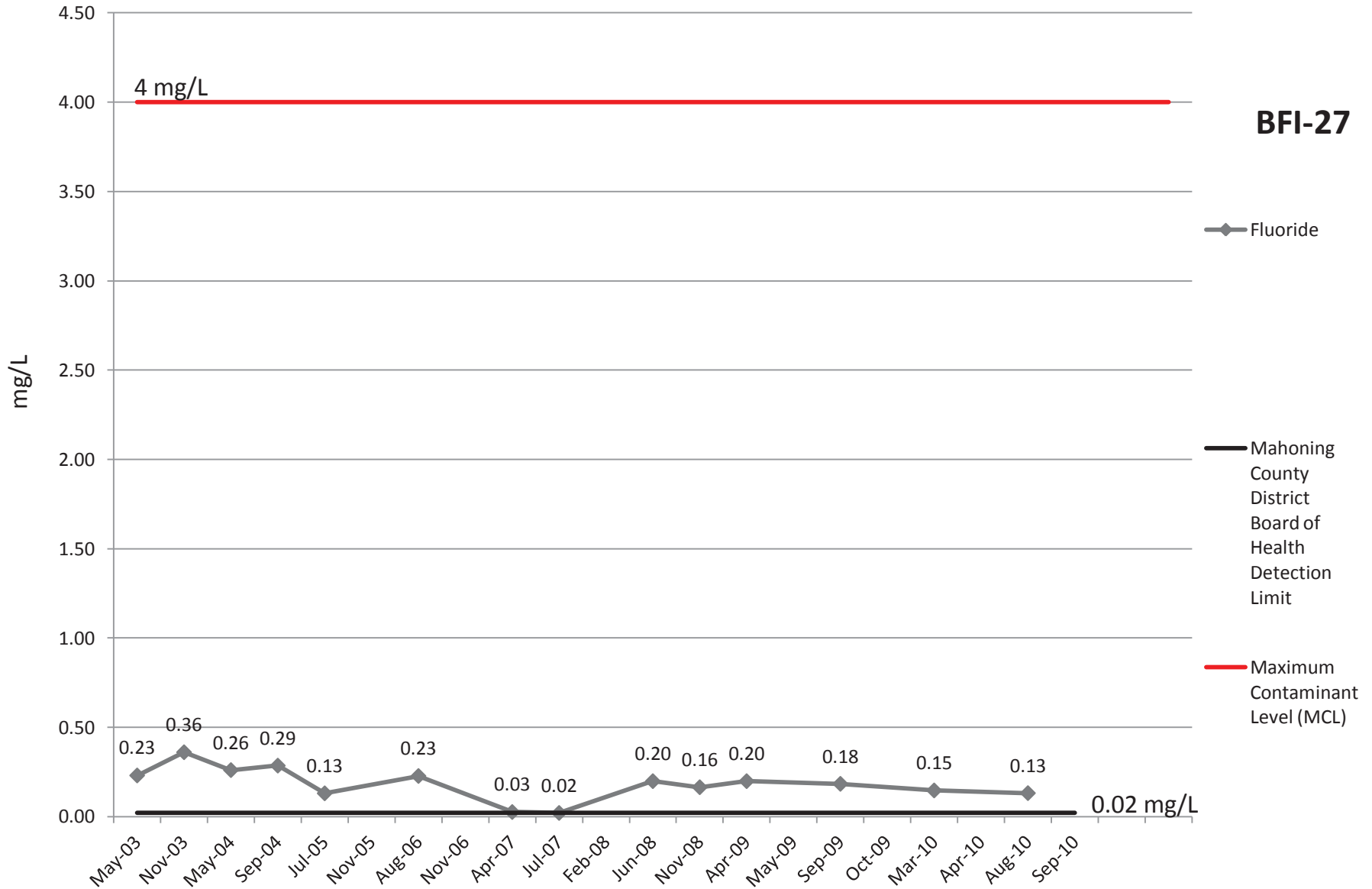


# Conductivity

**BFI-27**

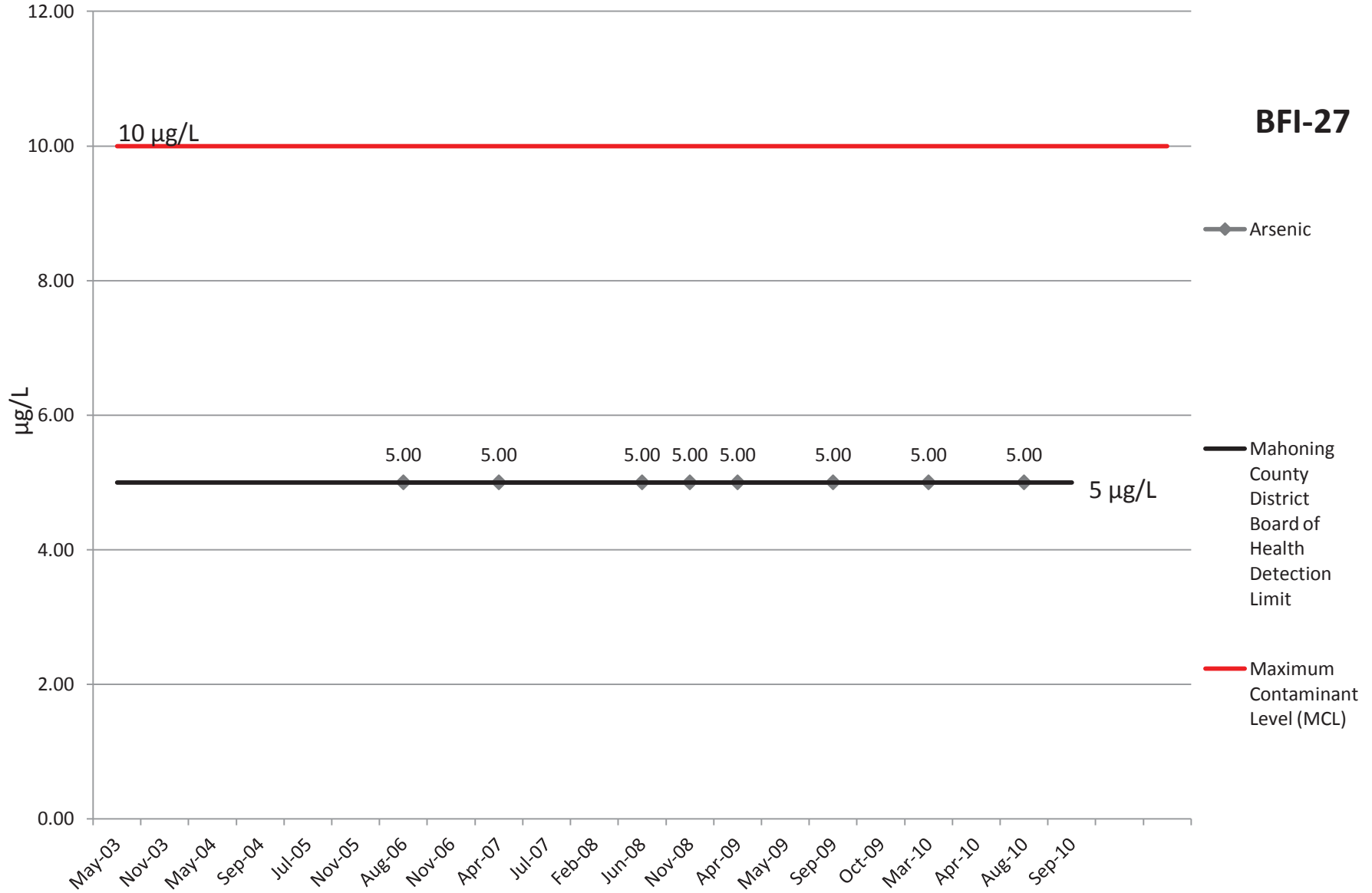


# Fluoride



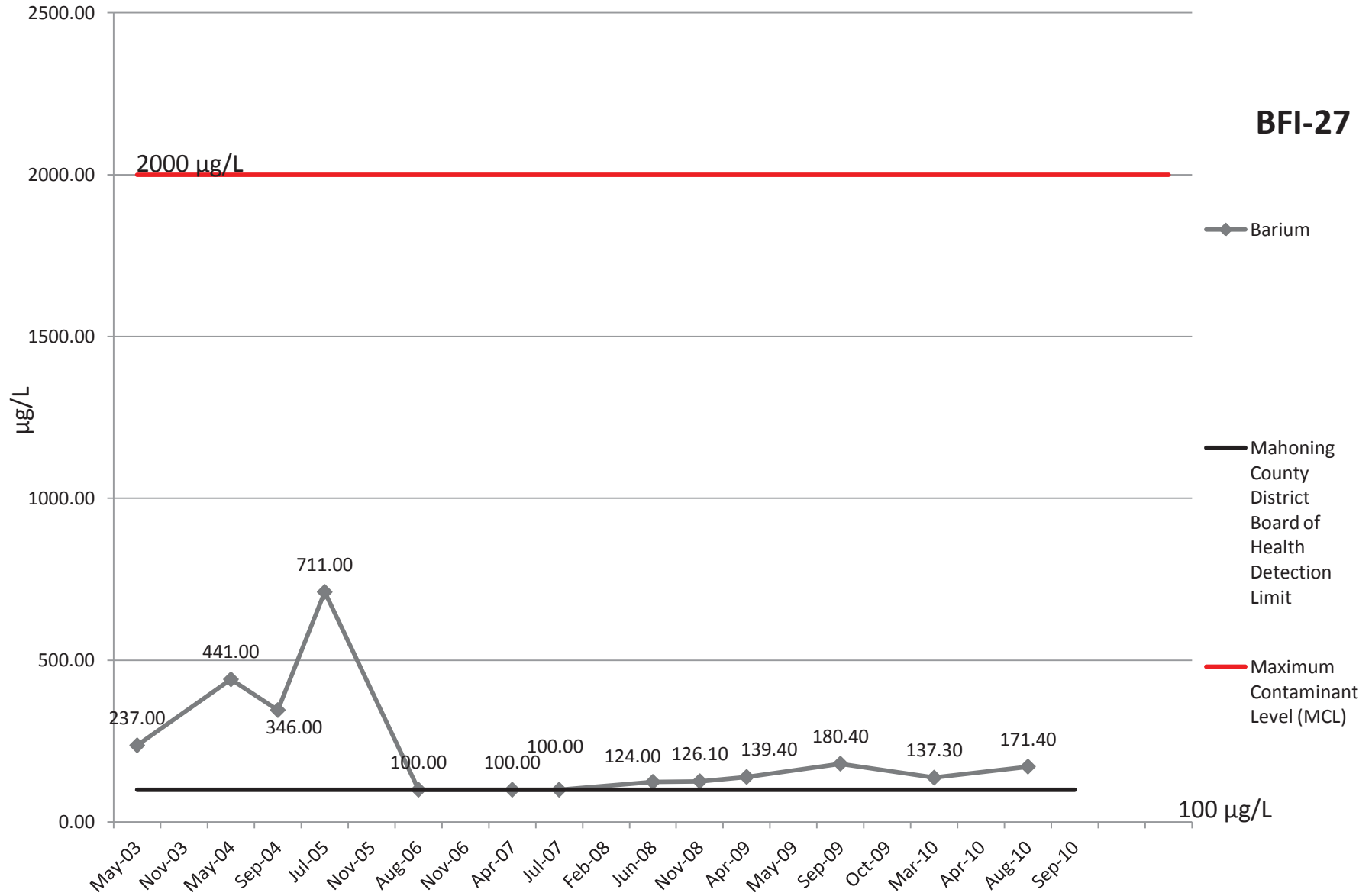
# Arsenic

**BFI-27**



# Barium

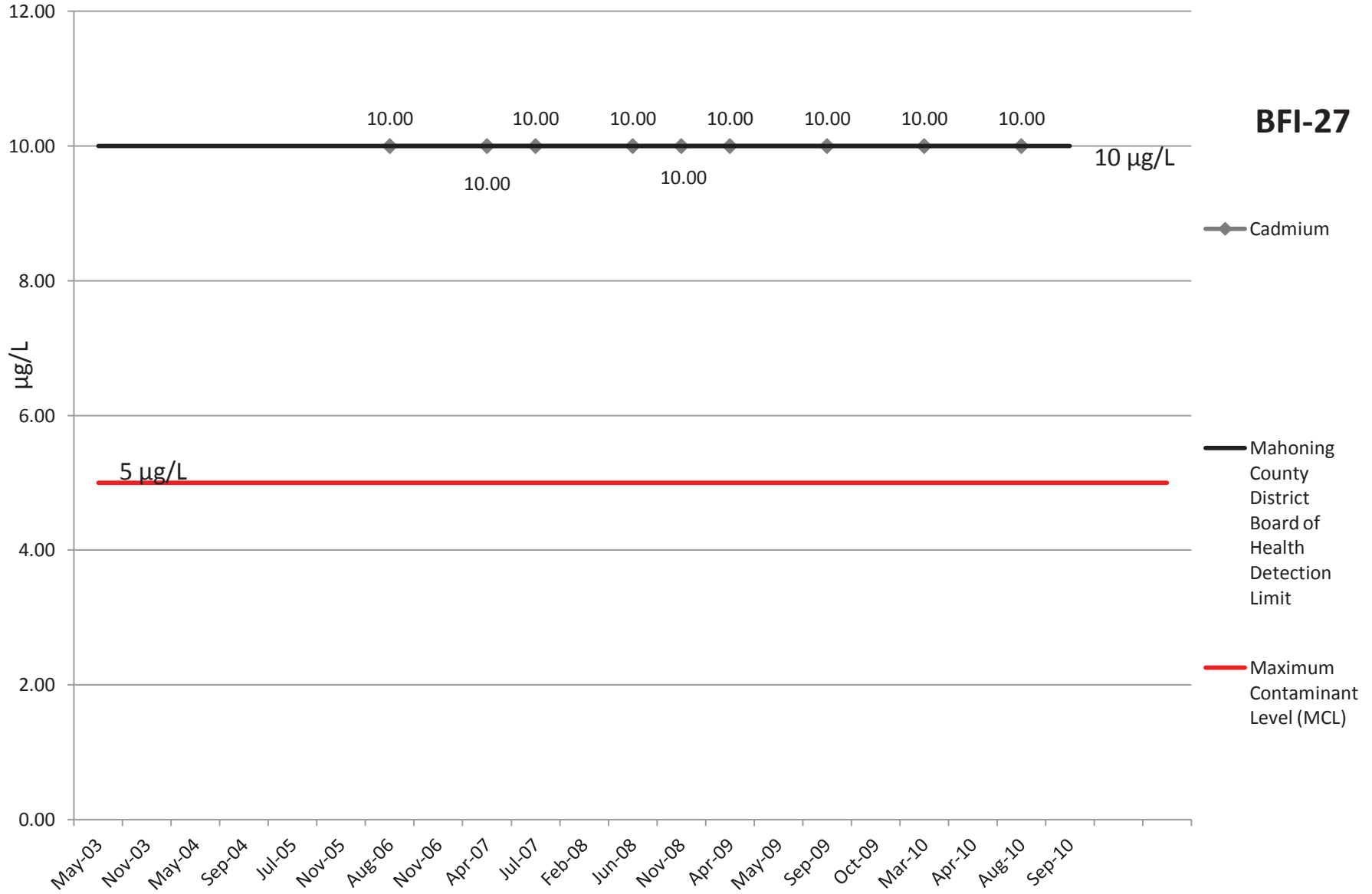
**BFI-27**





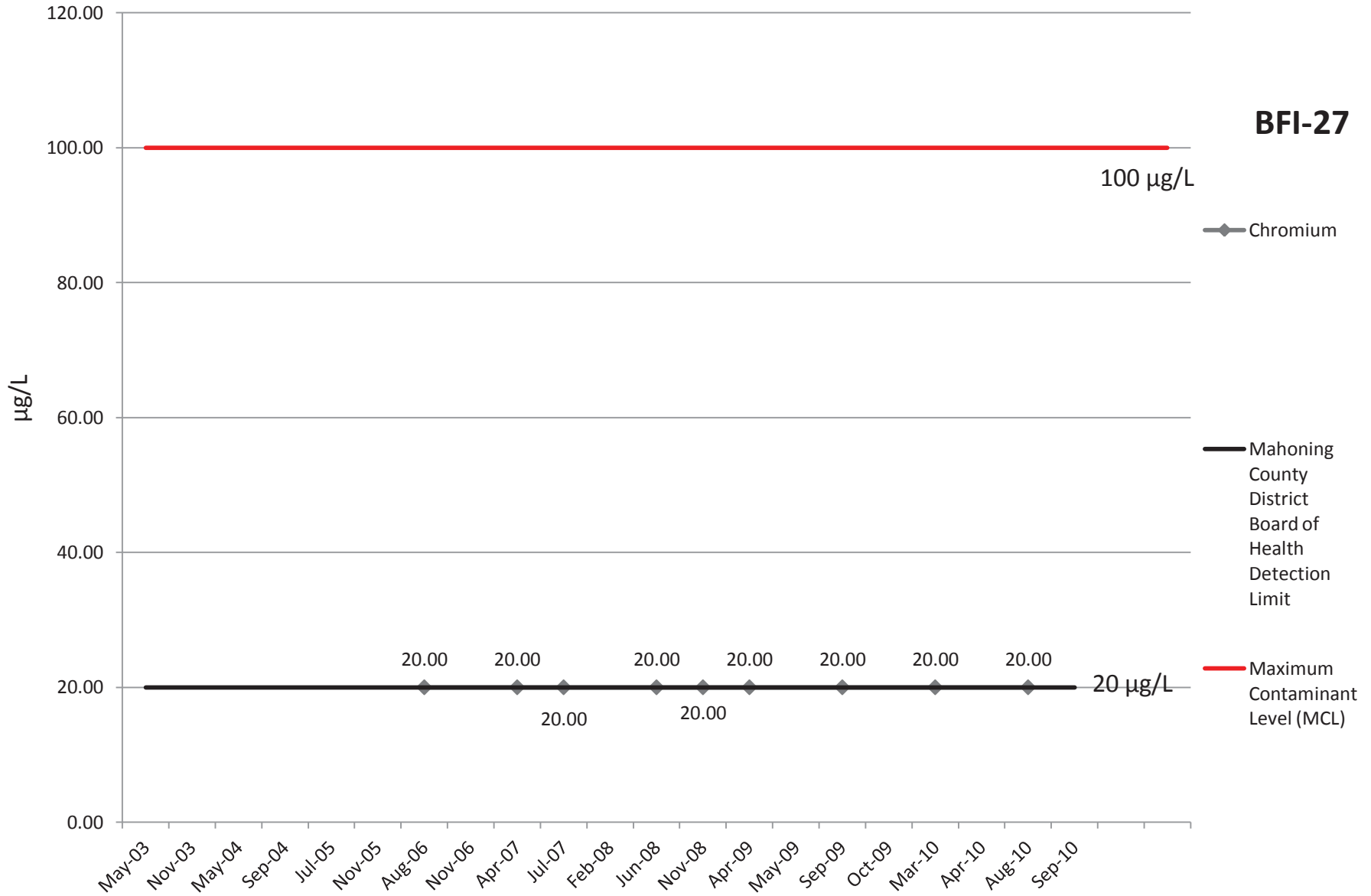
# Cadmium

**BFI-27**

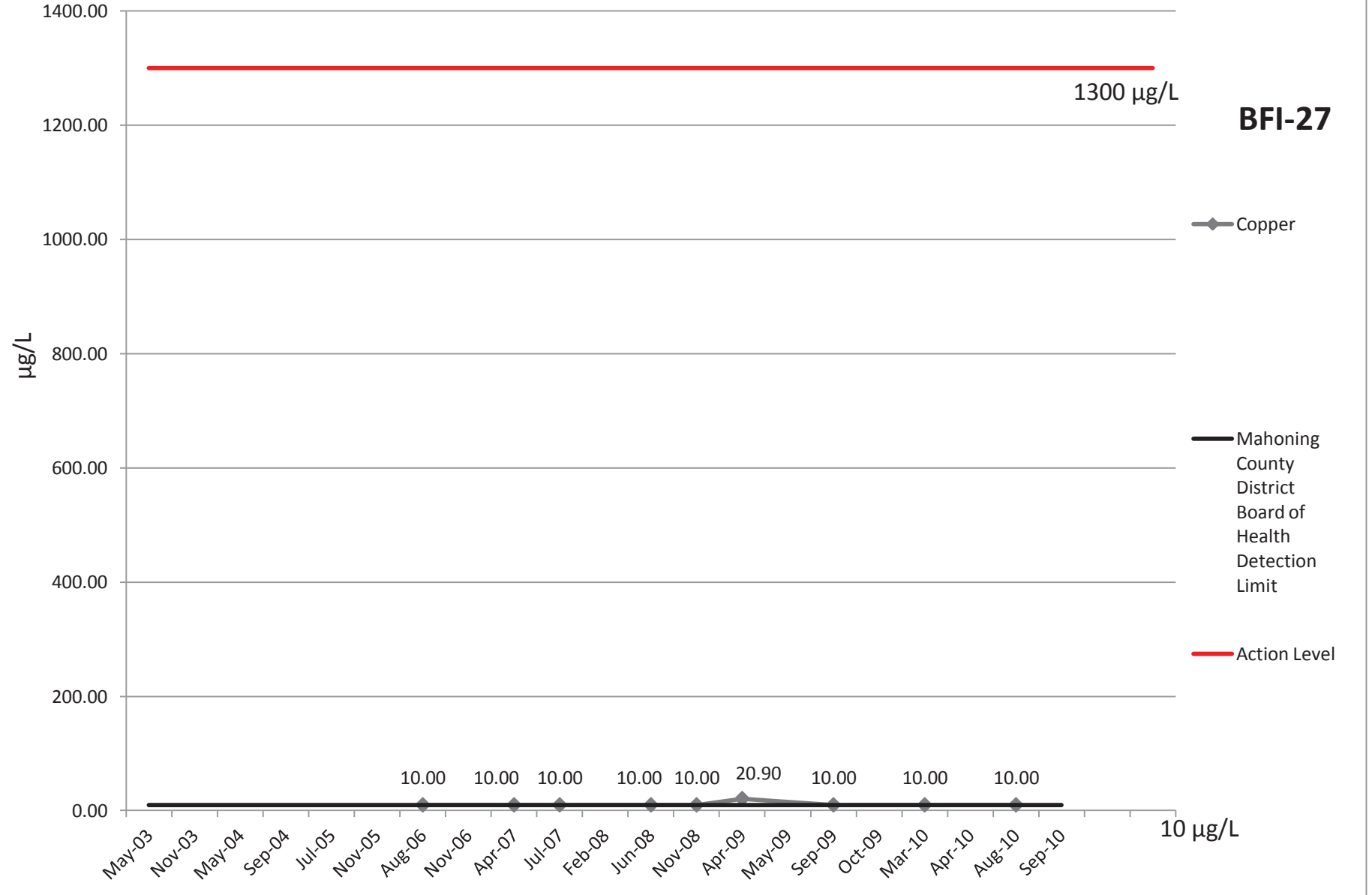


# Chromium

**BFI-27**

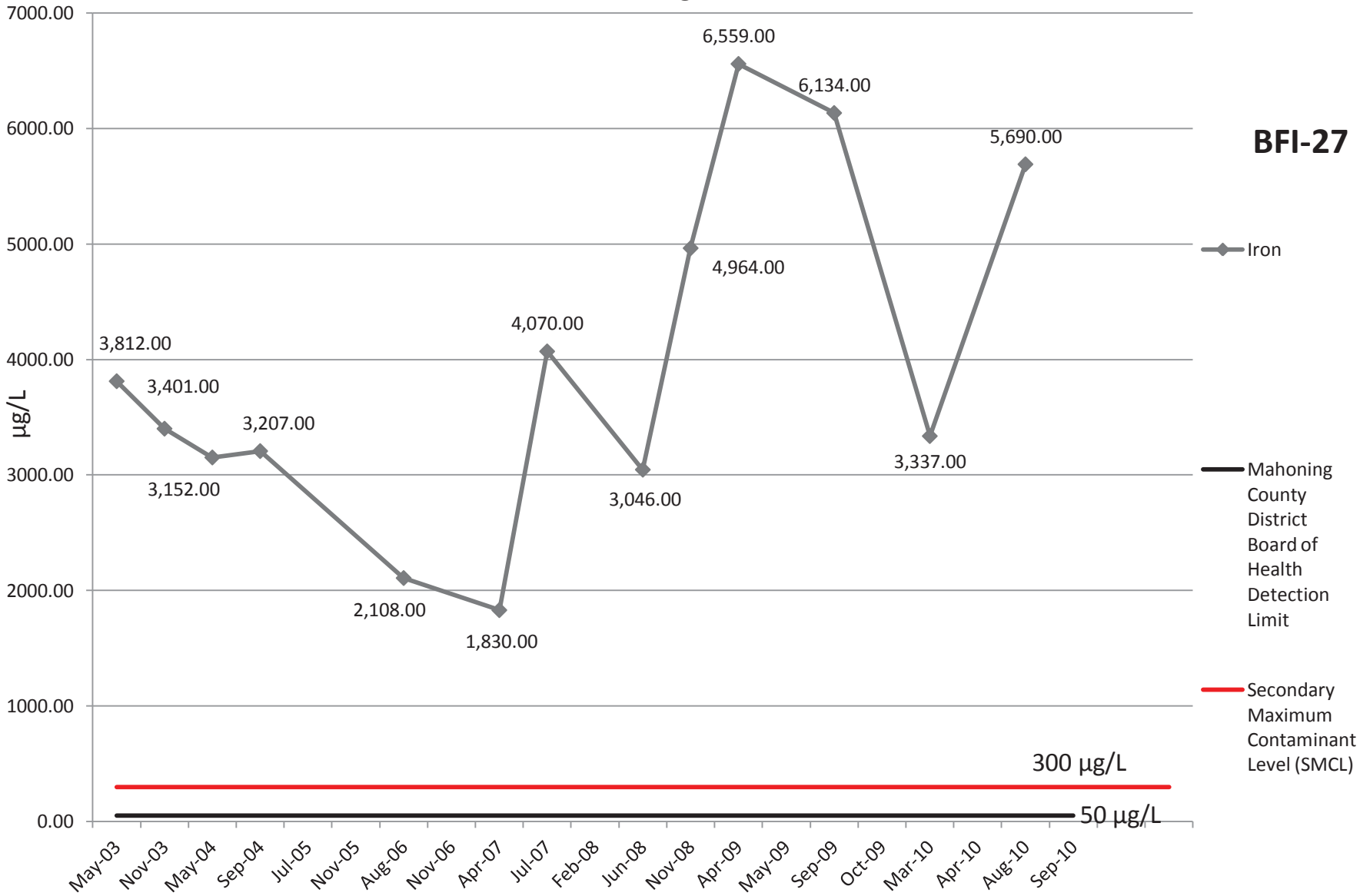


# Copper



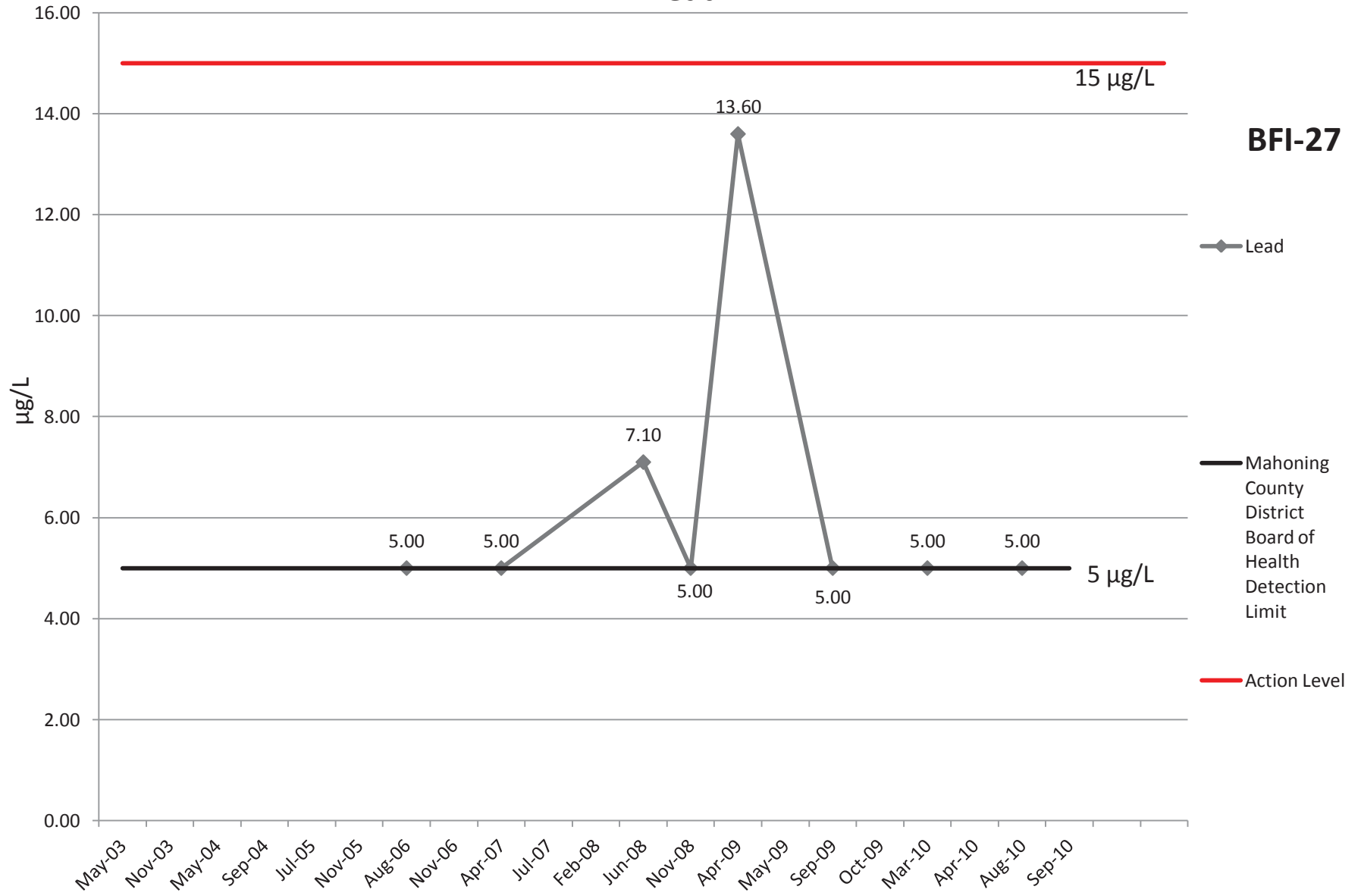
# Iron

**BFI-27**



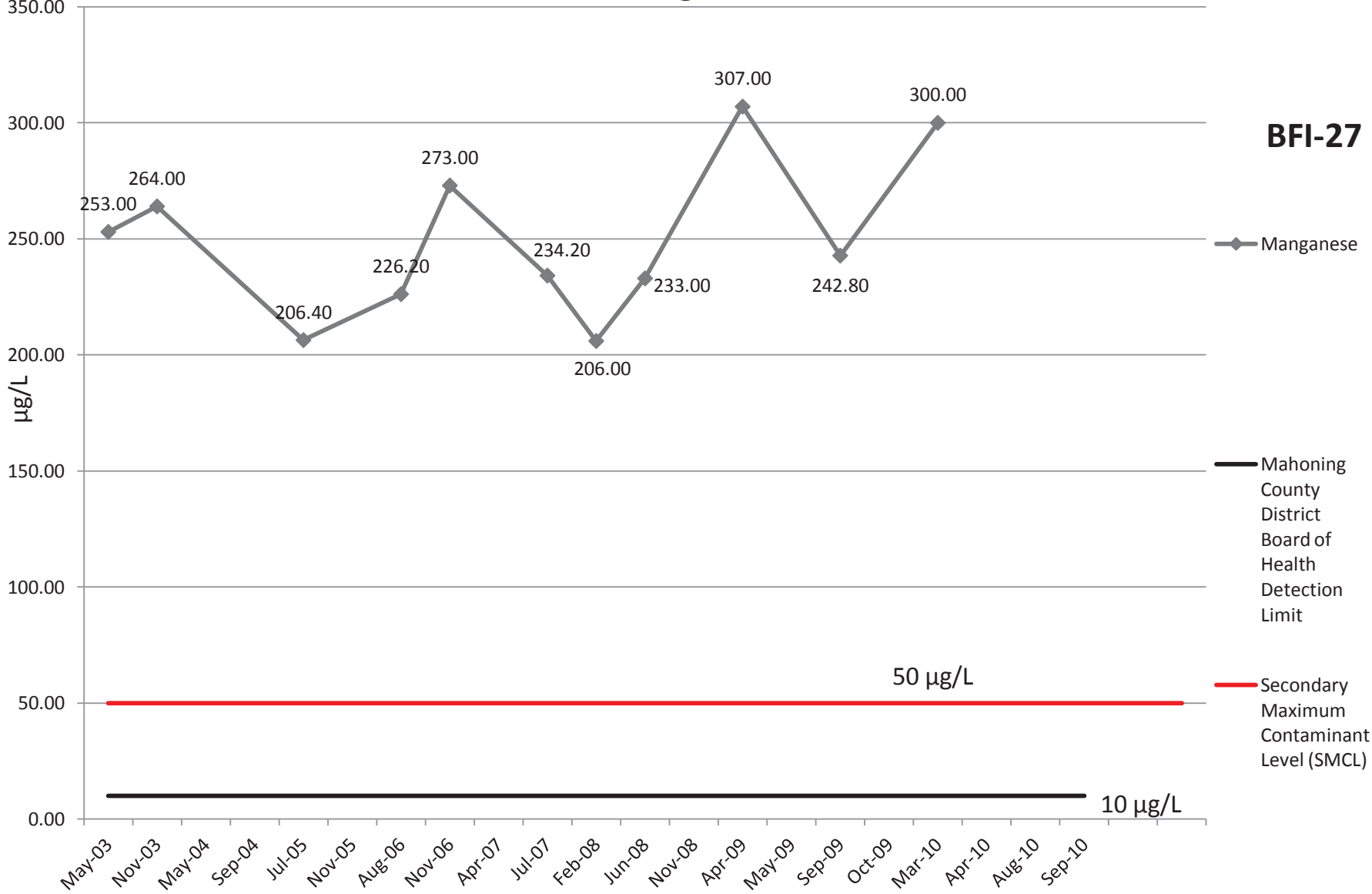
# Lead

**BFI-27**



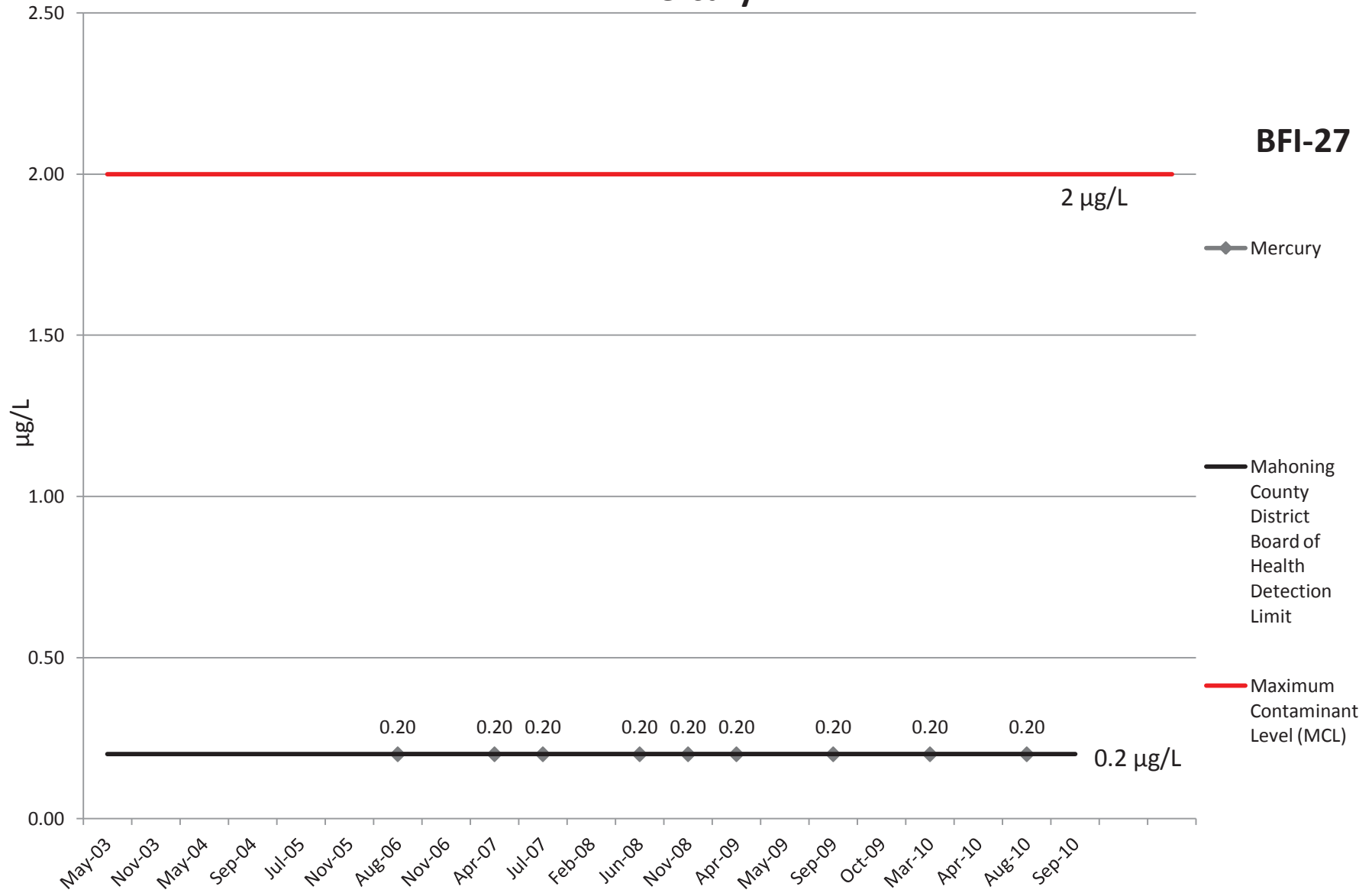
# Manganese

**BFI-27**

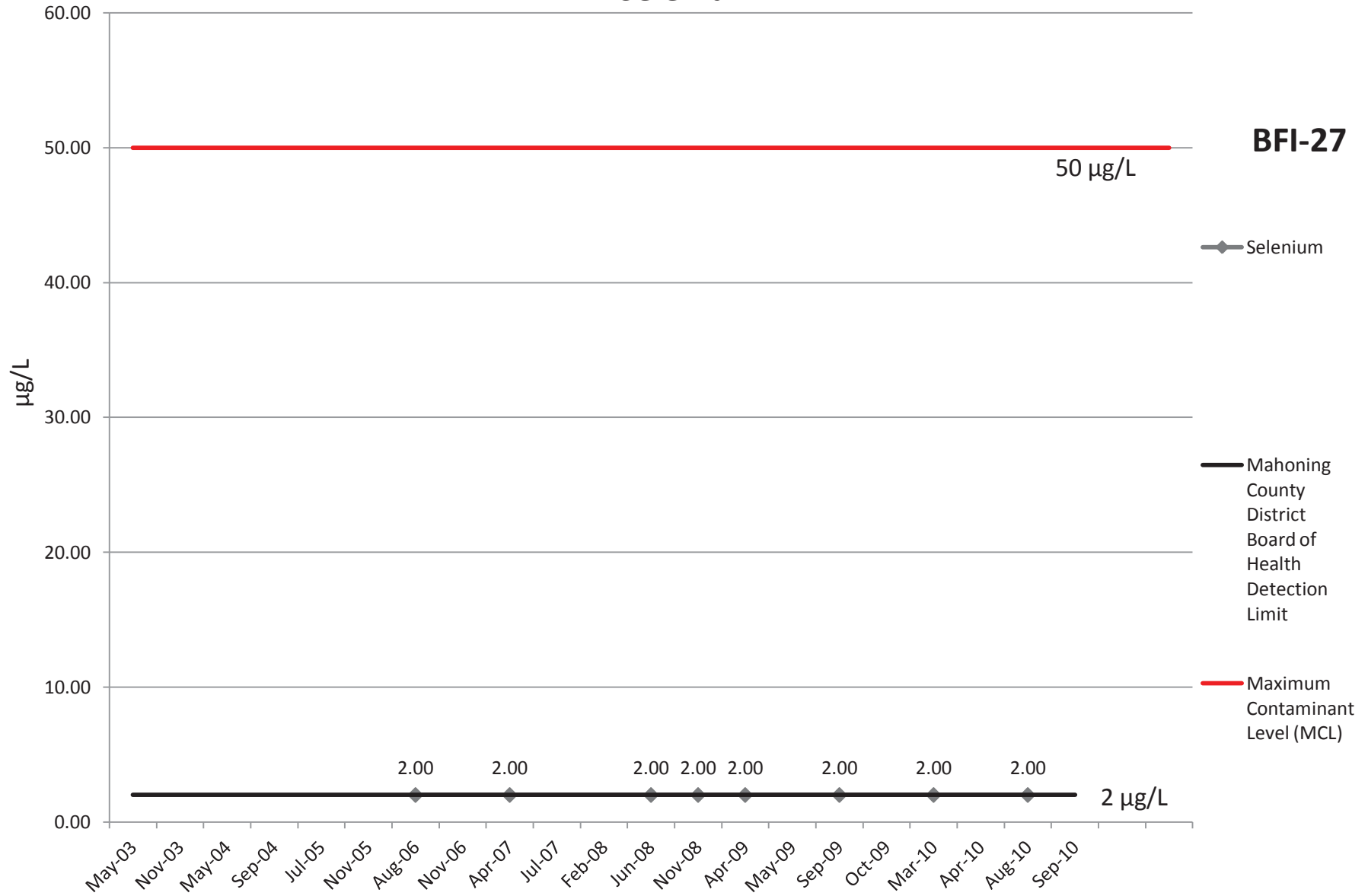


# Mercury

**BFI-27**



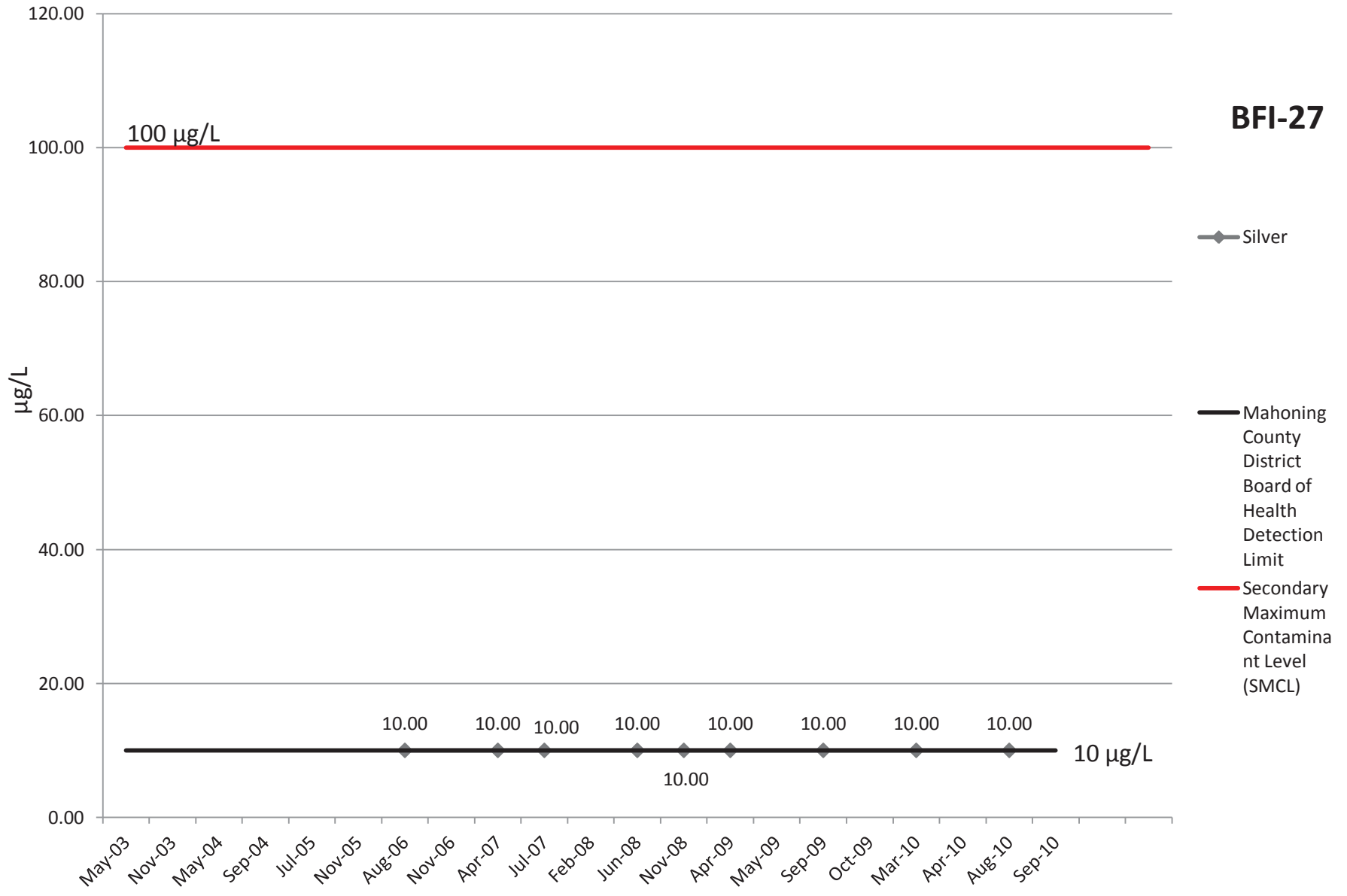
# Selenium



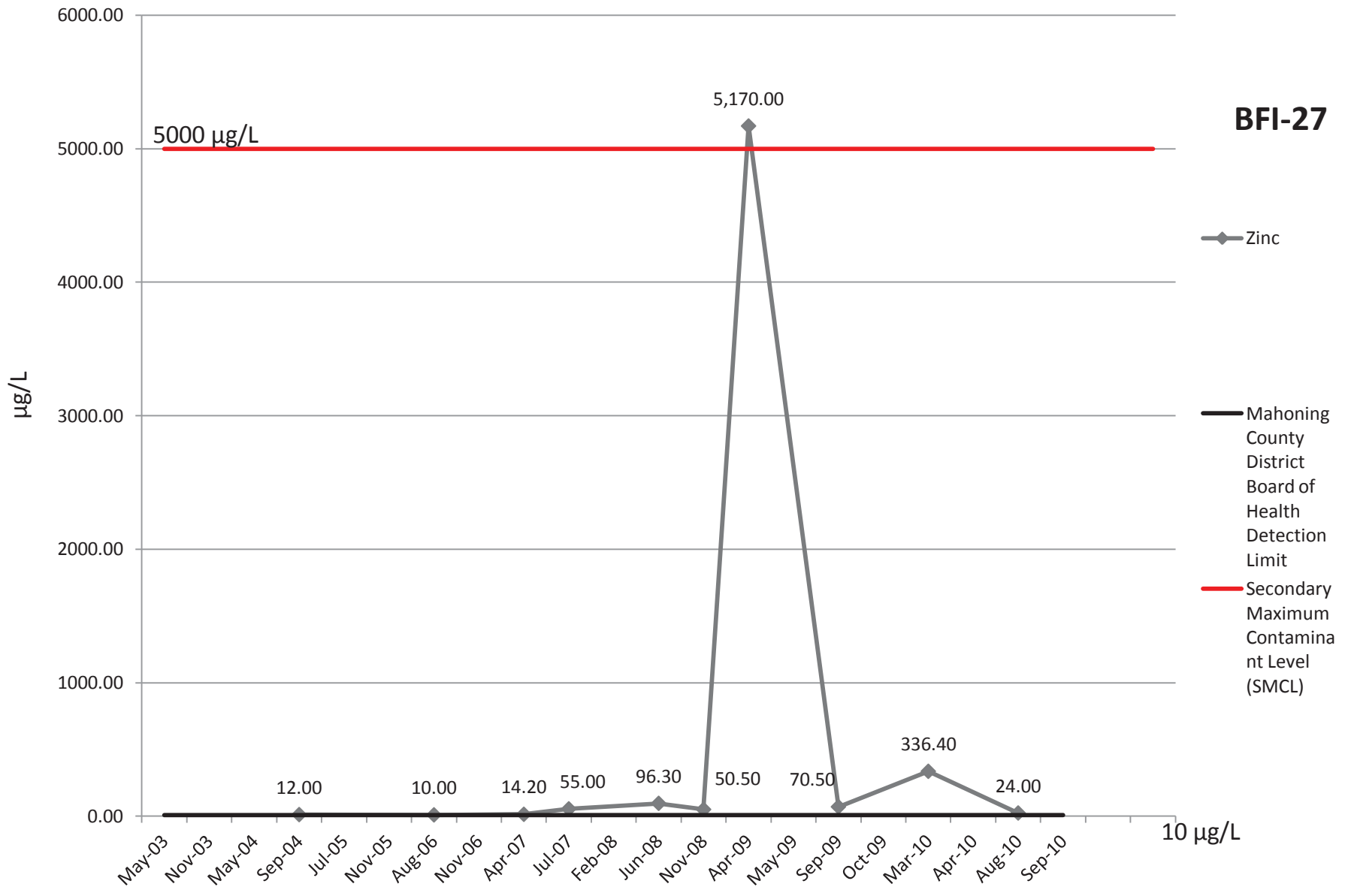


# Silver

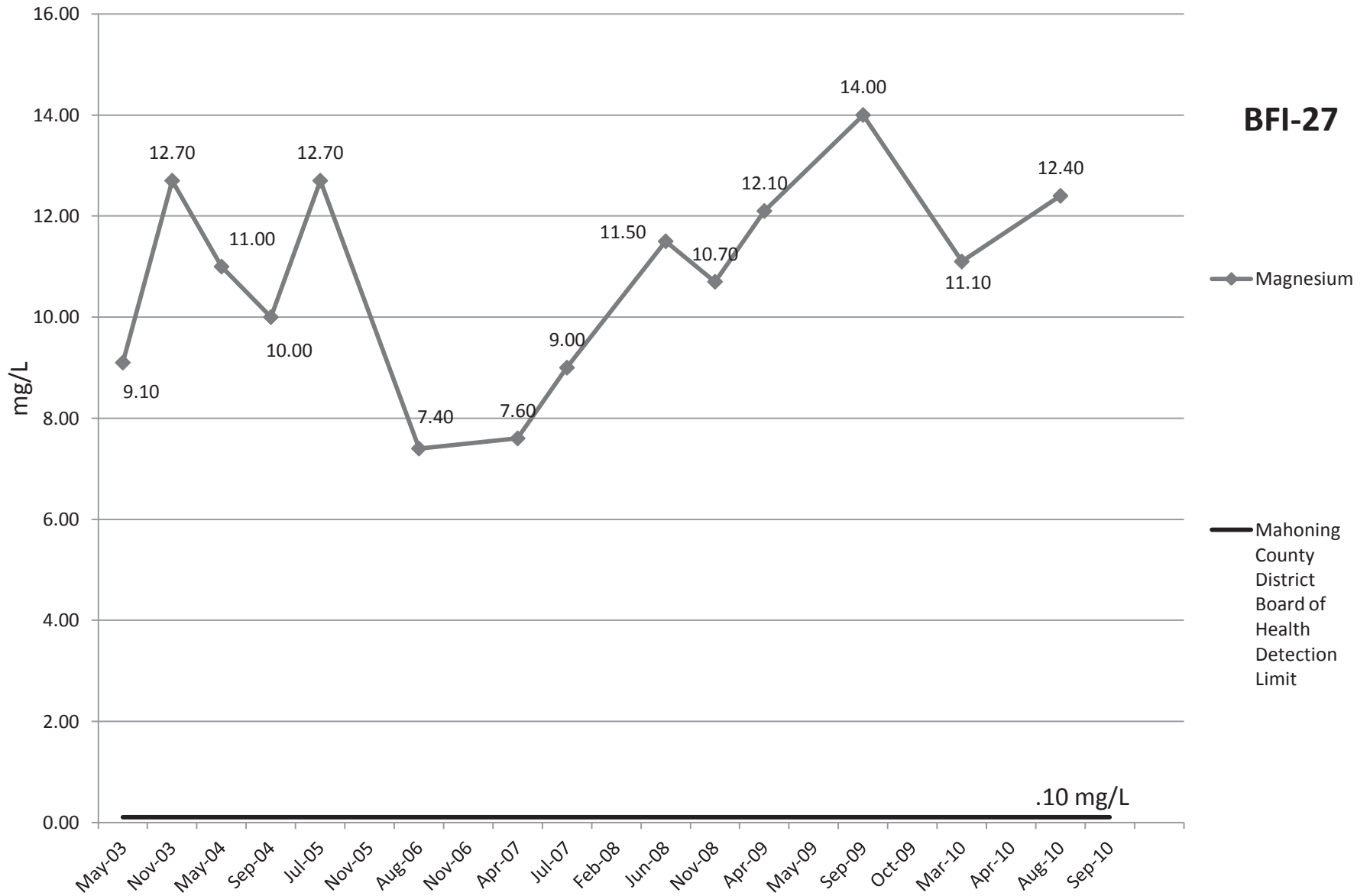
**BFI-27**



# Zinc

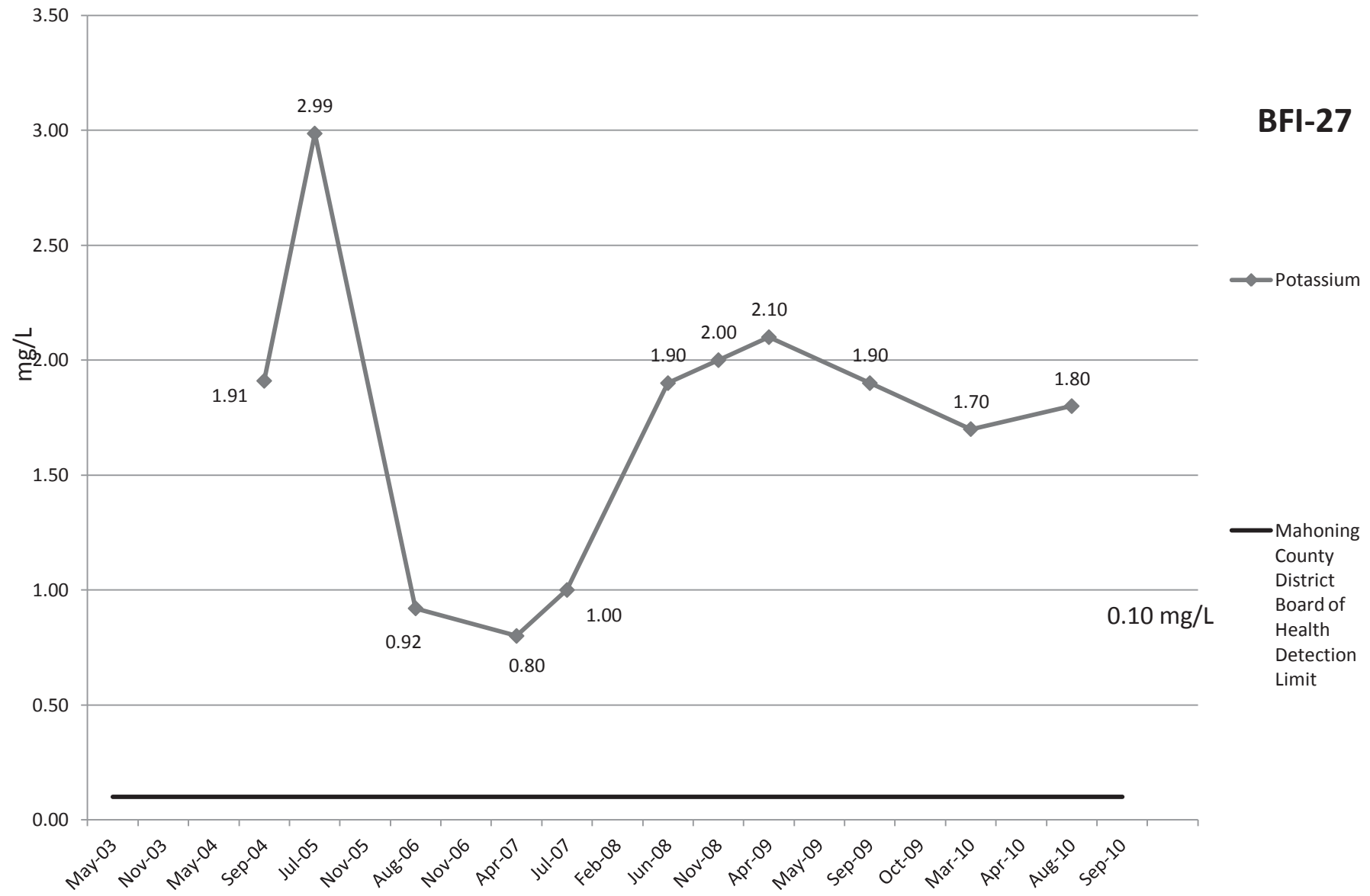


# Magnesium



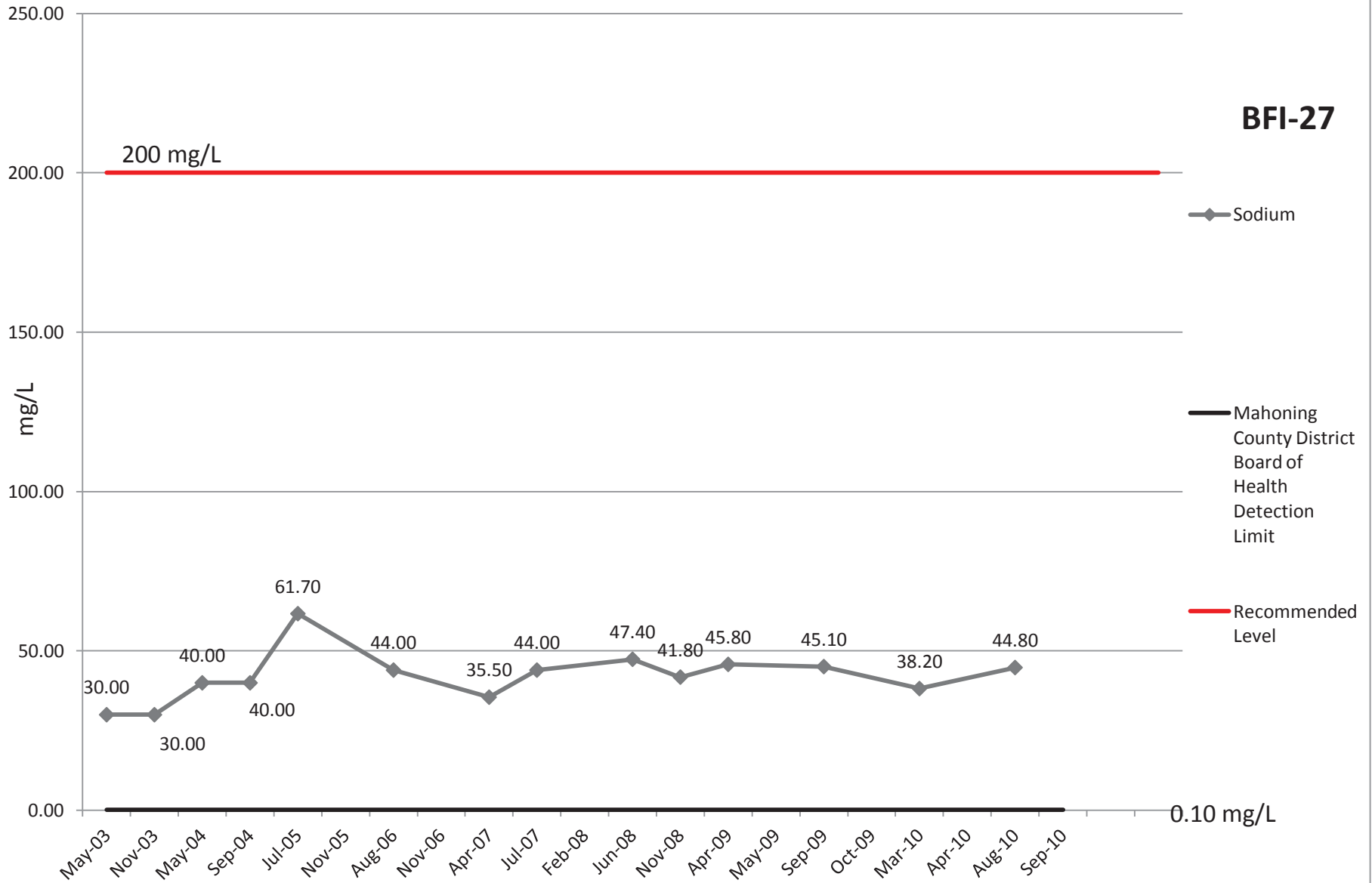
# Potassium

**BFI-27**



# Sodium

**BFI-27**



# Nitrate EPA

**BFI-27**

10 mg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00  
mg/L

- ◆ Nitrate EPA
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

.050 mg/L

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

2.07

0.50

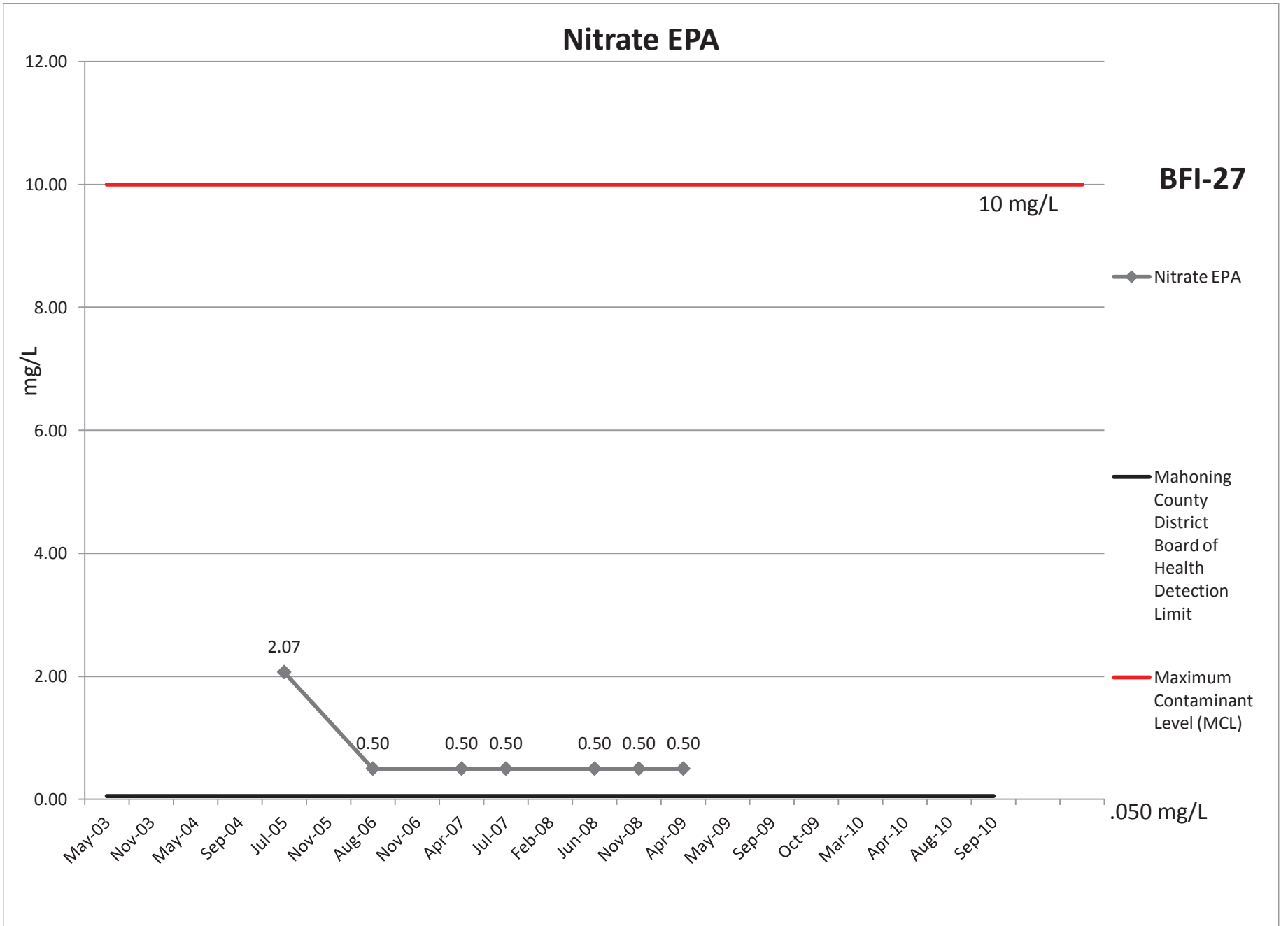
0.50

0.50

0.50

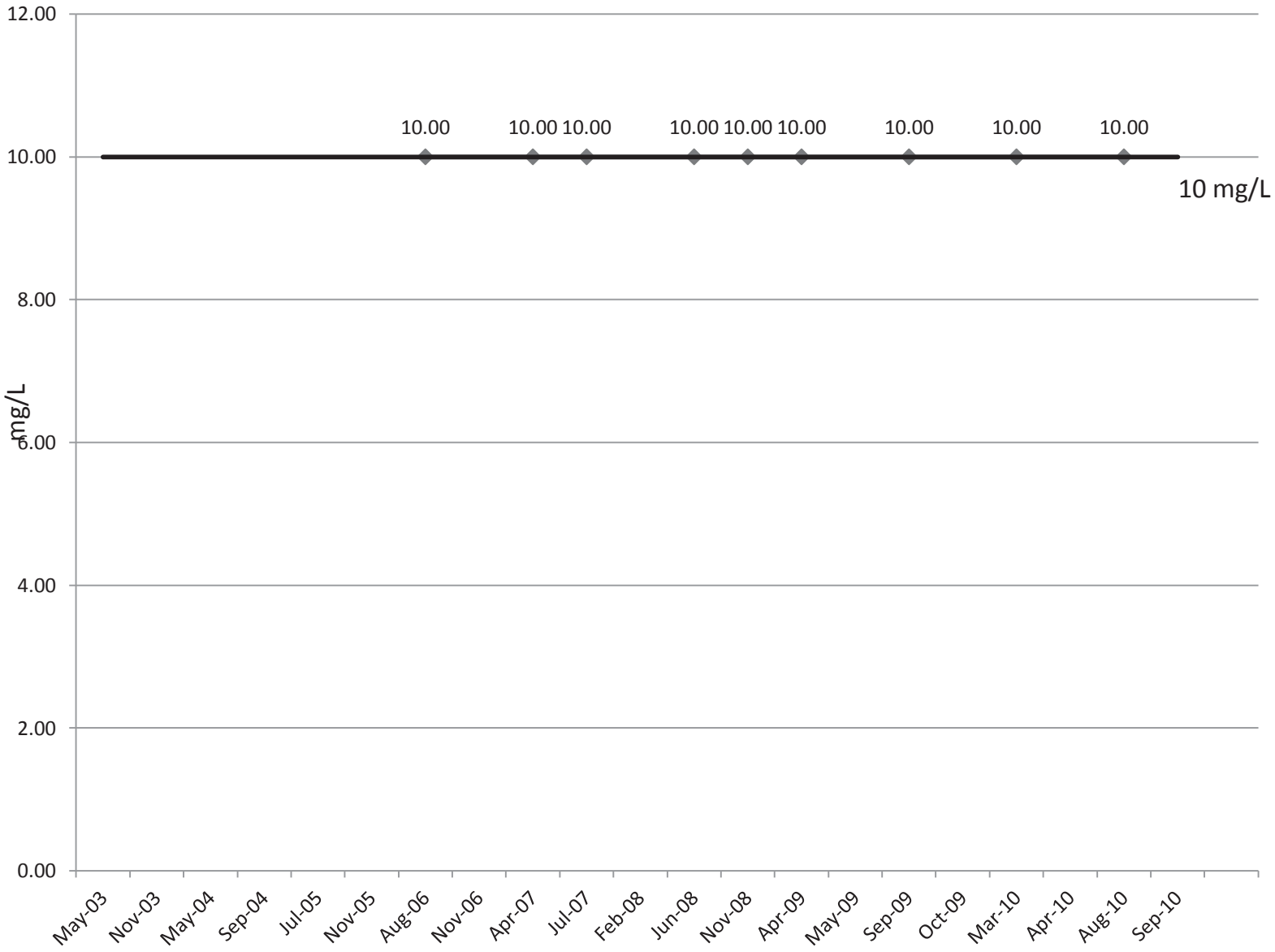
0.50

0.50



# COD

**BFI-27**



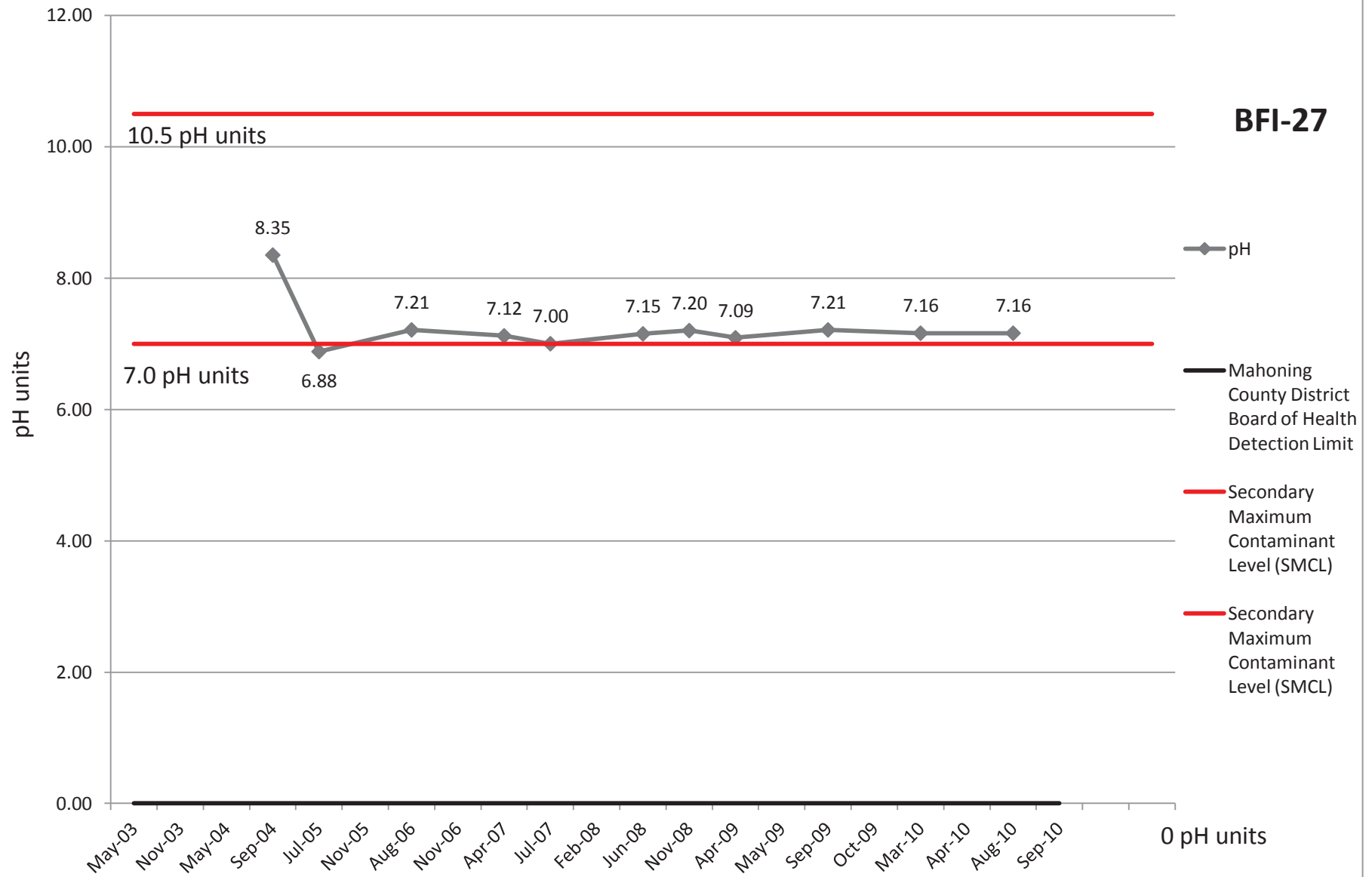
◆ COD

— Mahoning County District Board of Health Detection Limit

10 mg/L

# pH

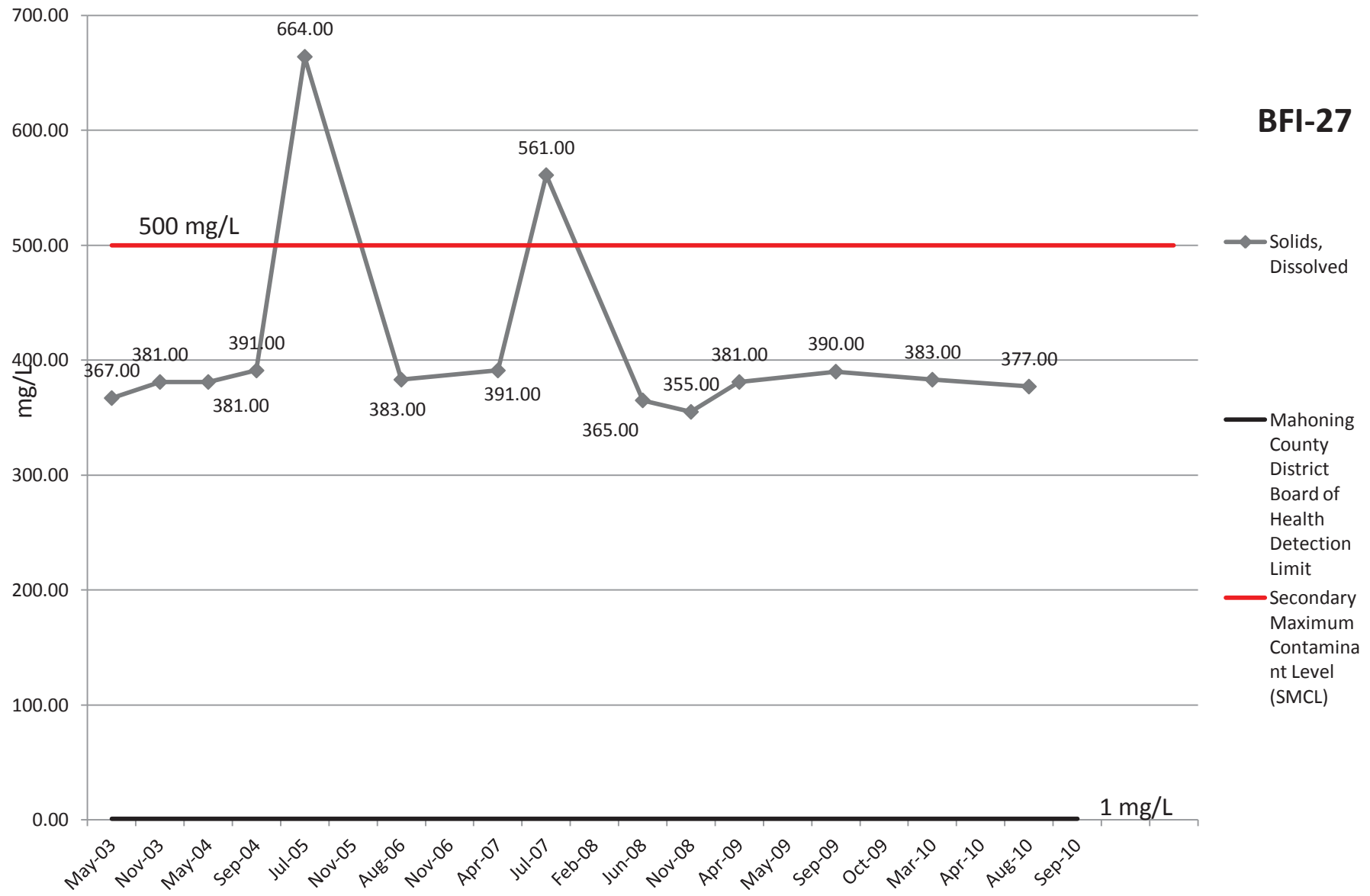
**BFI-27**





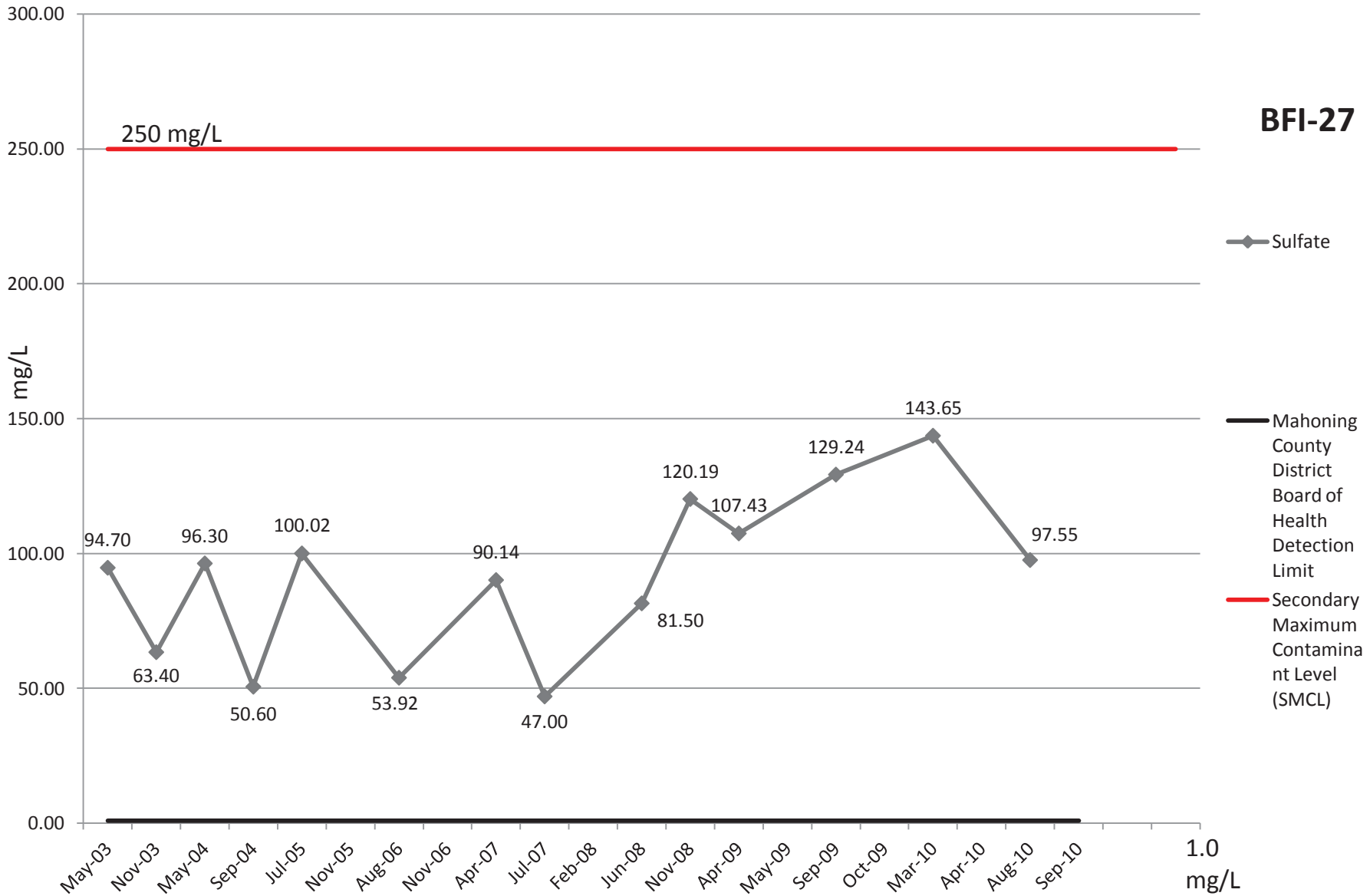
# Solids, Dissolved

**BFI-27**



# Sulfate

**BFI-27**



# Bacteria

**BFI-27**

Positive/Negative

◆ Bacteria

positive (1)

1.00

1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

0.00

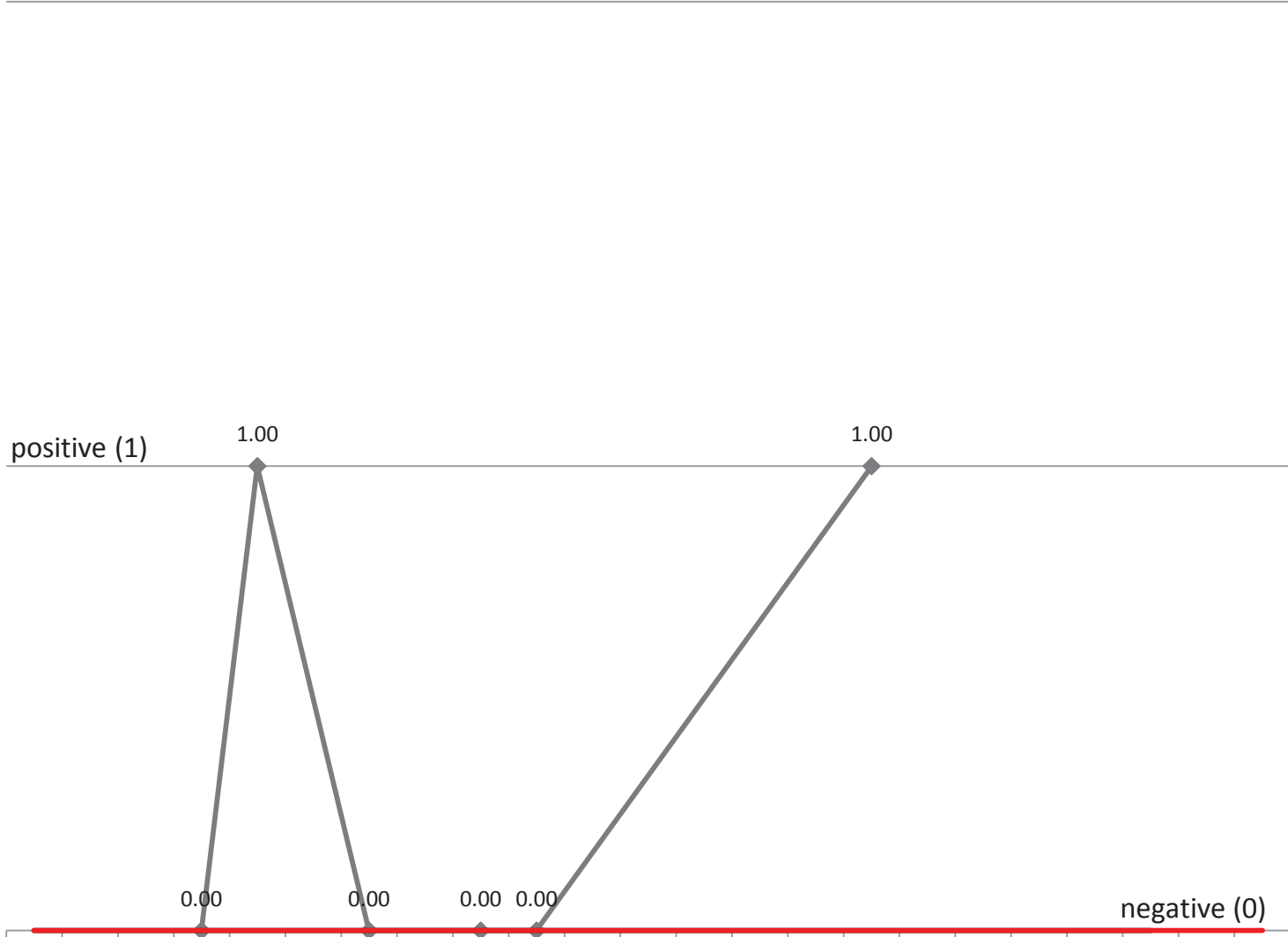
0.00

0.00

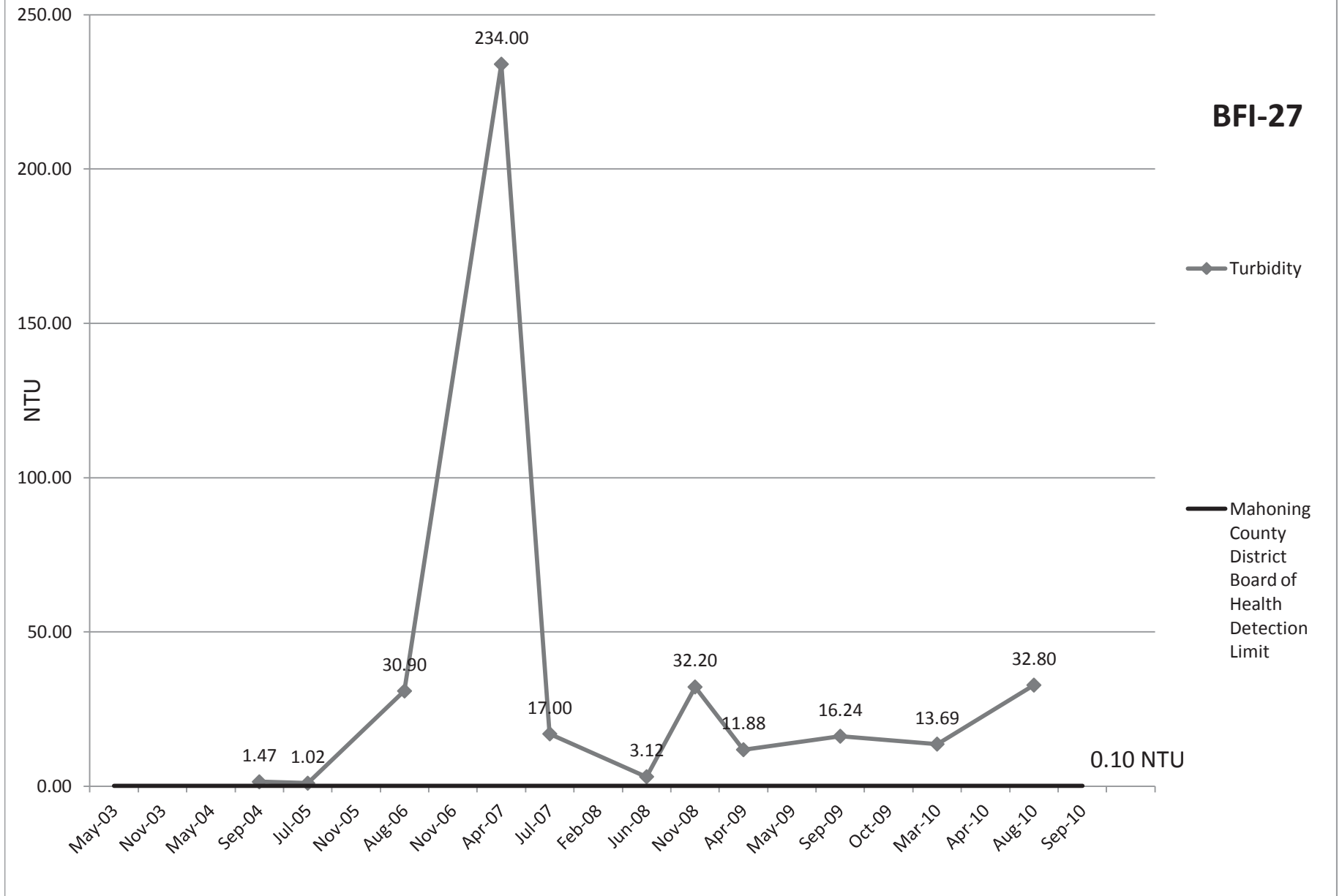
0.00

negative (0)

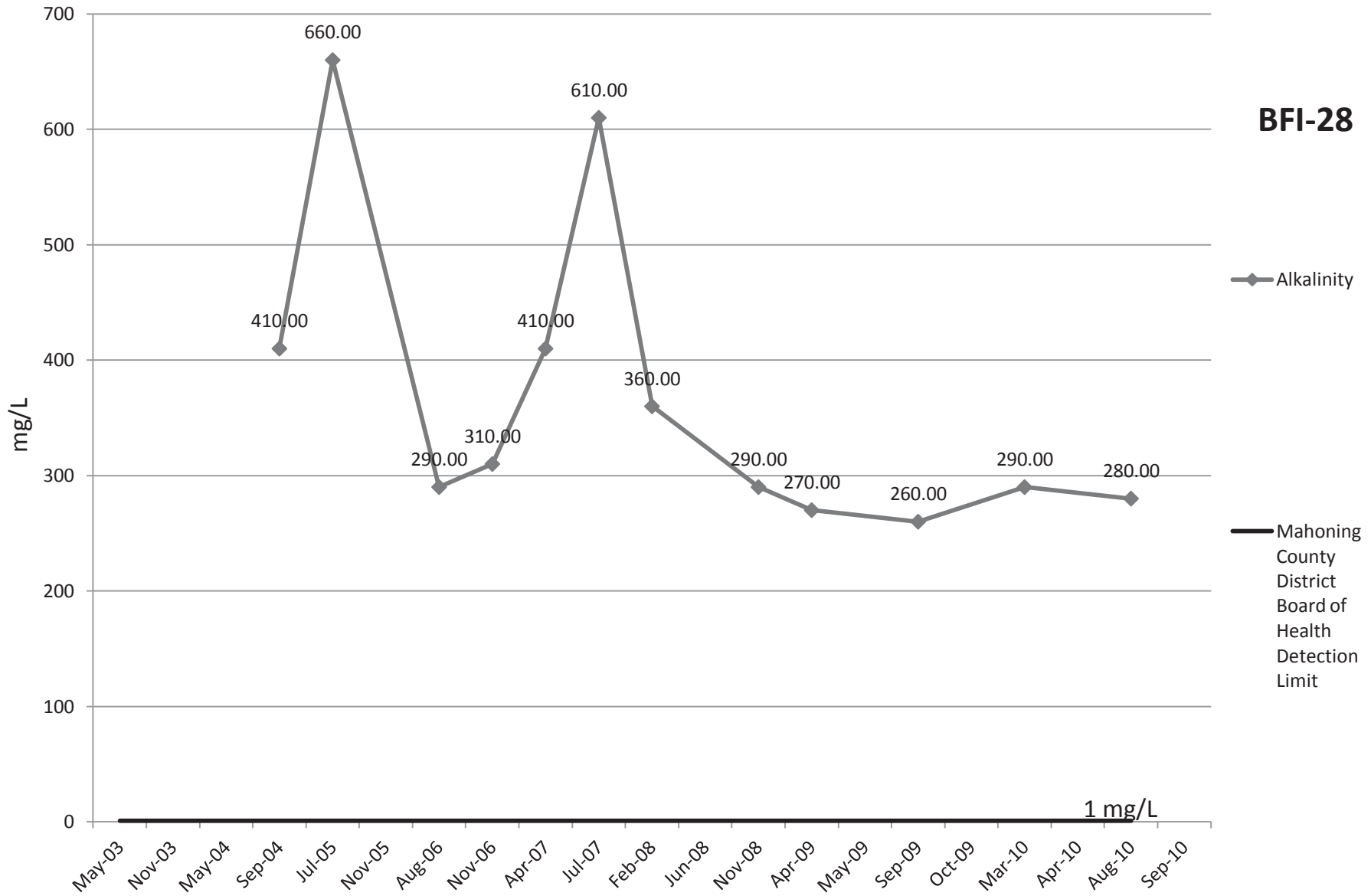
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



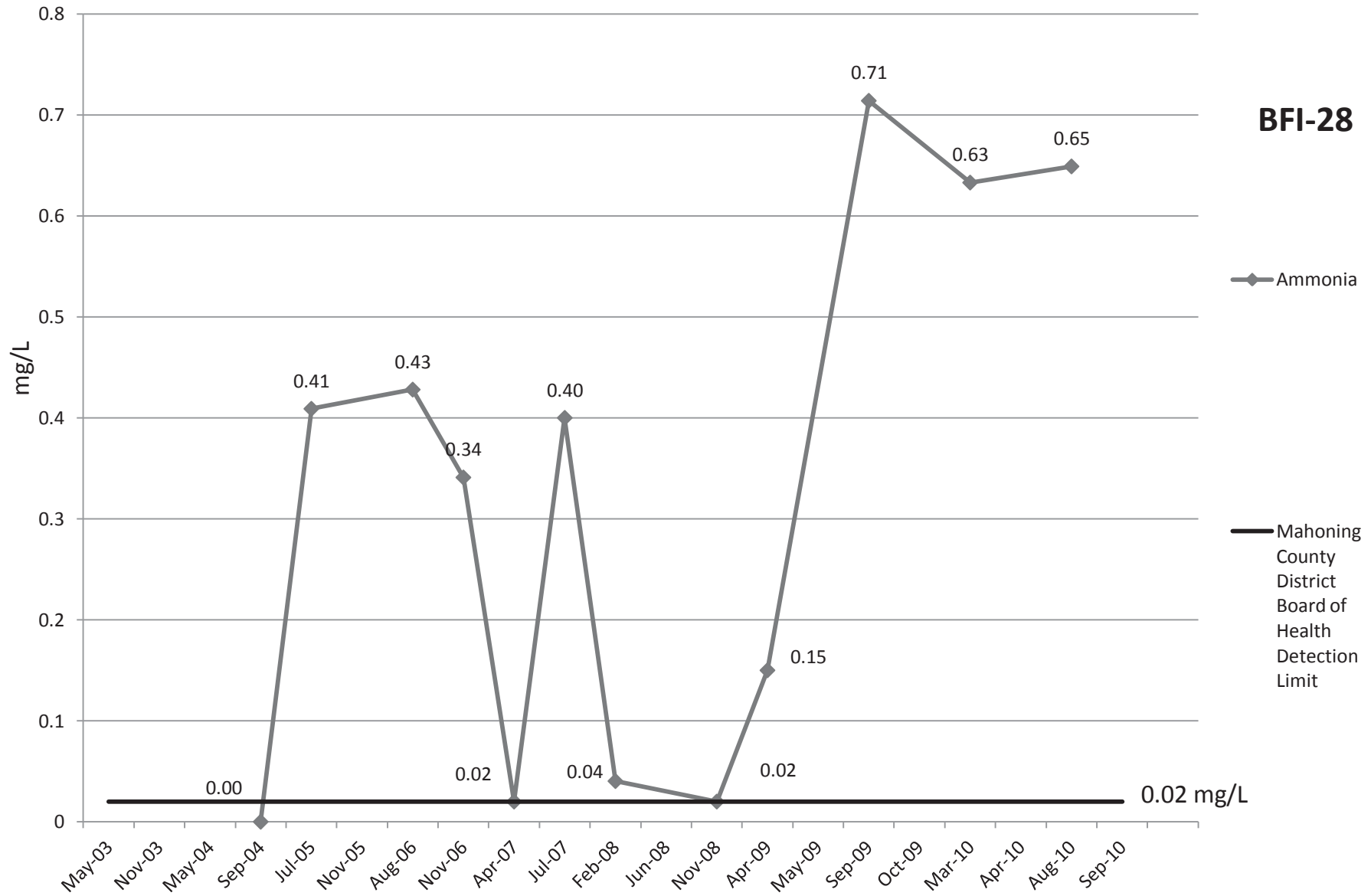
# Turbidity



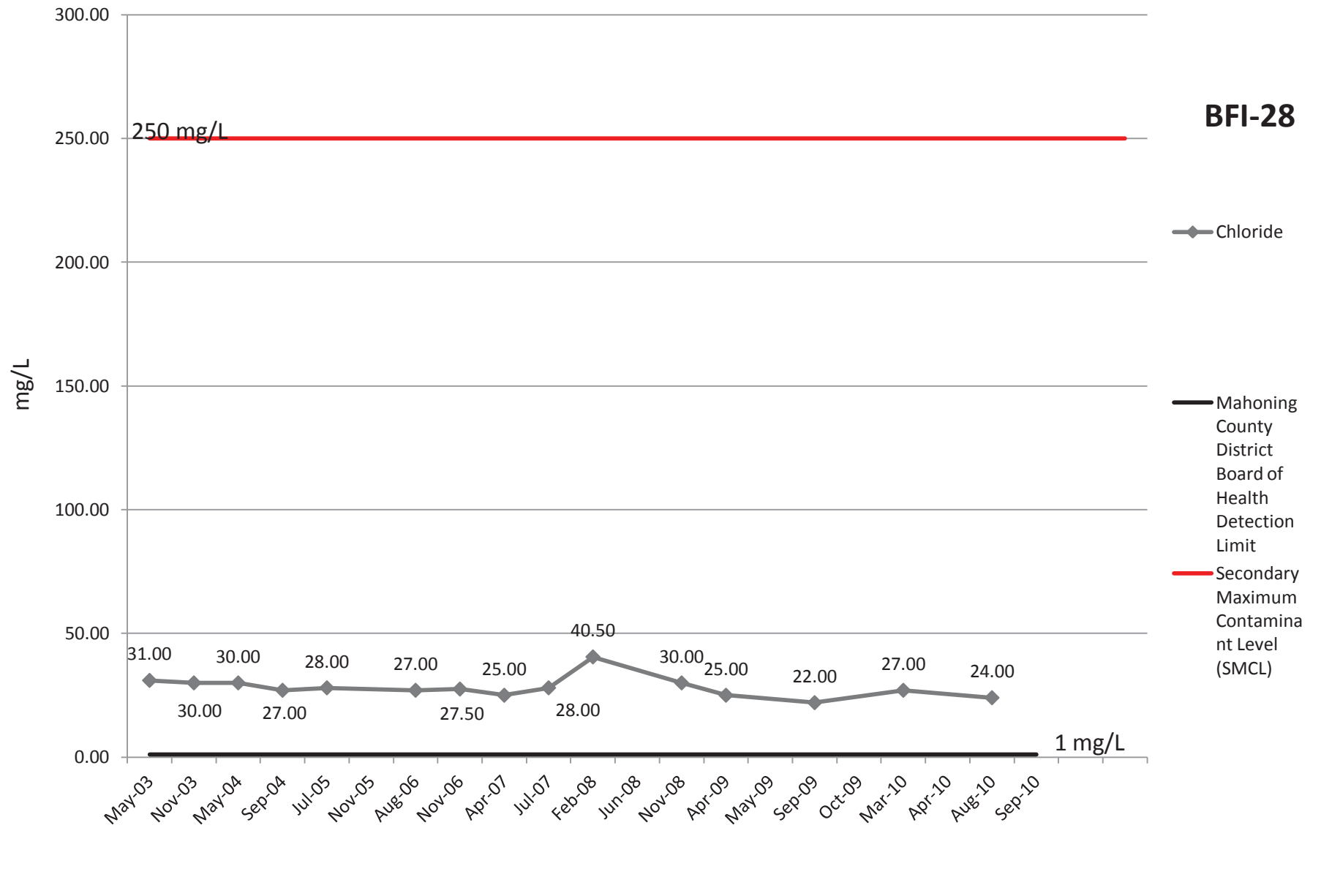
# Alkalinity



# Ammonia

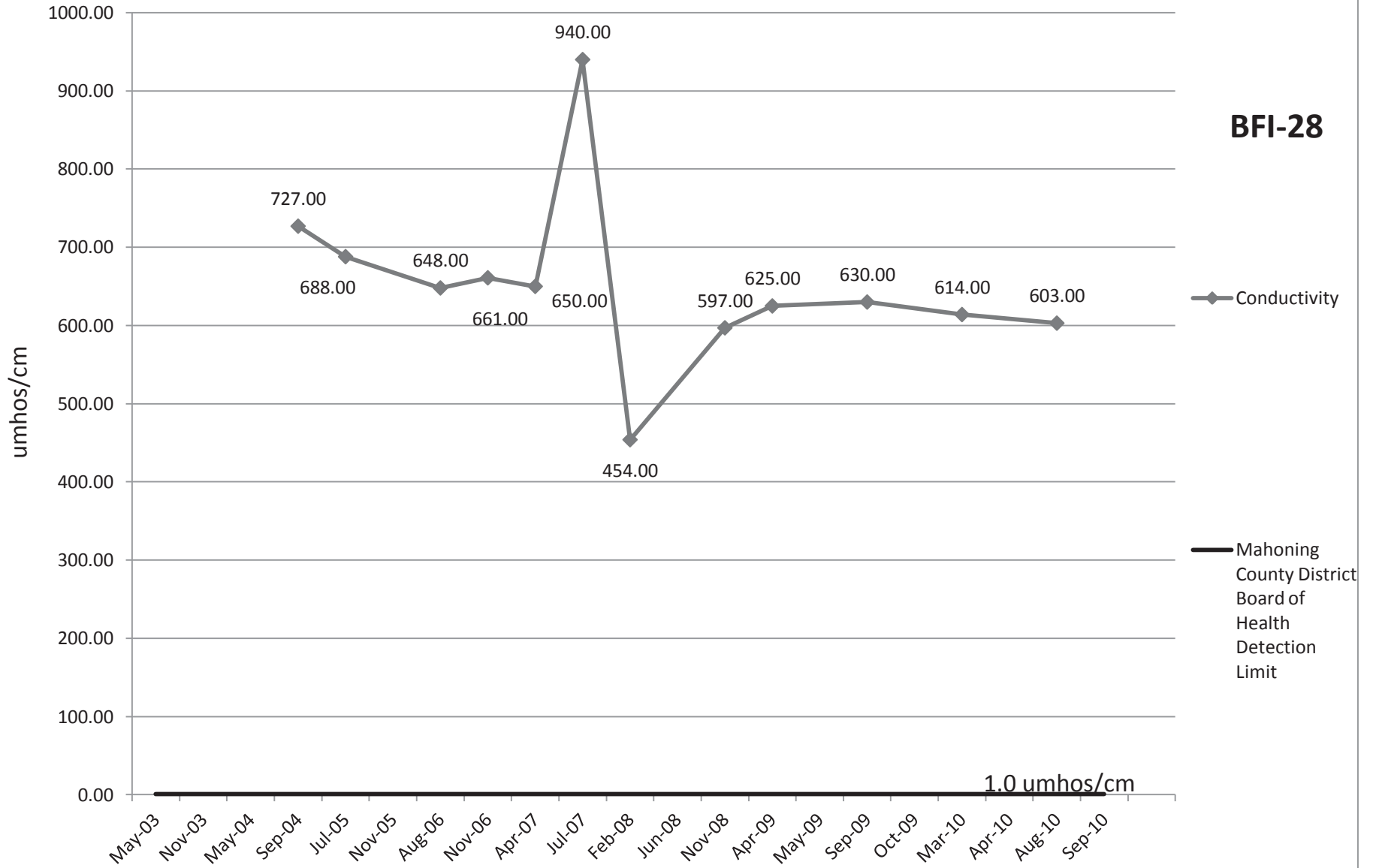


# Chloride



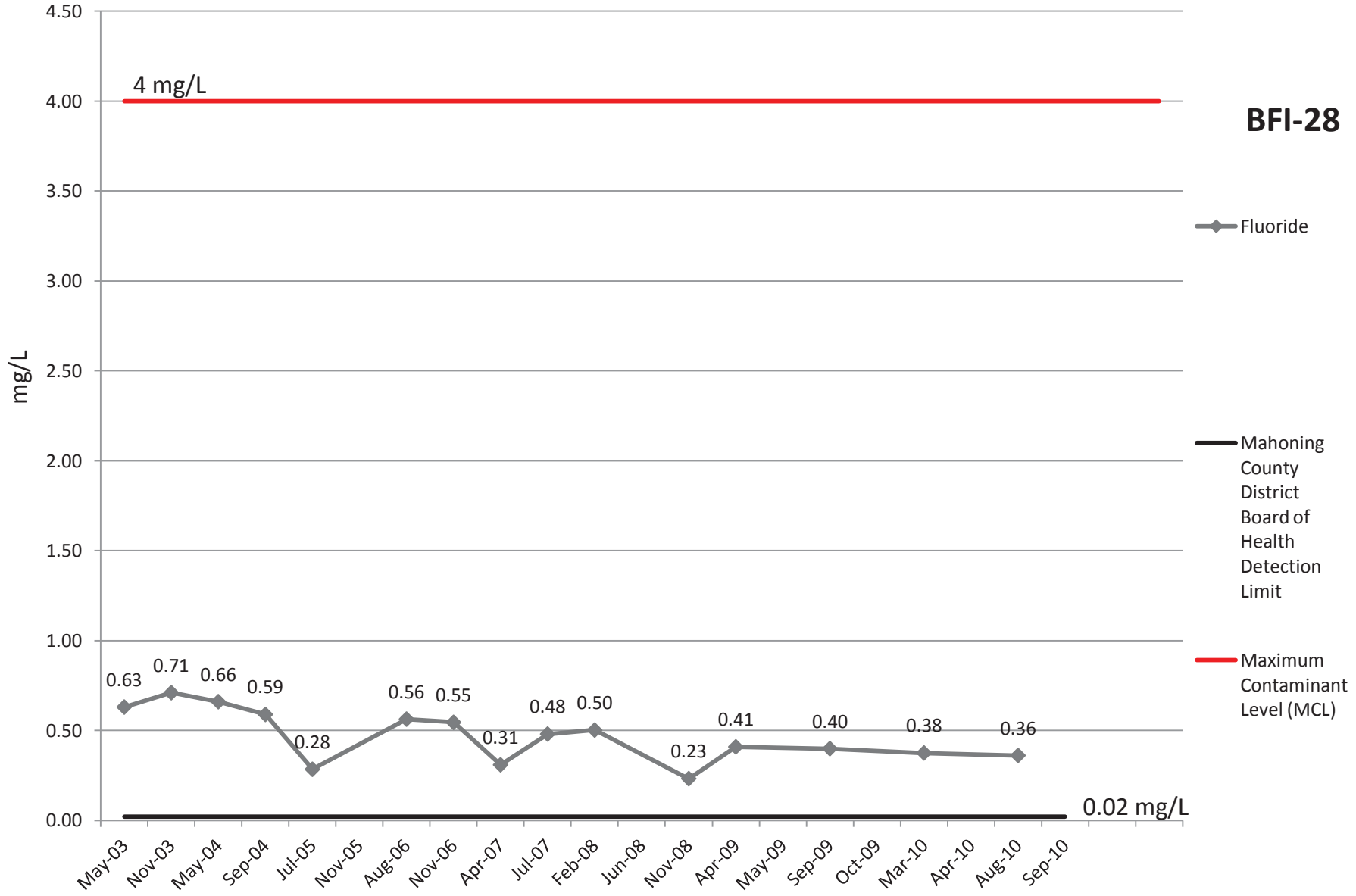
# Conductivity

**BFI-28**



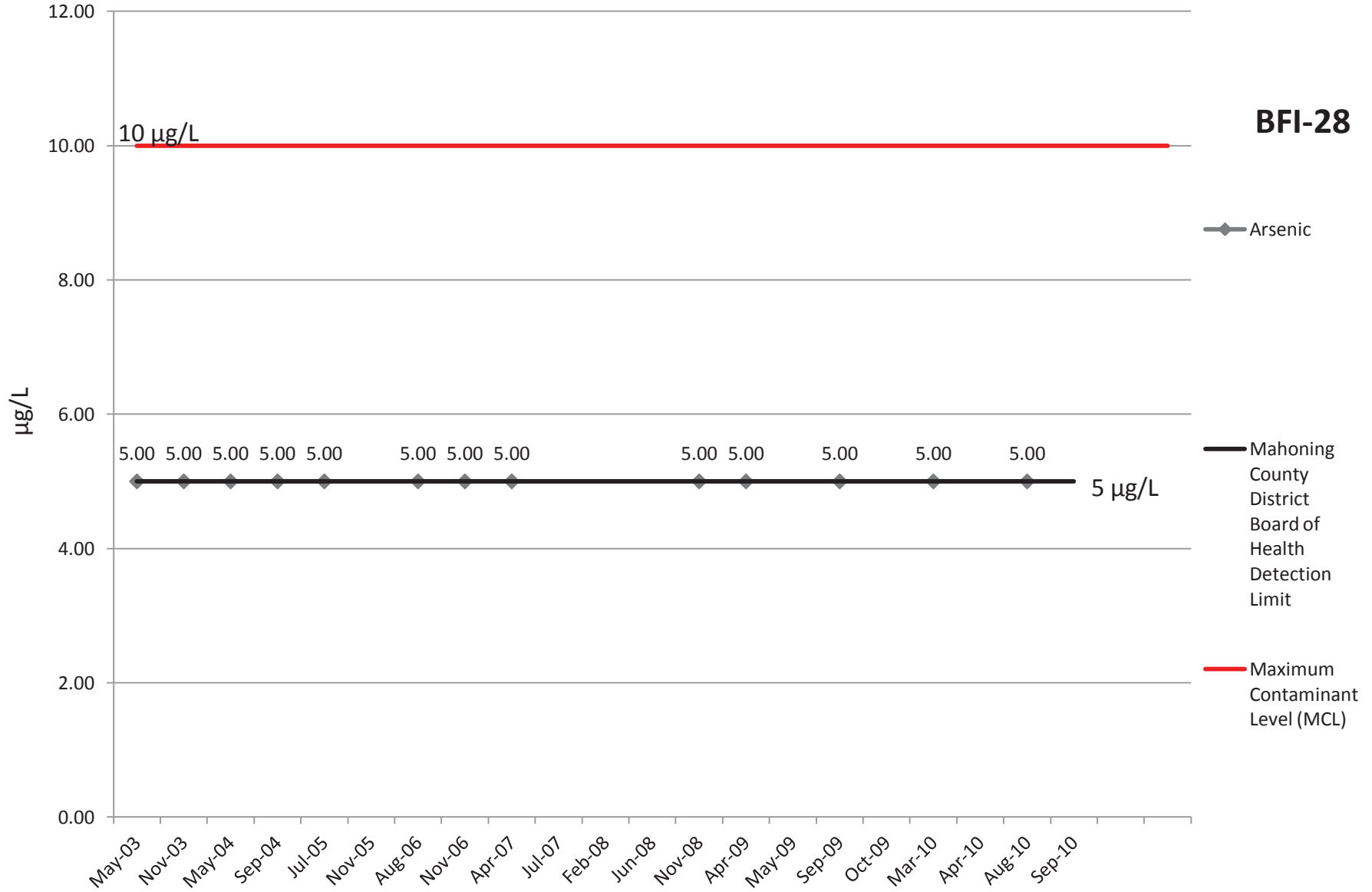


# Fluoride



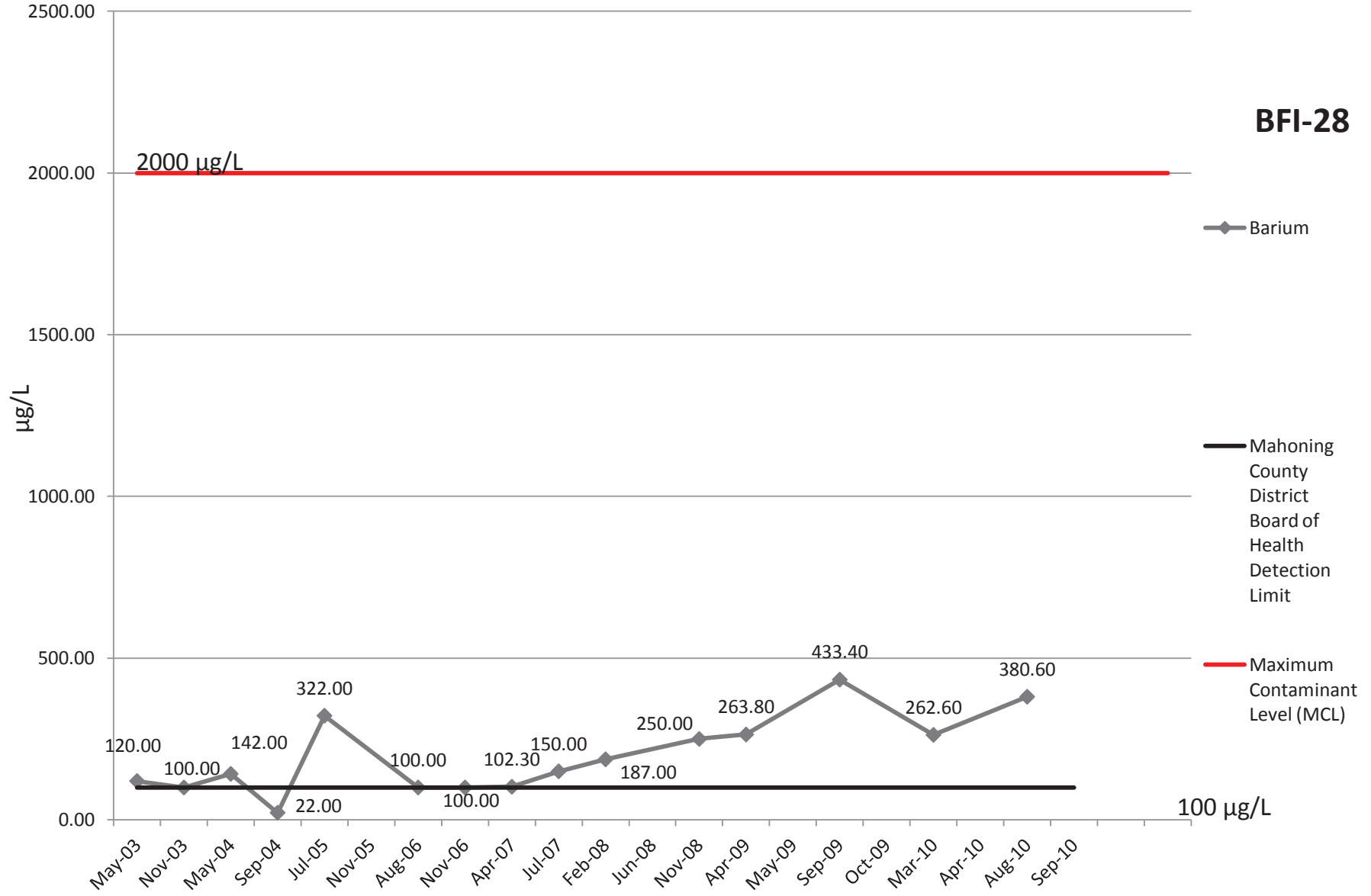
# Arsenic

**BFI-28**



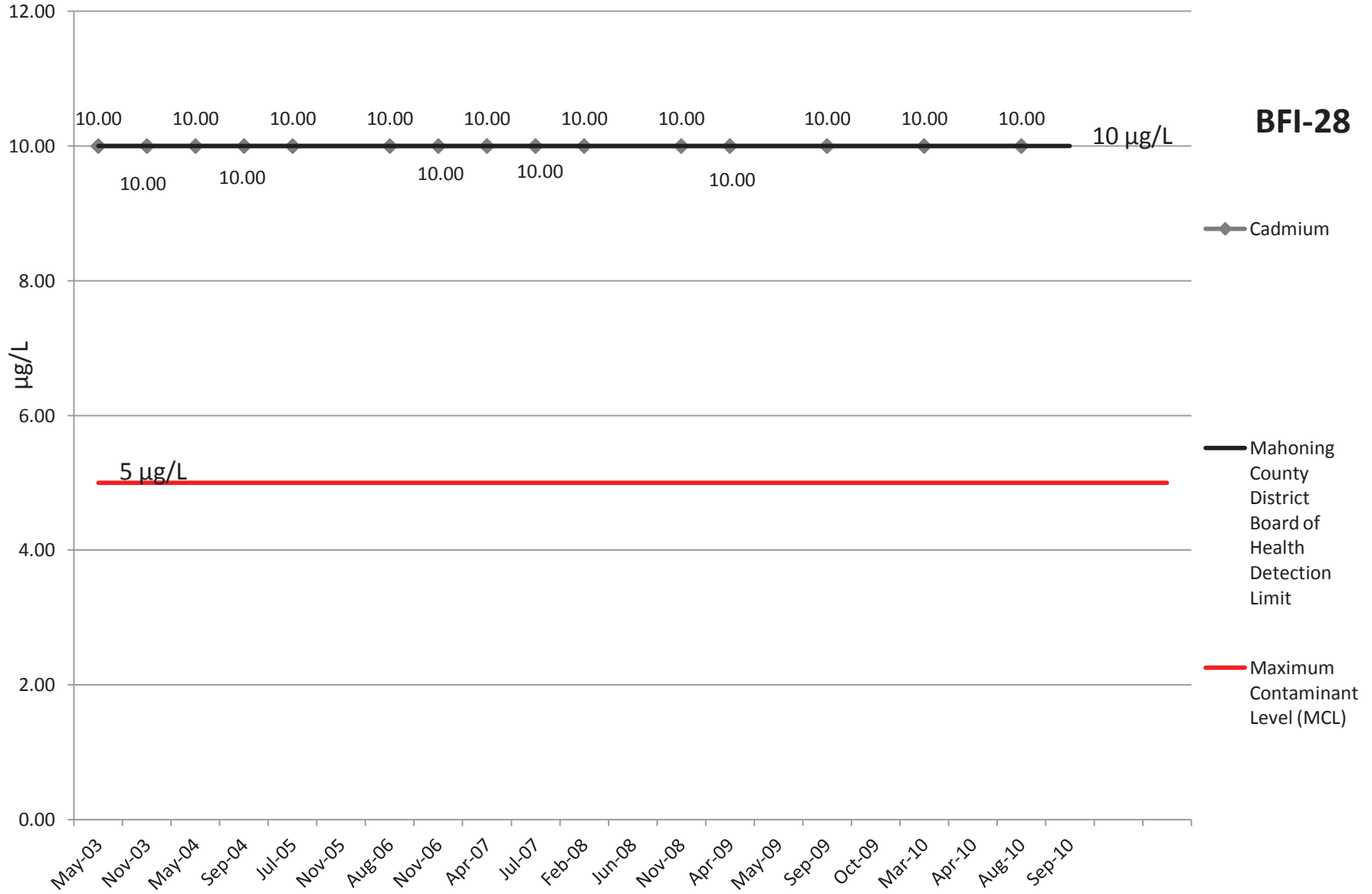
# Barium

**BFI-28**

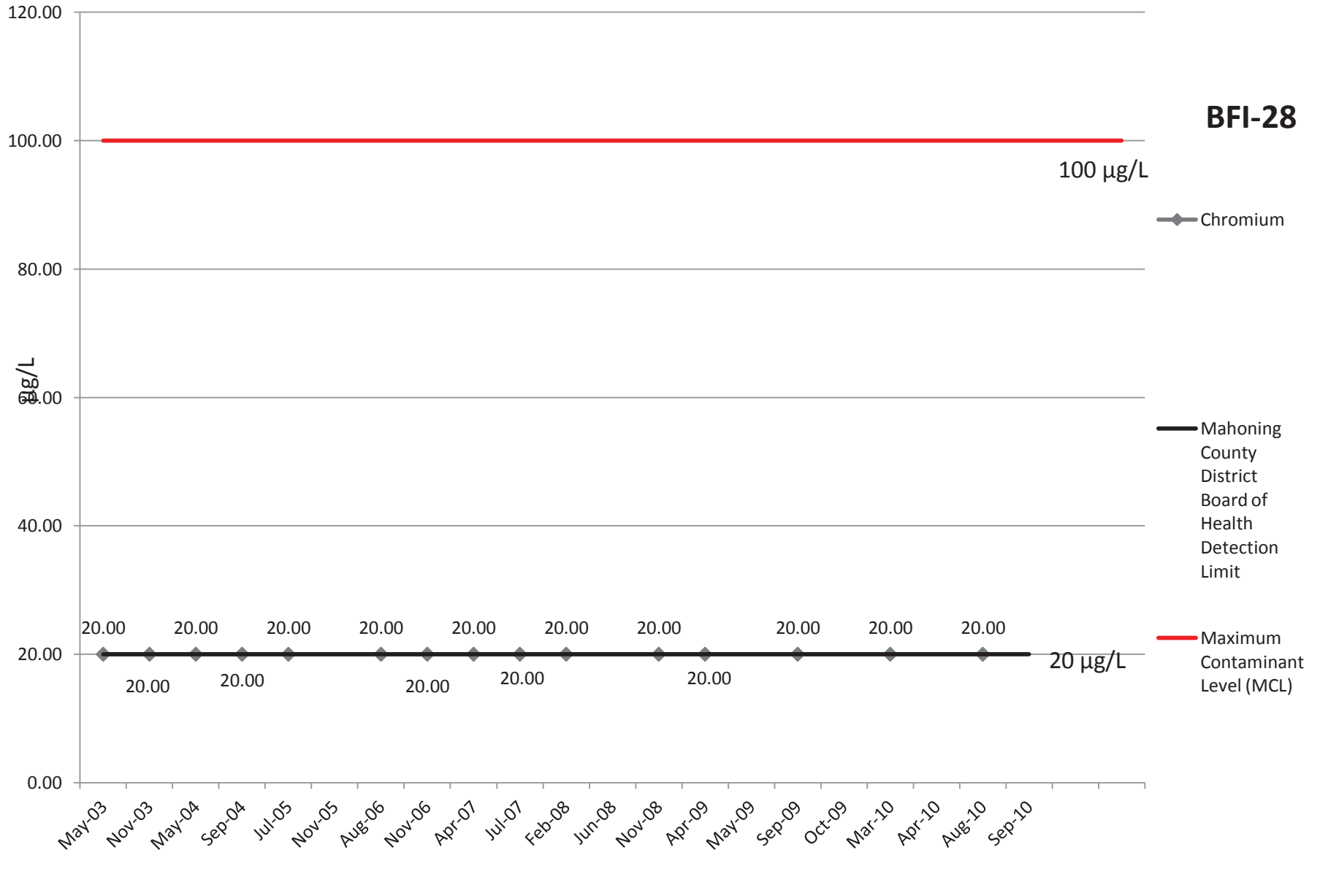


# Cadmium

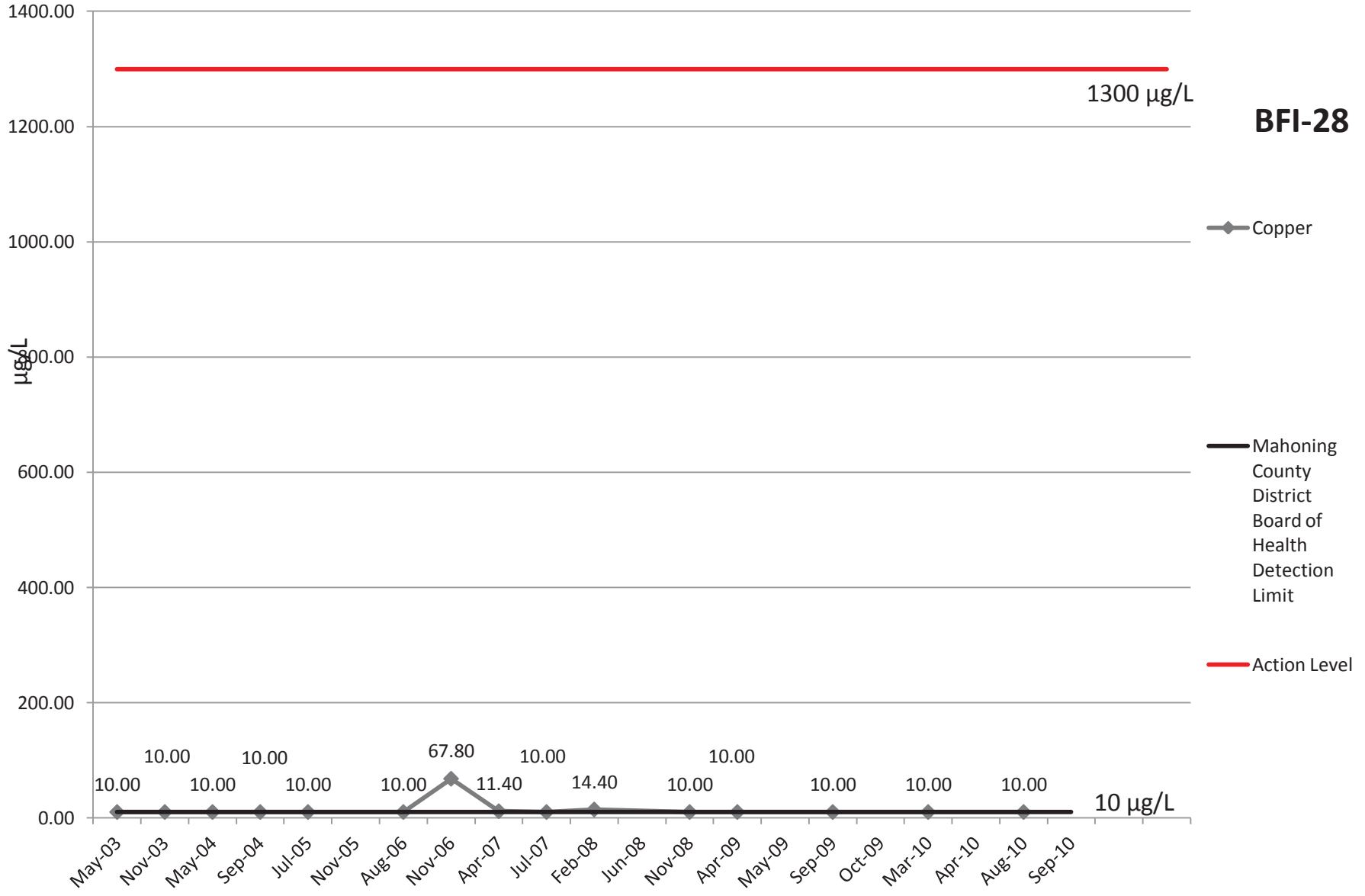
**BFI-28**



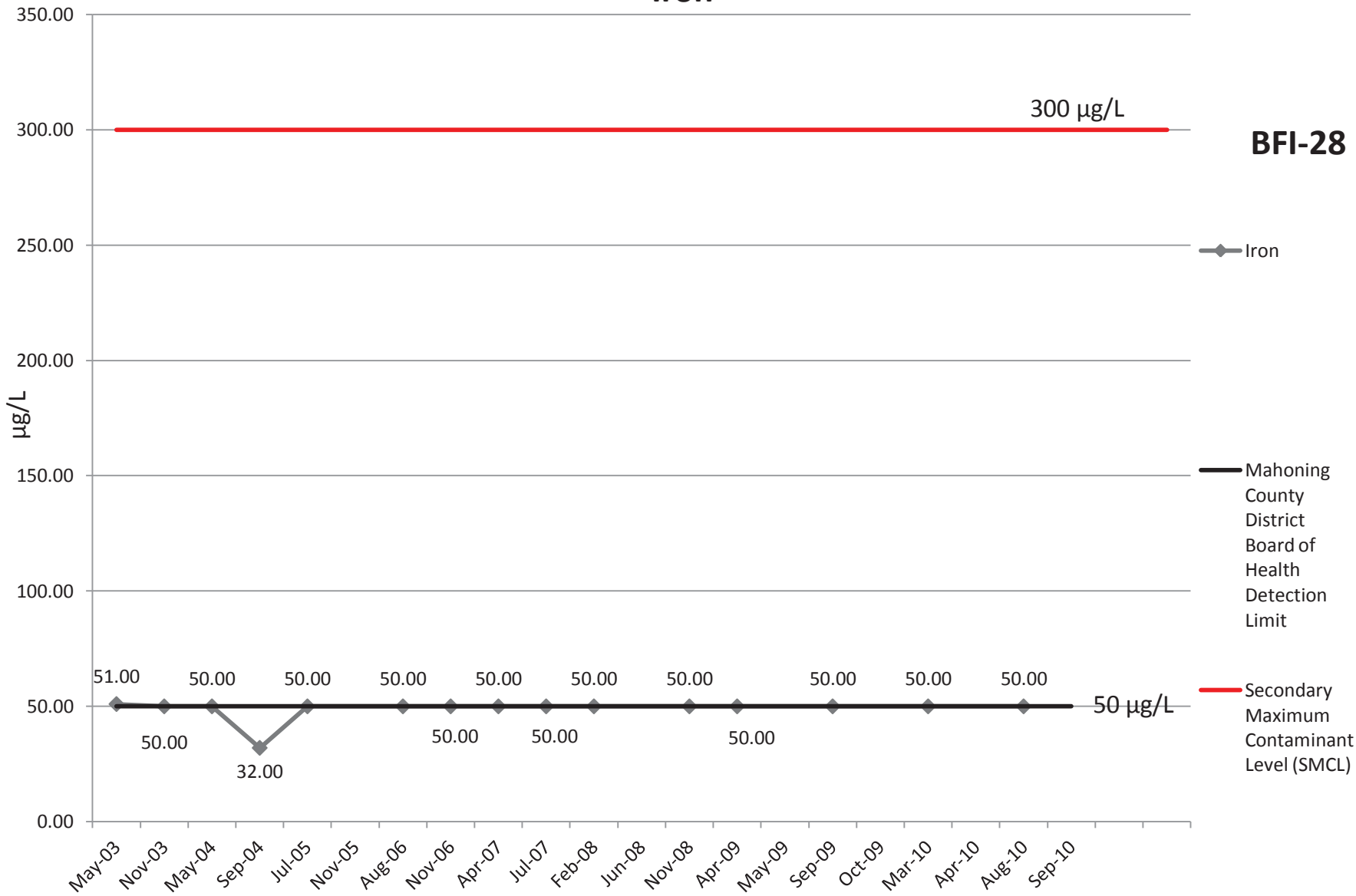
# Chromium



# Copper

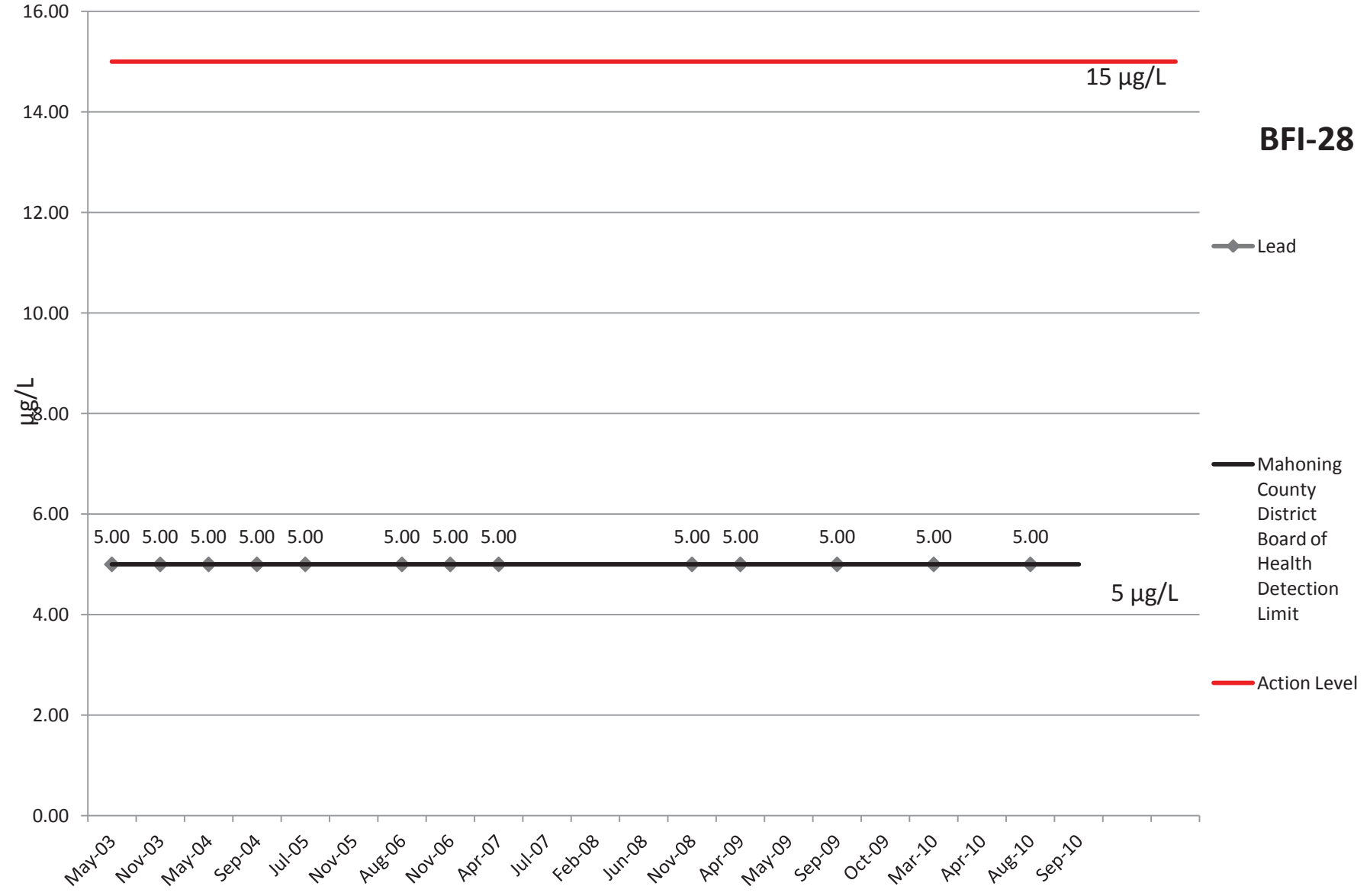


# Iron



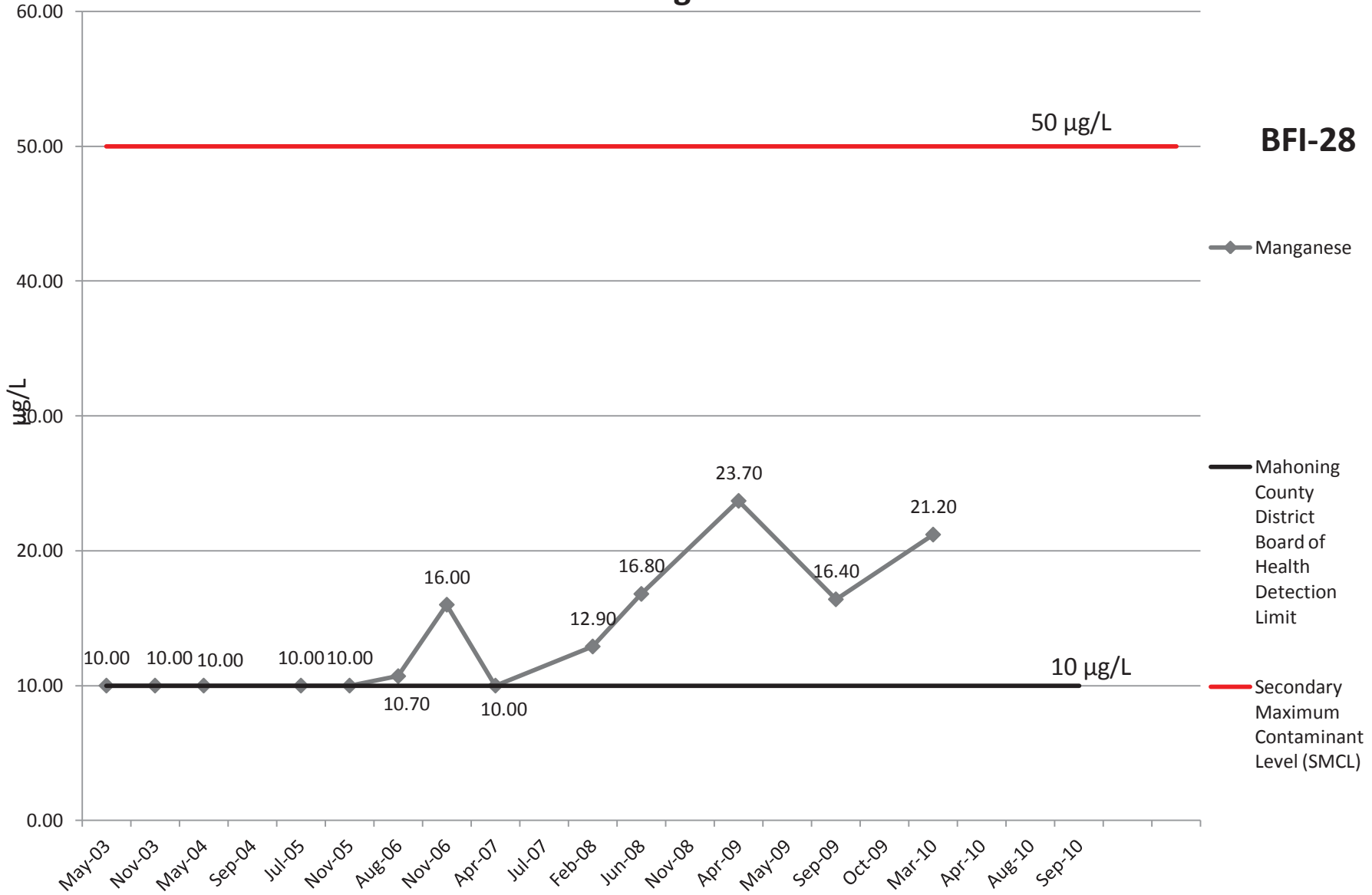
# Lead

**BFI-28**





# Manganese



**BFI-28**

◆ Manganese

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

# Mercury

**BFI-28**

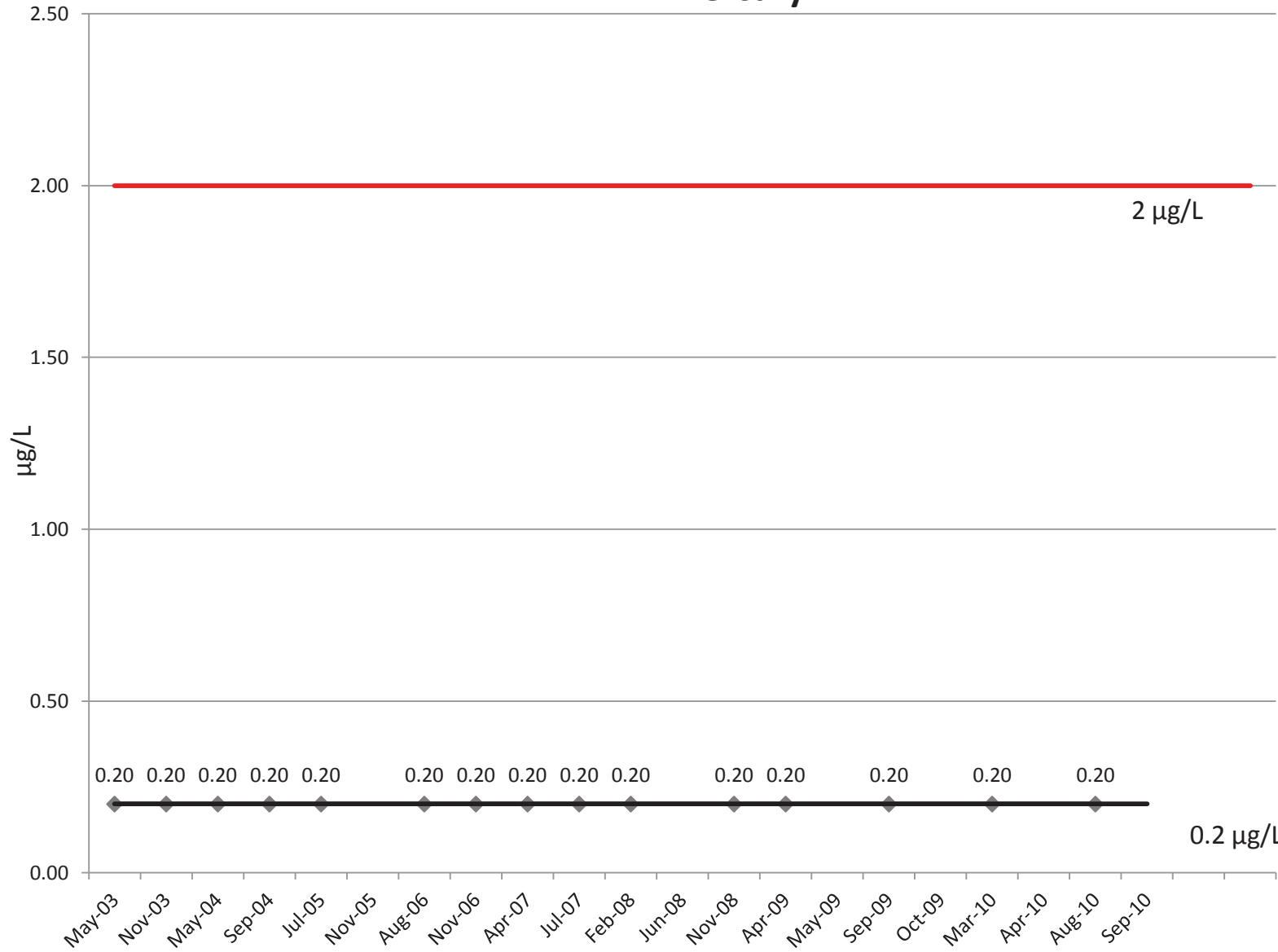
2 µg/L

Mercury

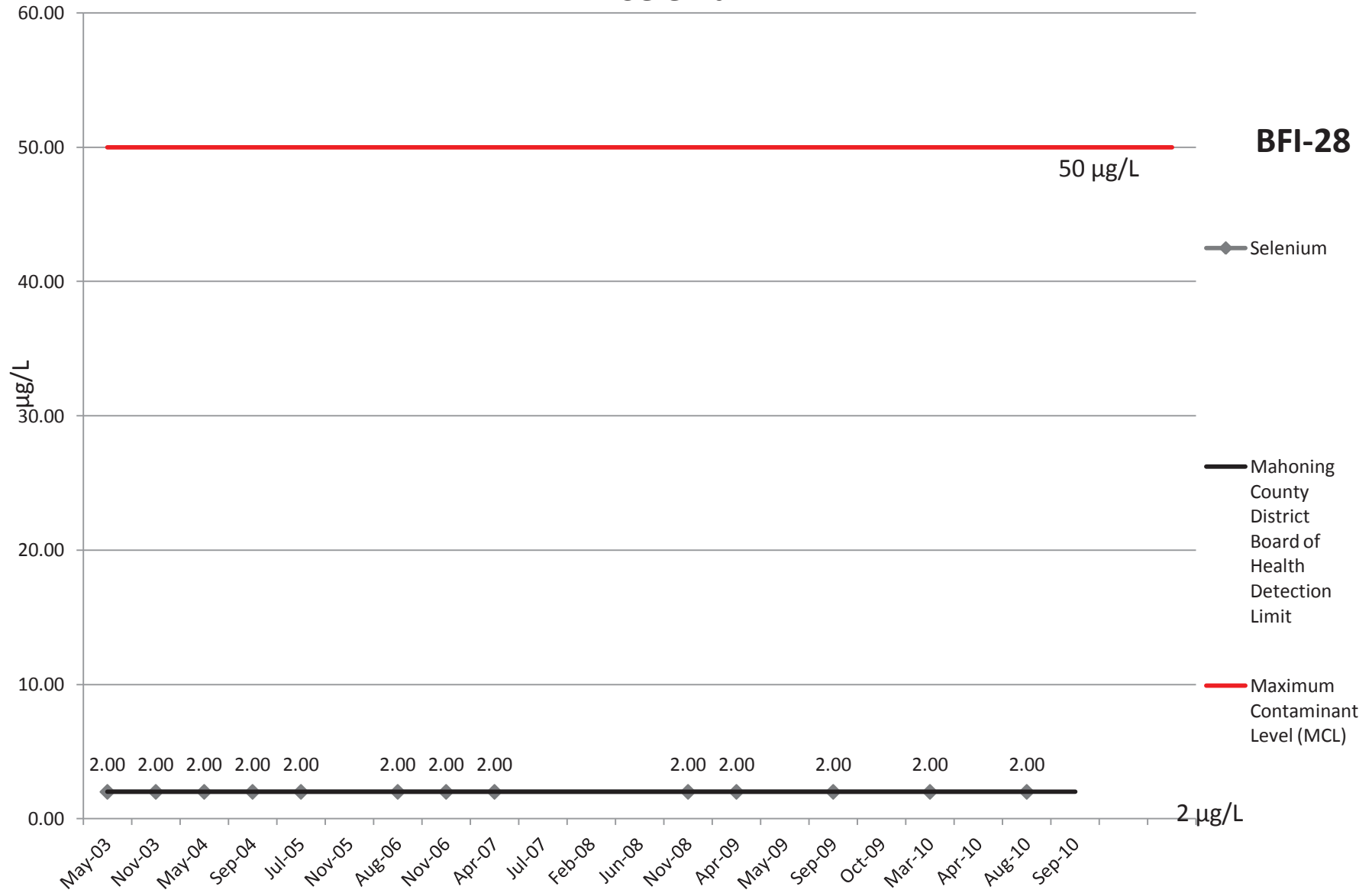
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

0.2 µg/L



# Selenium



**BFI-28**

50  $\mu\text{g/L}$

◆ Selenium

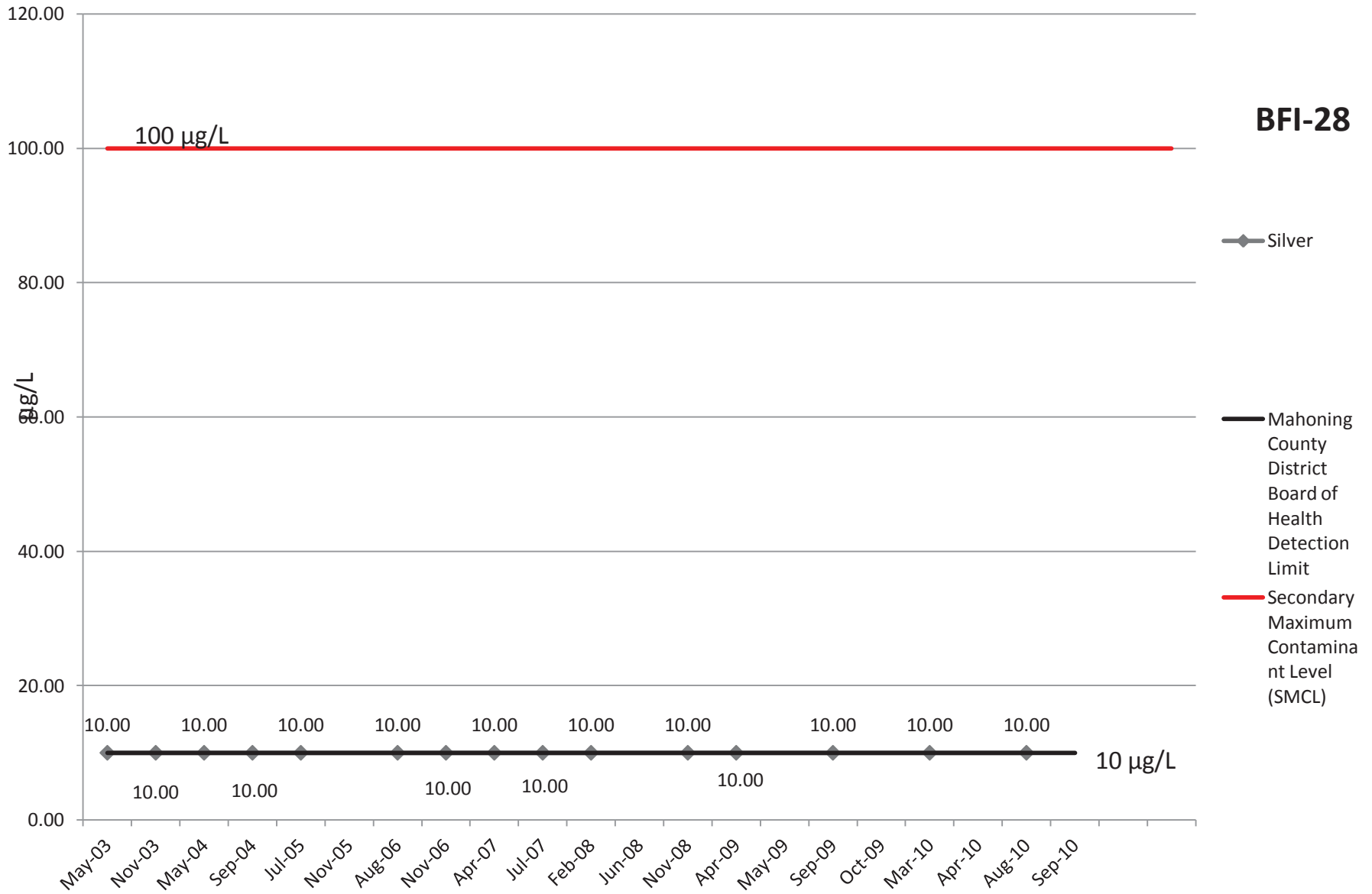
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

2  $\mu\text{g/L}$

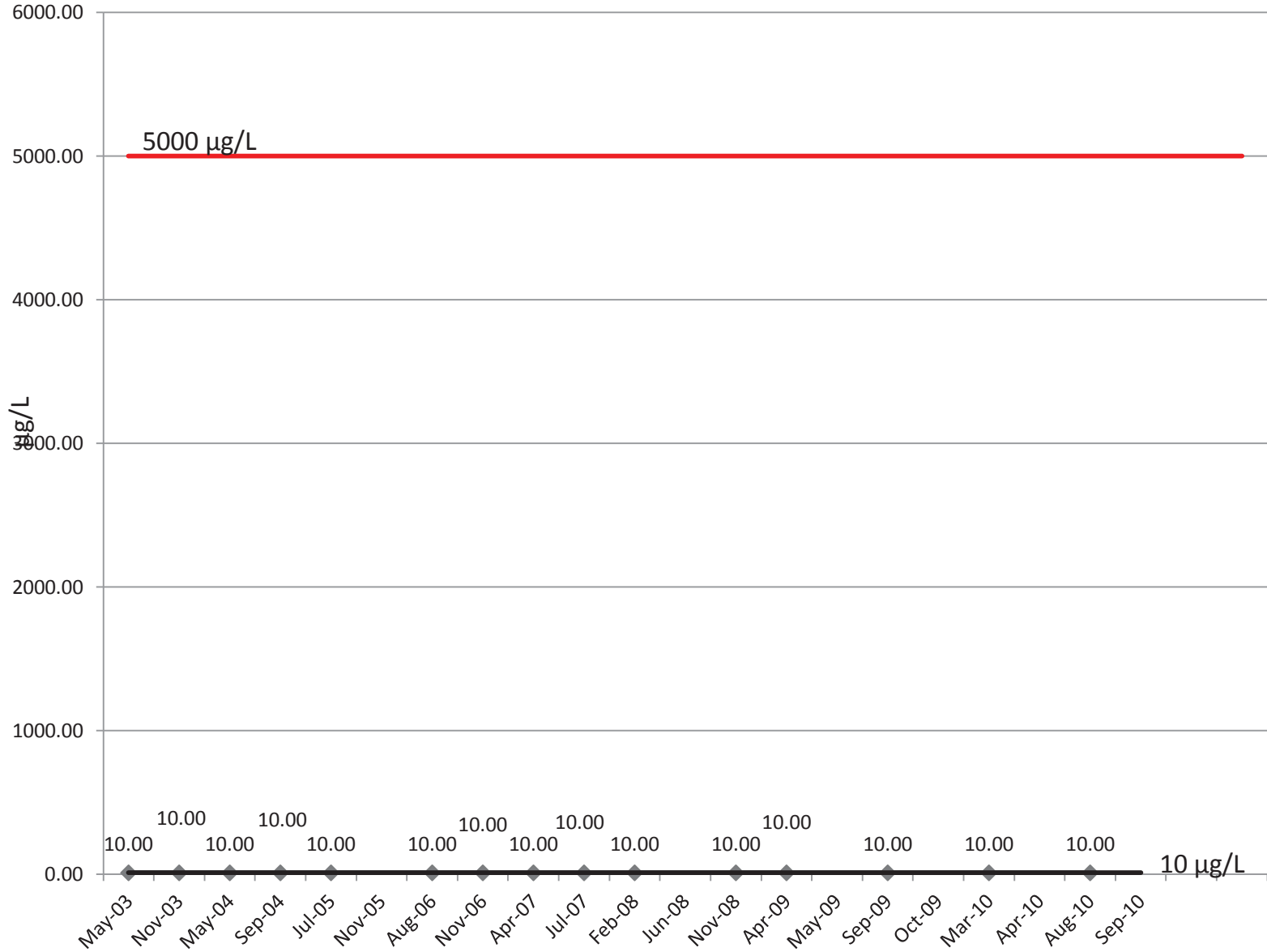
# Silver

**BFI-28**



# Zinc

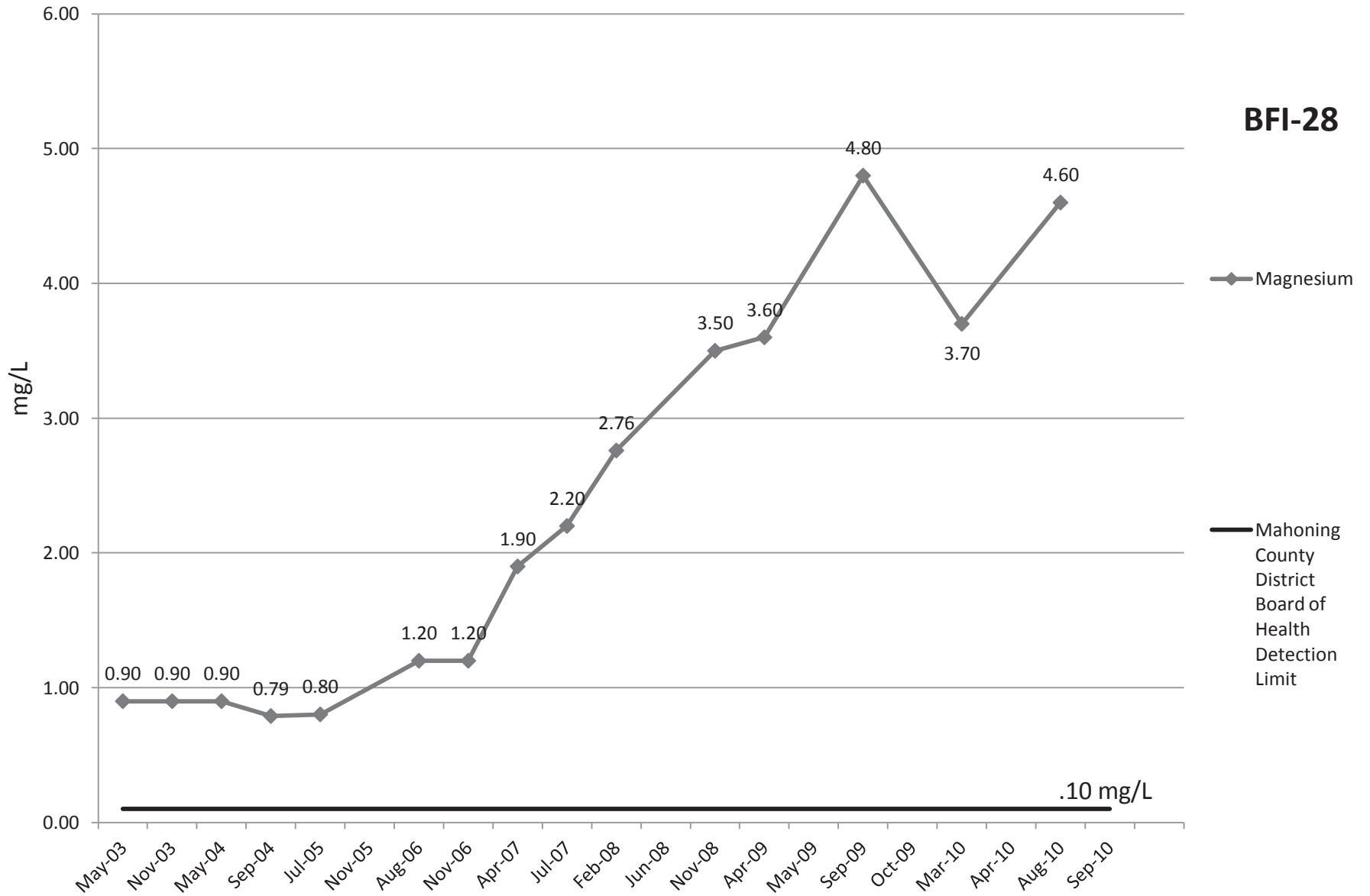
**BFI-28**



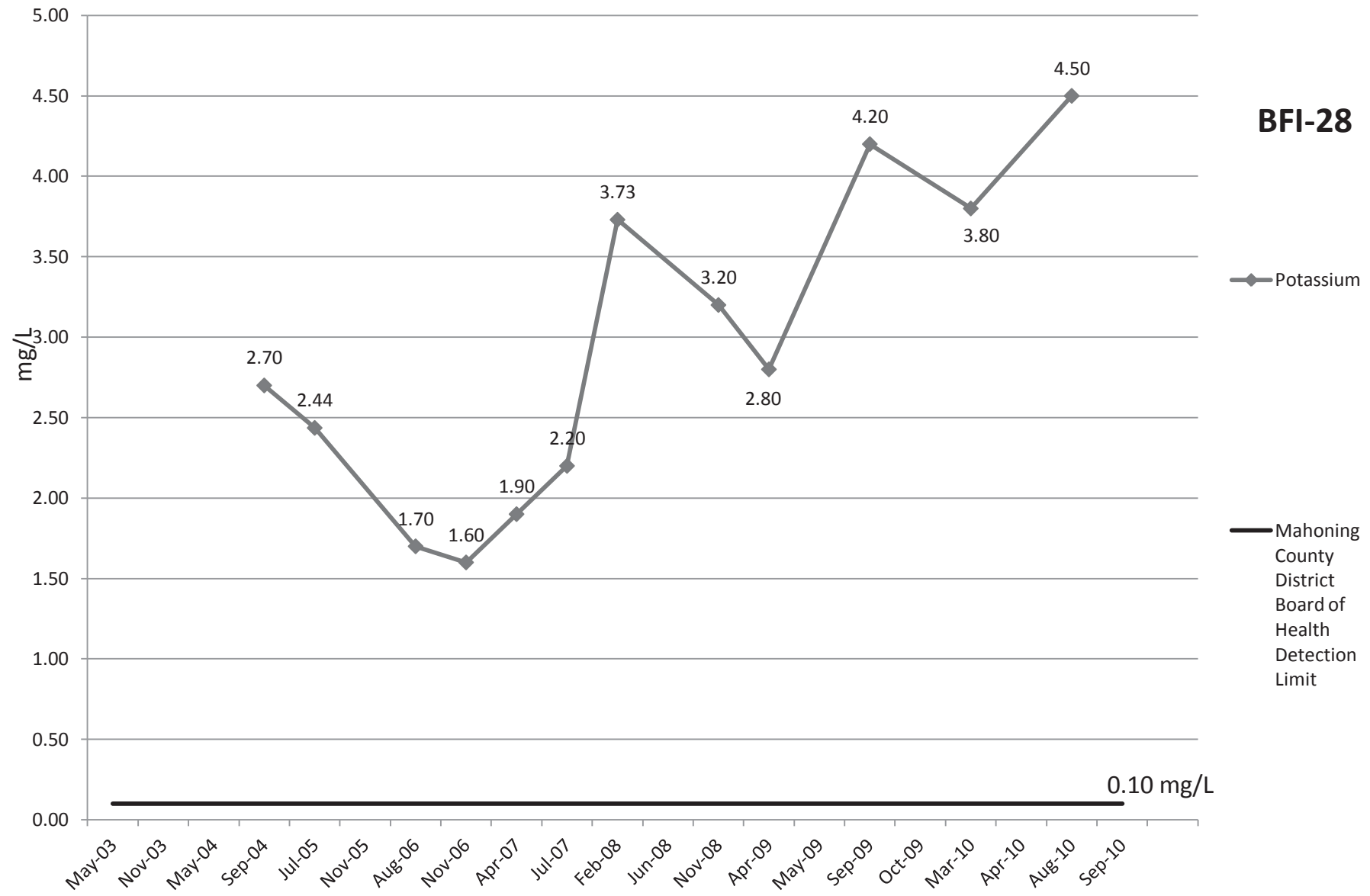
◆ Zinc

— Mahoning County District Board of Health Detection Limit  
— Secondary Maximum Contaminant Level (SMCL)

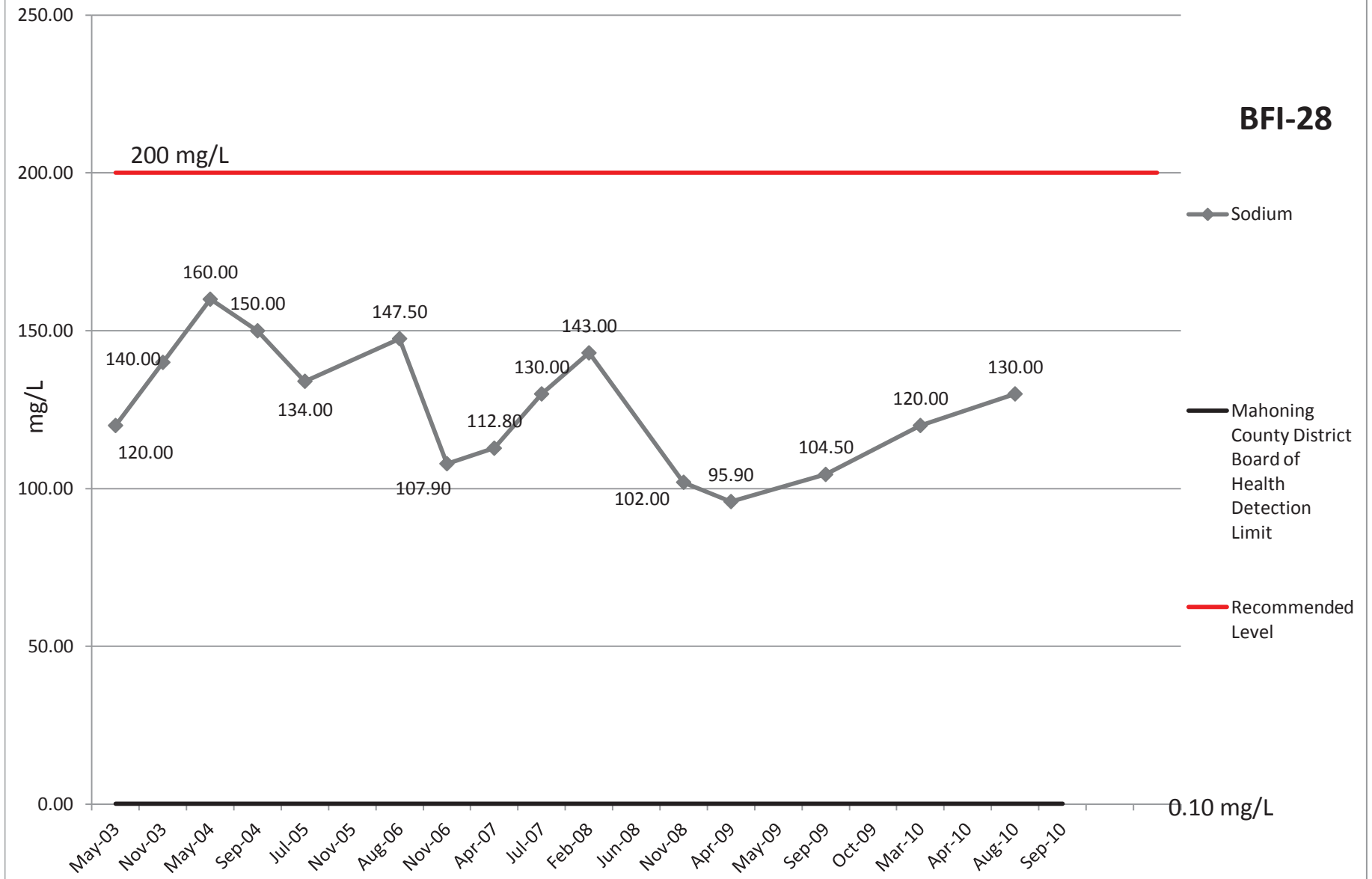
# Magnesium



# Potassium

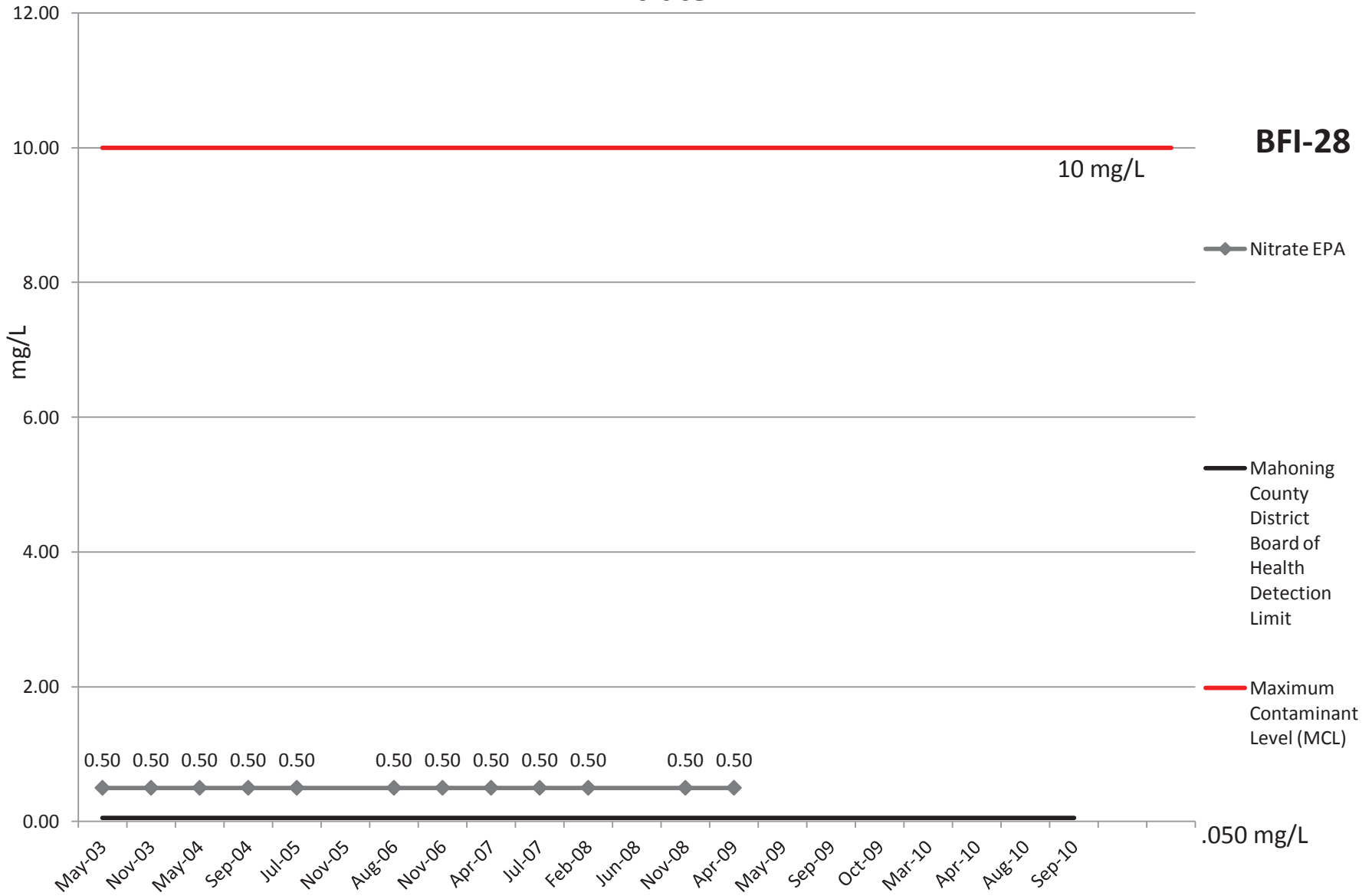


# Sodium



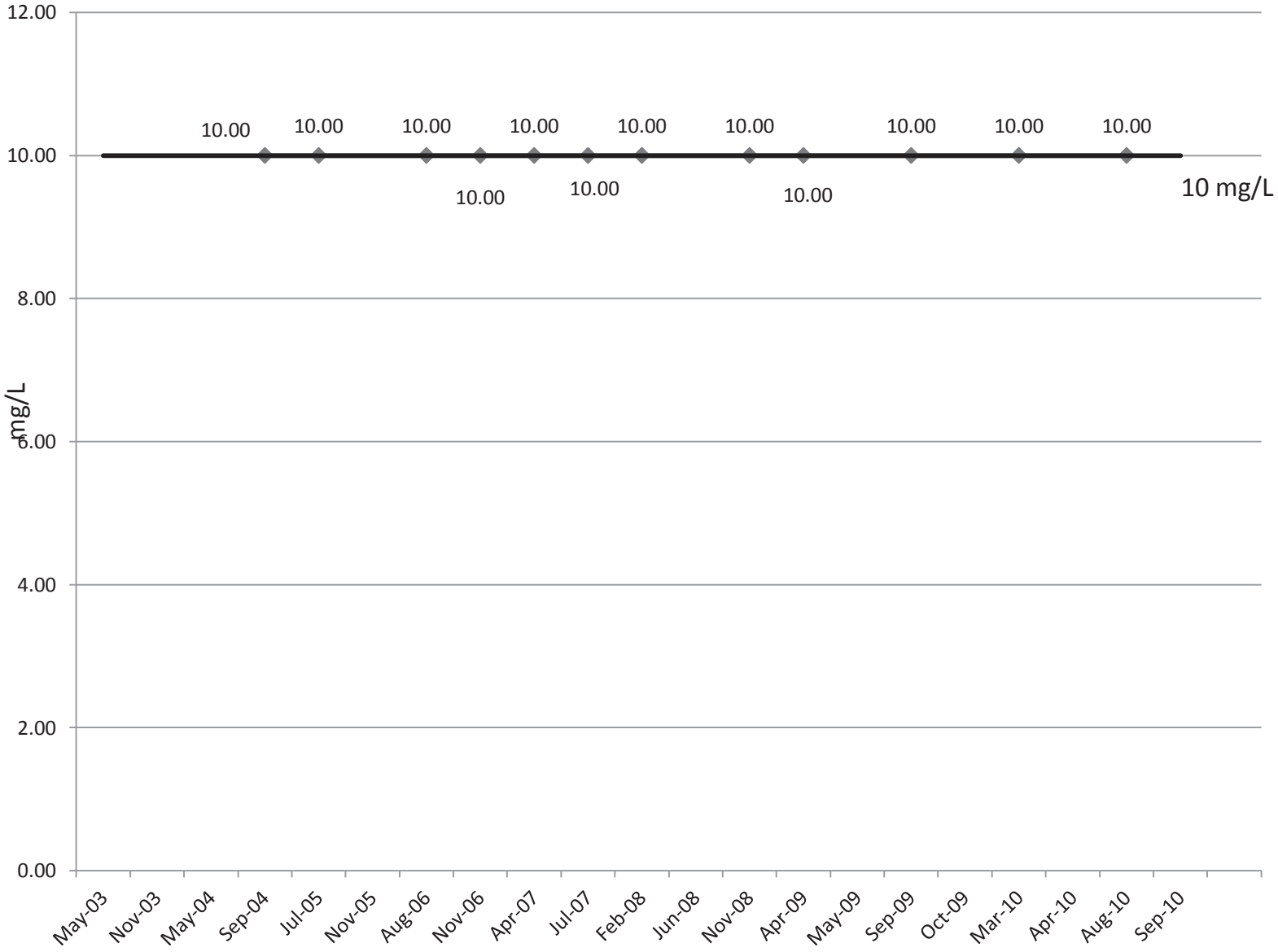


# Nitrate EPA



# COD

**BFI-28**

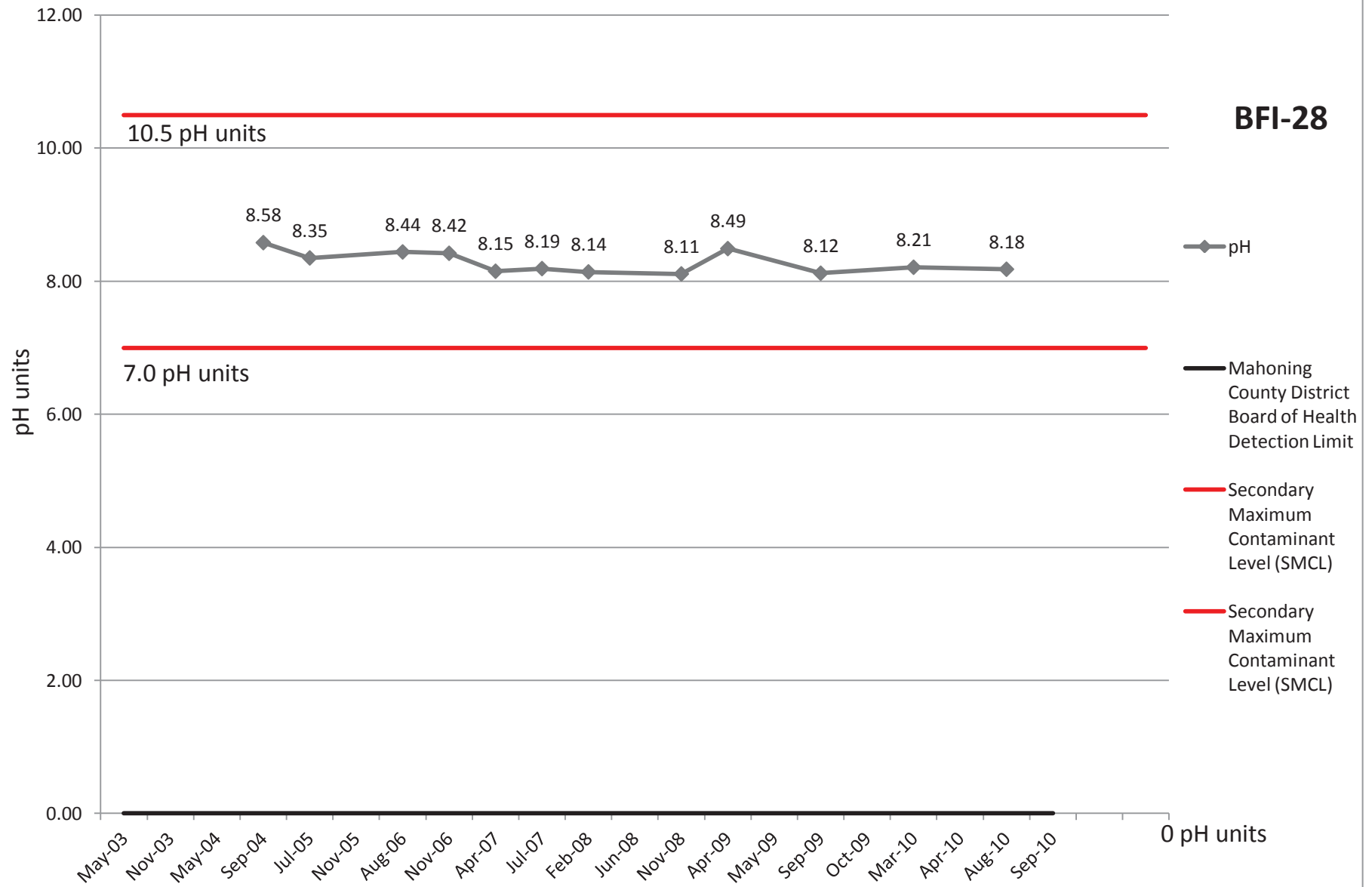


◆ COD

— Mahoning County District Board of Health Detection Limit

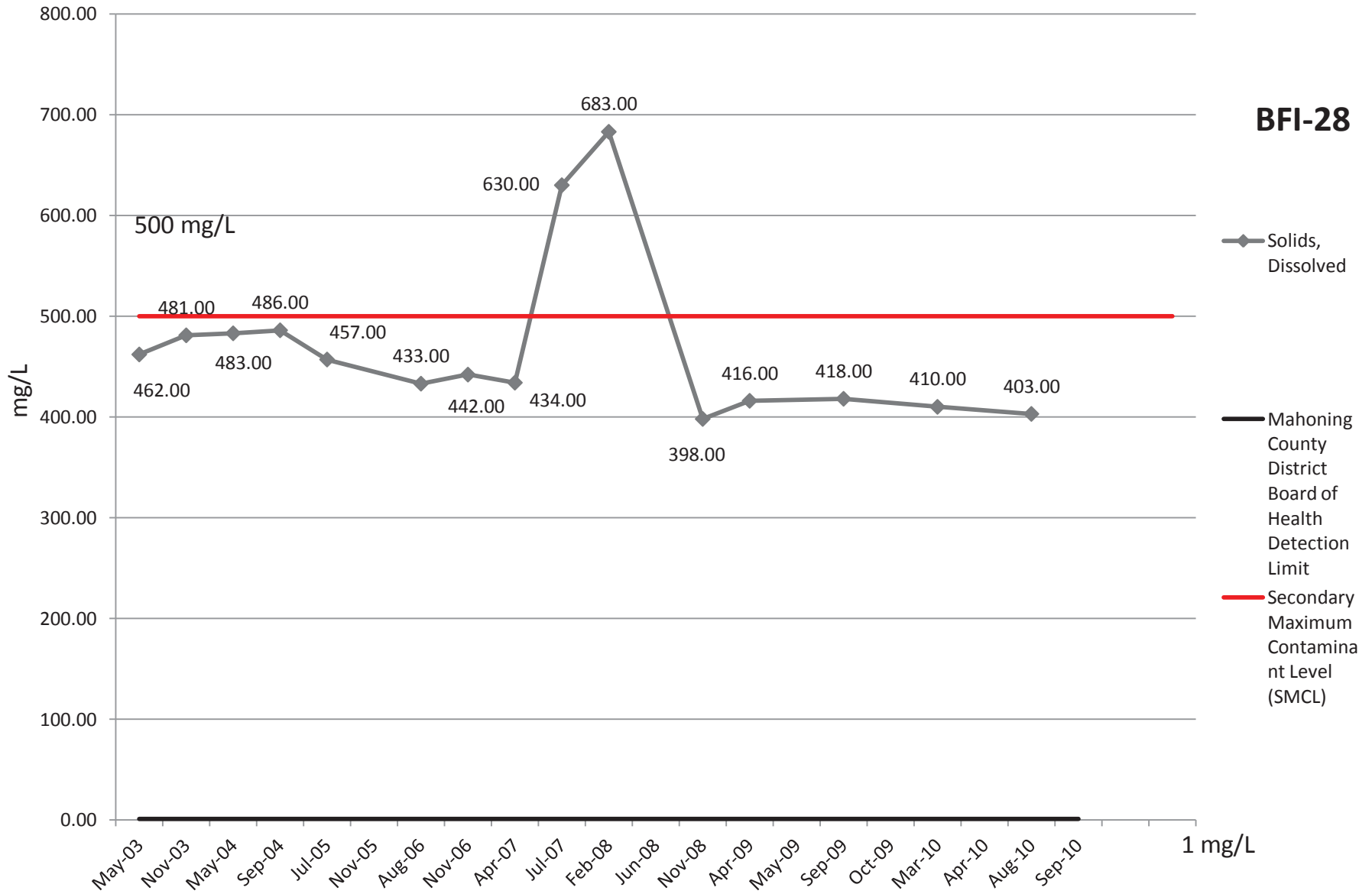
# pH

**BFI-28**



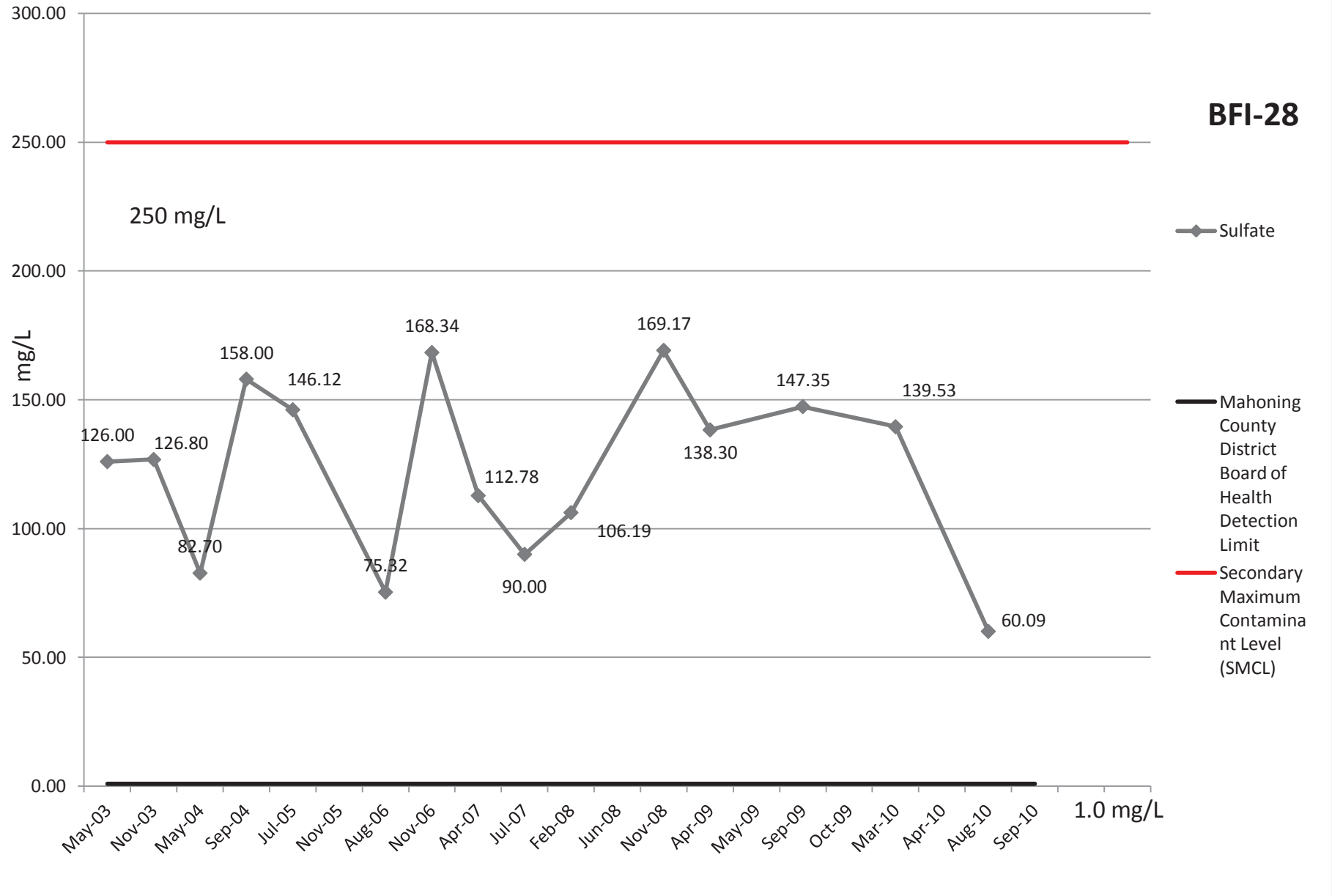
# Solids, Dissolved

**BFI-28**



# Sulfate

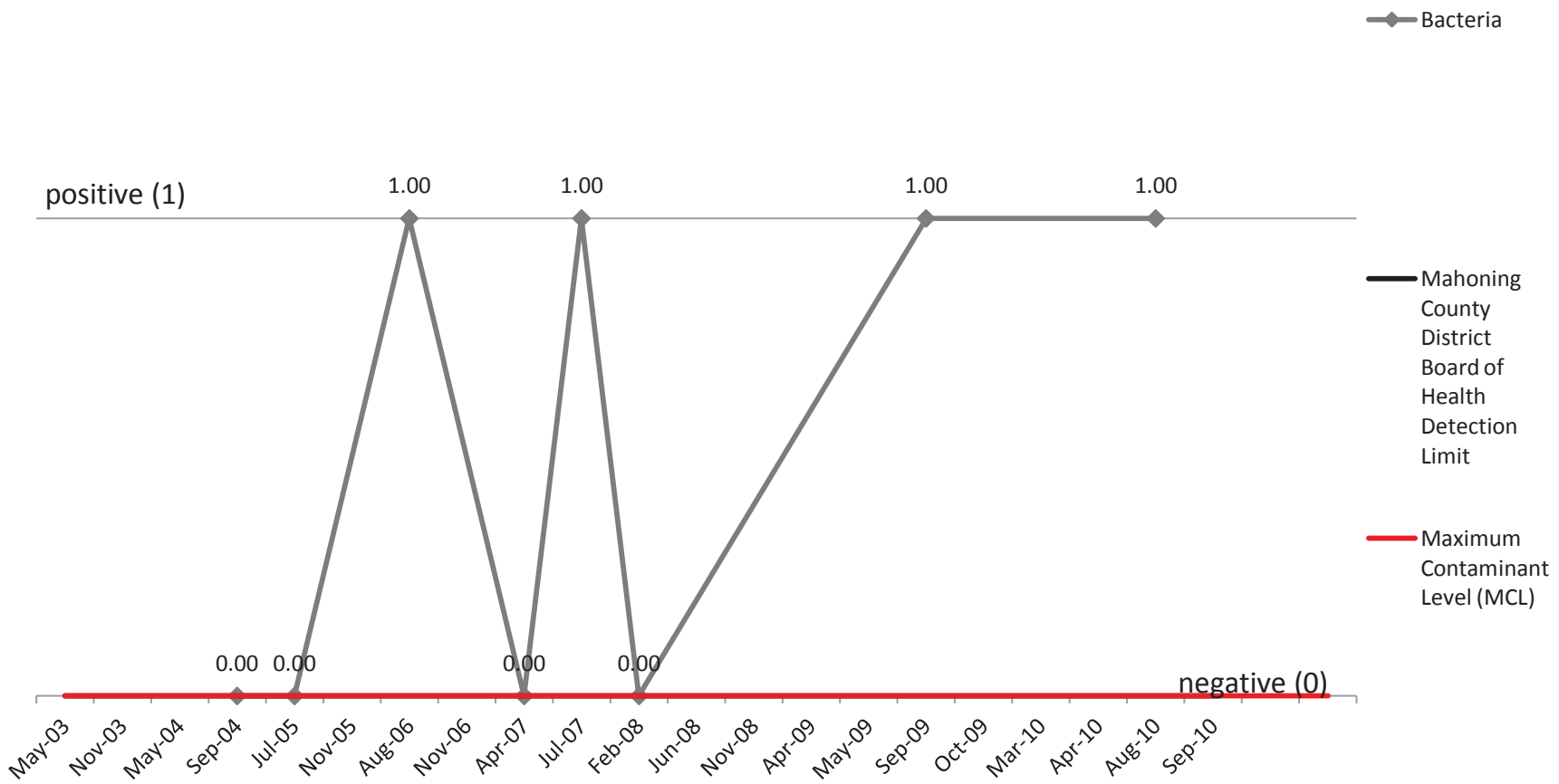
**BFI-28**



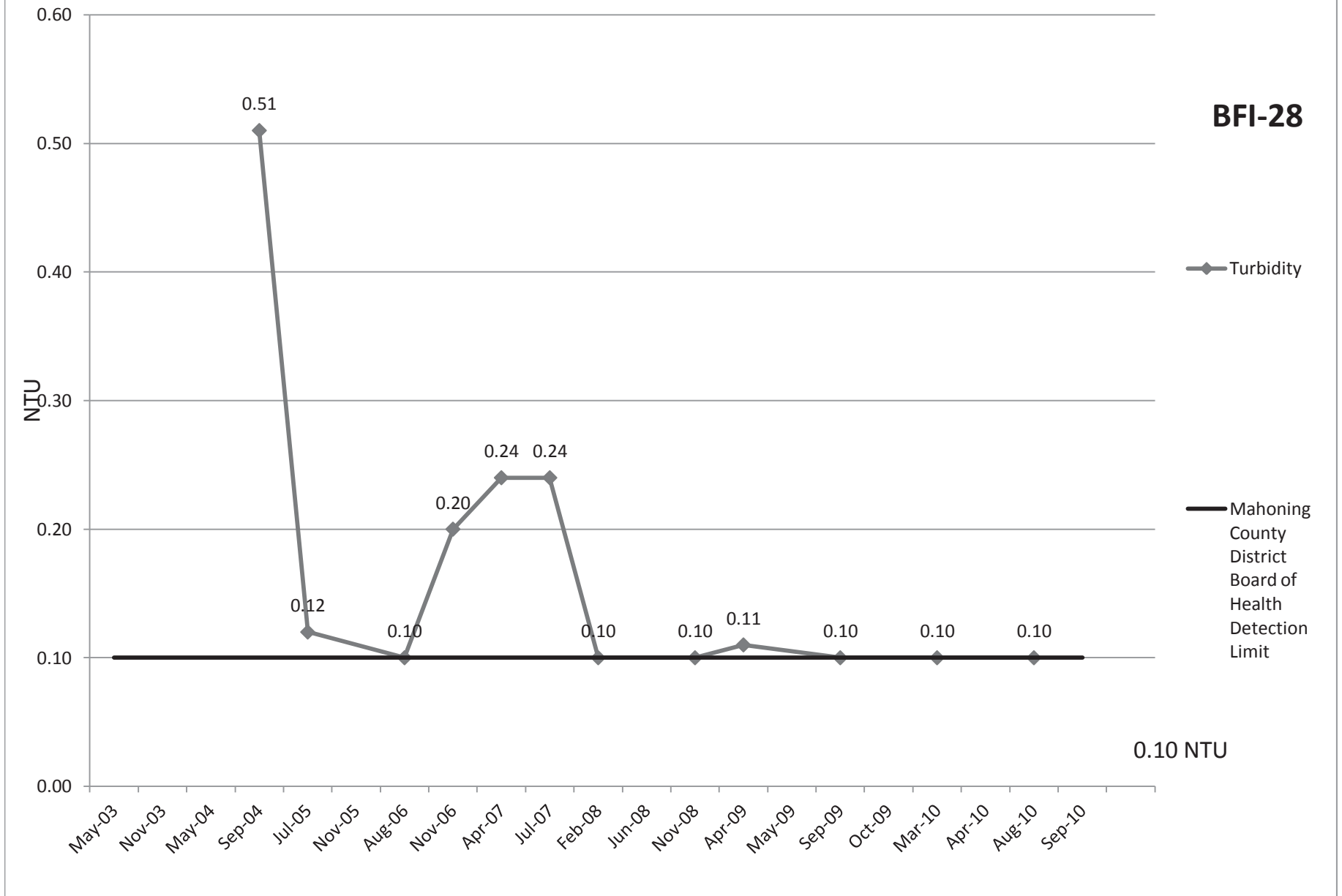
# Bacteria

## BFI-28

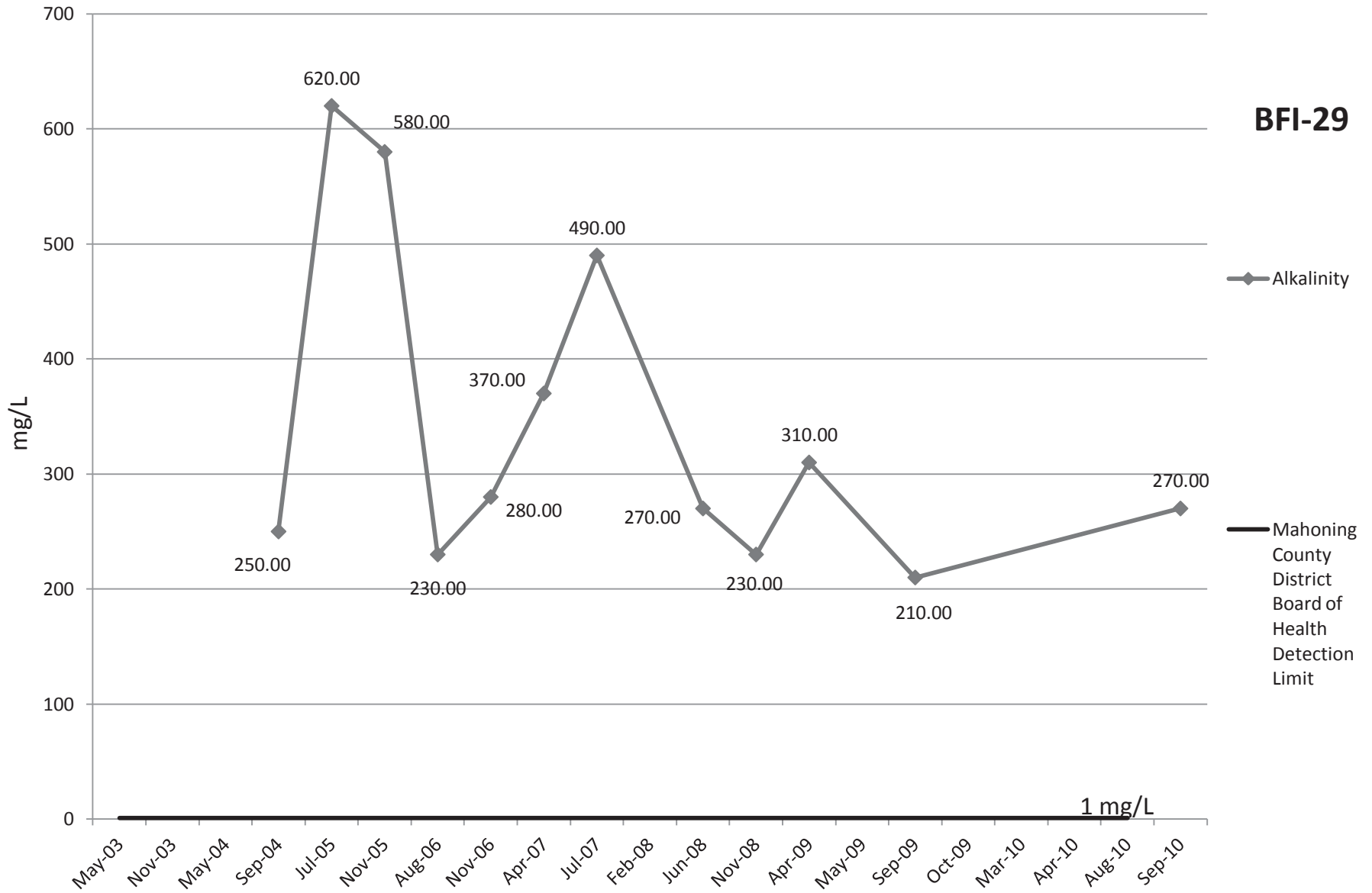
Positive/Negative



# Turbidity



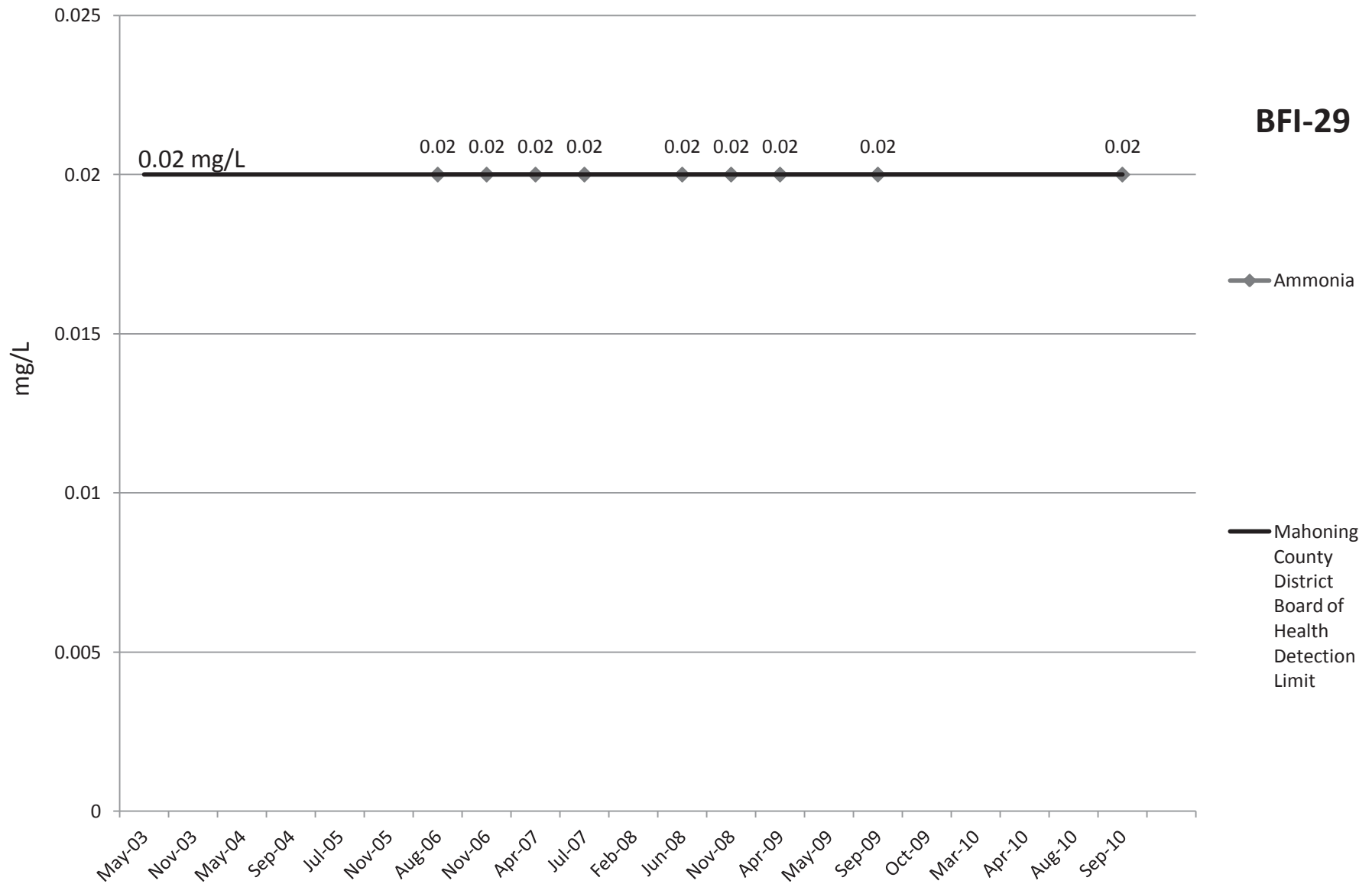
# Alkalinity





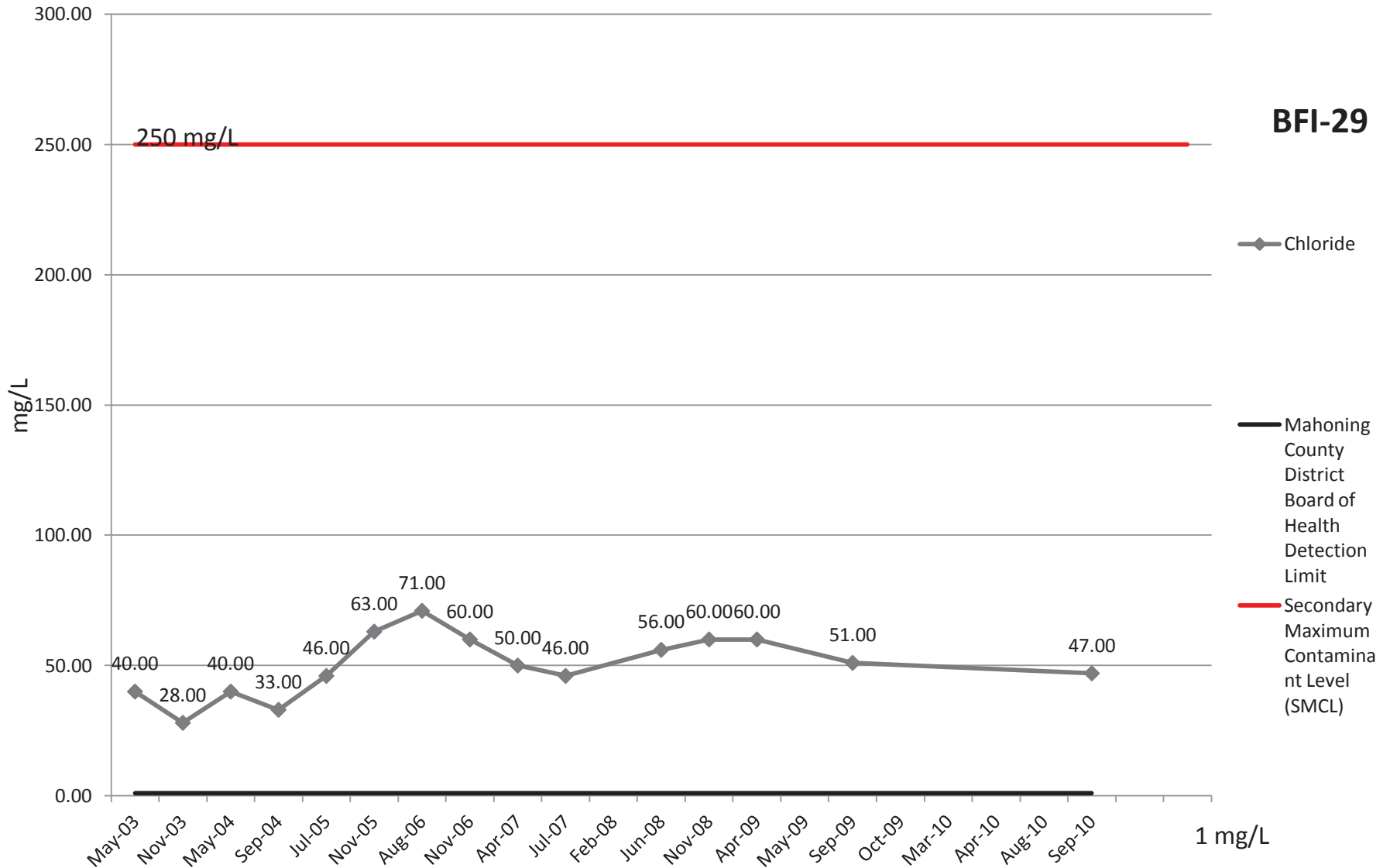
# Ammonia

**BFI-29**

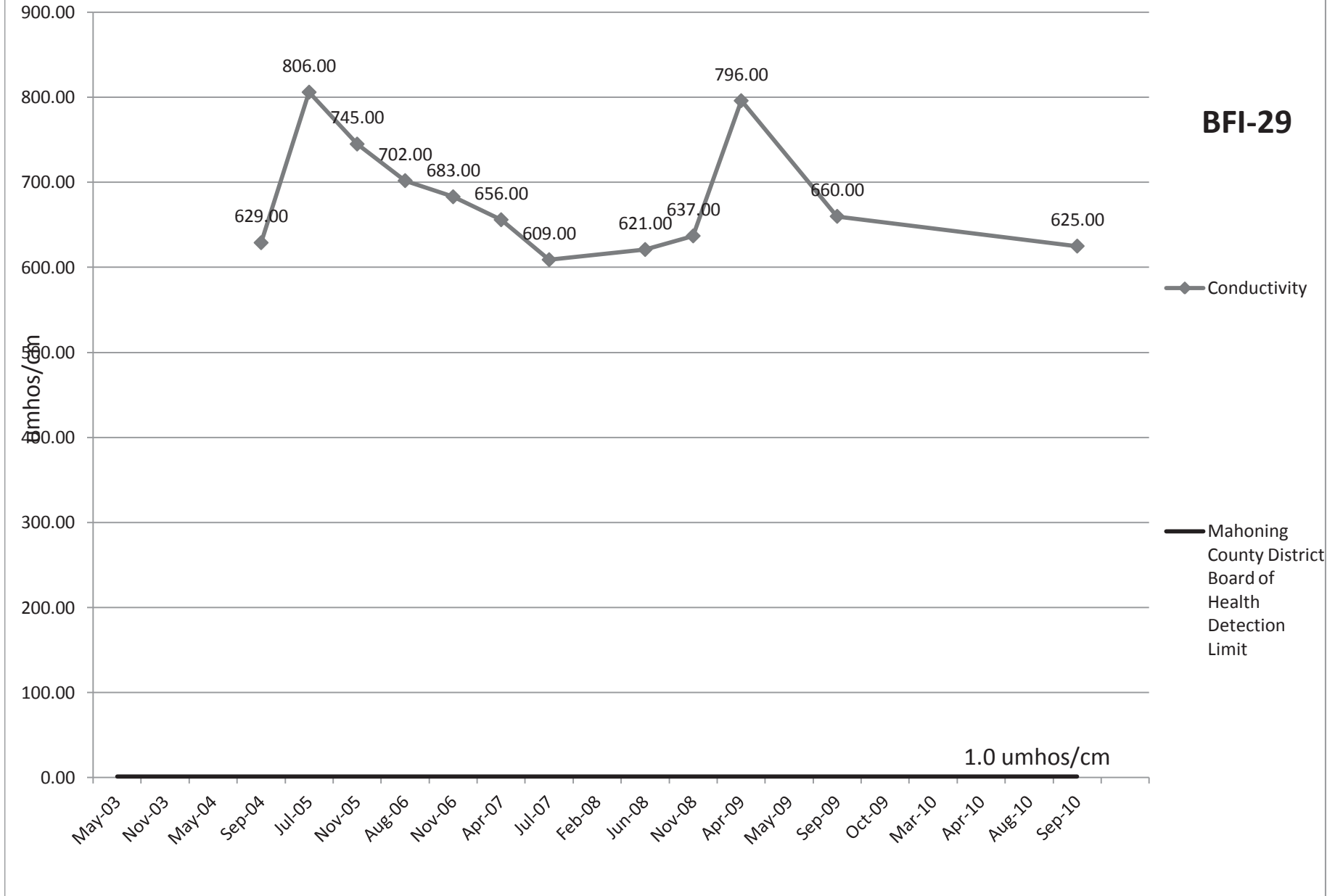


# Chloride

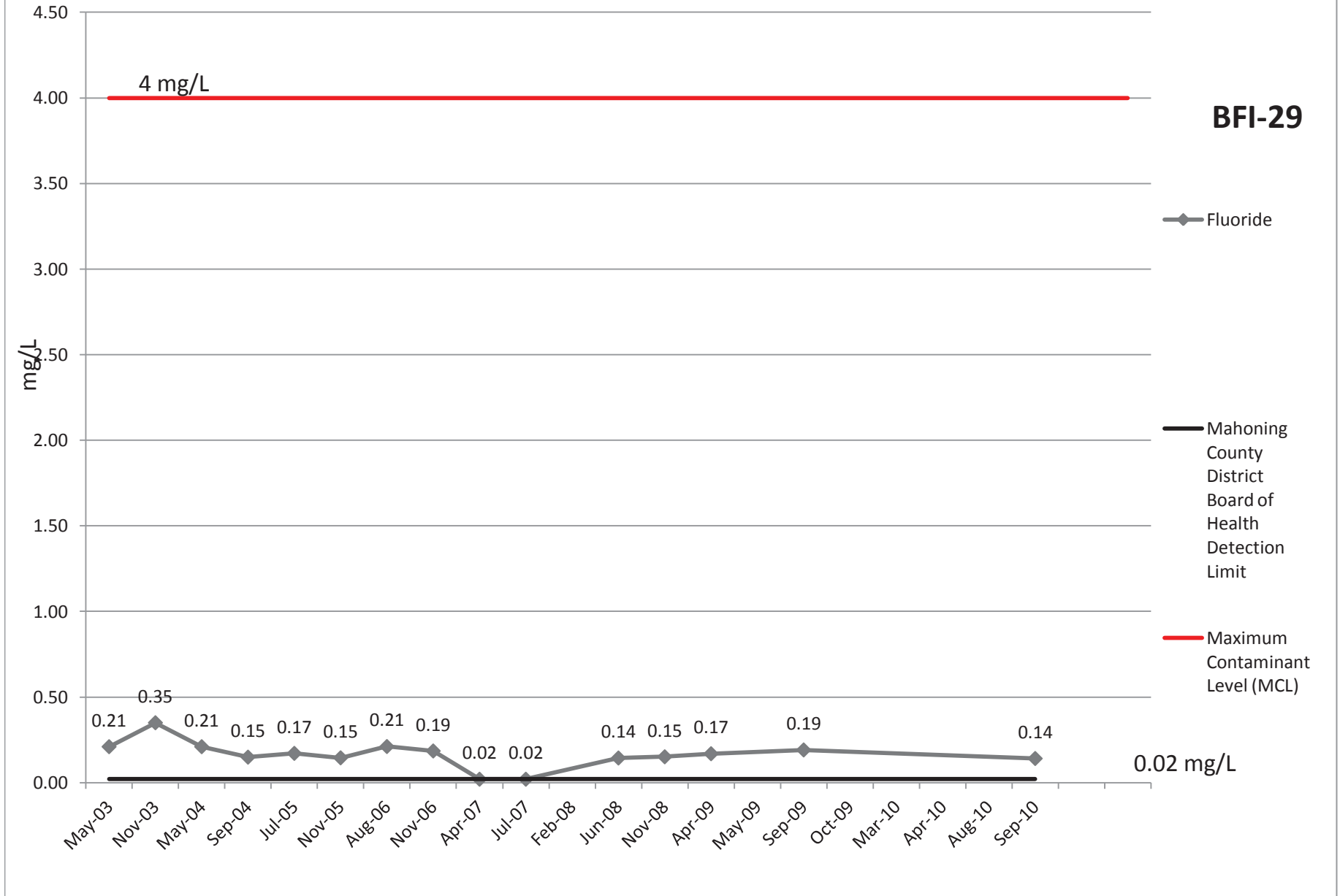
**BFI-29**



# Conductivity

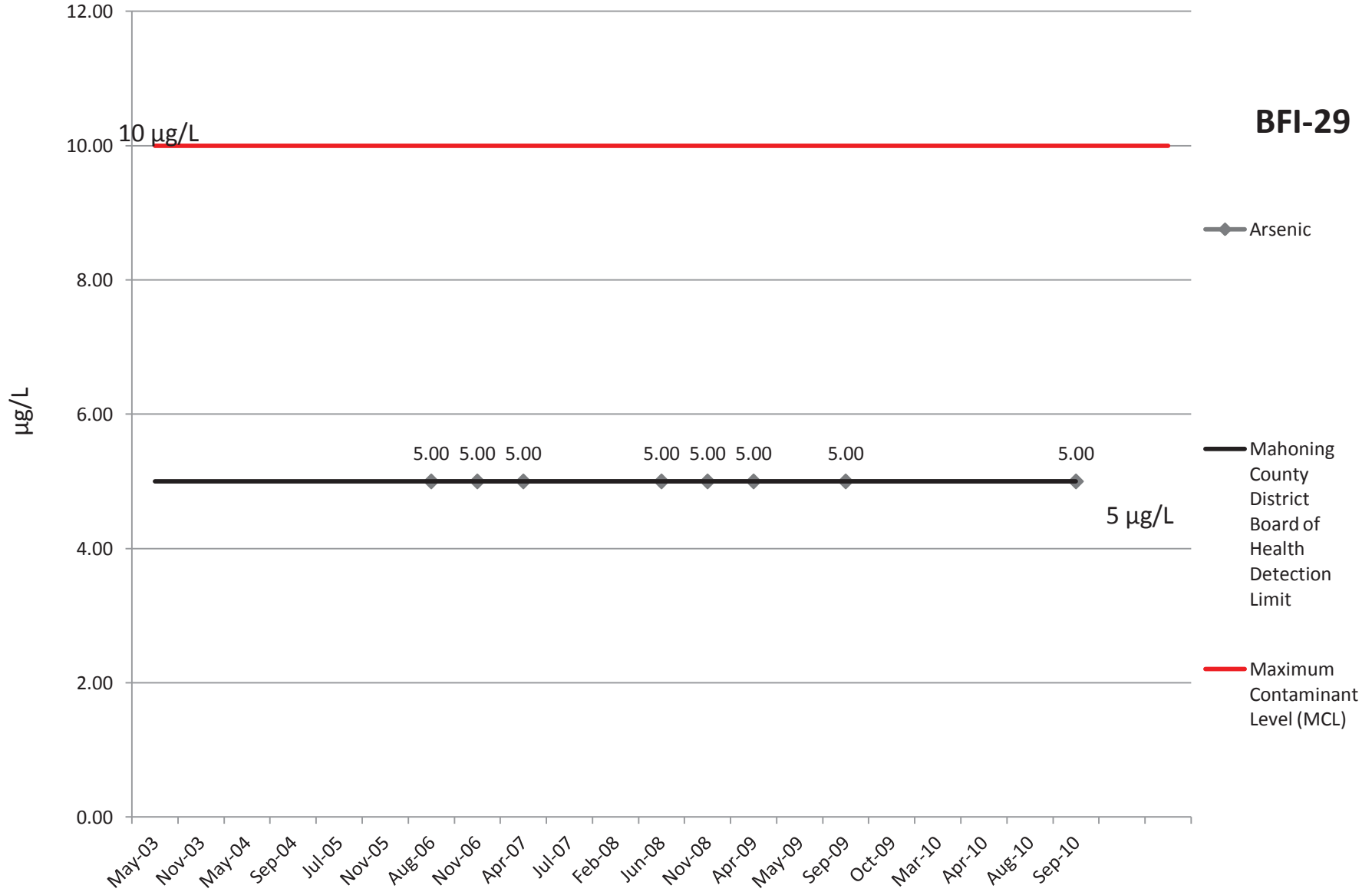


# Fluoride



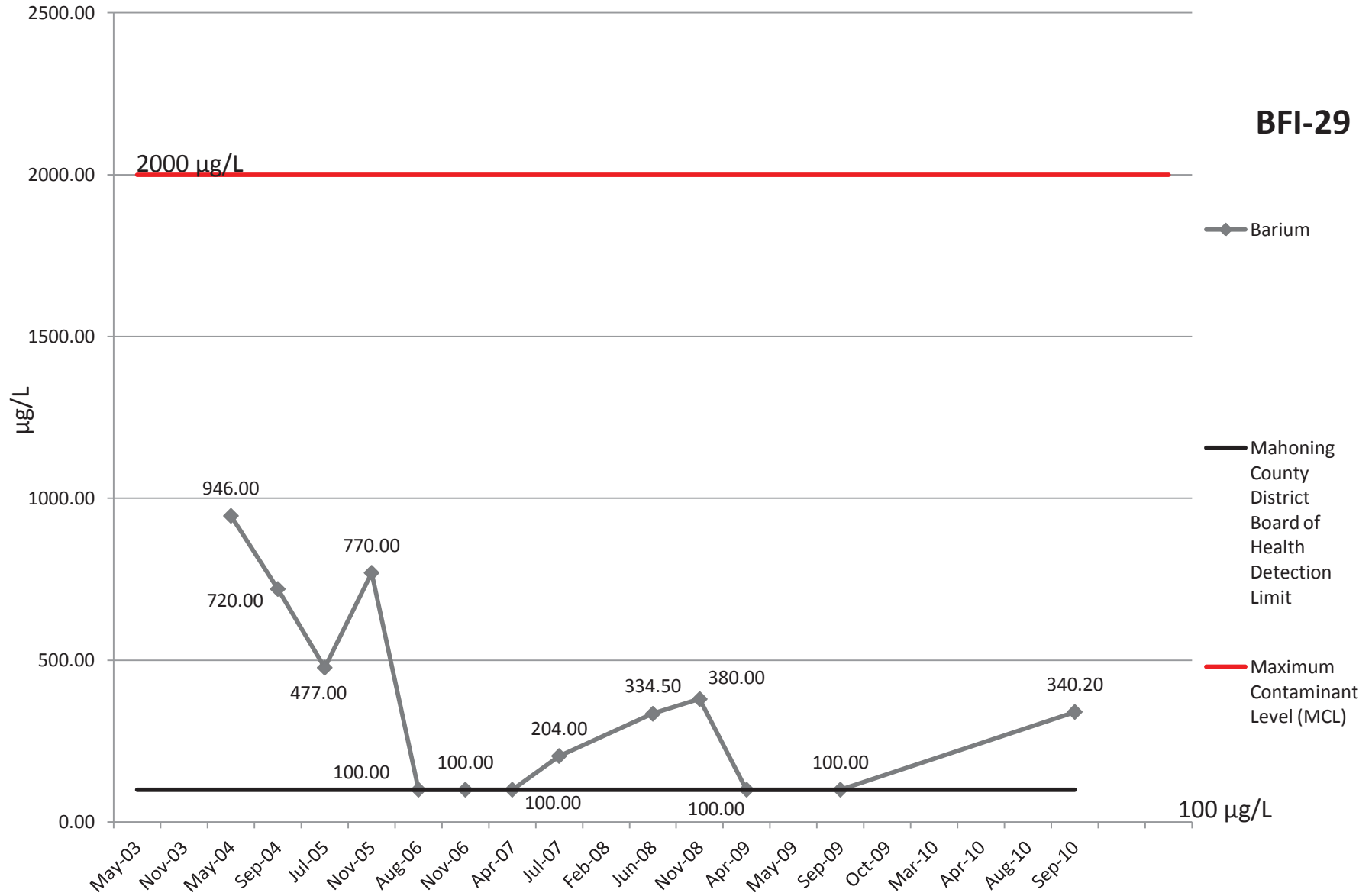
# Arsenic

**BFI-29**



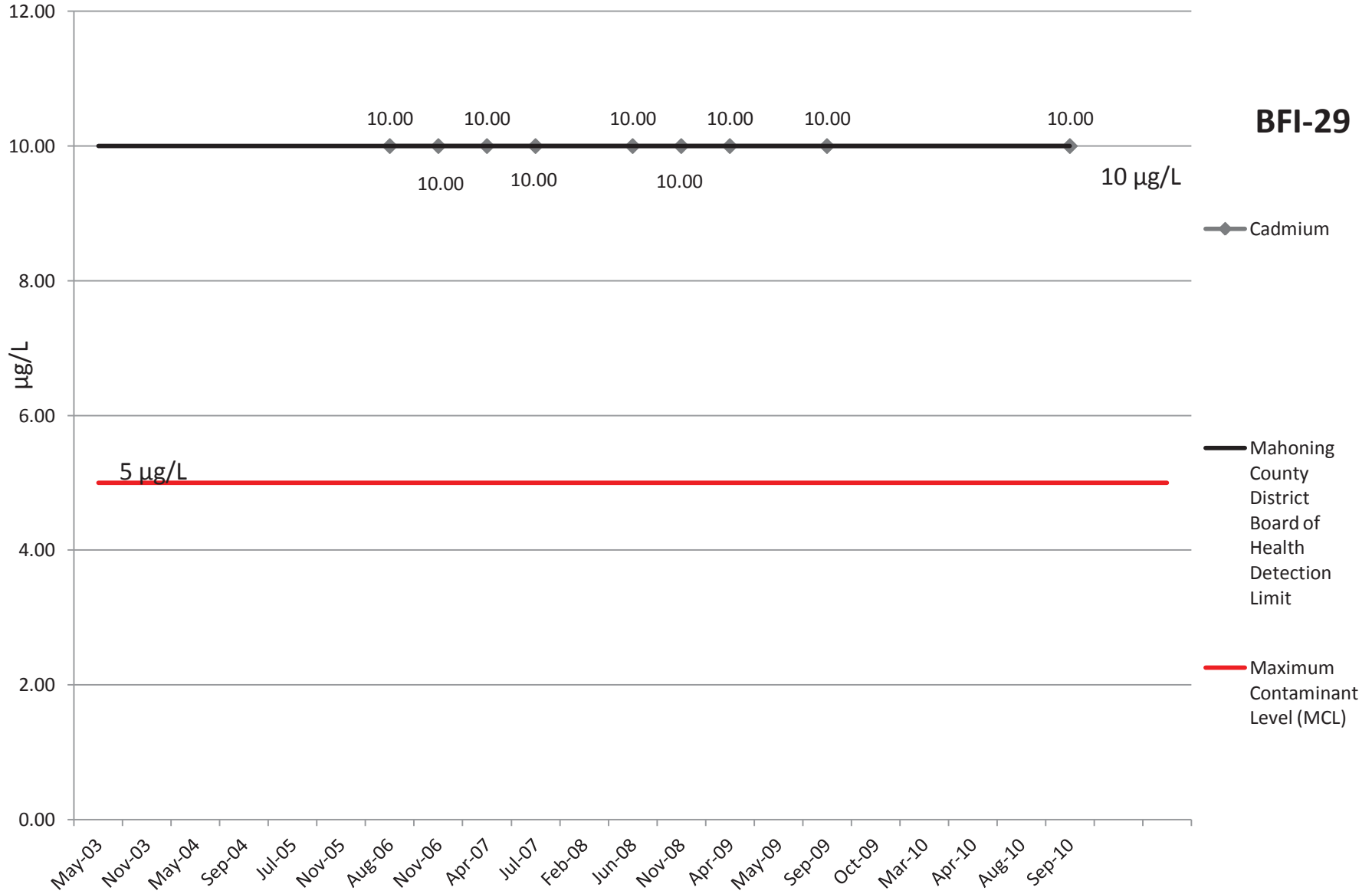
# Barium

**BFI-29**



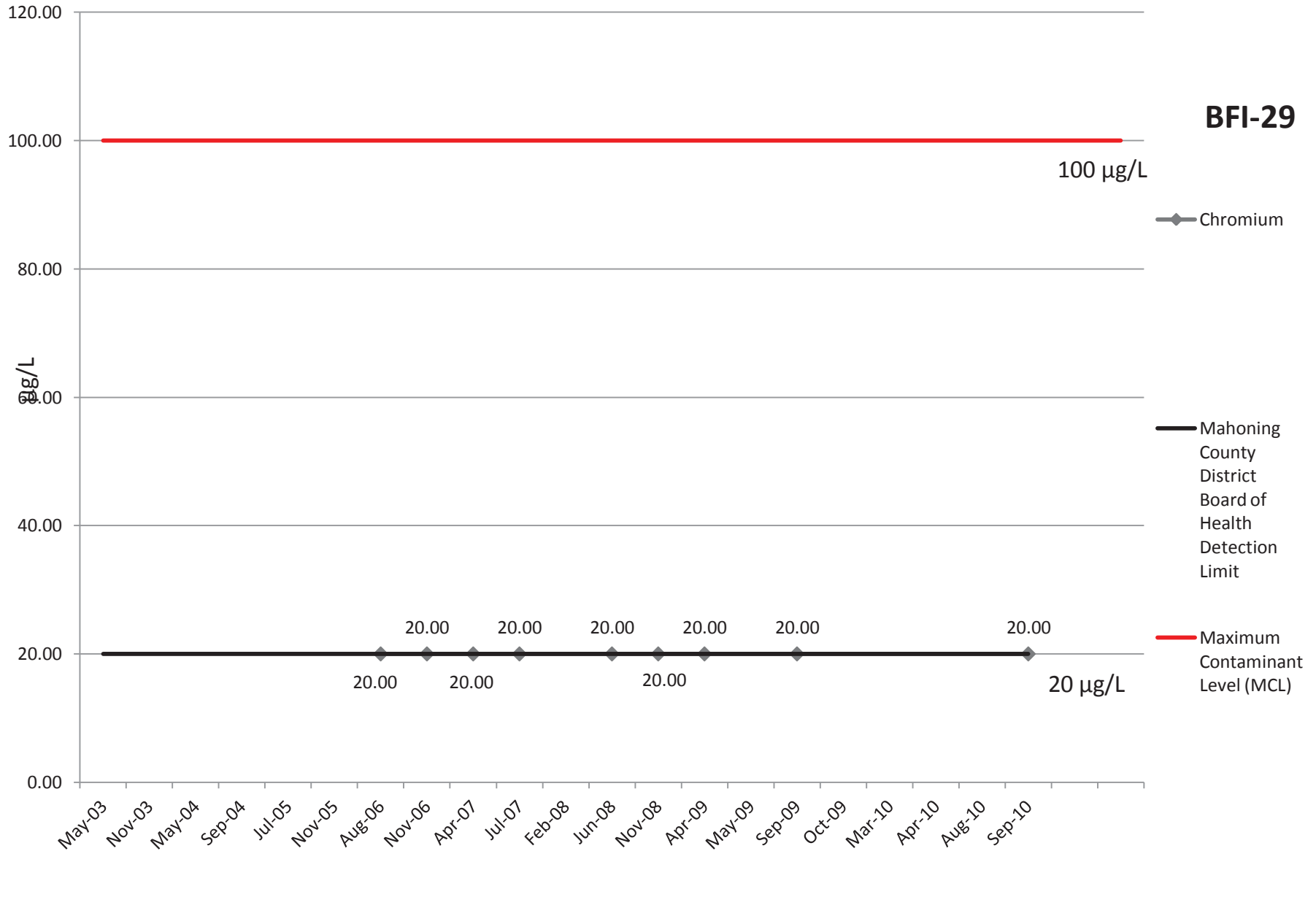
# Cadmium

**BFI-29**



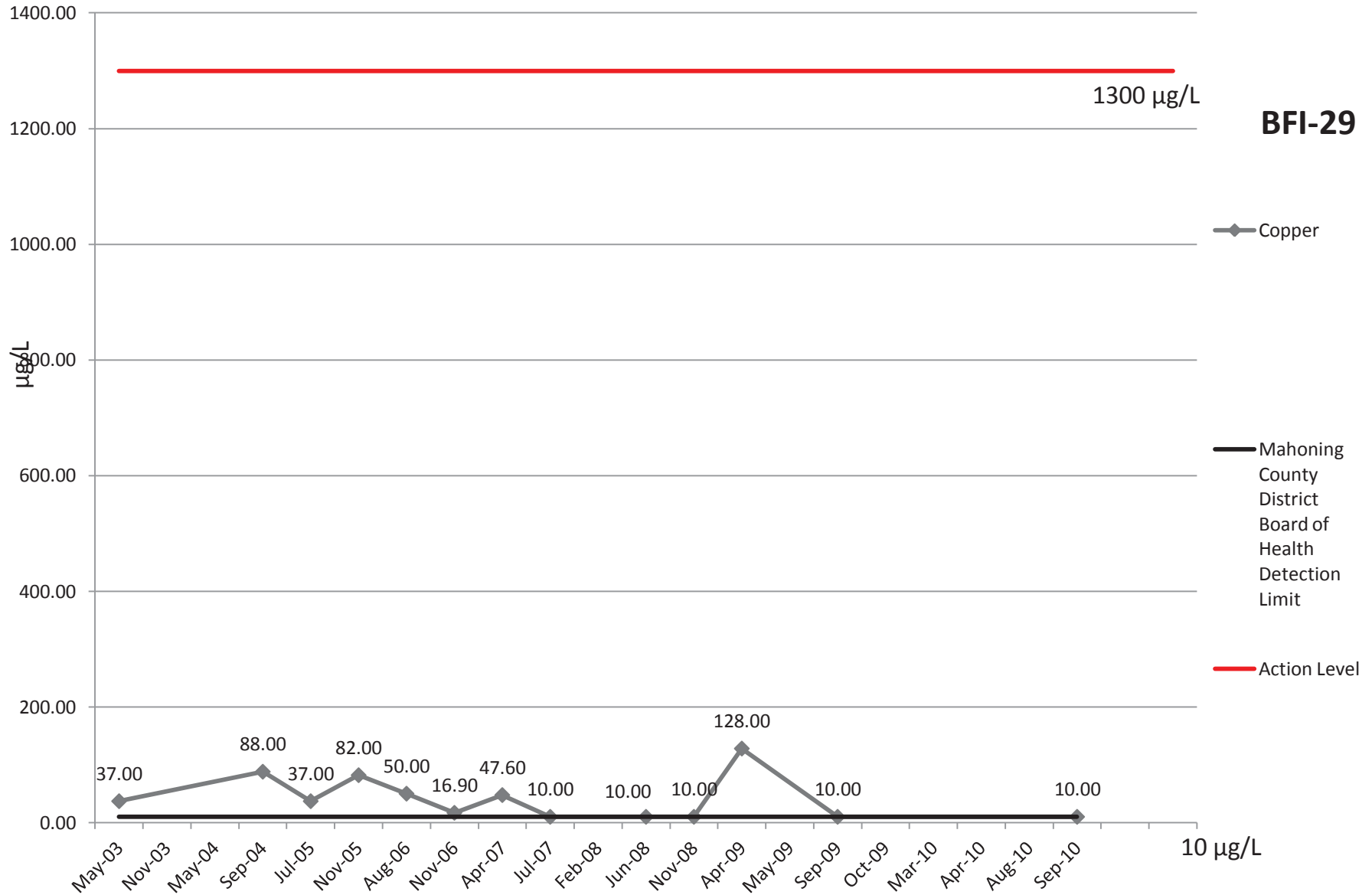
# Chromium

**BFI-29**



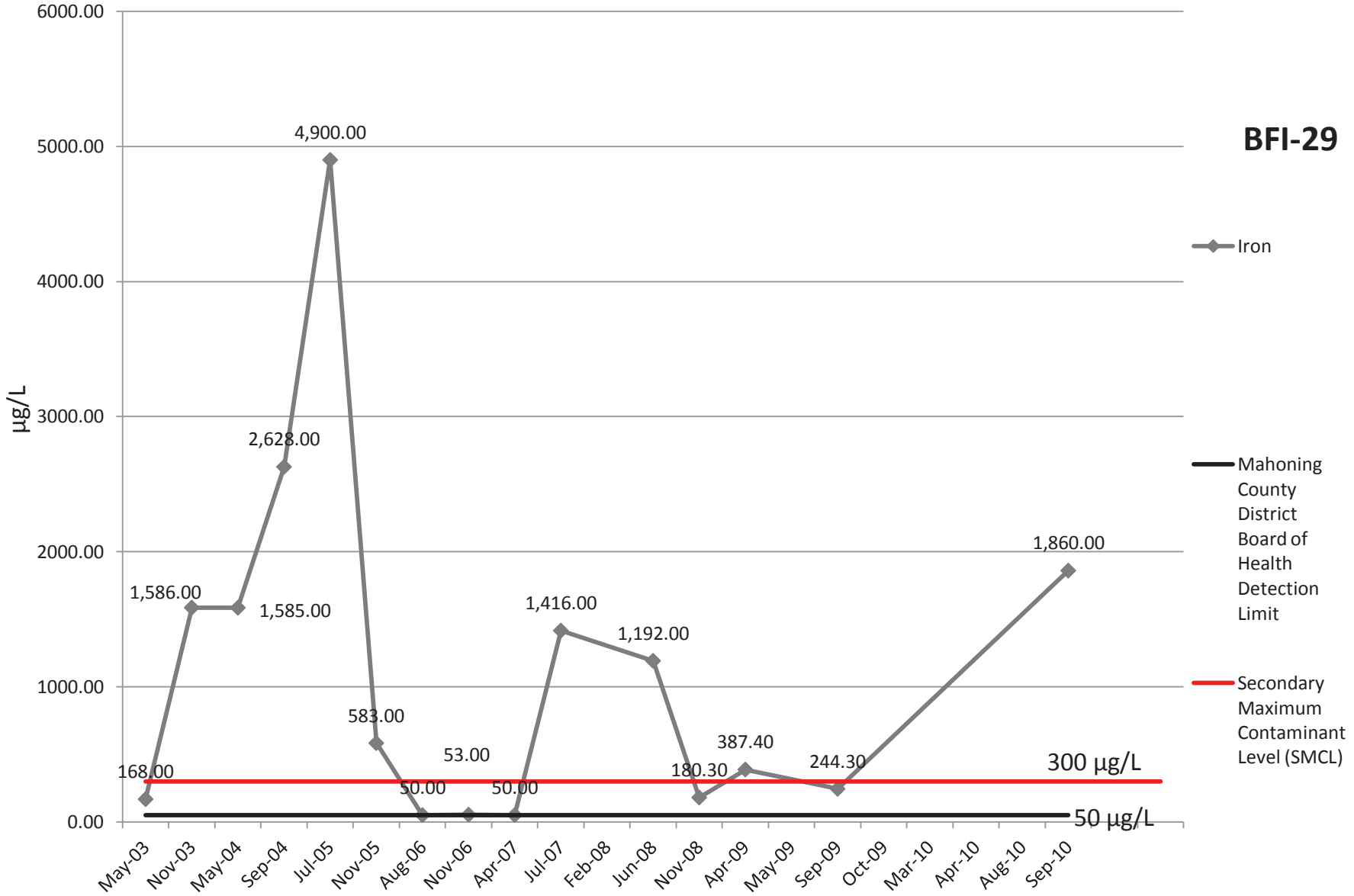


# Copper



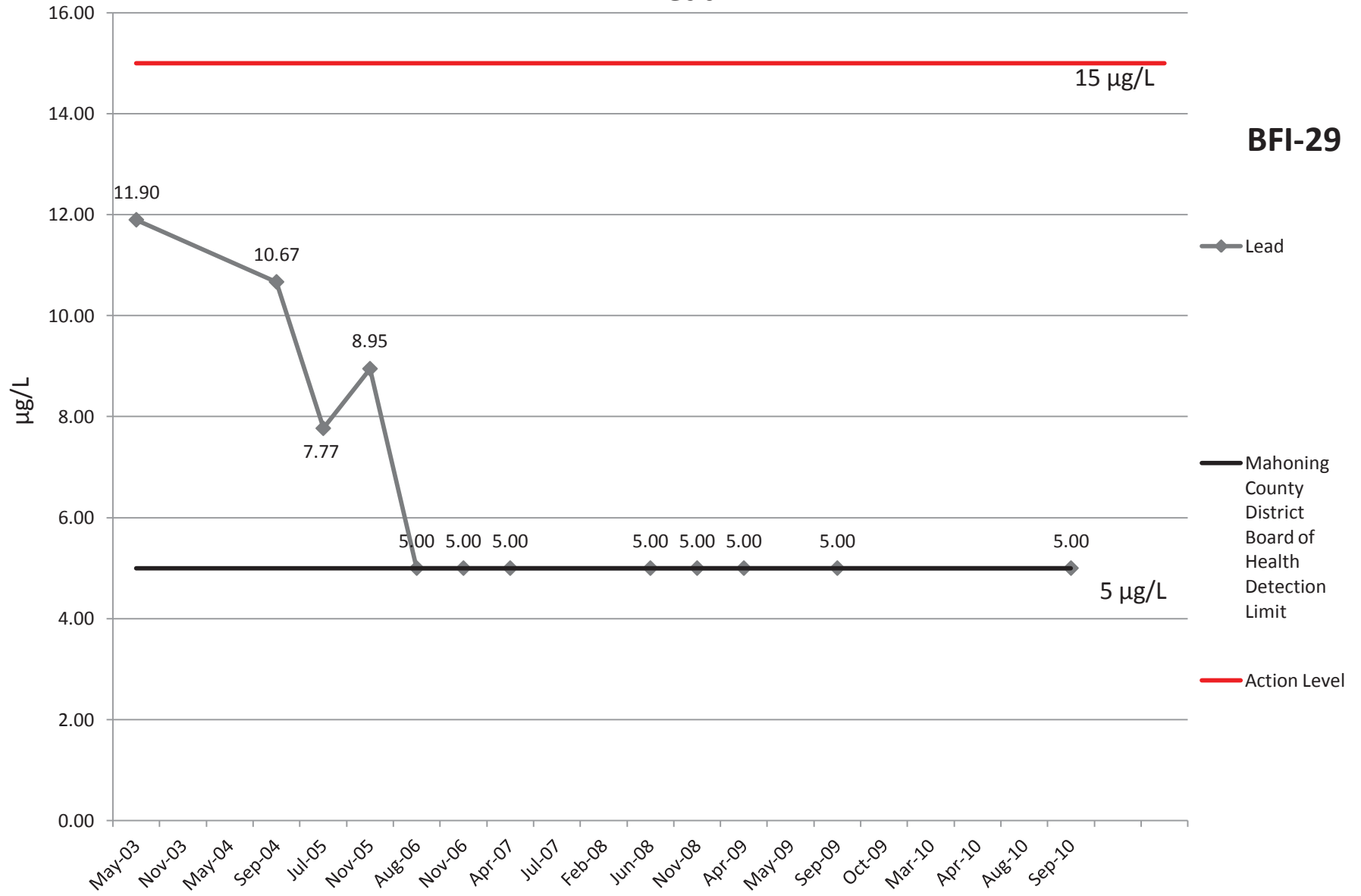
# Iron

**BFI-29**



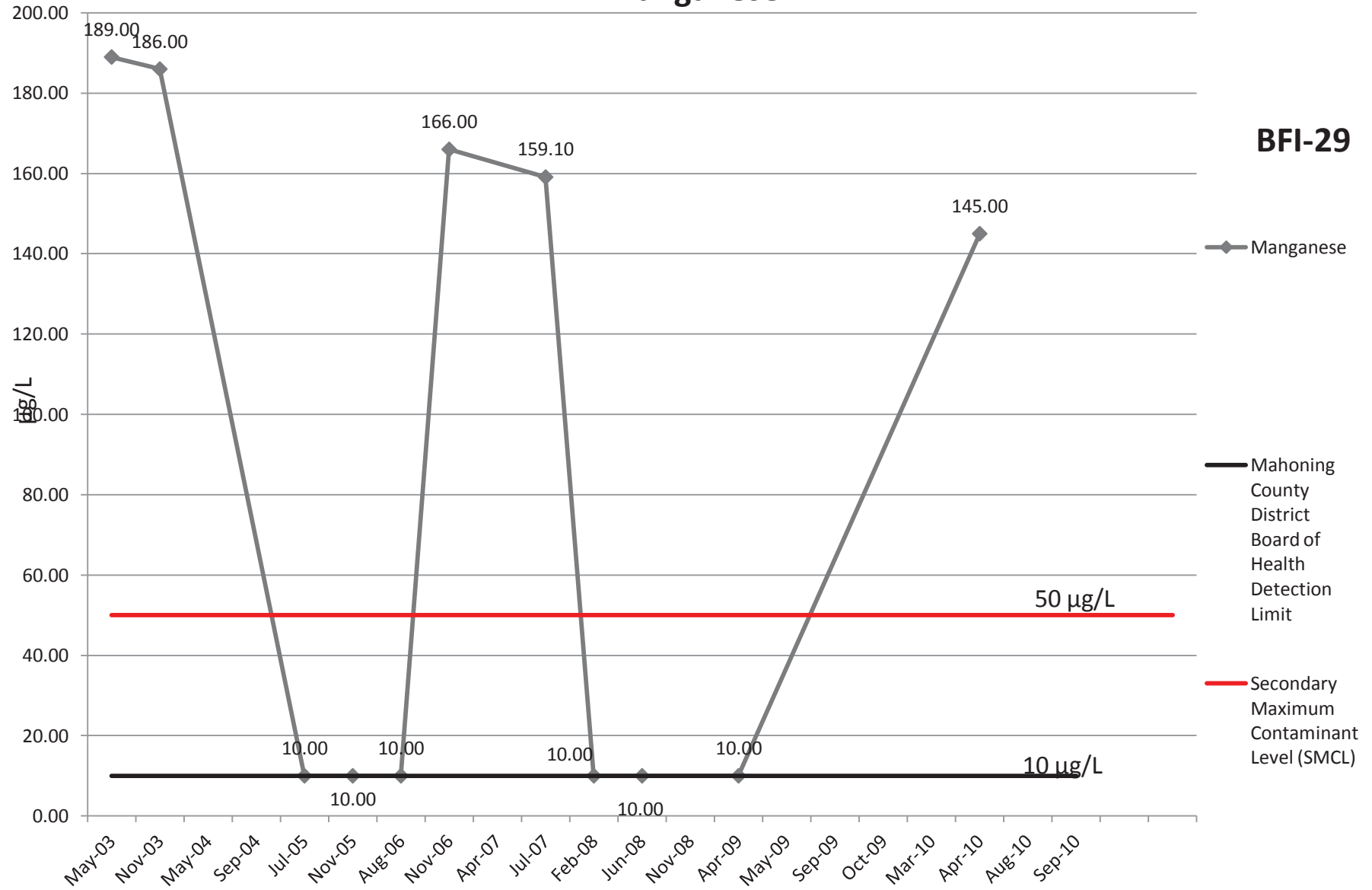
# Lead

**BFI-29**



# Manganese

**BFI-29**



# Mercury

**BFI-29**

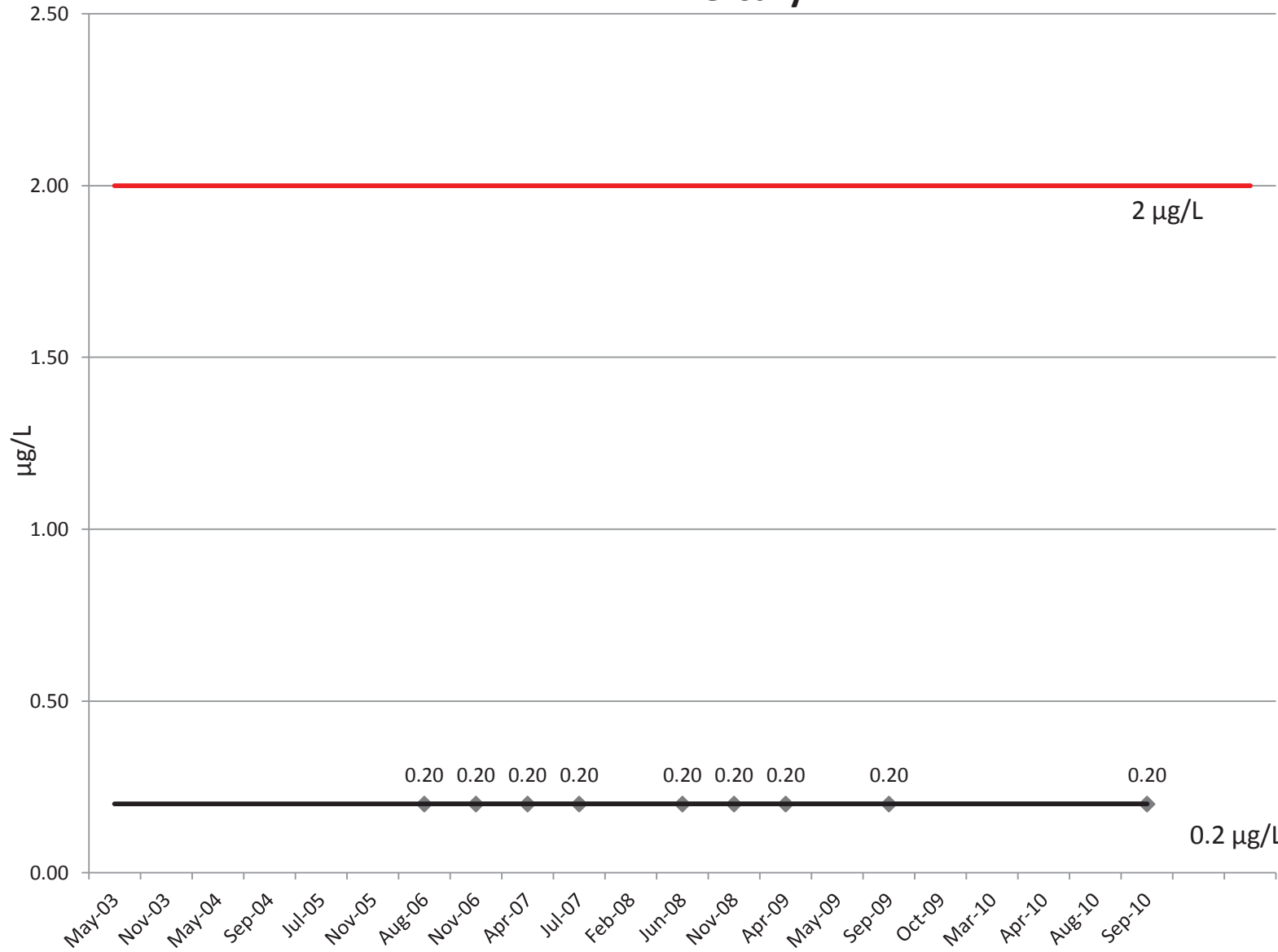
2 µg/L

Mercury

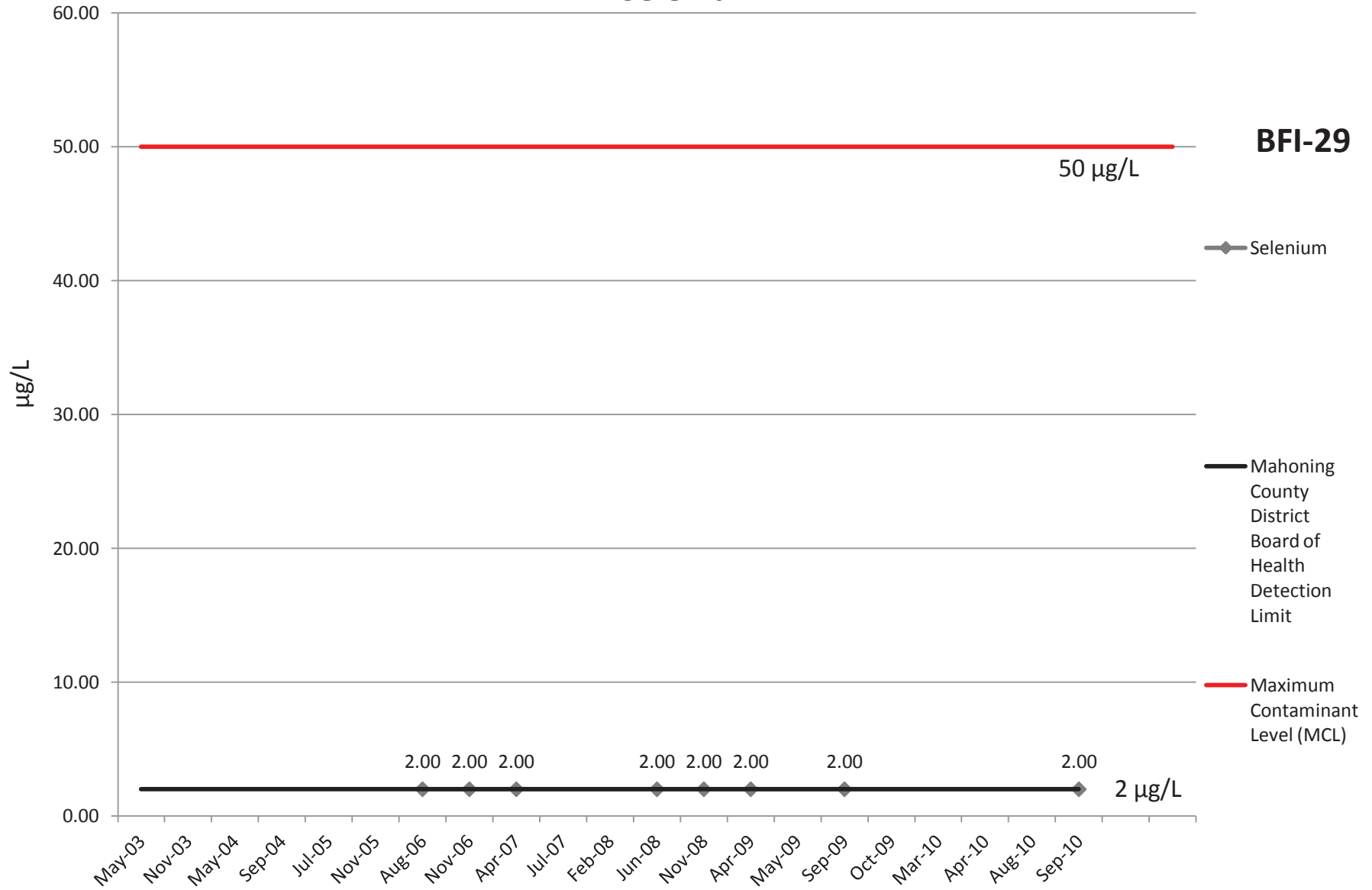
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

0.2 µg/L

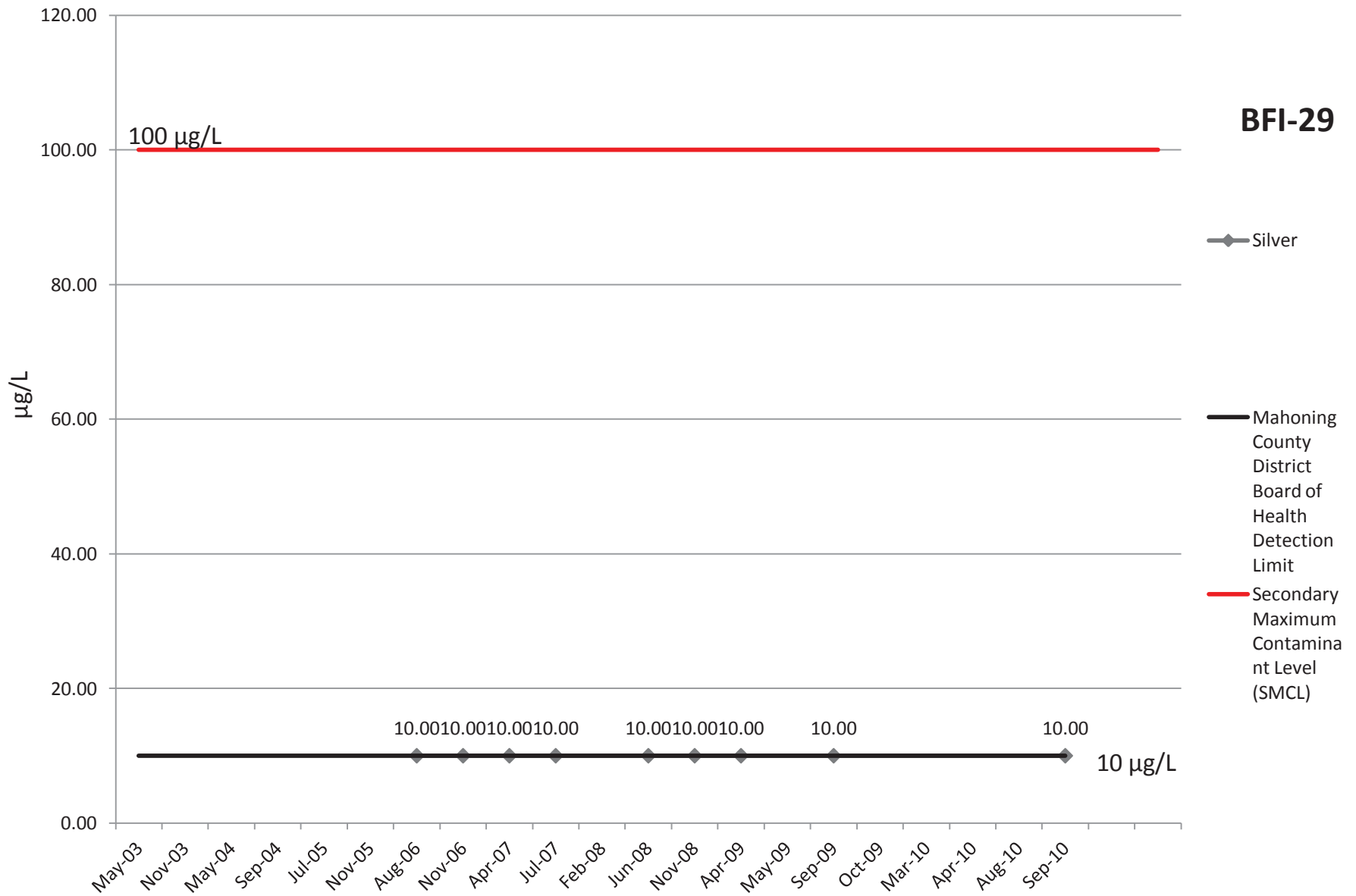


# Selenium



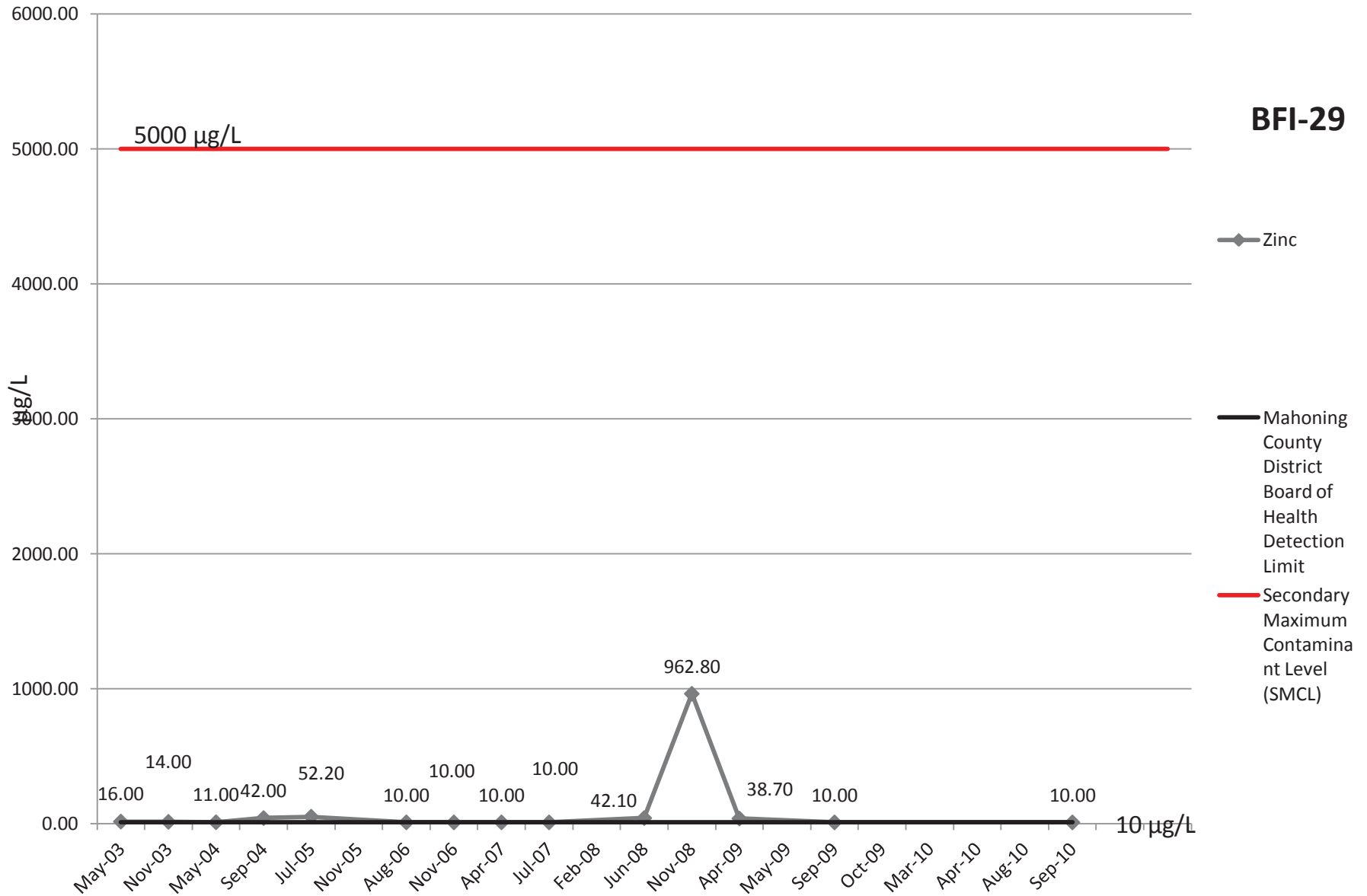
# Silver

**BFI-29**



# Zinc

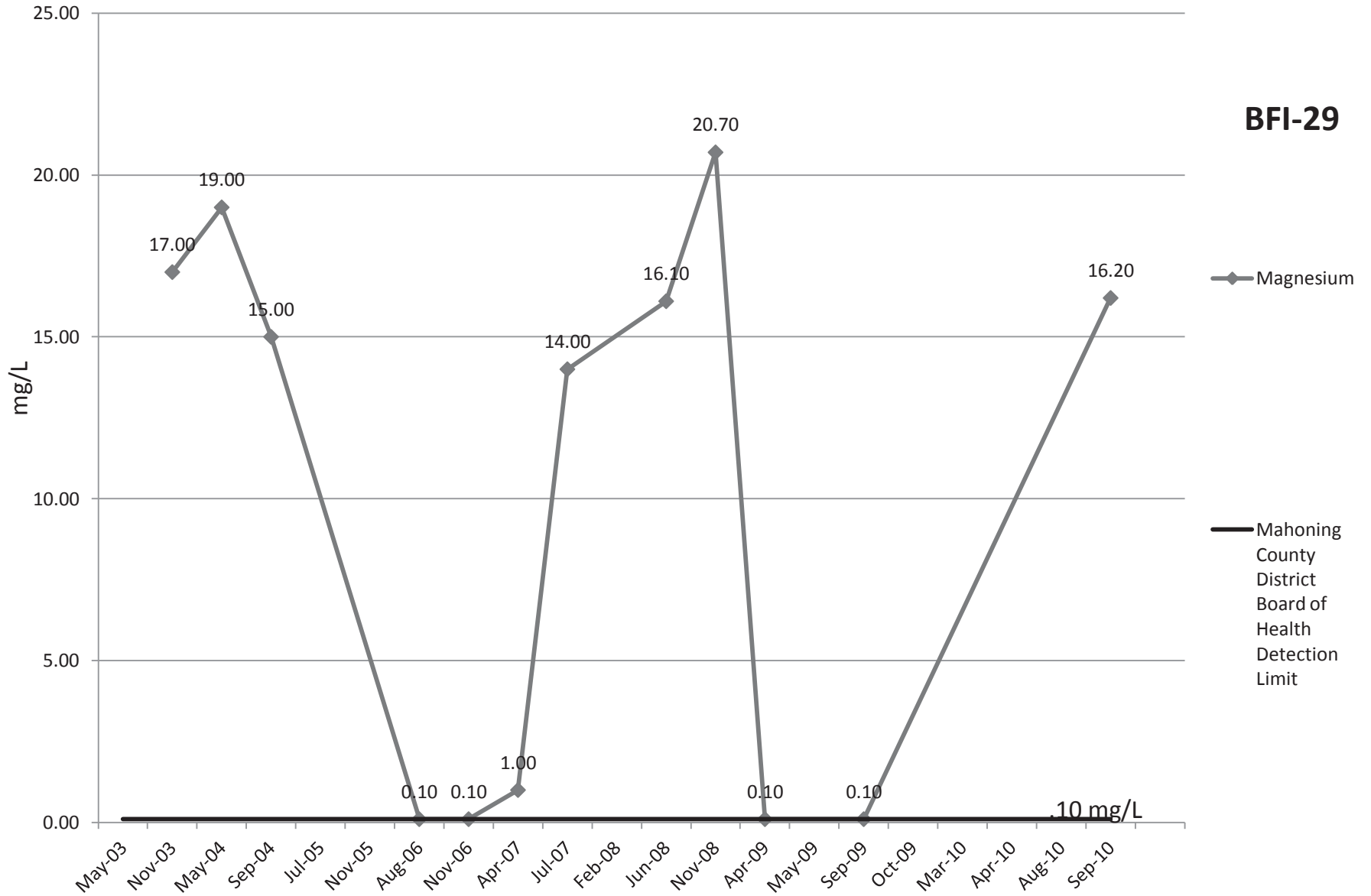
**BFI-29**



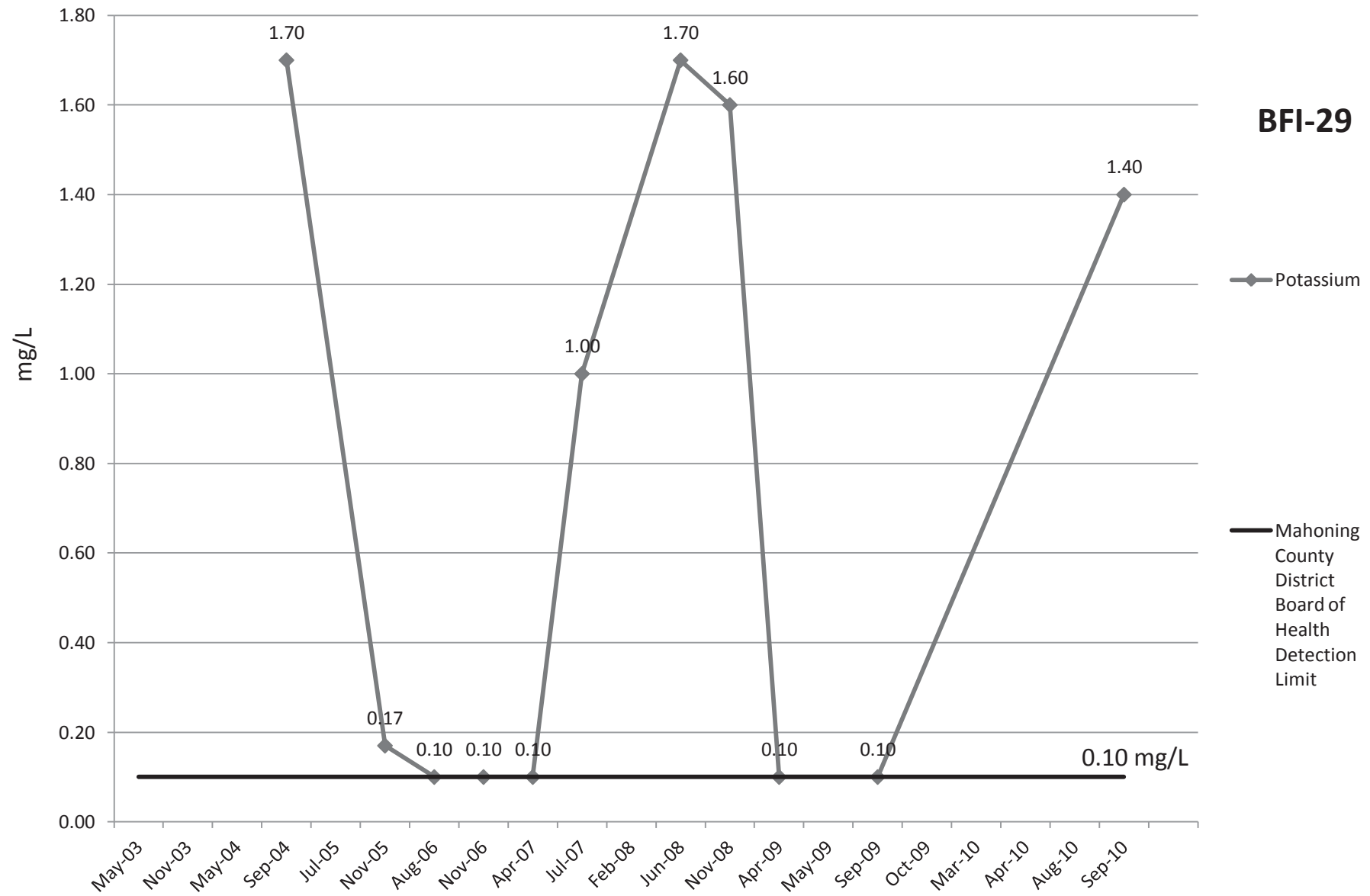


# Magnesium

**BFI-29**

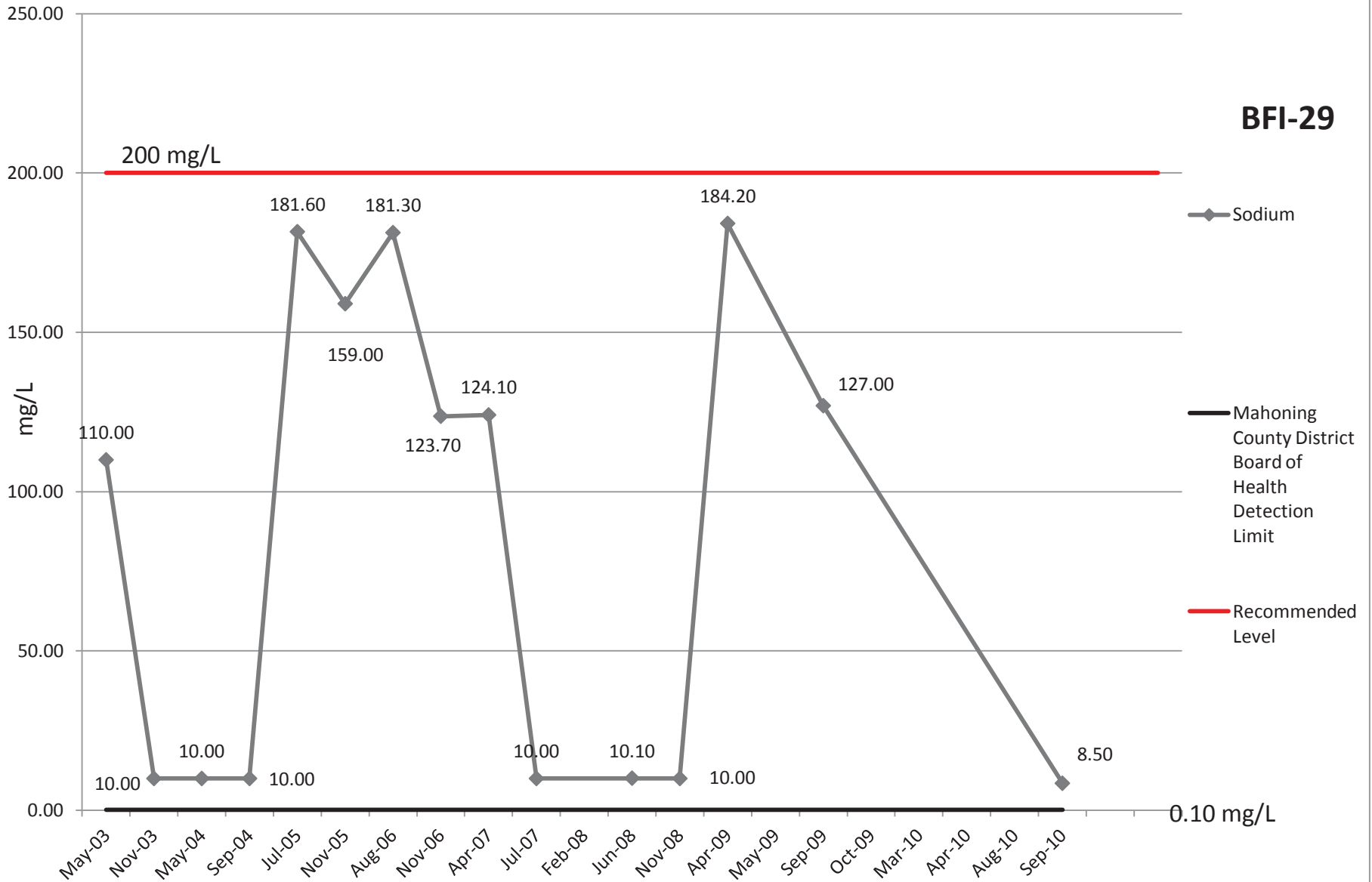


# Potassium

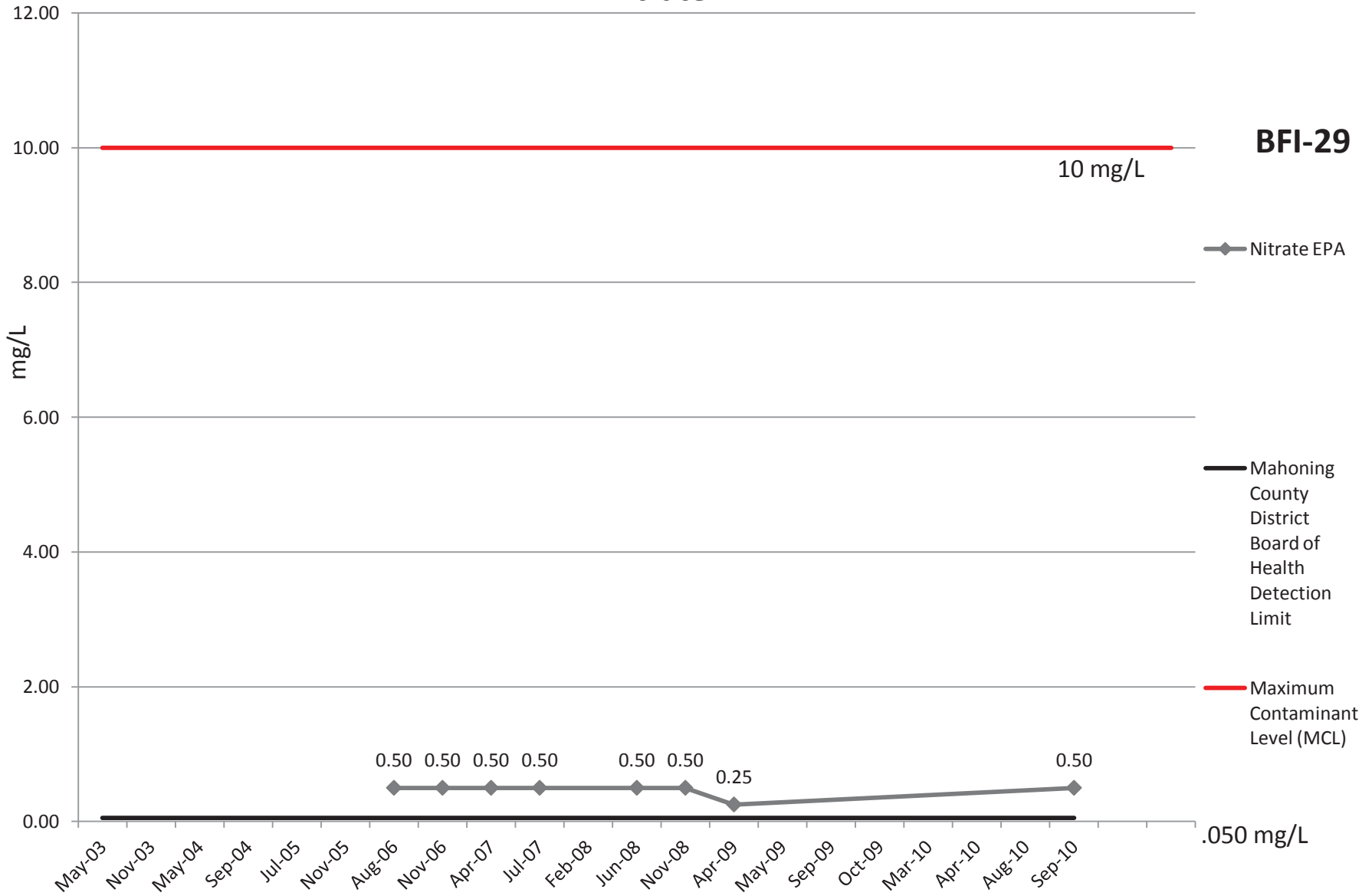


# Sodium

**BFI-29**



# Nitrate EPA



**BFI-29**

10 mg/L

◆ Nitrate EPA

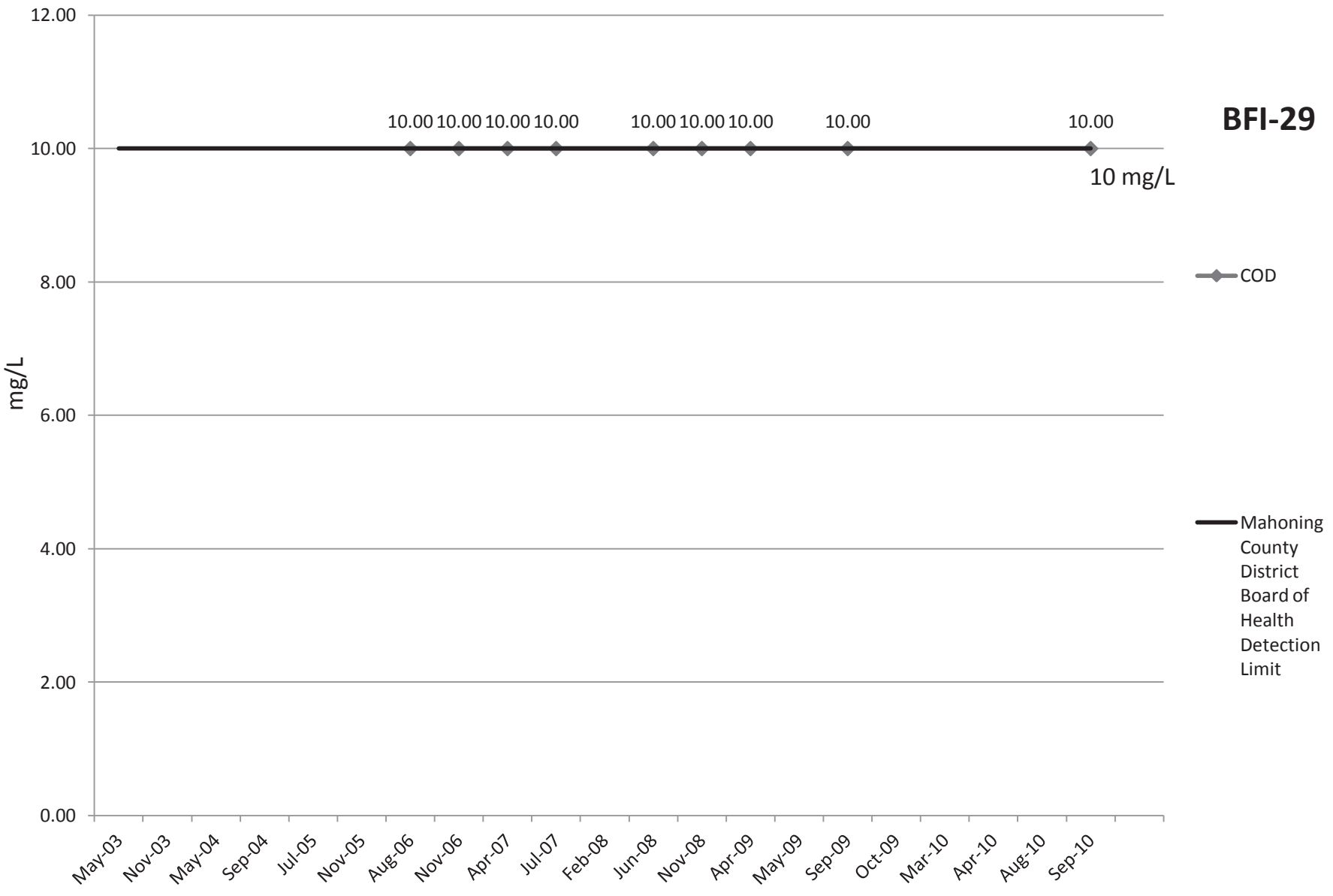
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

0.05 mg/L

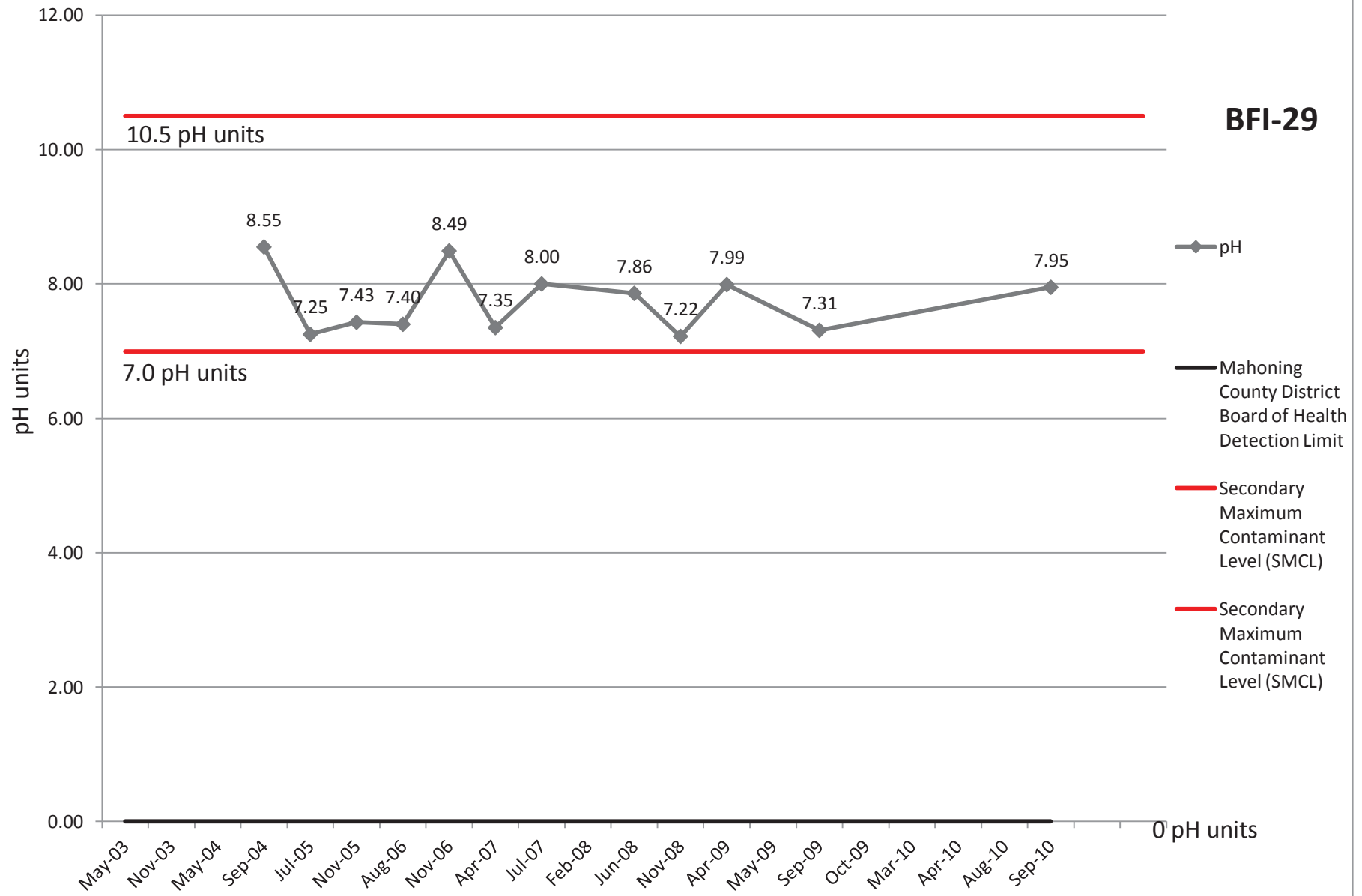
# COD

**BFI-29**

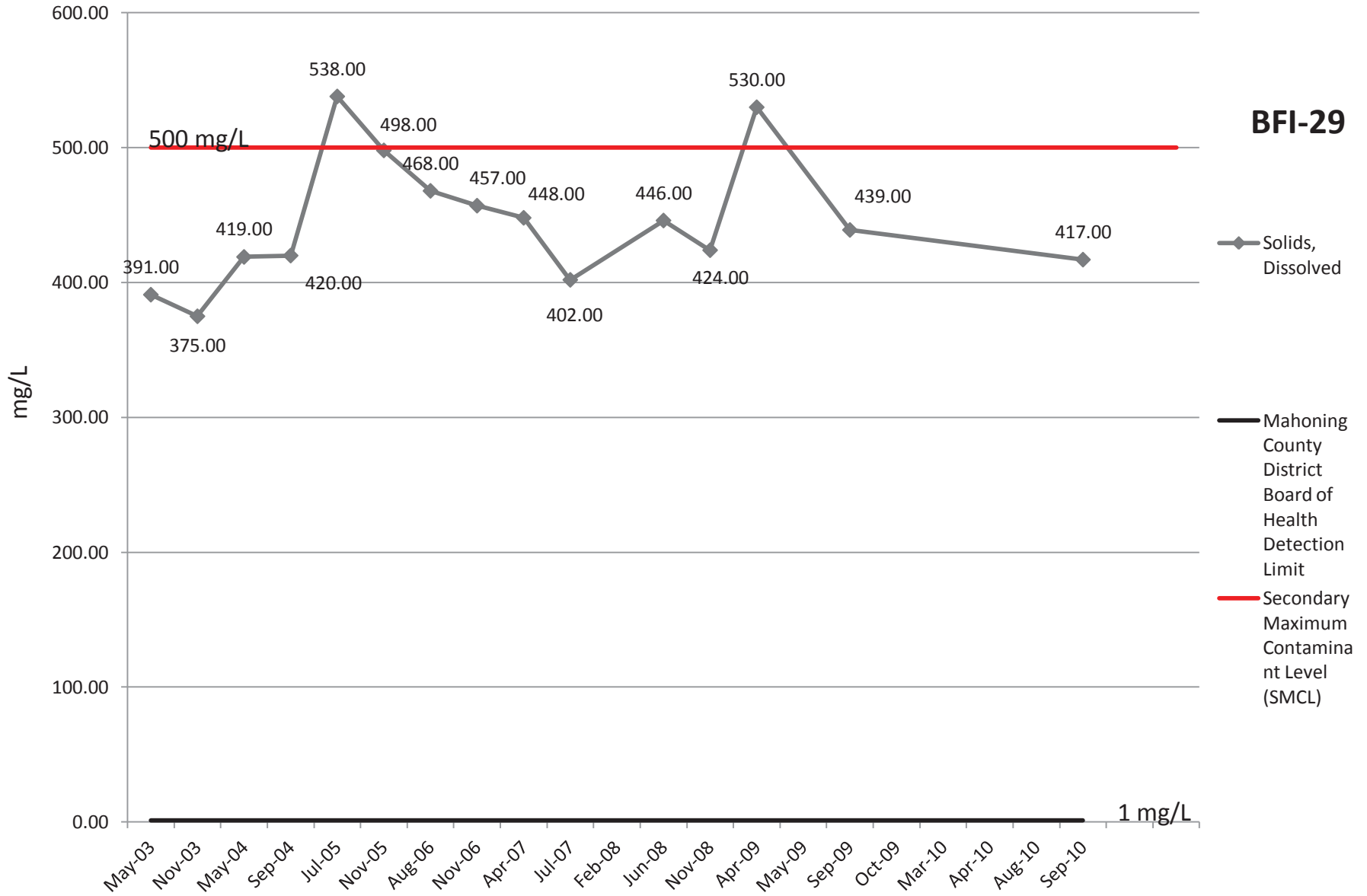


# pH

**BFI-29**

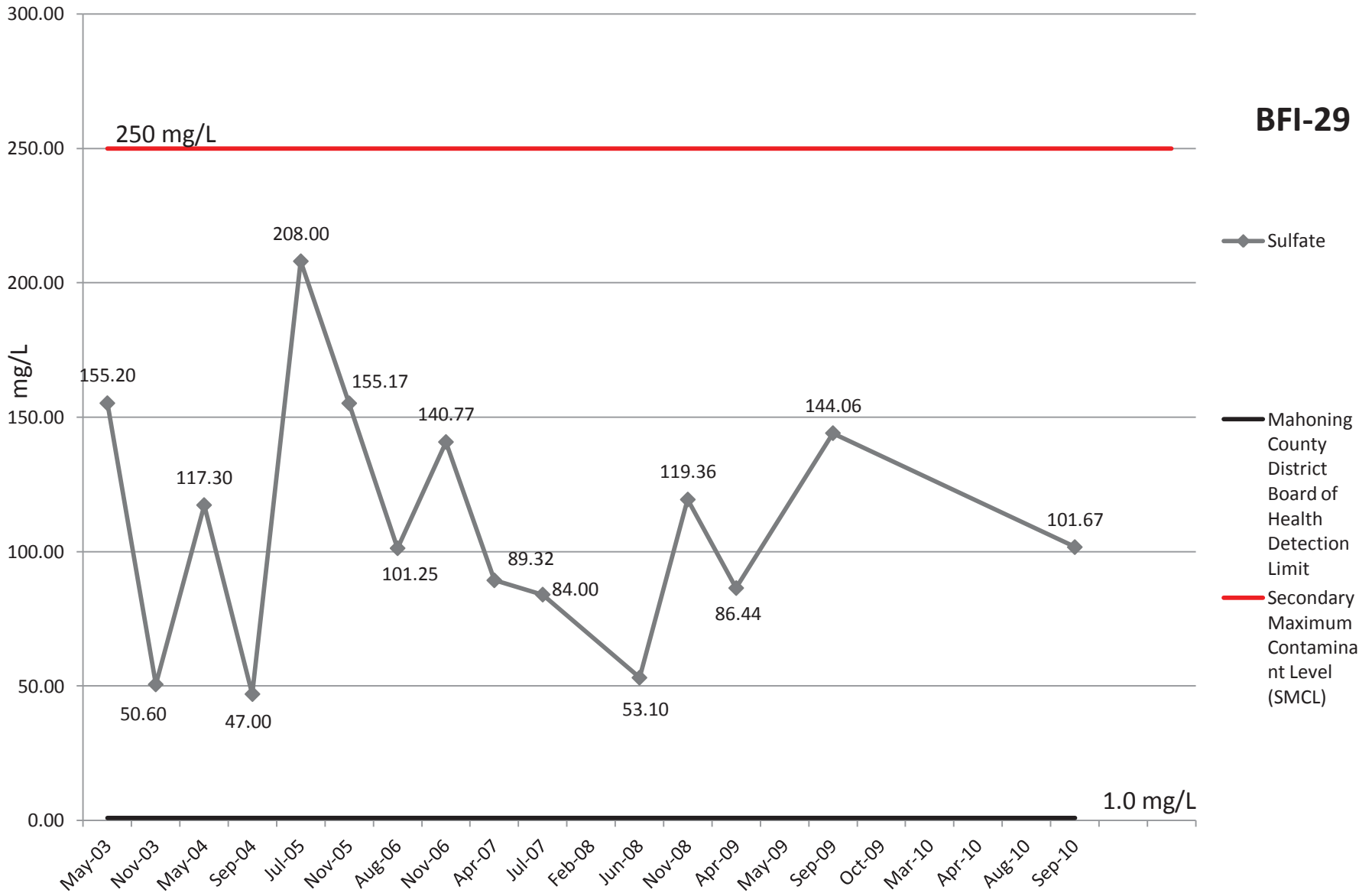


# Solids, Dissolved



# Sulfate

**BFI-29**





# Bacteria

## BFI-29

Positive/Negative

◆ Bacteria

positive (1)

1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

negative (0)

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

May-03

Nov-03

May-04

Sep-04

Jul-05

Nov-05

Aug-06

Nov-06

Apr-07

Jul-07

Feb-08

Jun-08

Nov-08

Apr-09

May-09

Sep-09

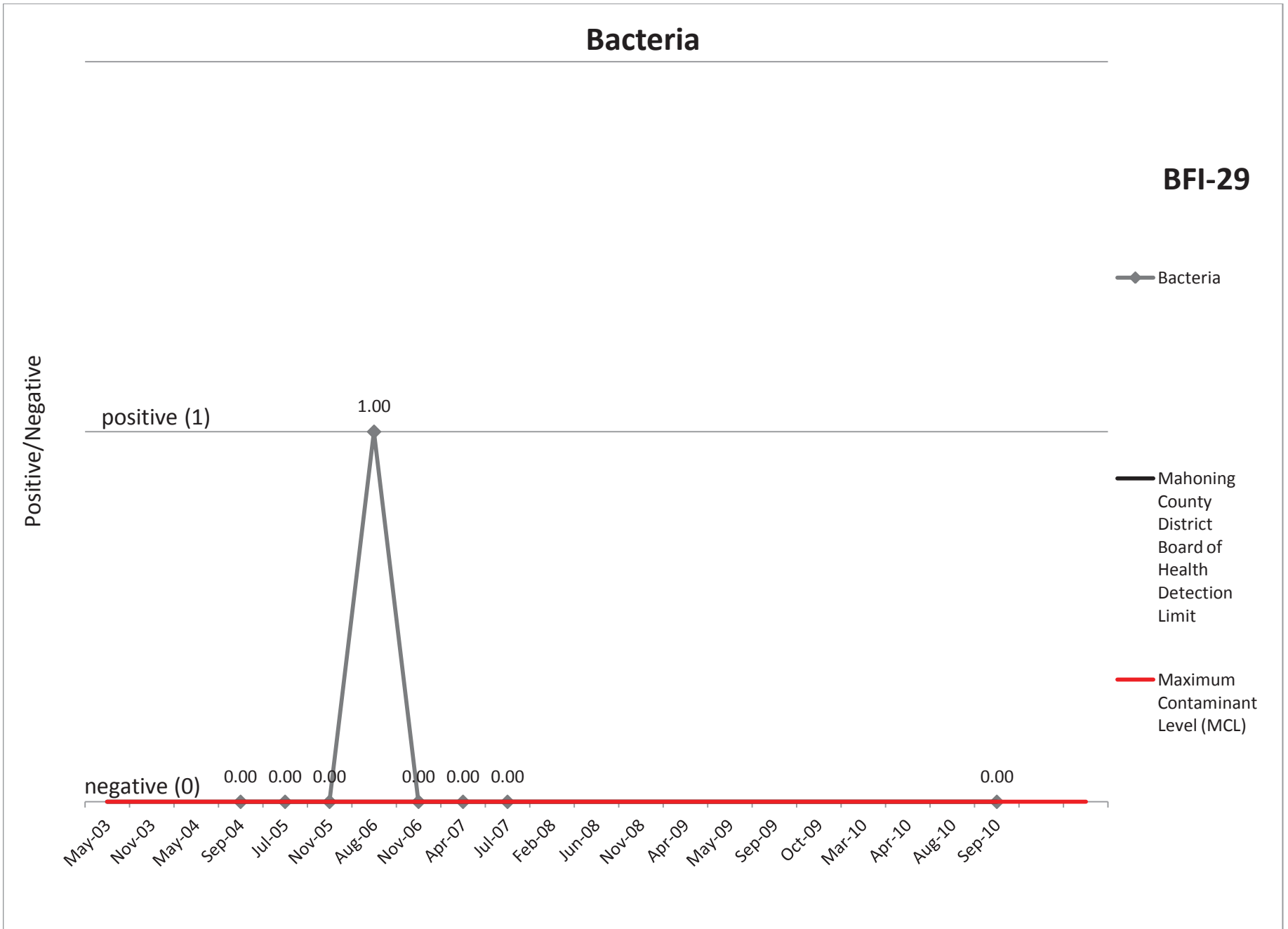
Oct-09

Mar-10

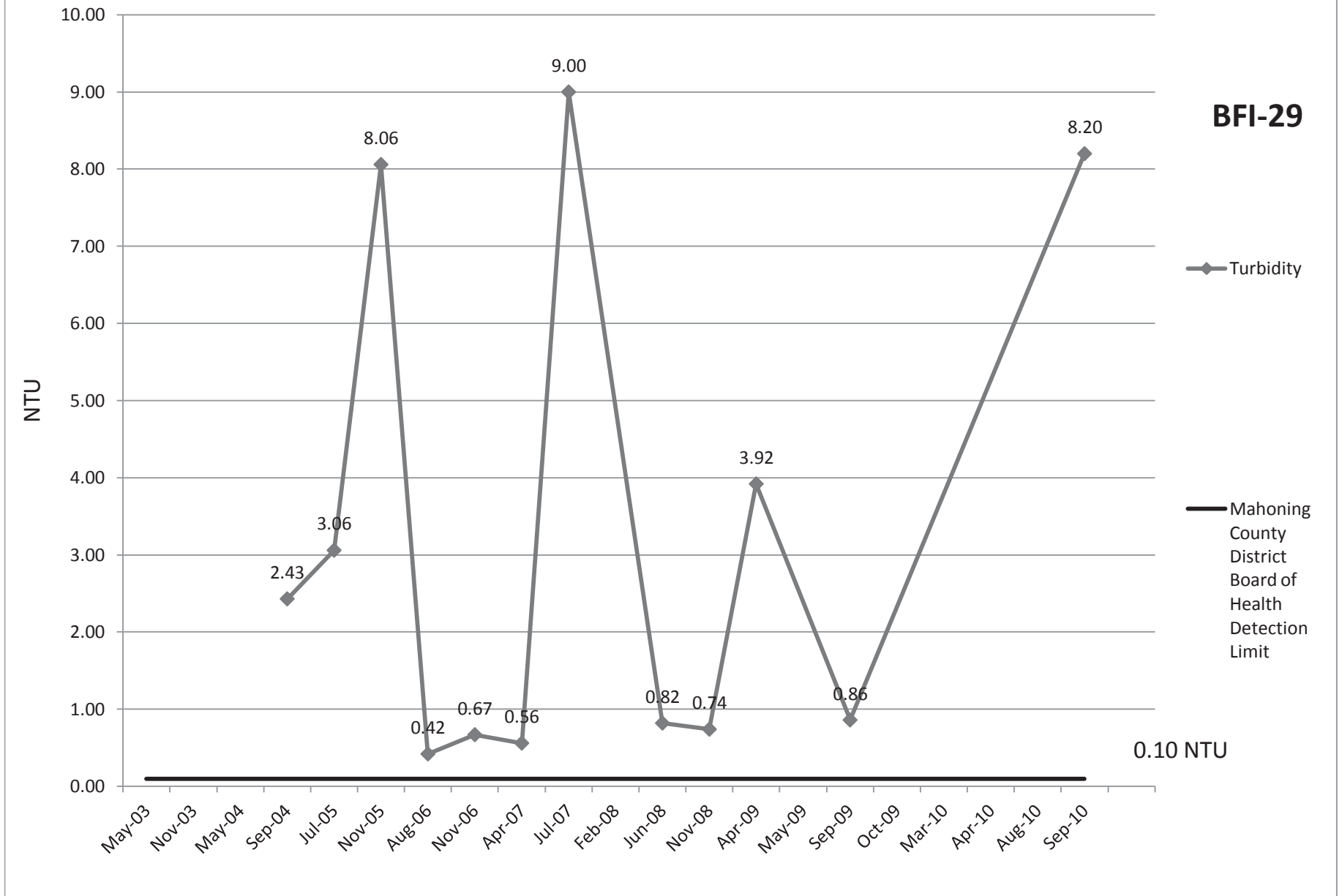
Apr-10

Aug-10

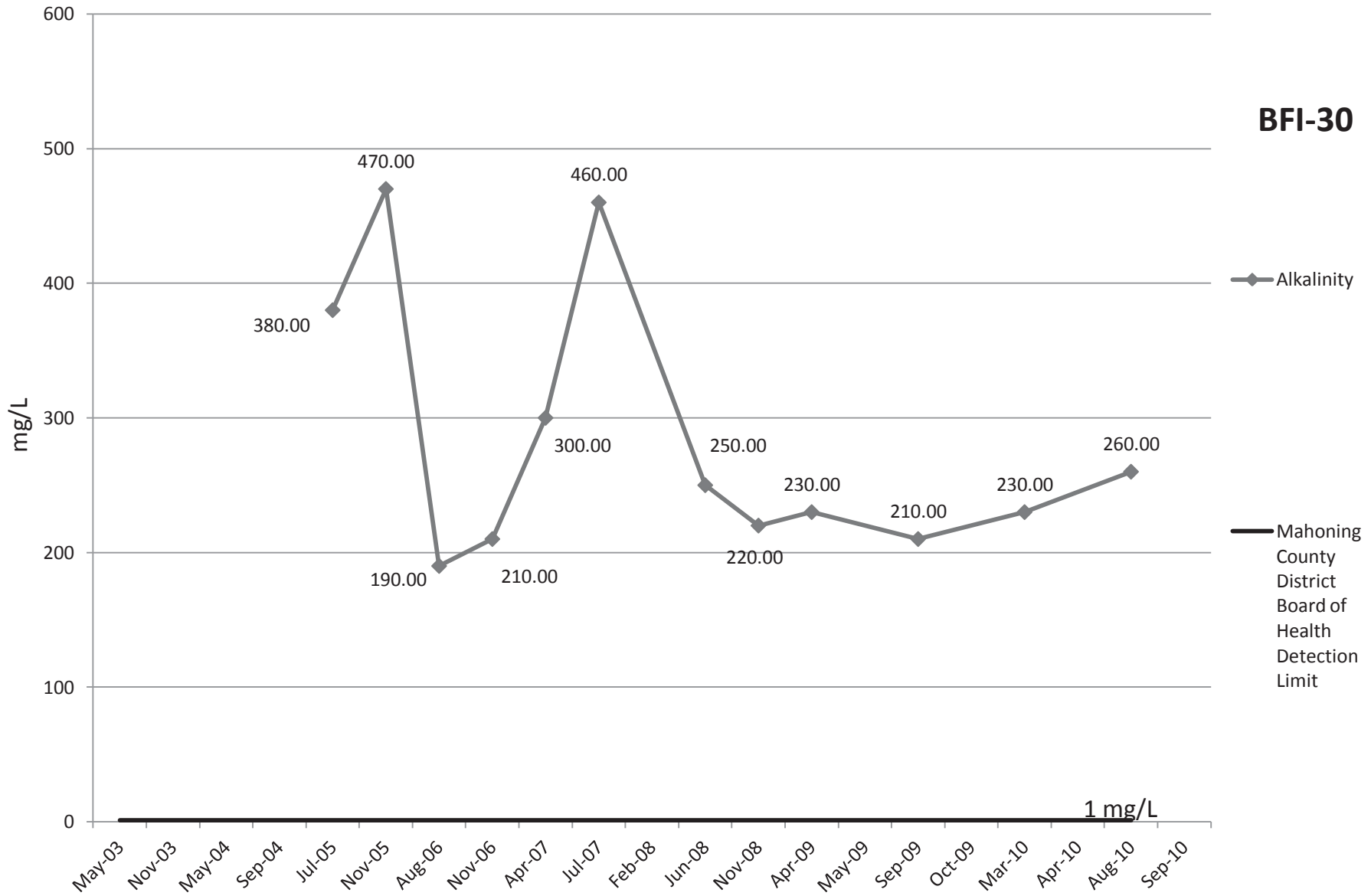
Sep-10



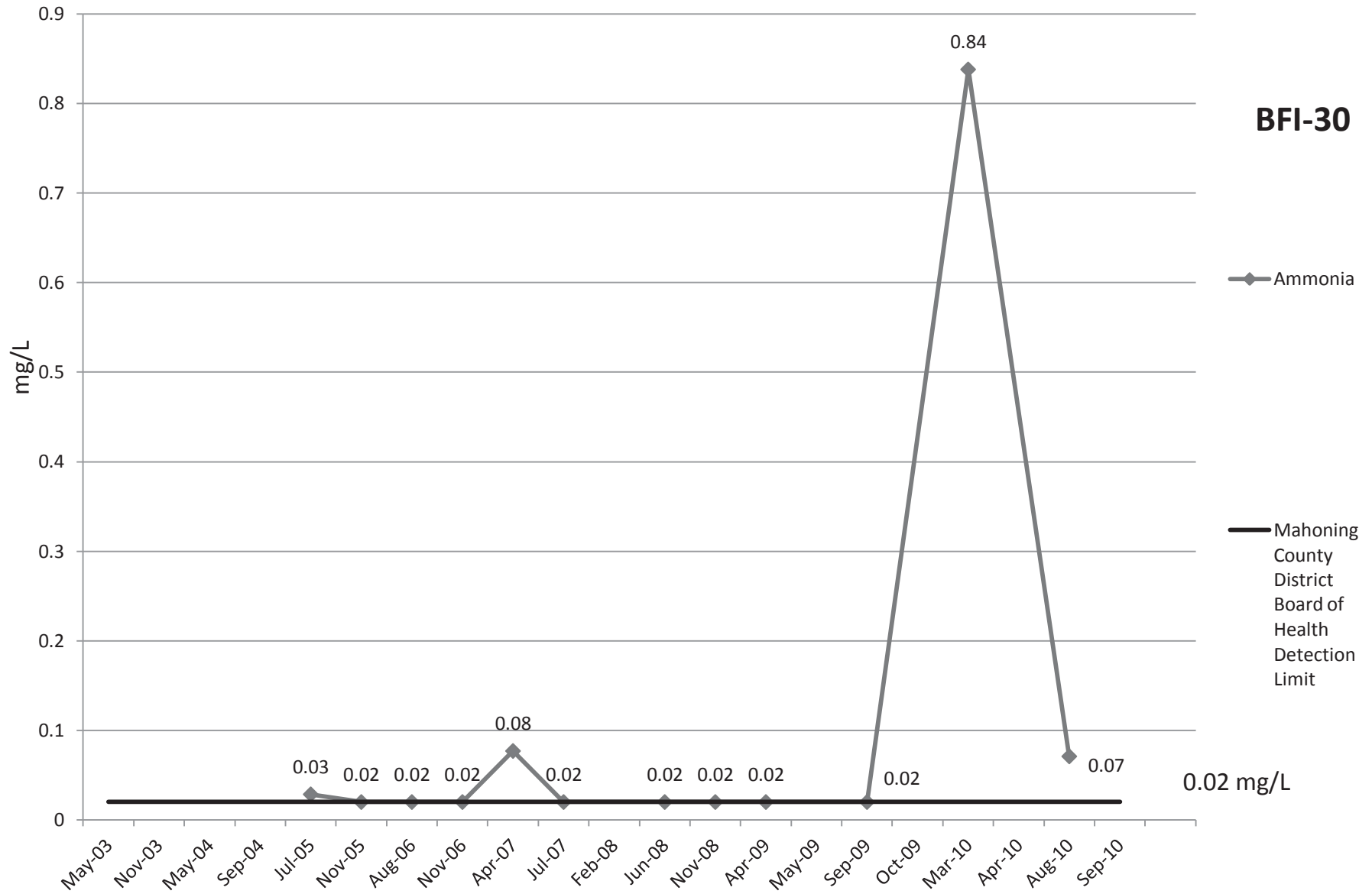
# Turbidity



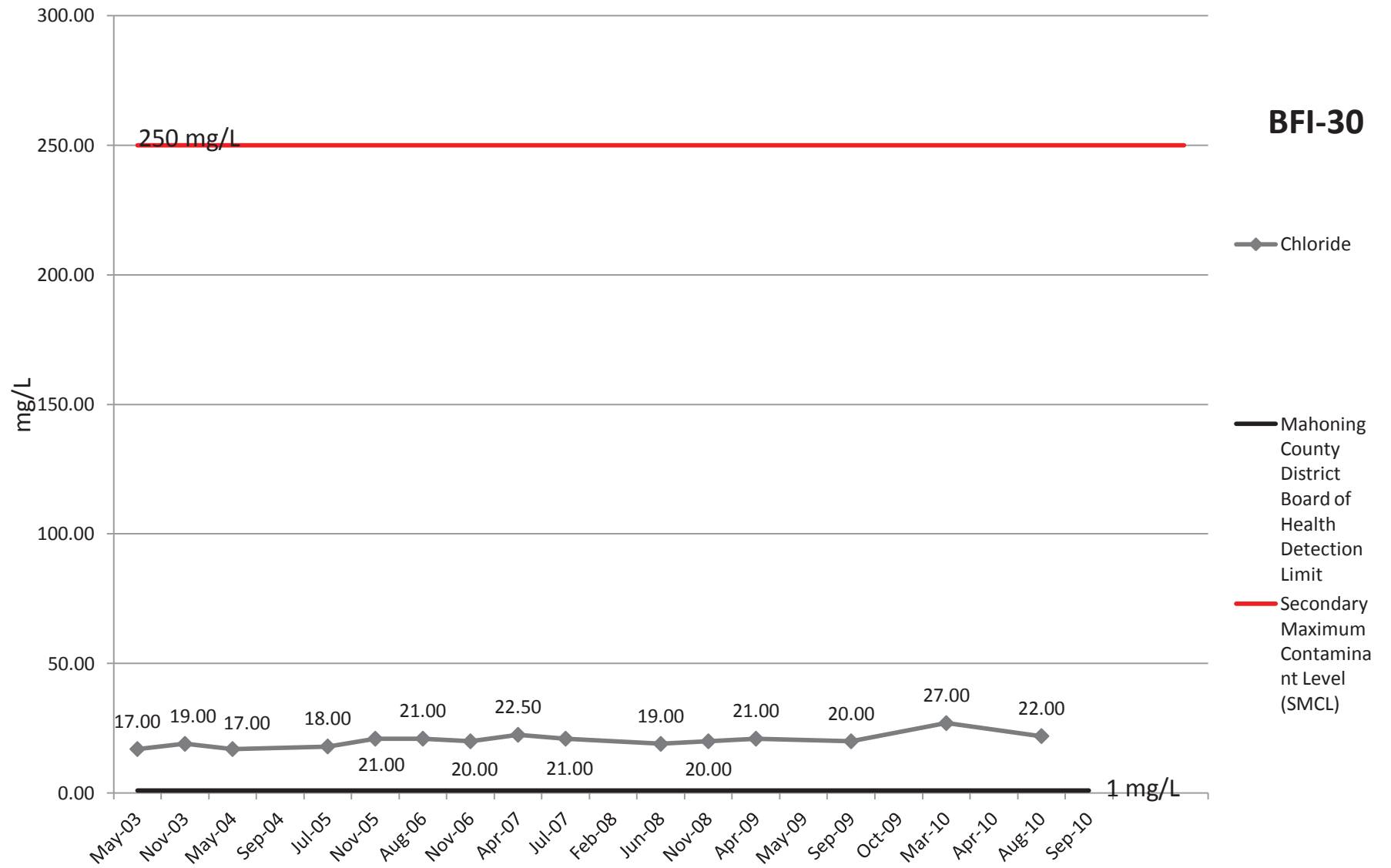
# Alkalinity



# Ammonia

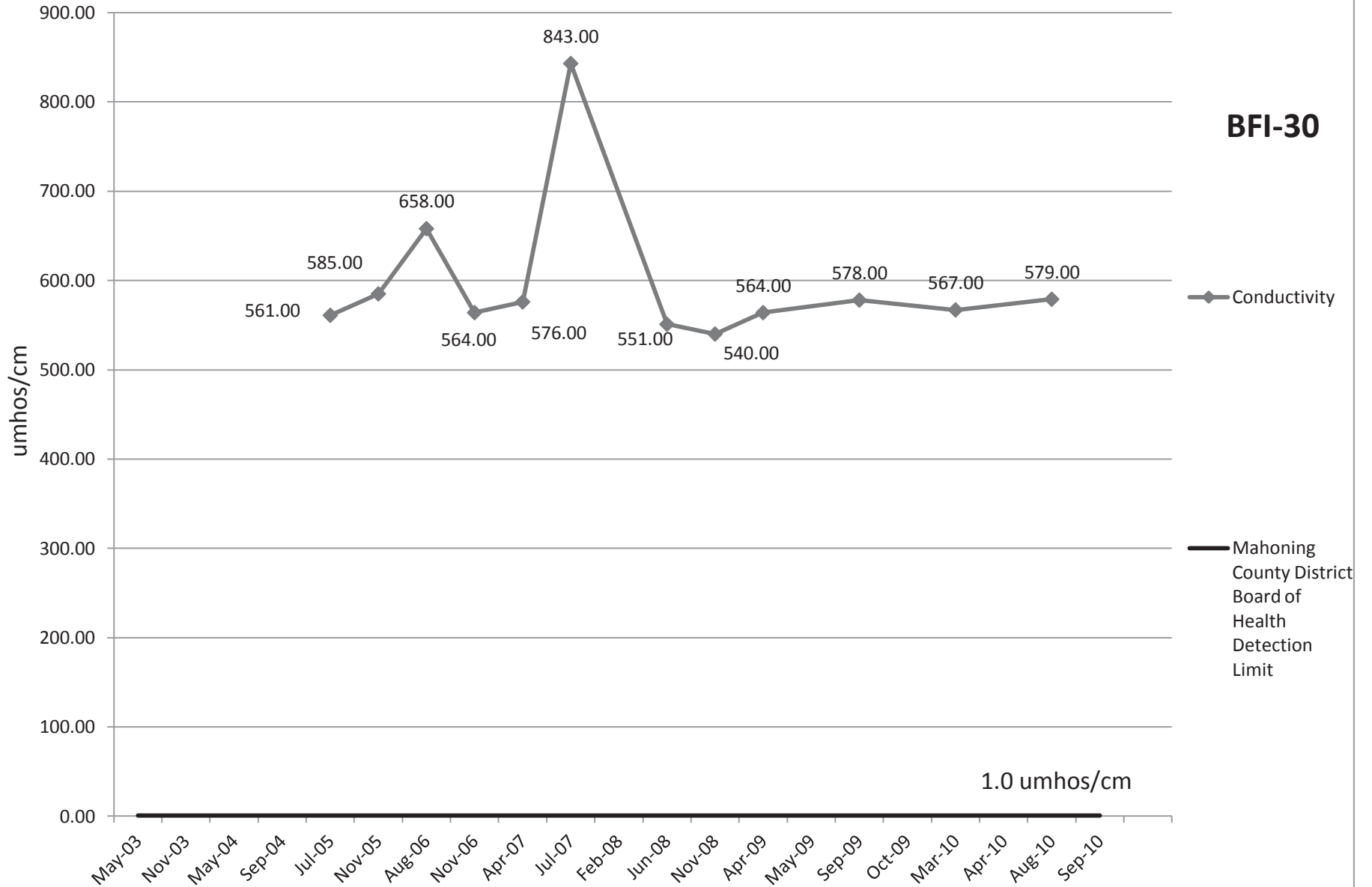


# Chloride

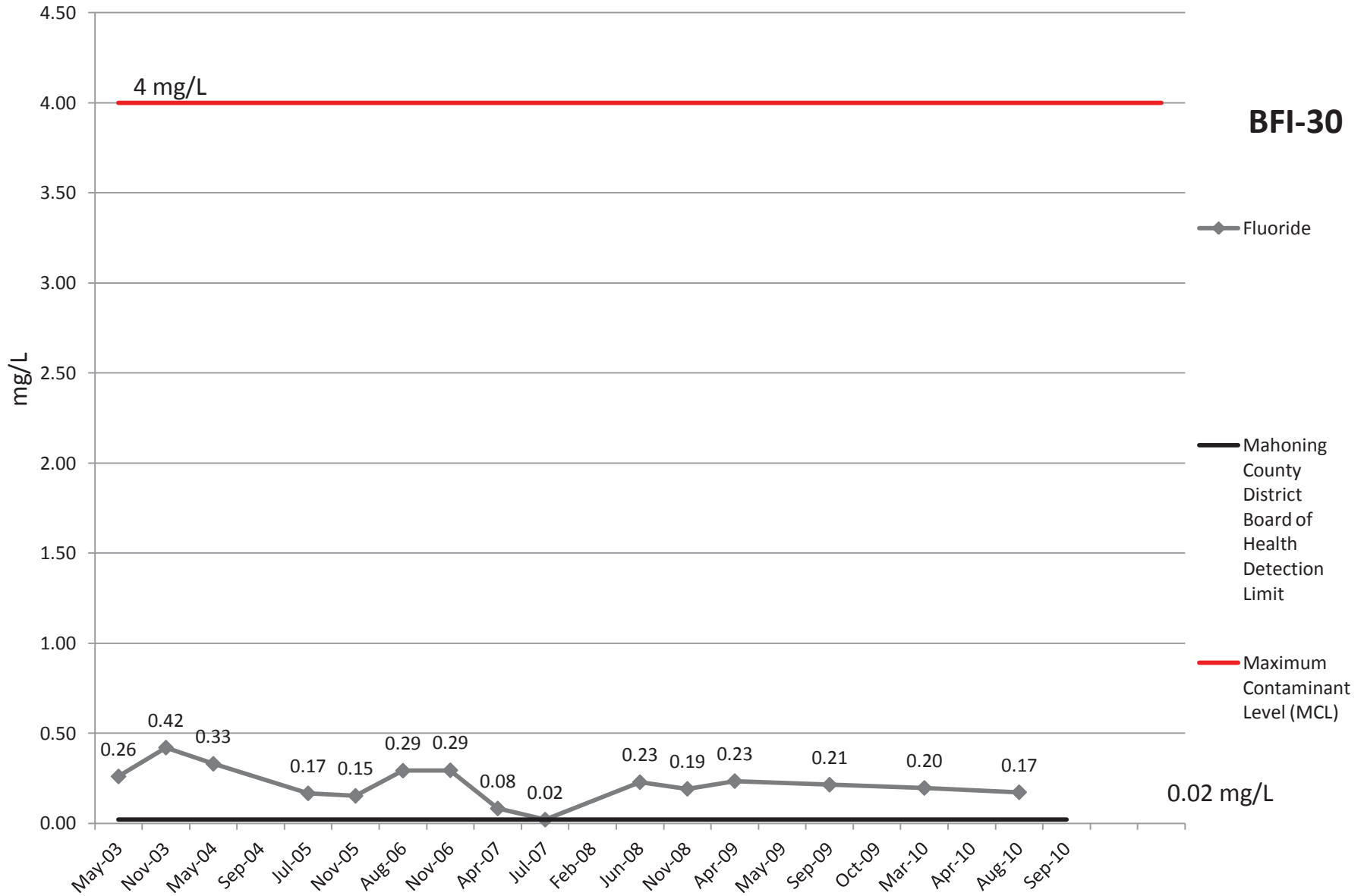


# Conductivity

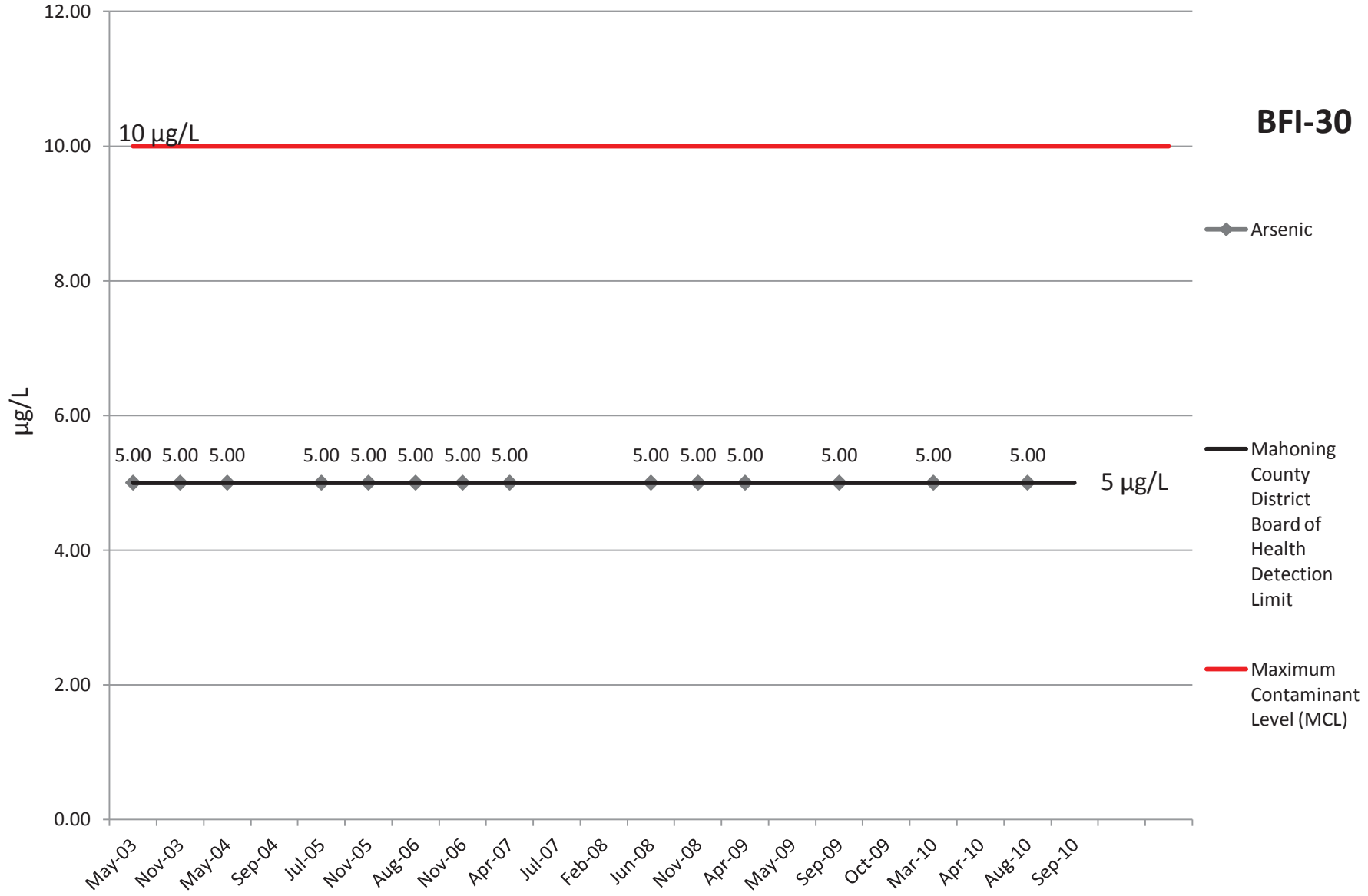
**BFI-30**



# Fluoride

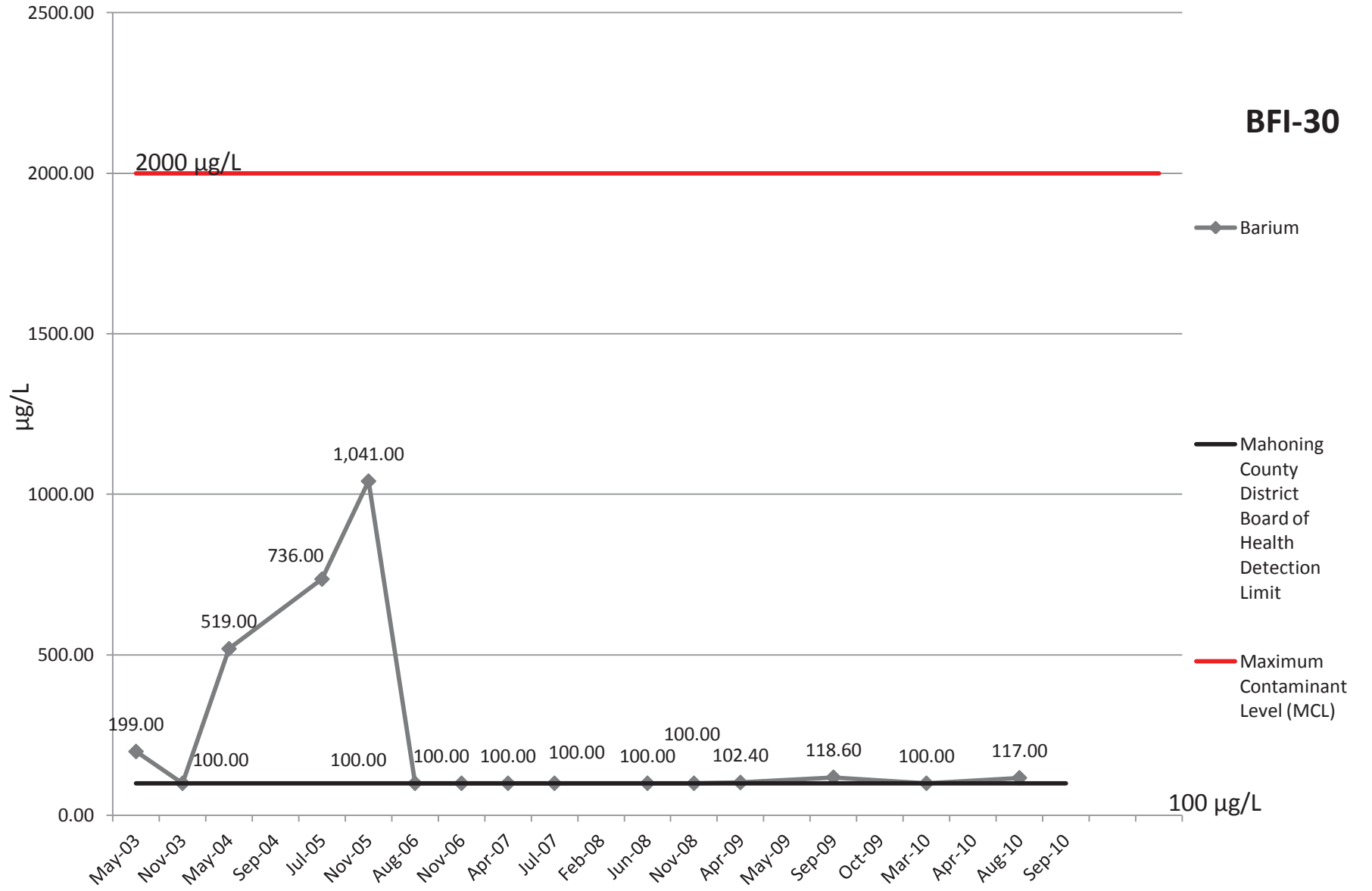


# Arsenic



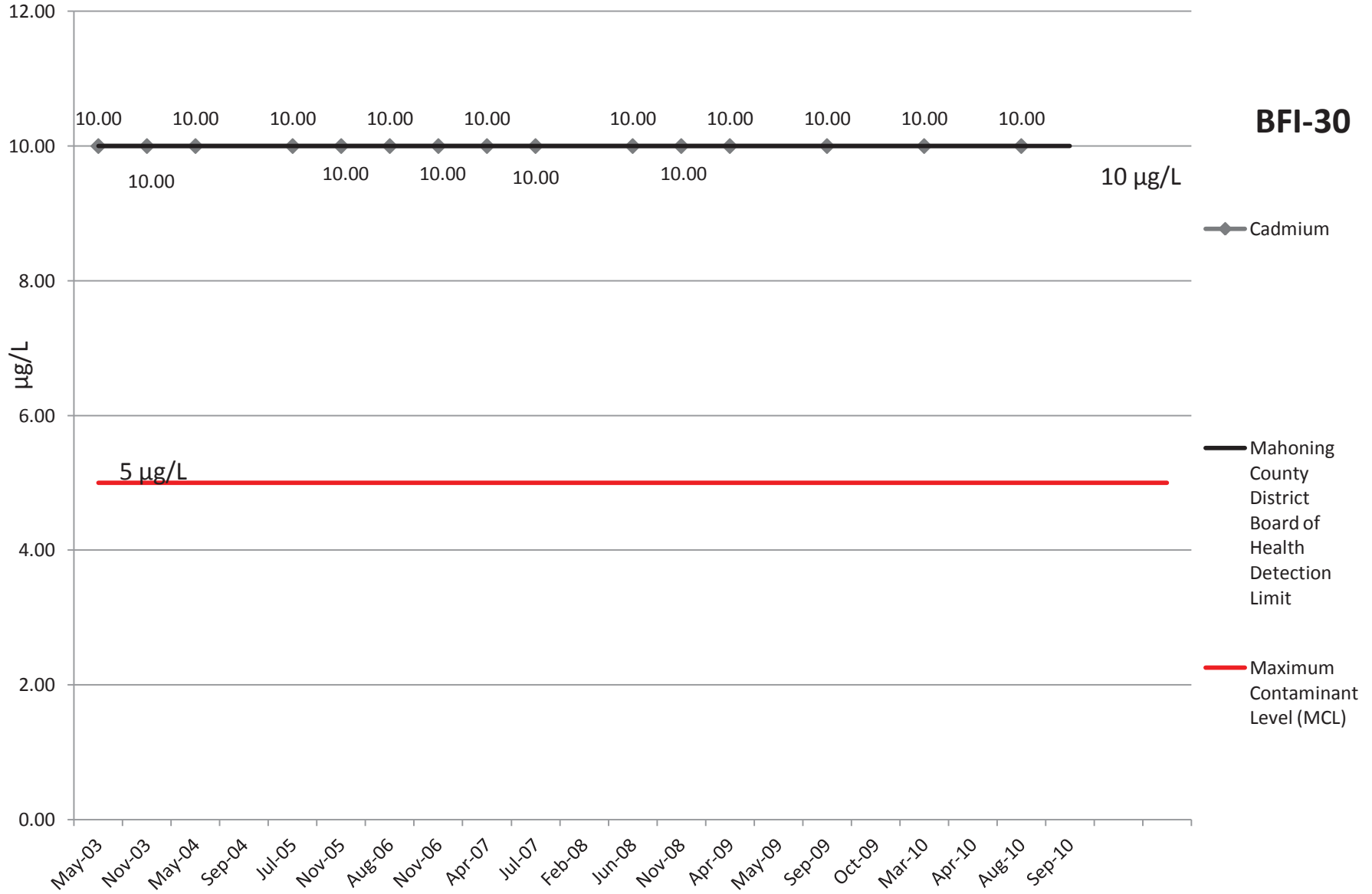


# Barium

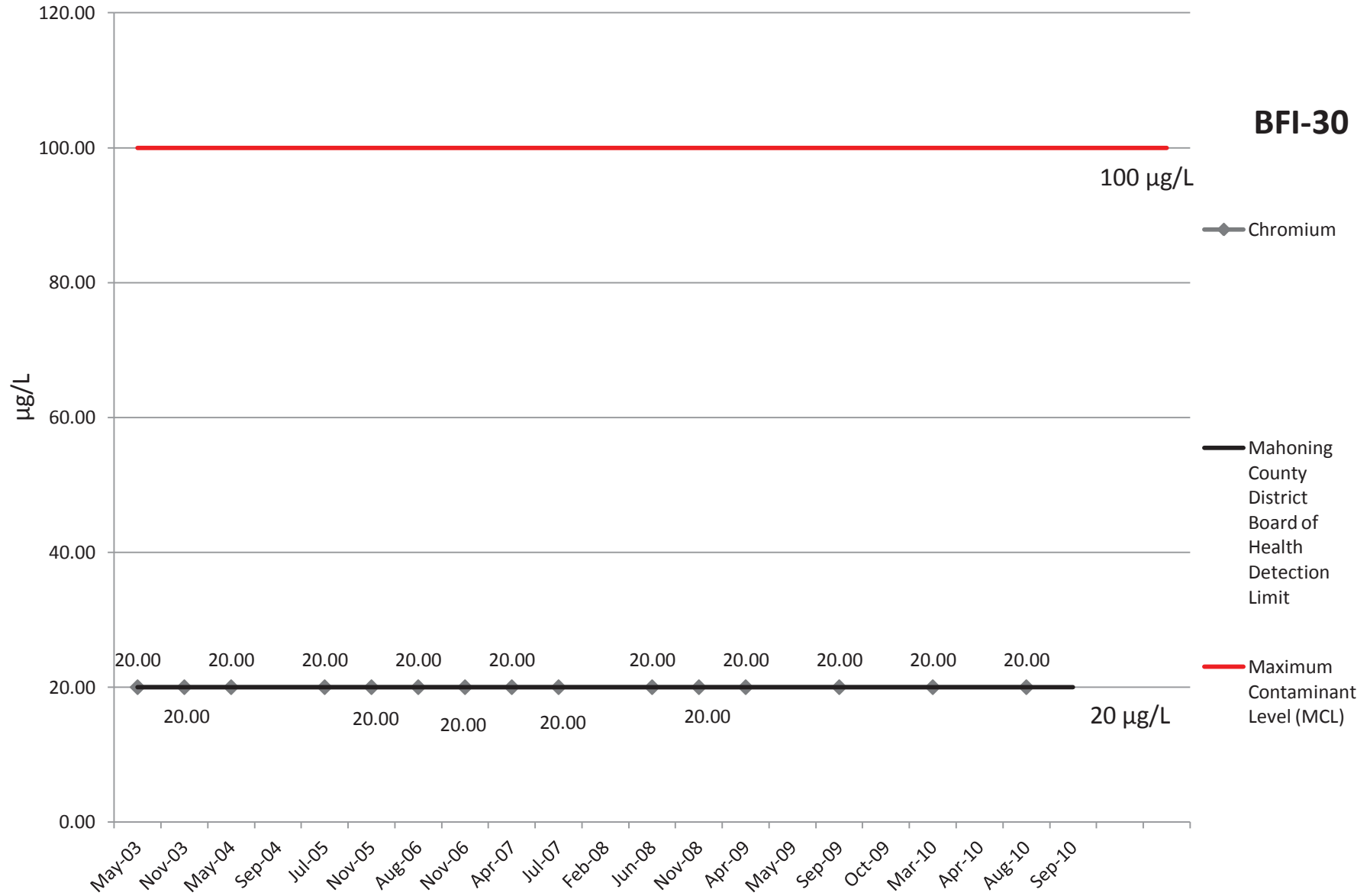


# Cadmium

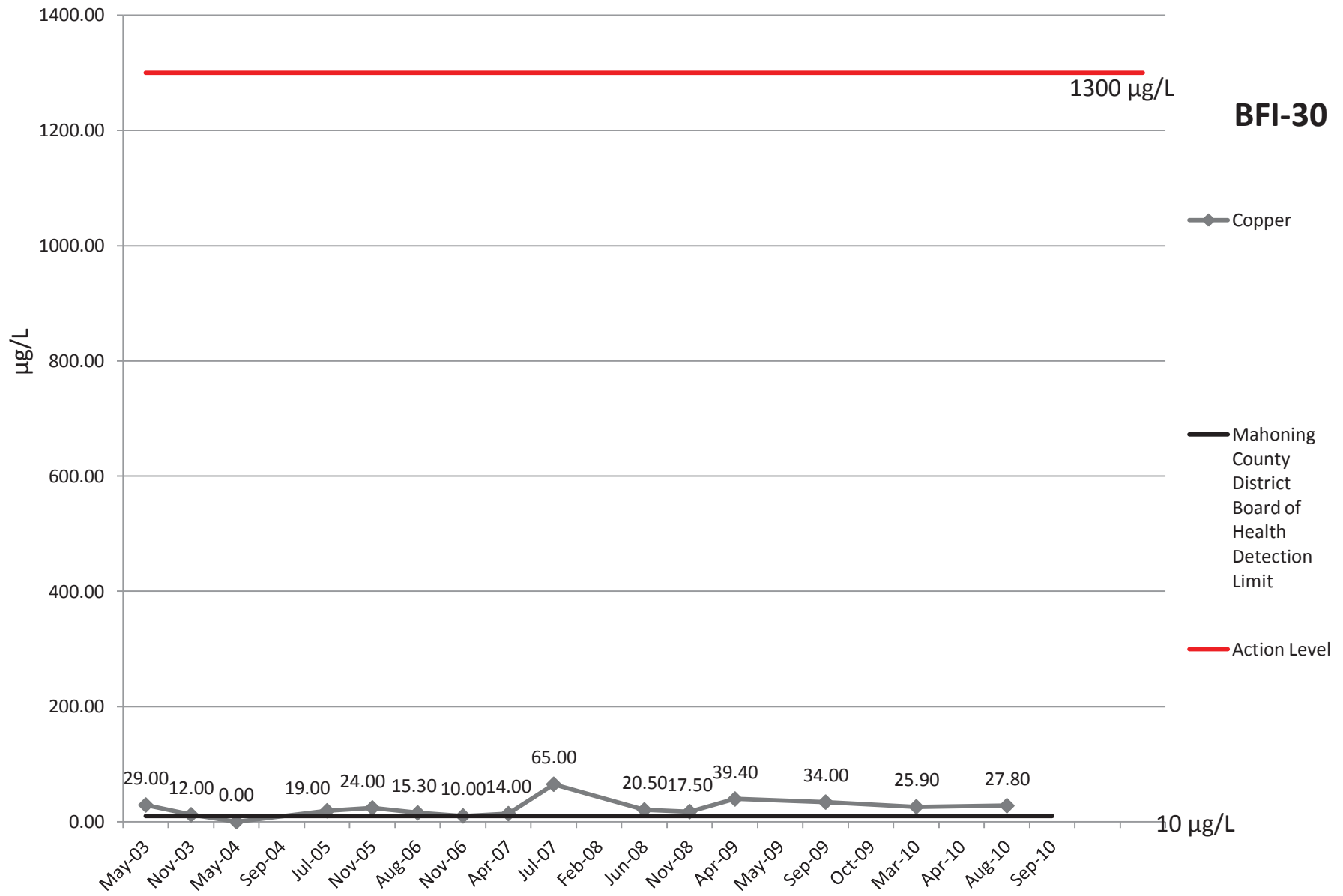
**BFI-30**



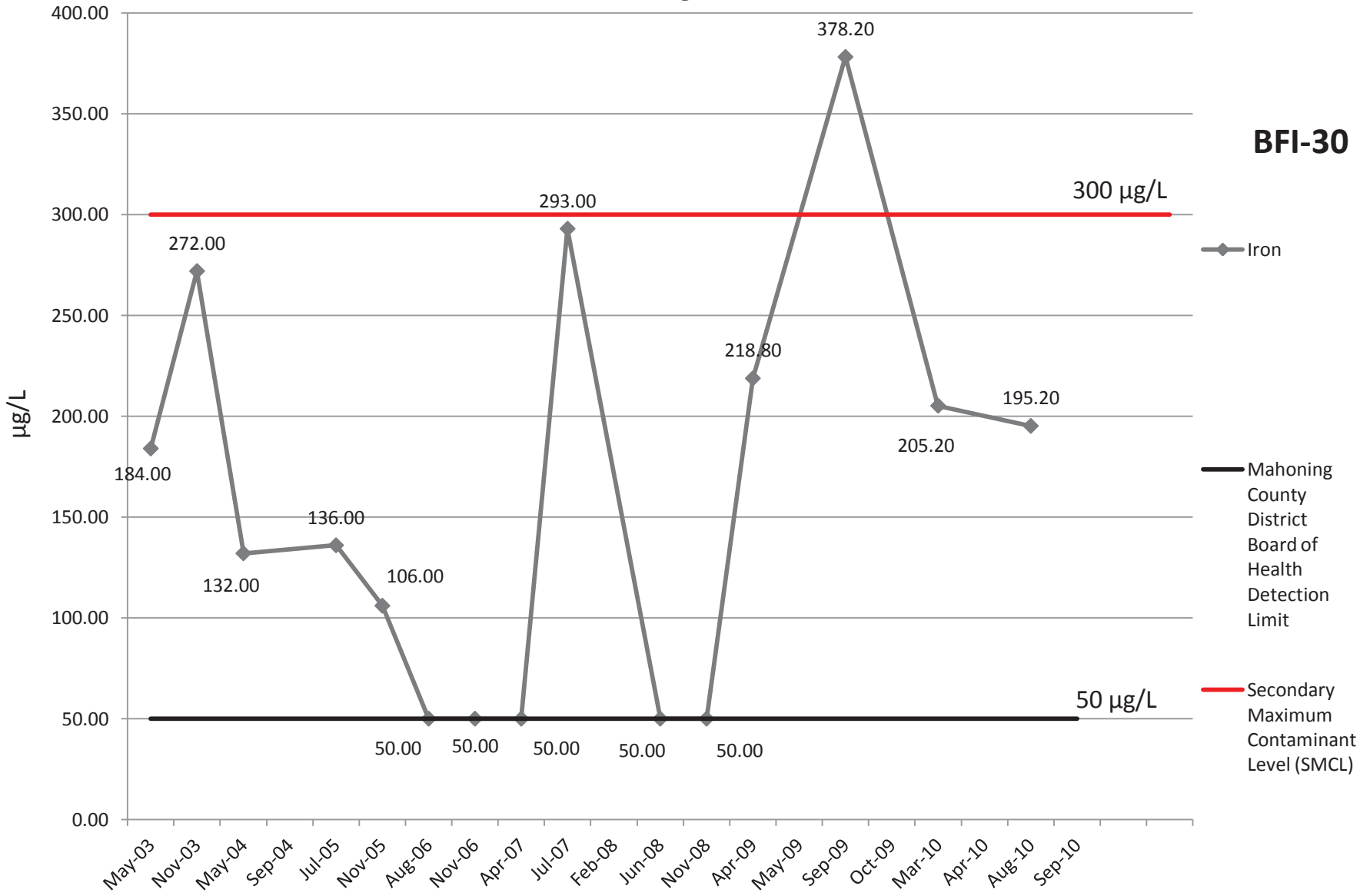
# Chromium



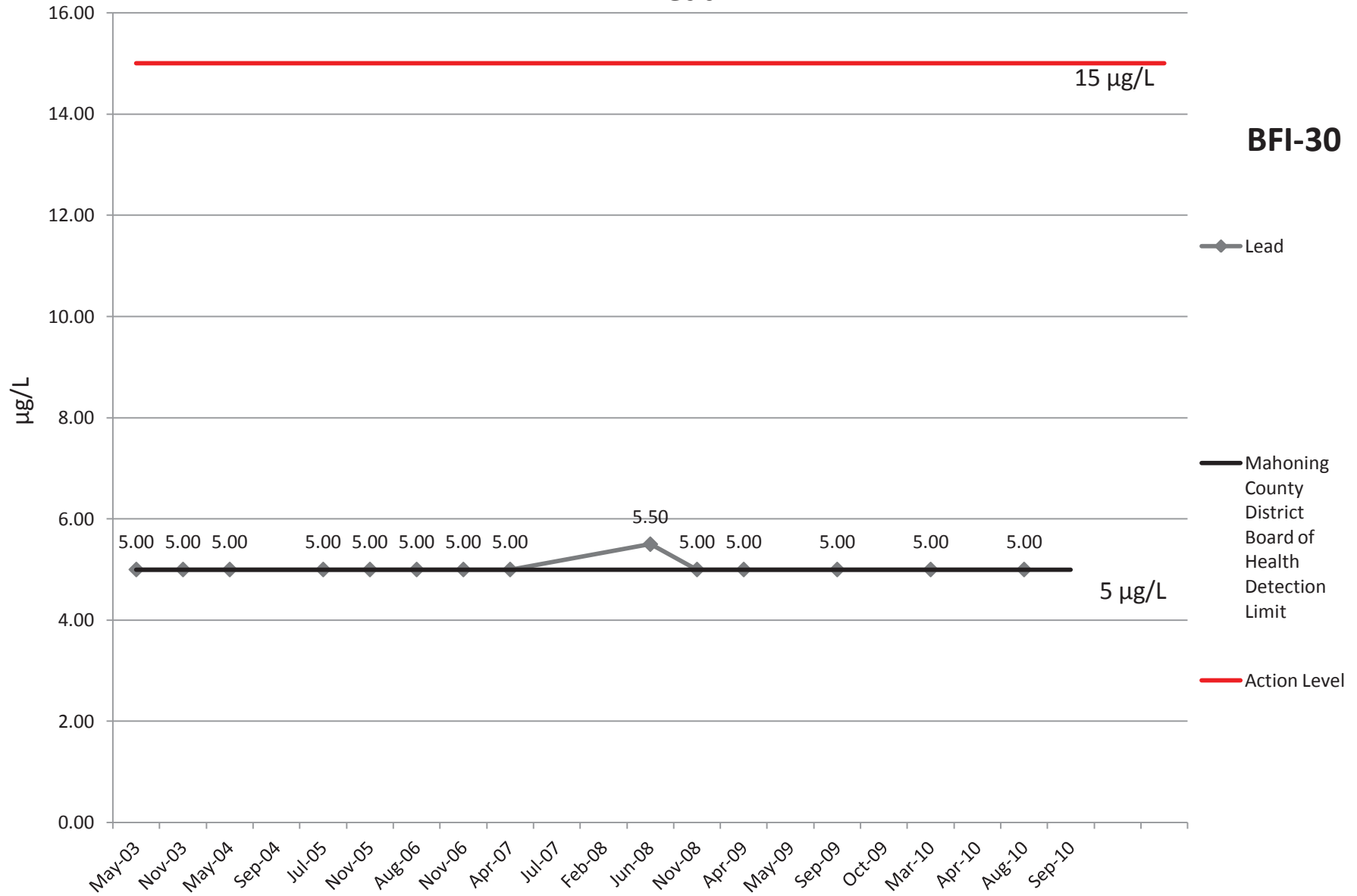
# Copper



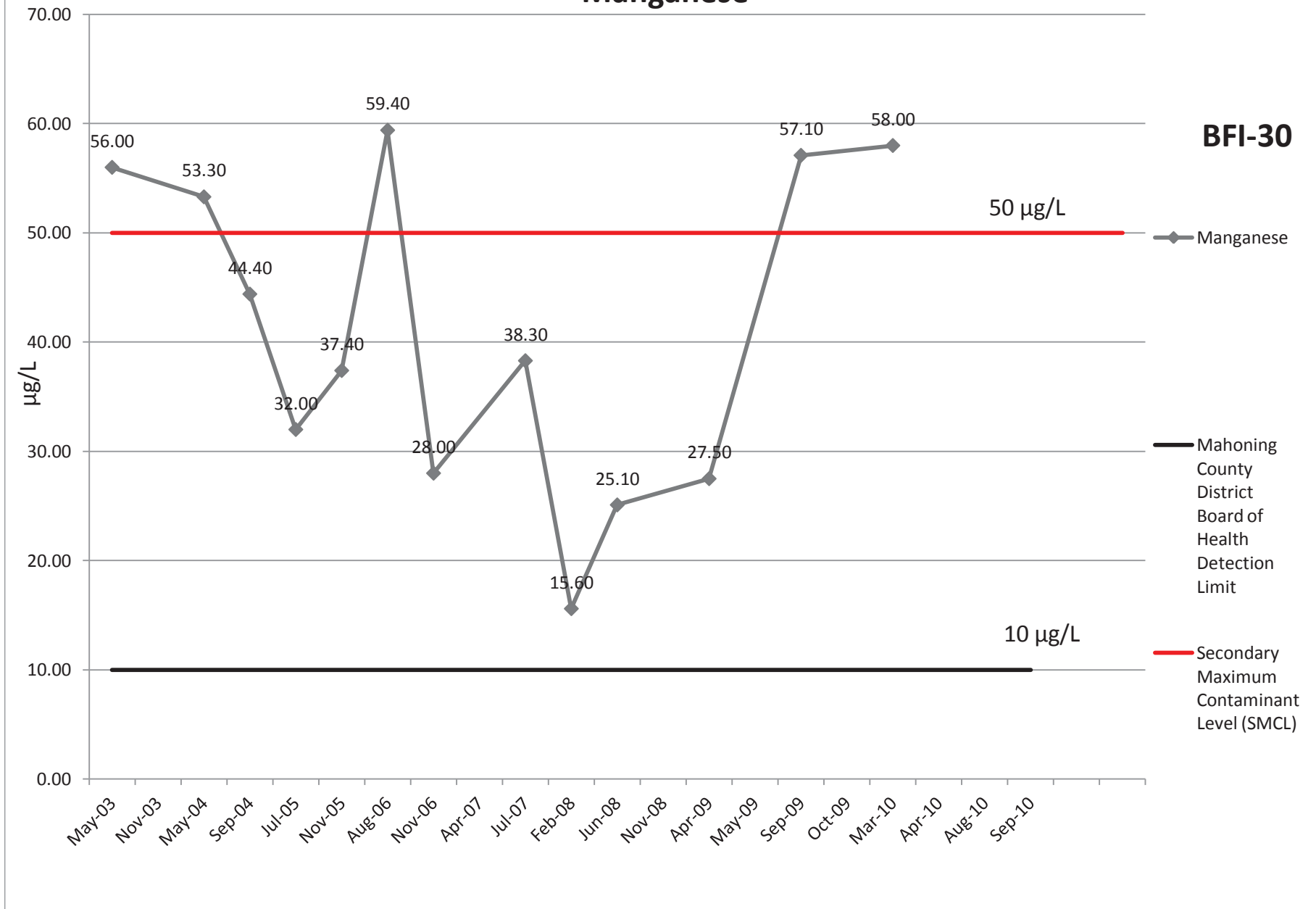
# Iron



# Lead

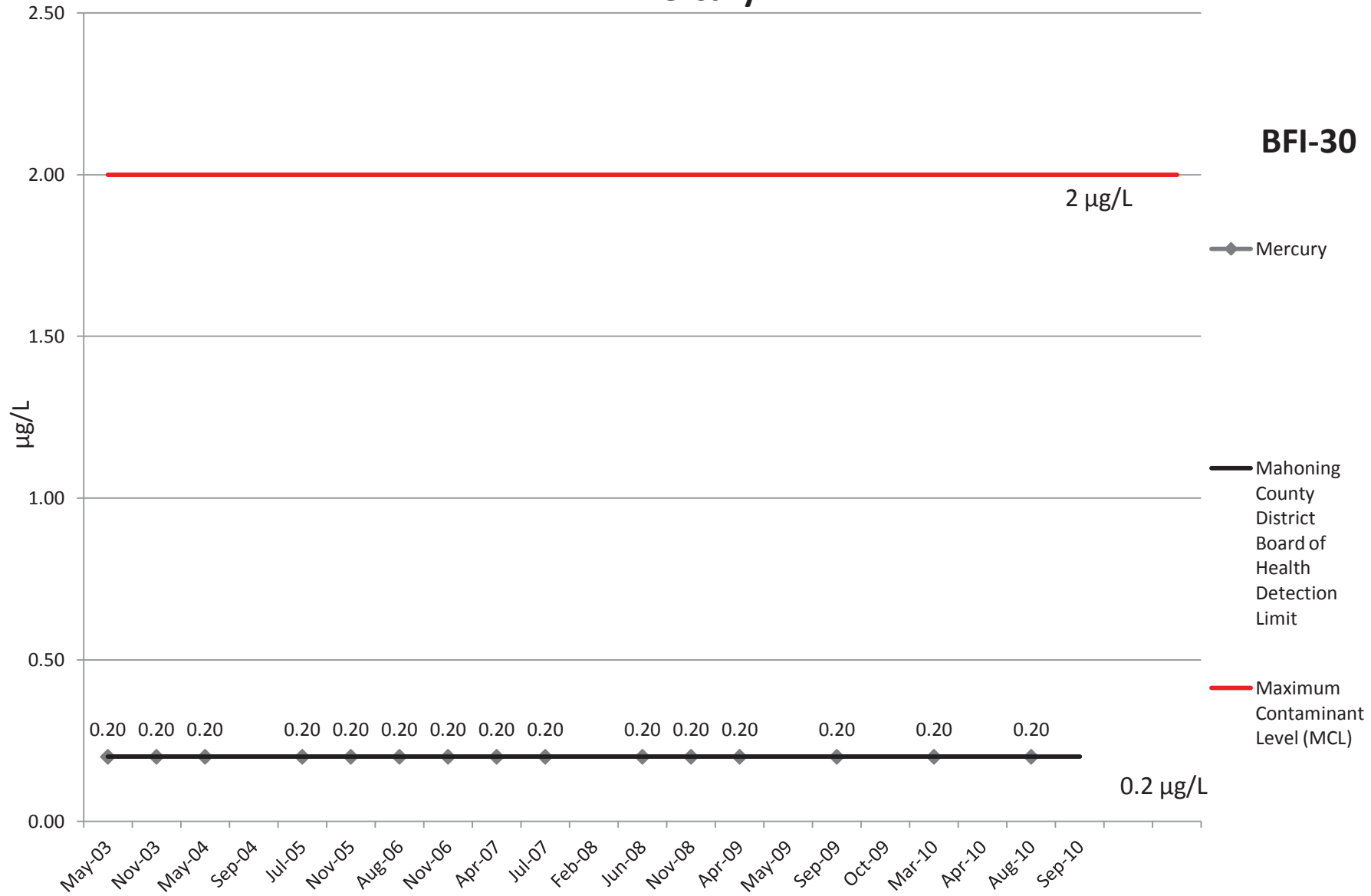


# Manganese



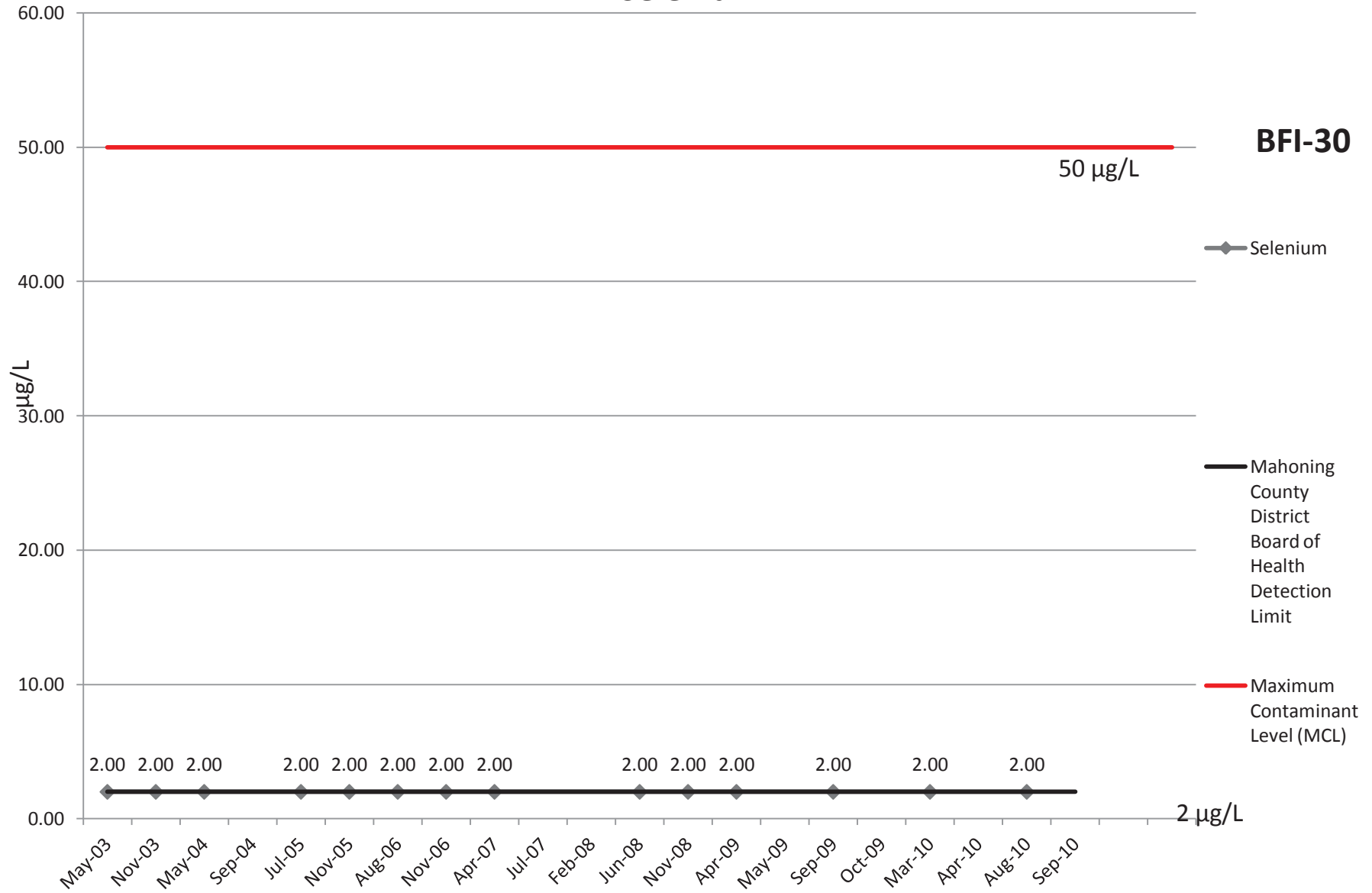
# Mercury

**BFI-30**

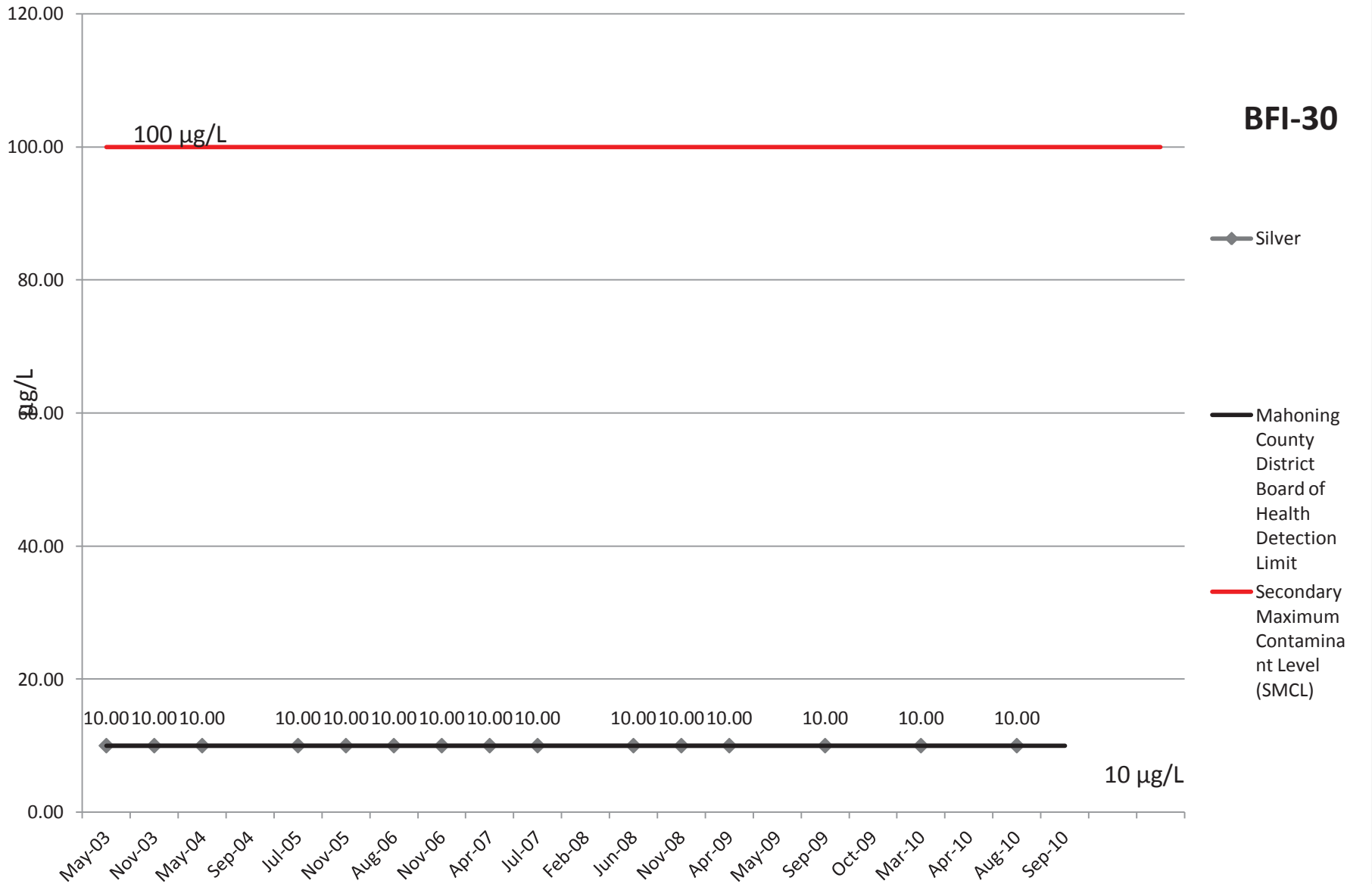




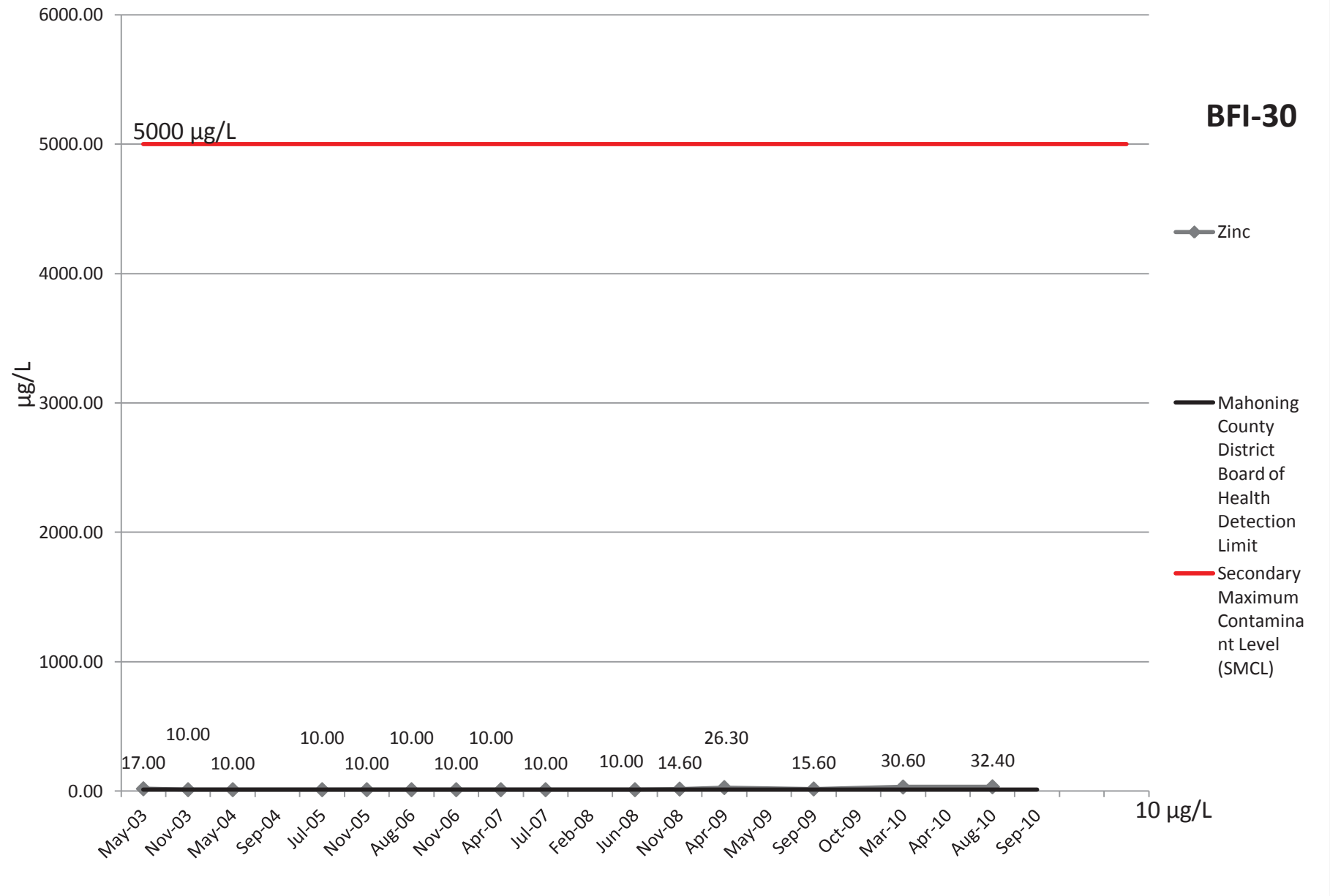
# Selenium



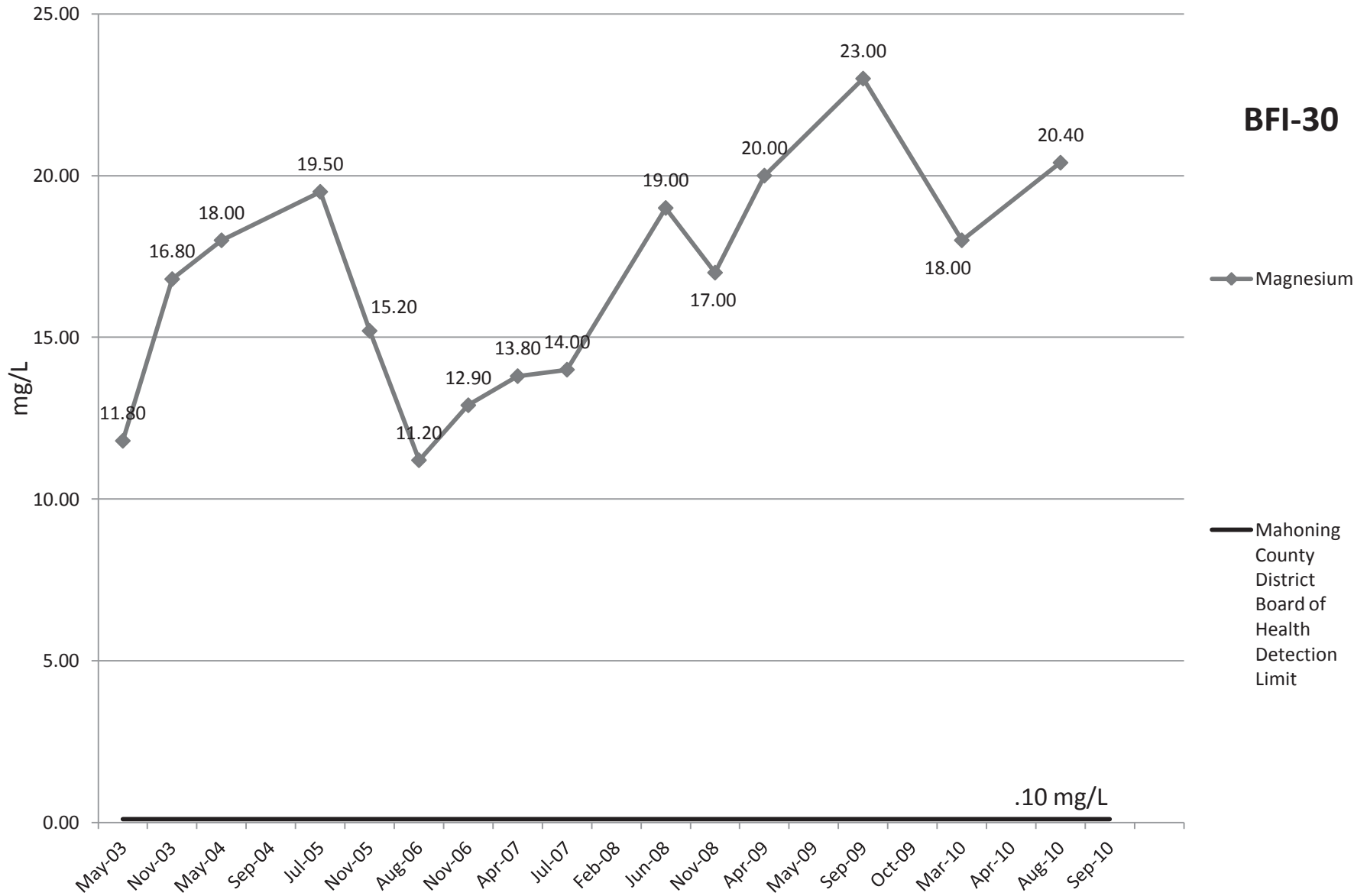
# Silver



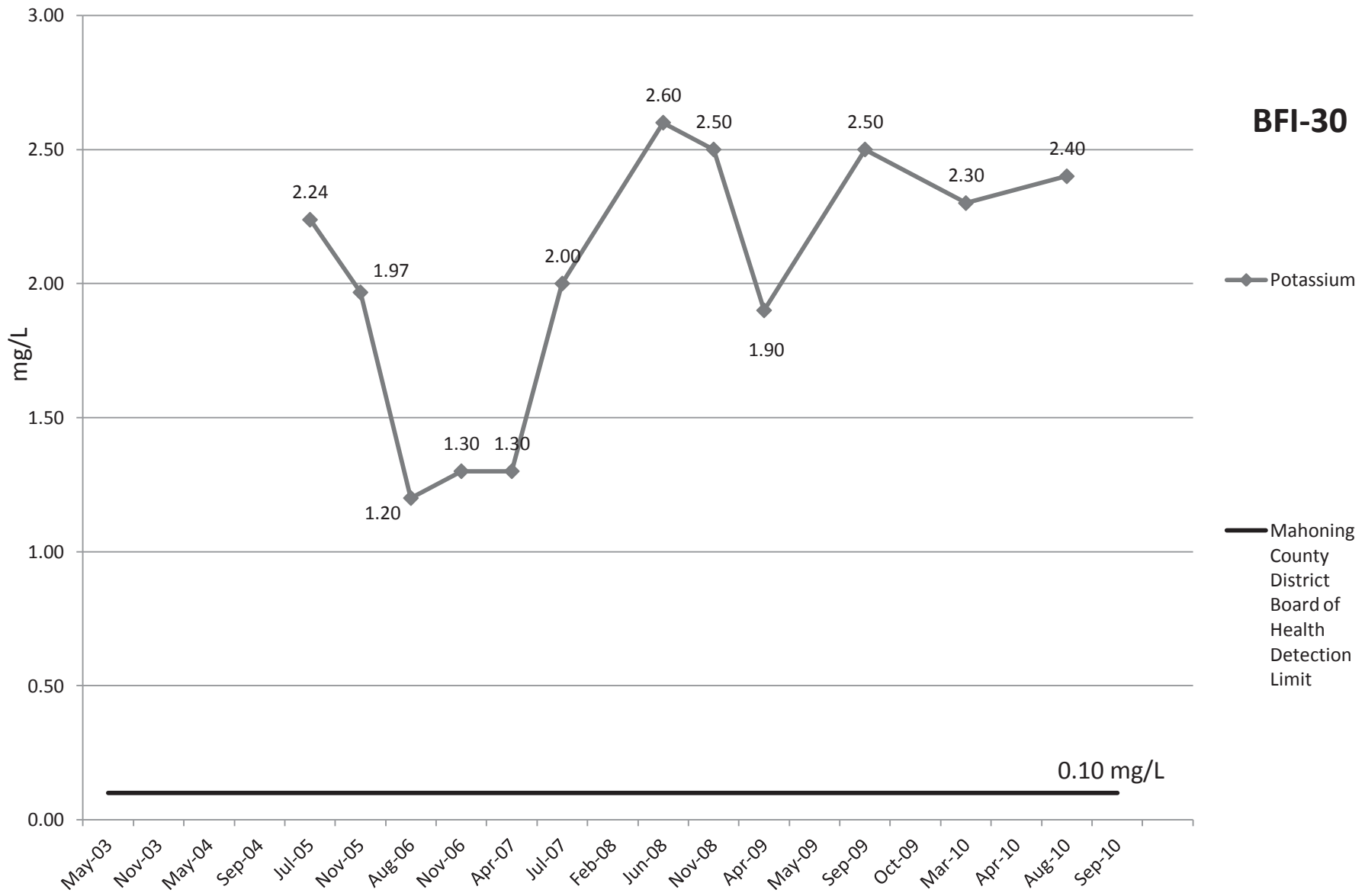
# Zinc



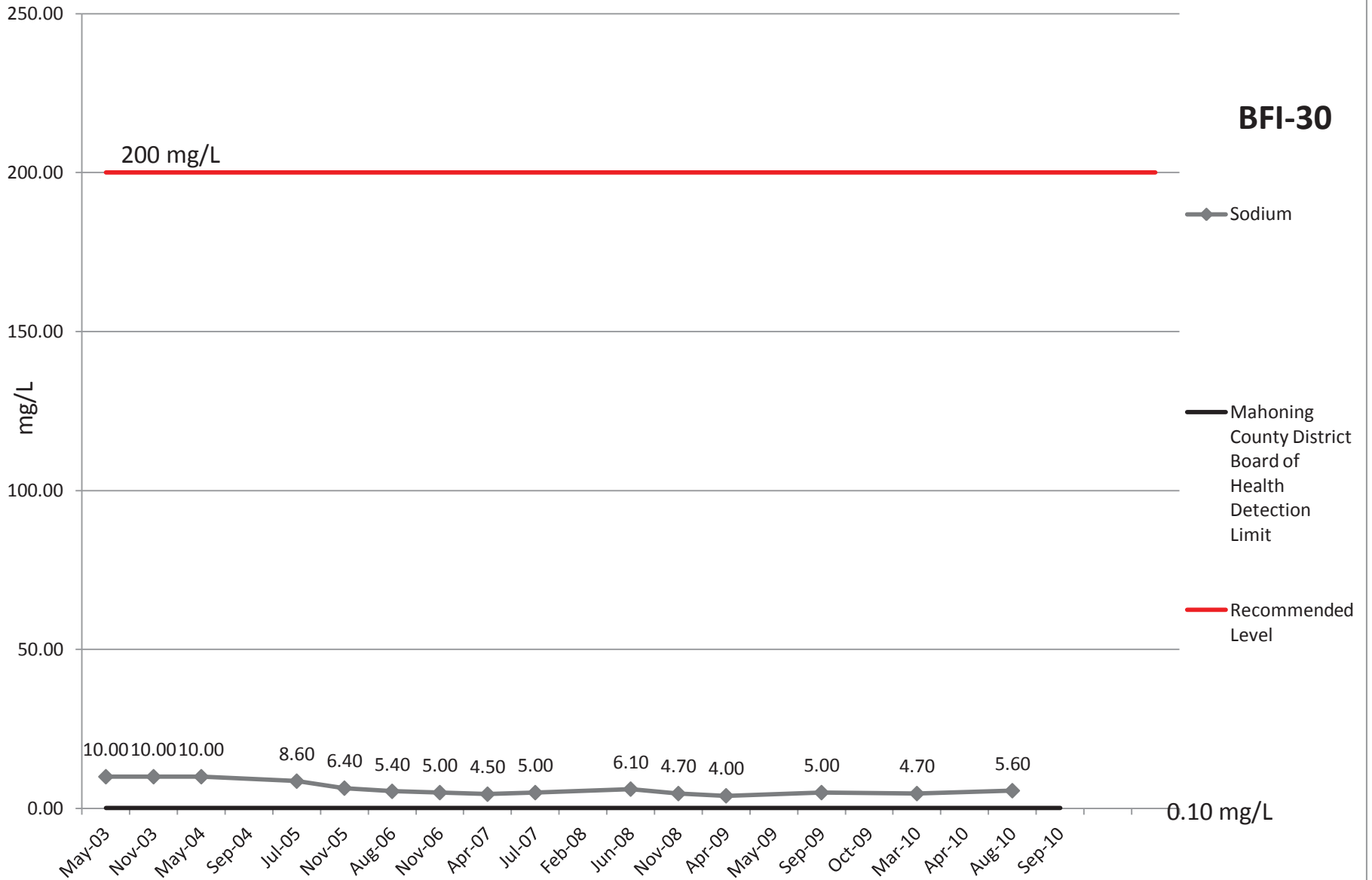
# Magnesium



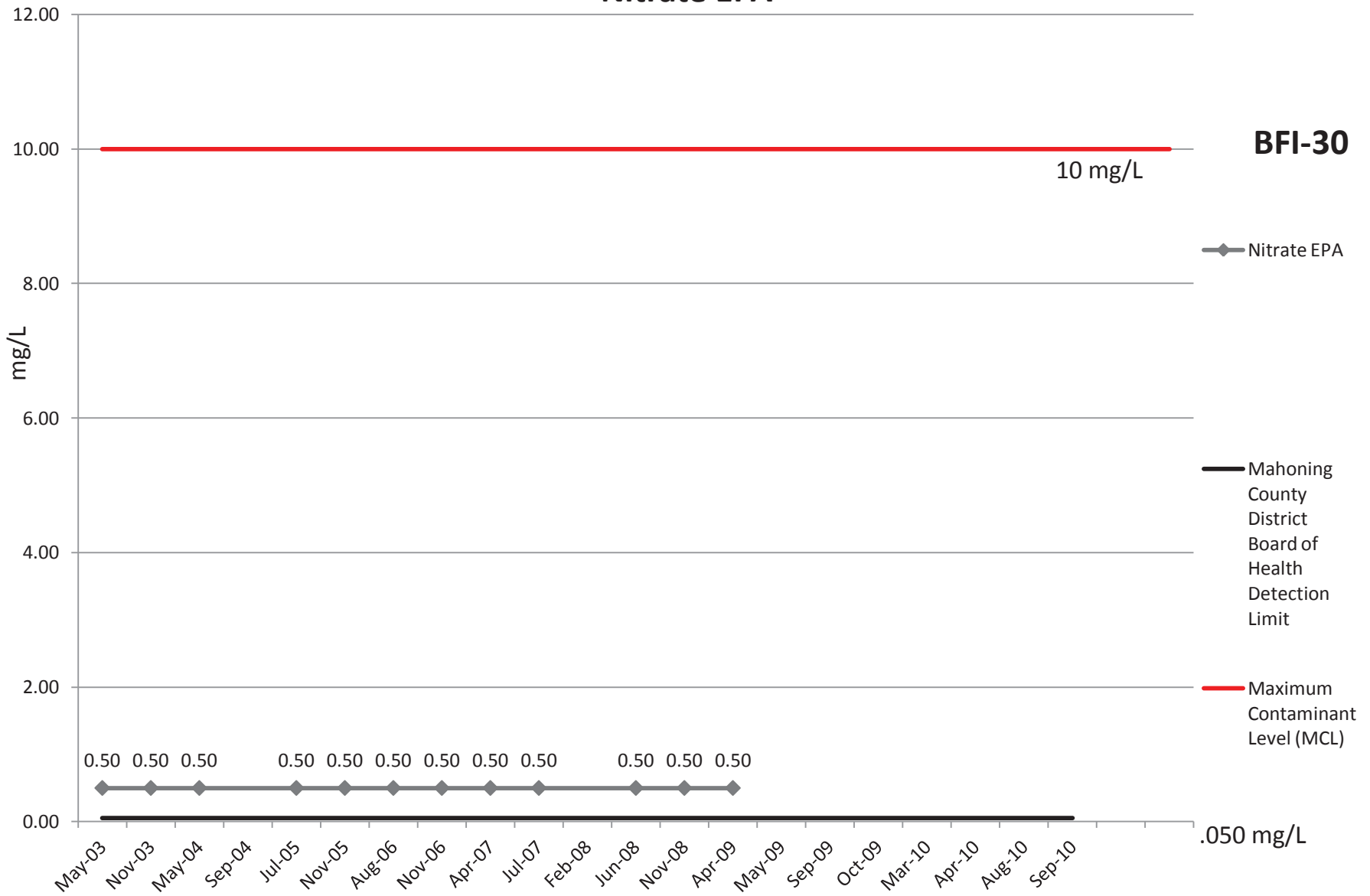
# Potassium



# Sodium



# Nitrate EPA



**BFI-30**

◆ Nitrate EPA

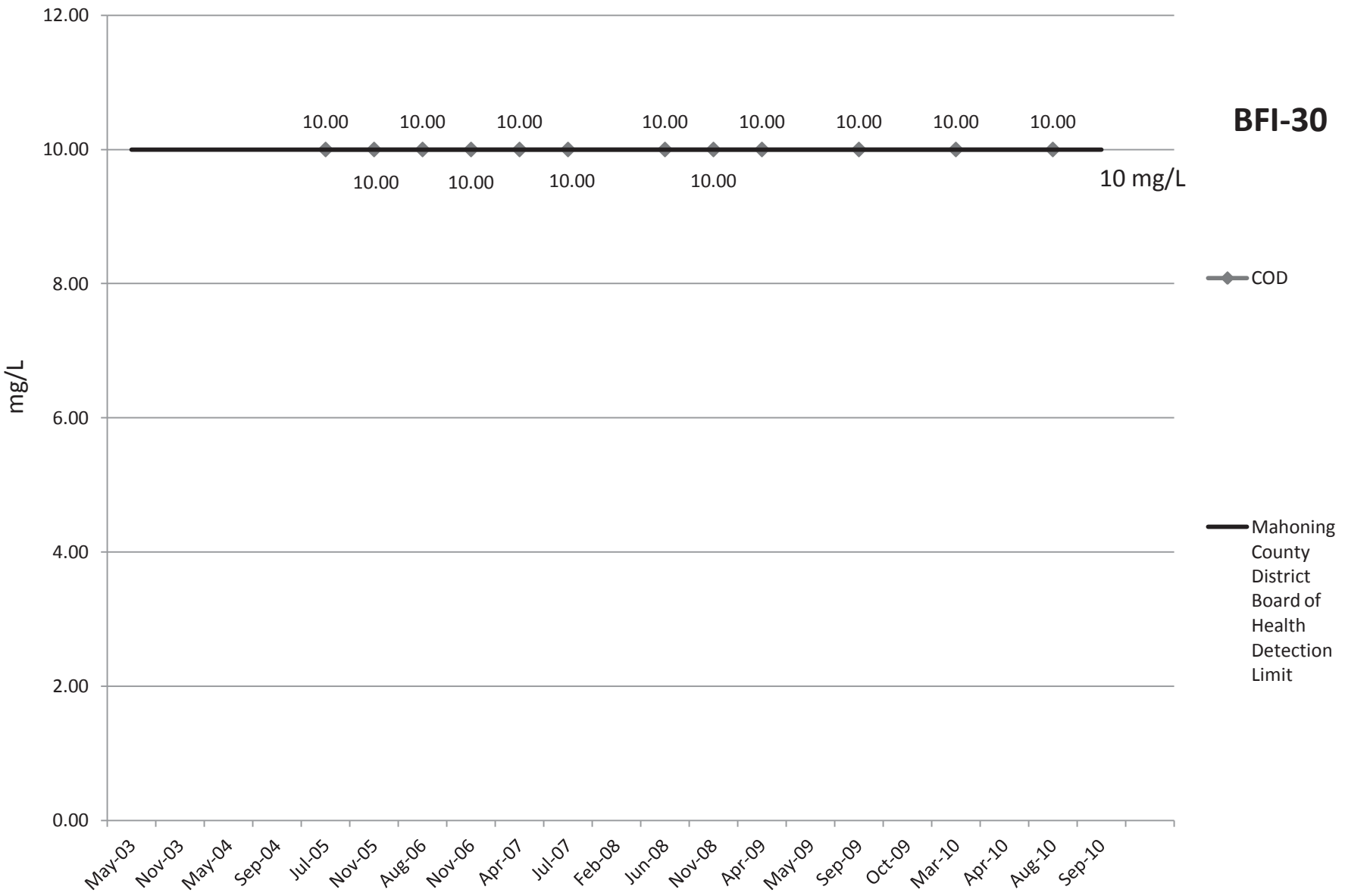
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

0.050 mg/L

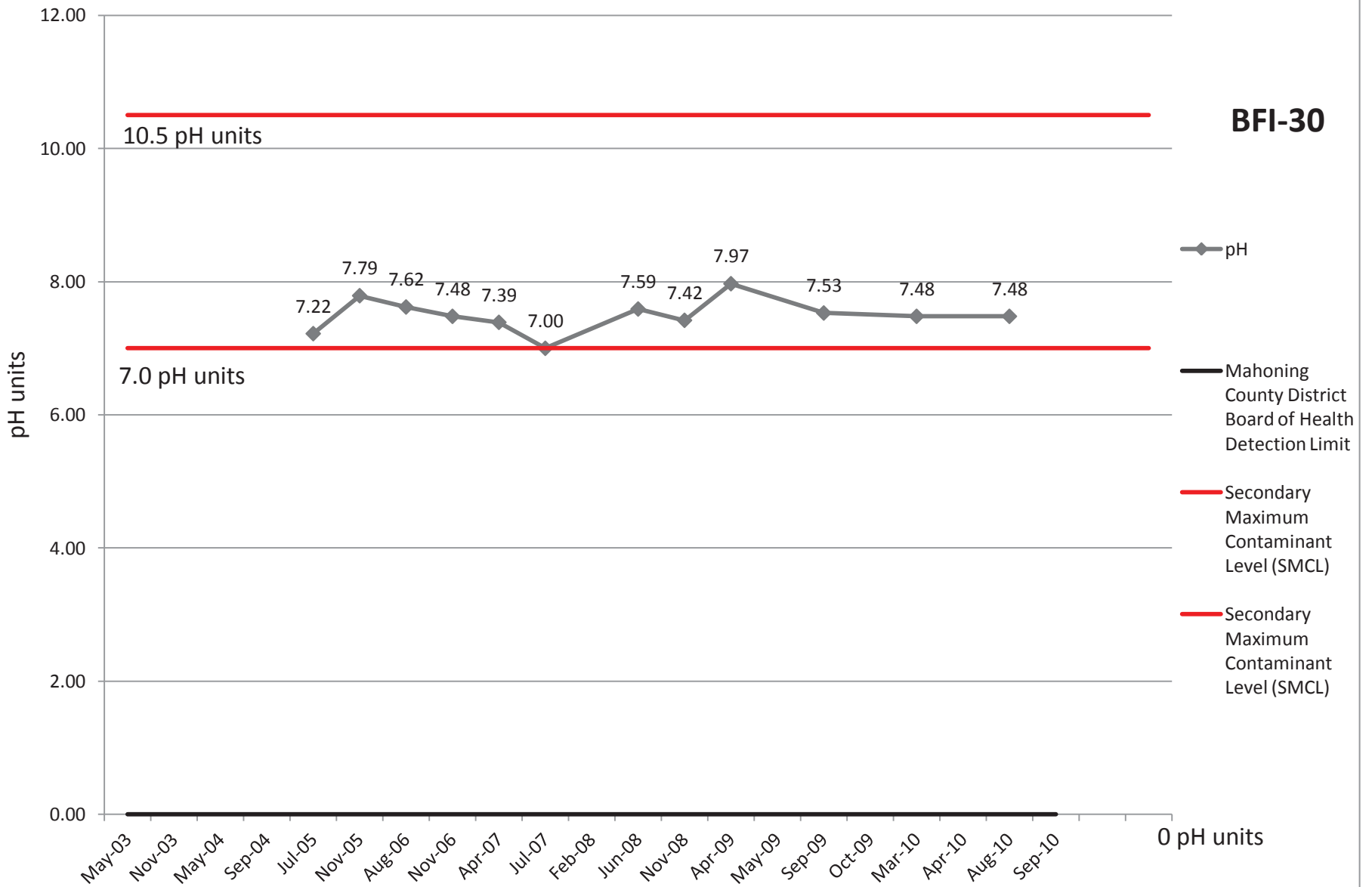
# COD

**BFI-30**

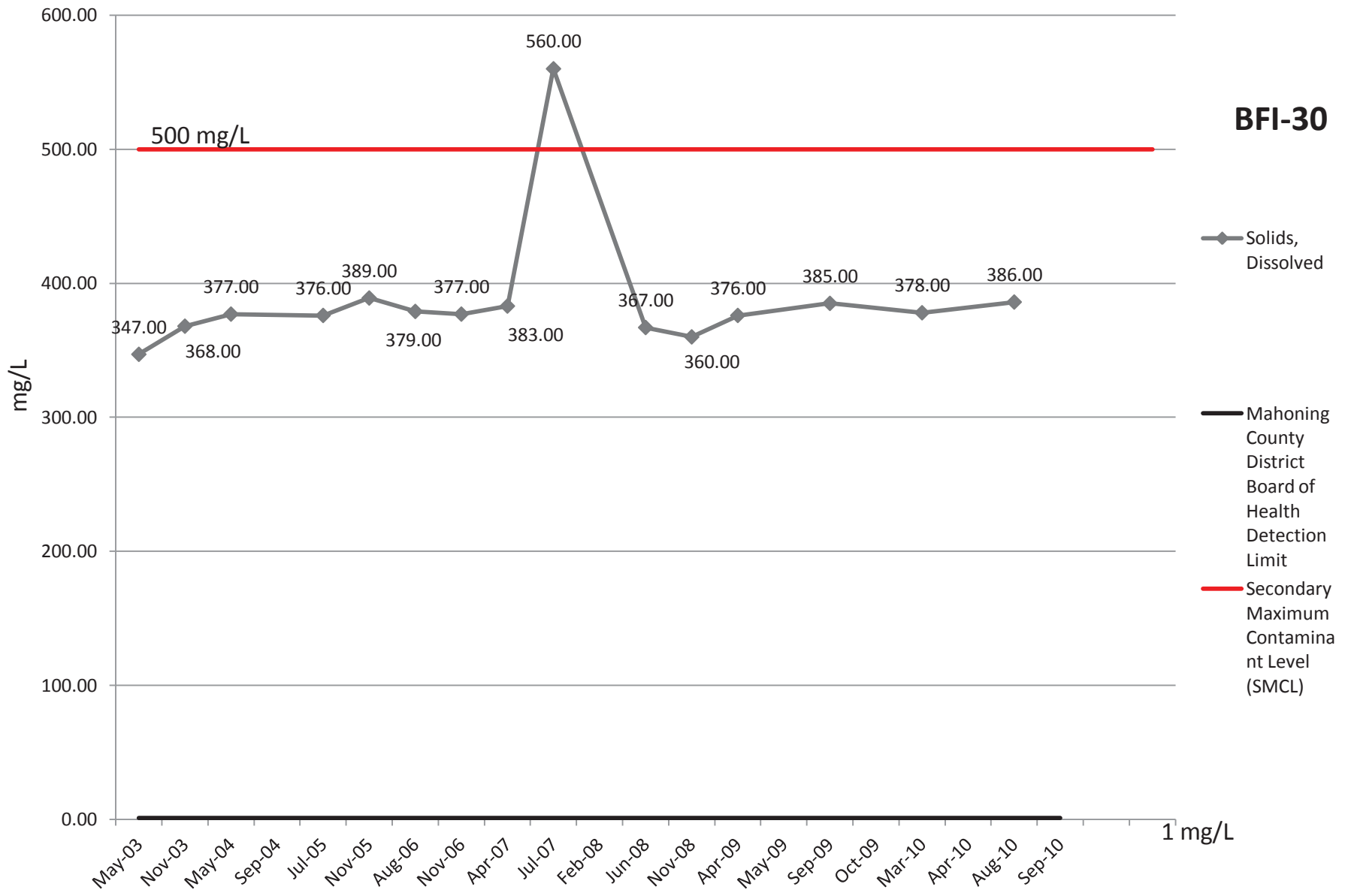




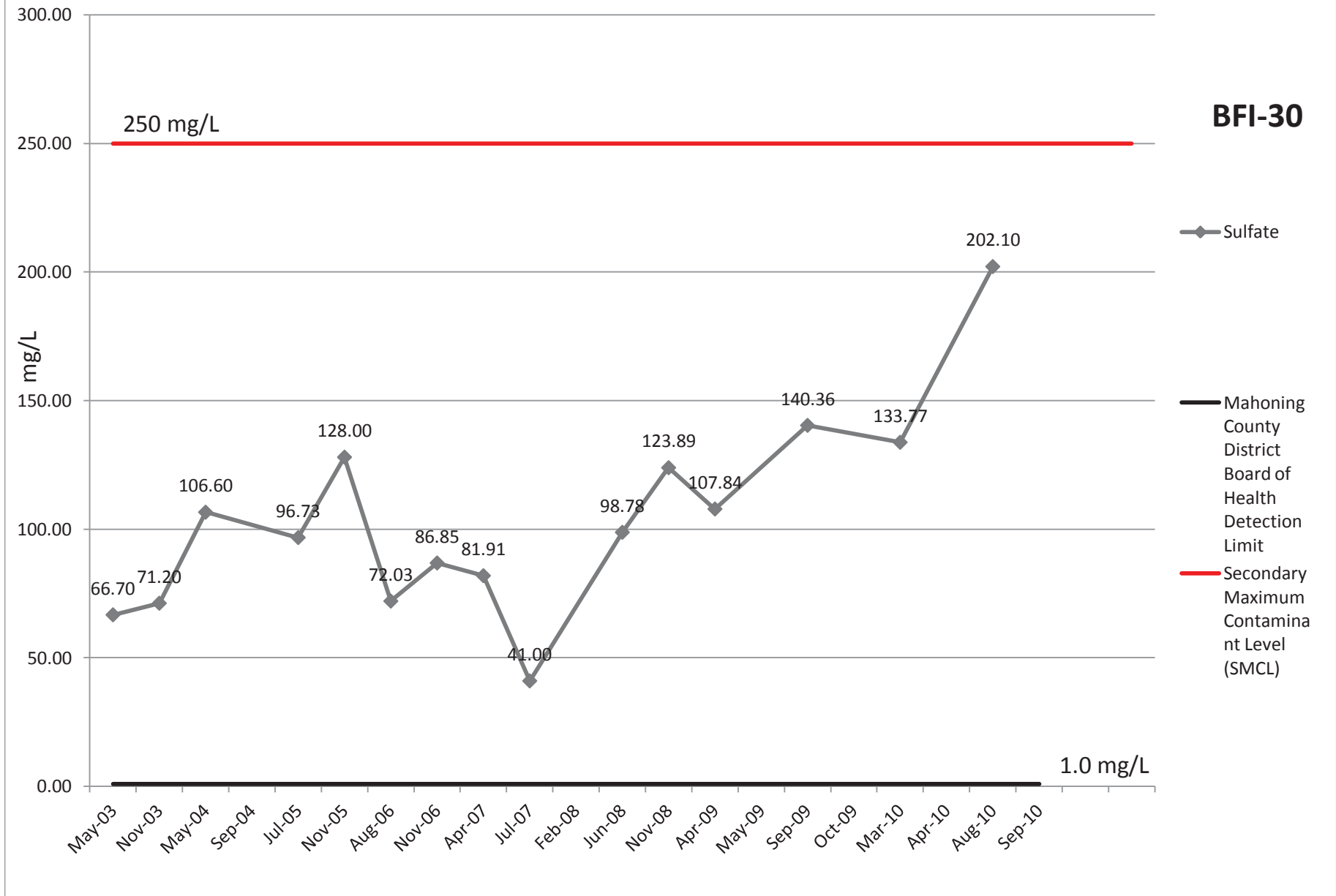
# pH



# Solids, Dissolved



# Sulfate



# Bacteria

## BFI-30

Positive/Negative

positive (1)

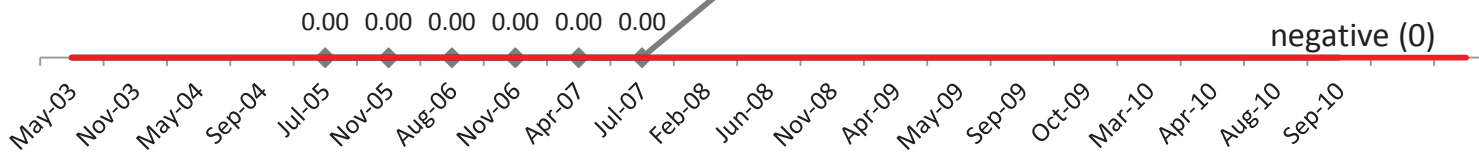
1.00

negative (0)

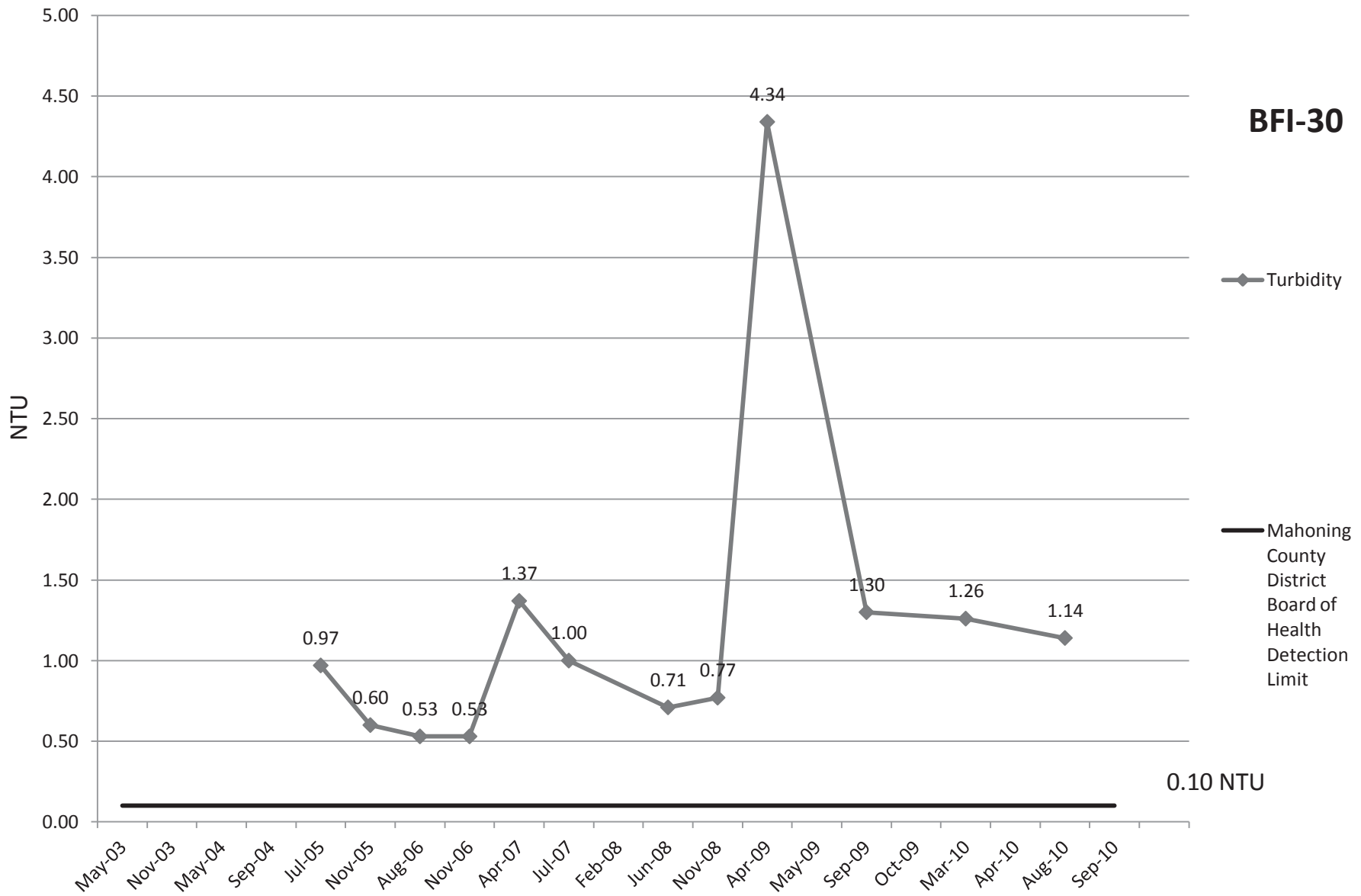
◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

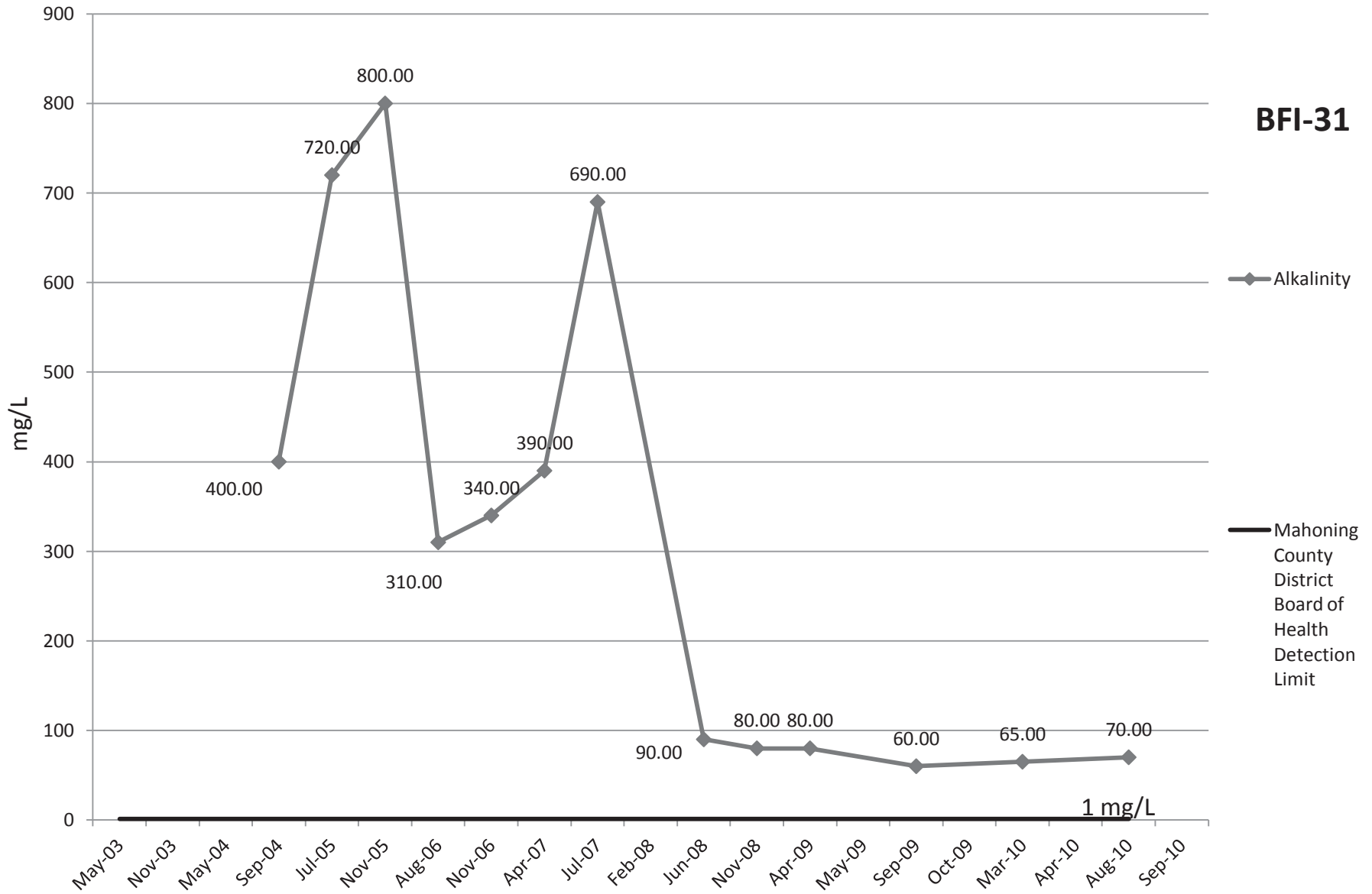
— Maximum  
Contaminant  
Level (MCL)



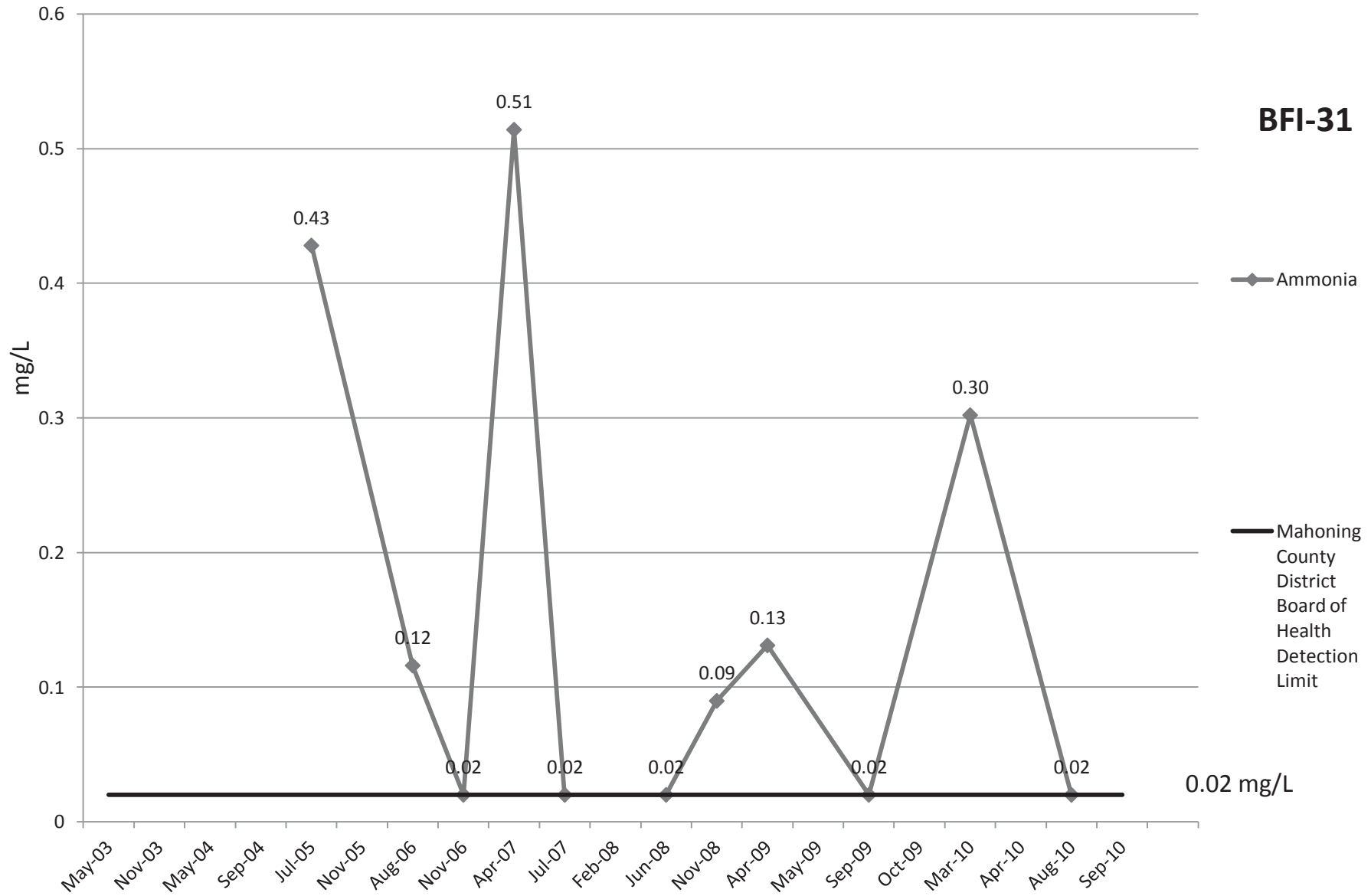
# Turbidity



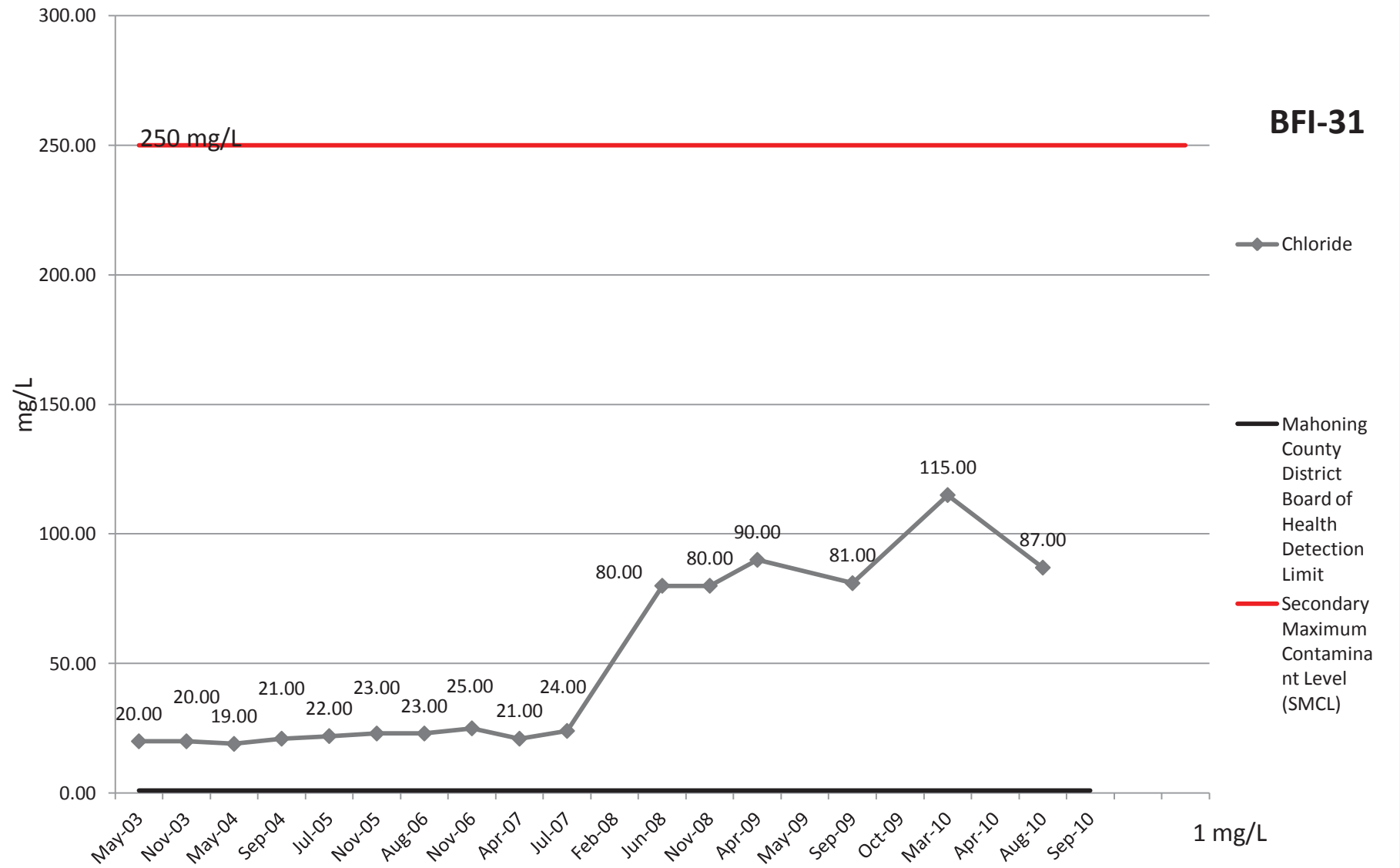
# Alkalinity



# Ammonia



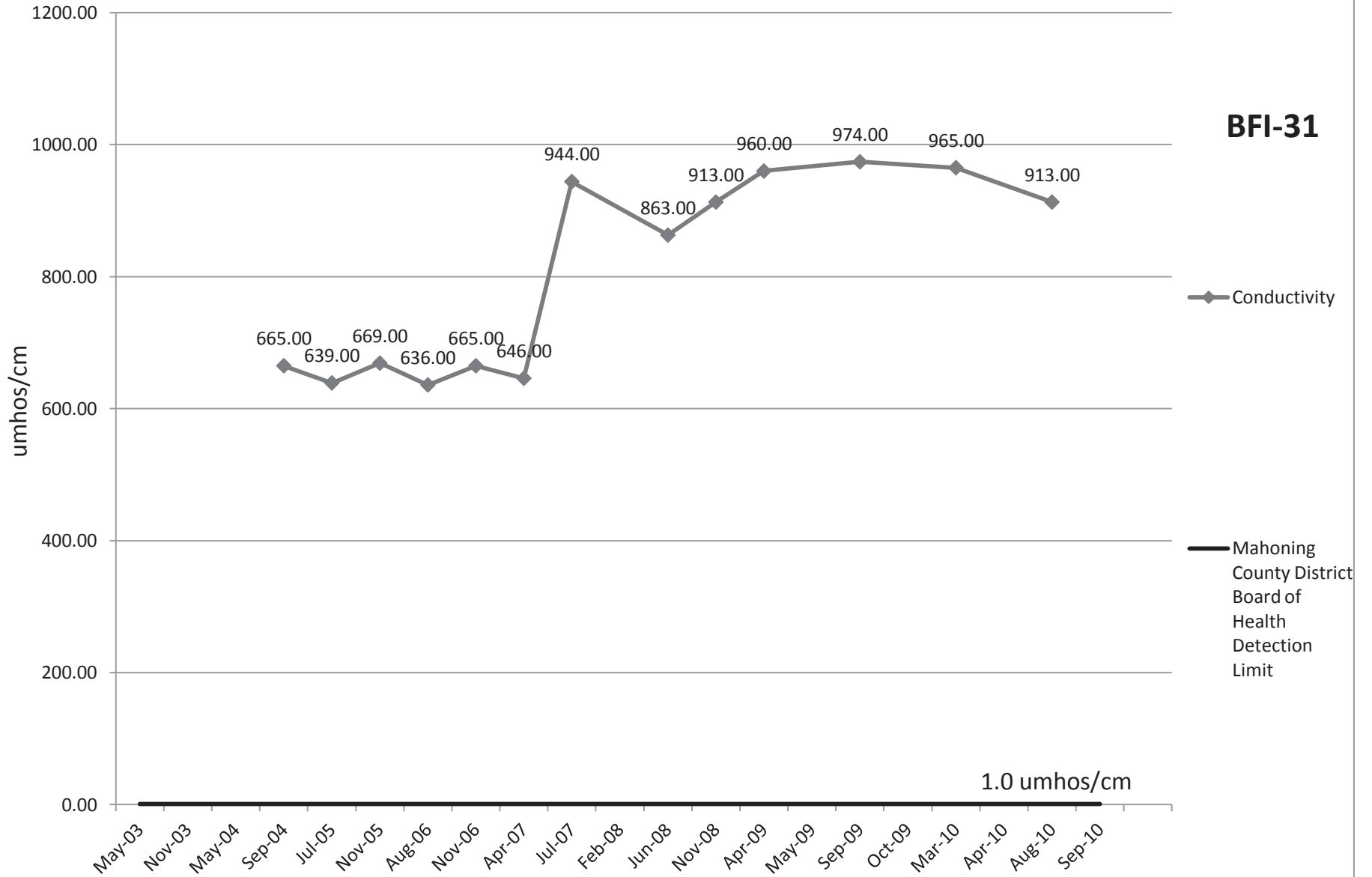
# Chloride



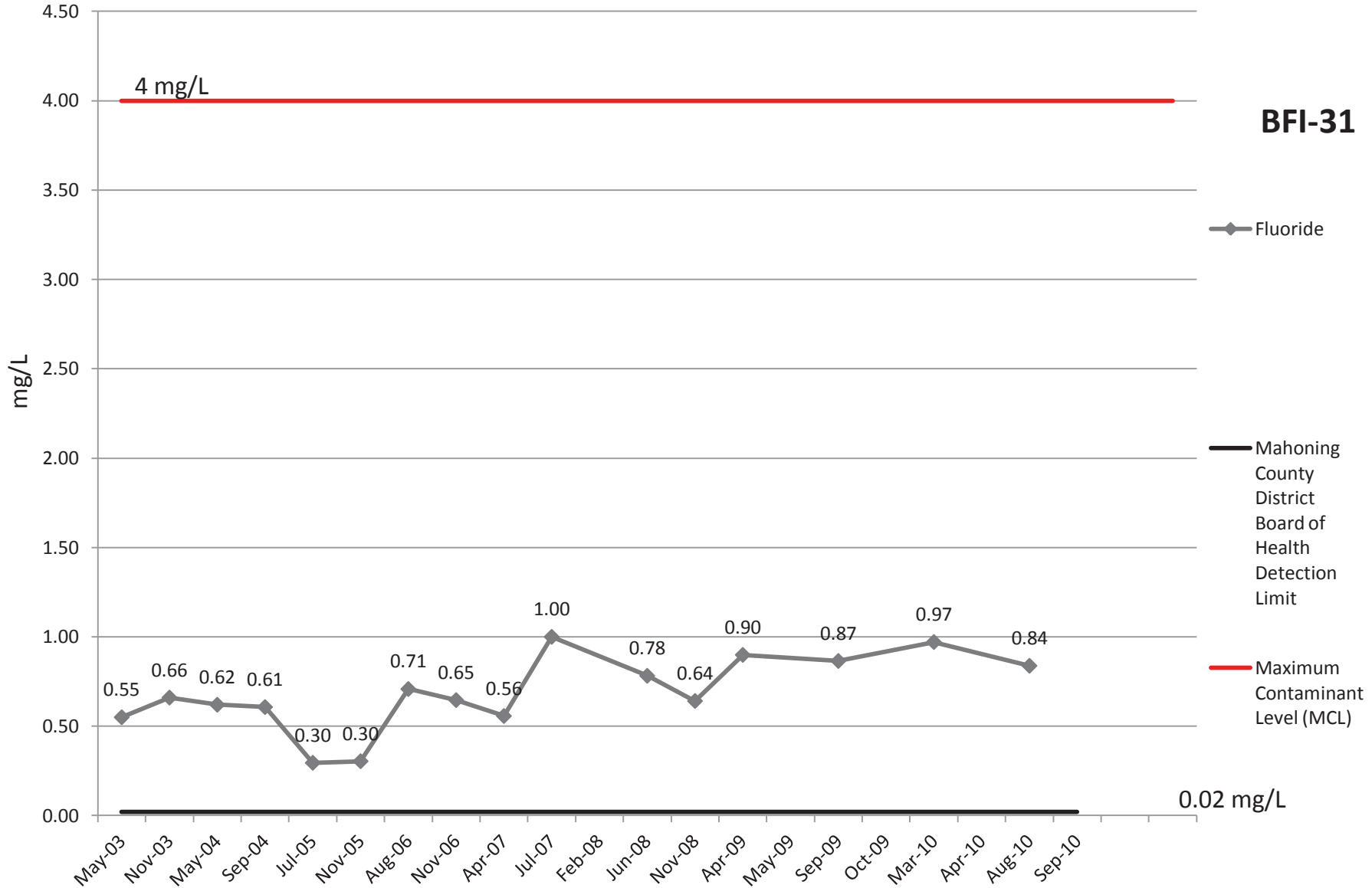


# Conductivity

**BFI-31**

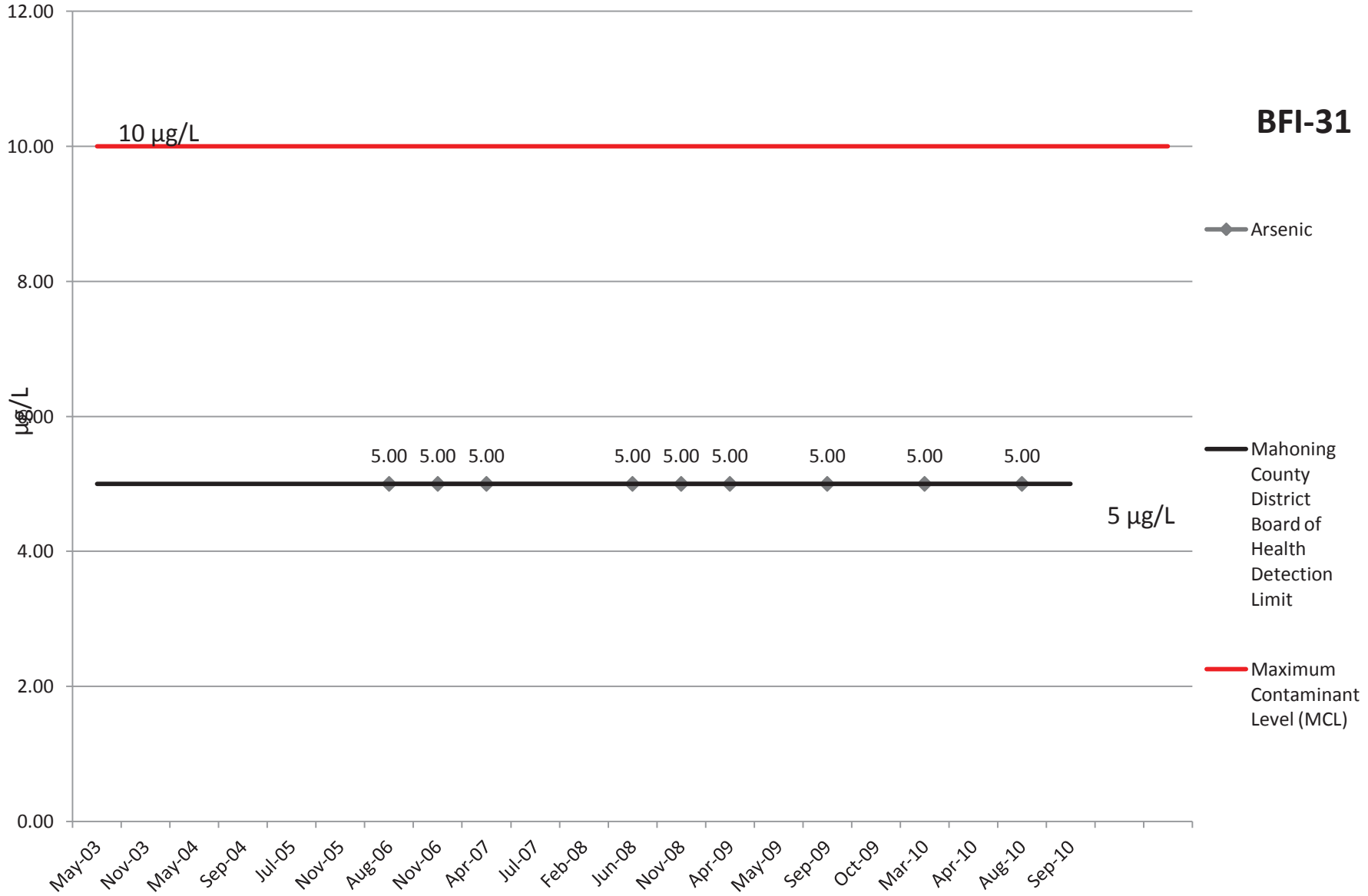


# Fluoride



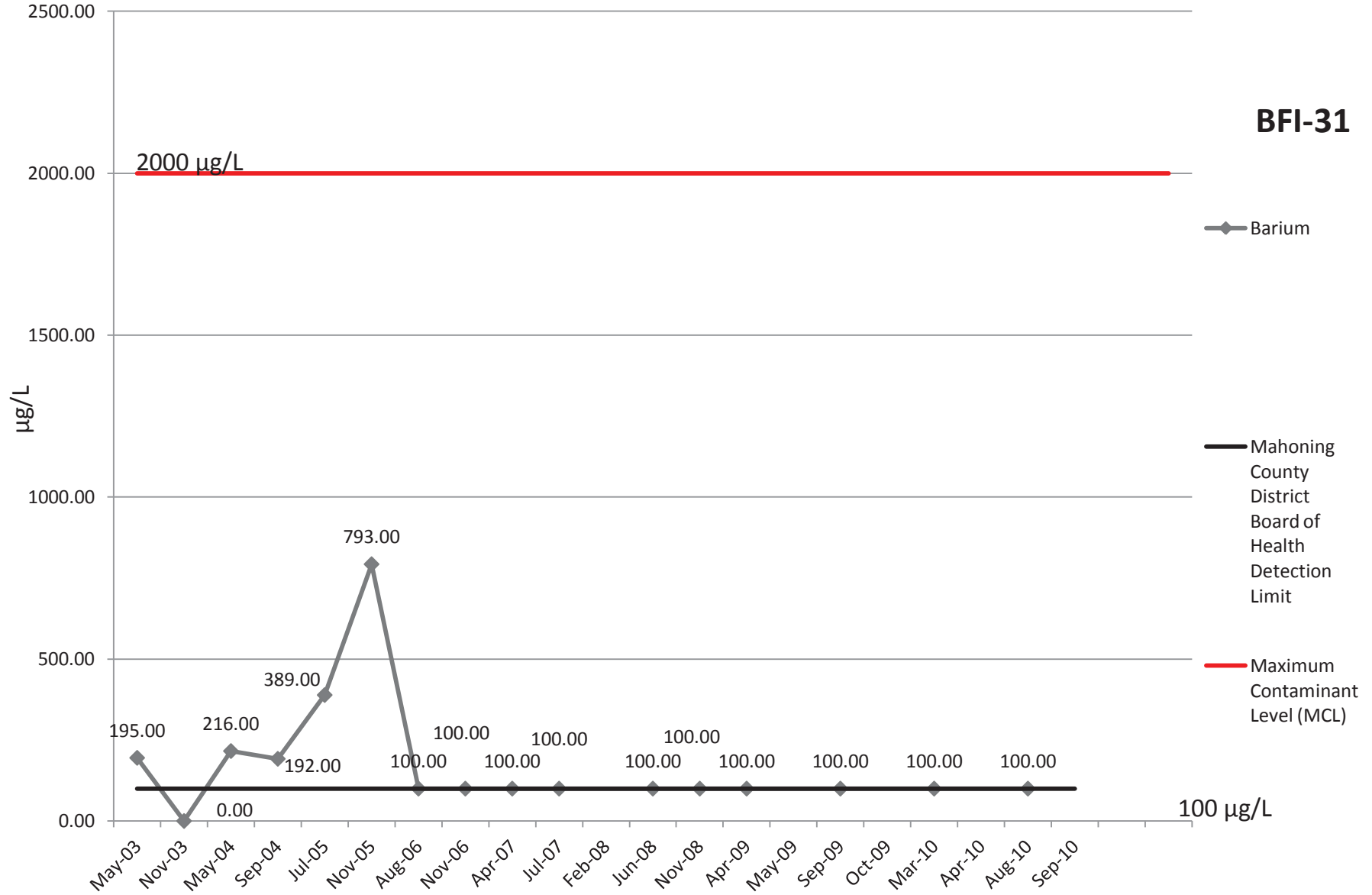
# Arsenic

**BFI-31**



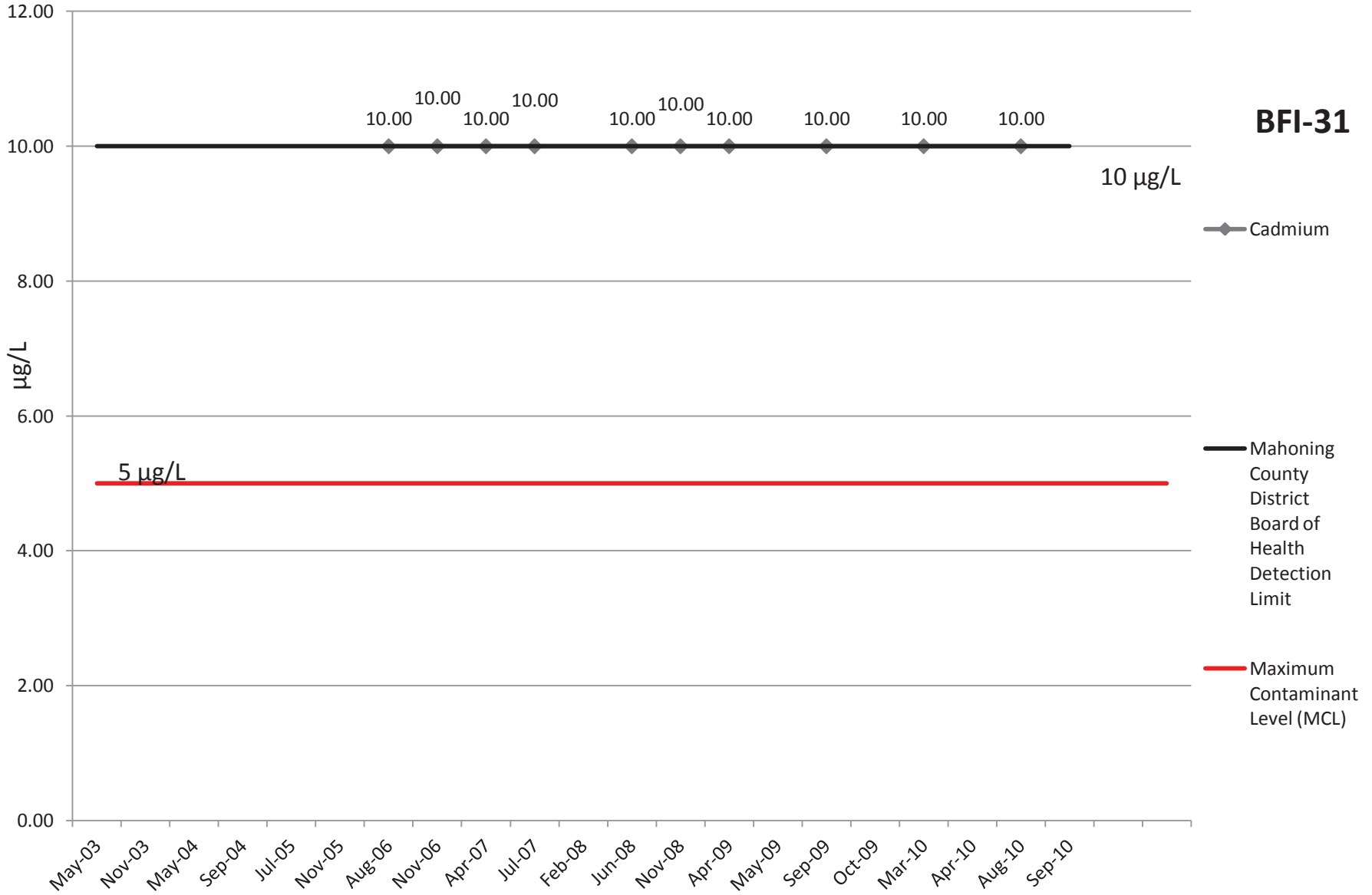
# Barium

**BFI-31**

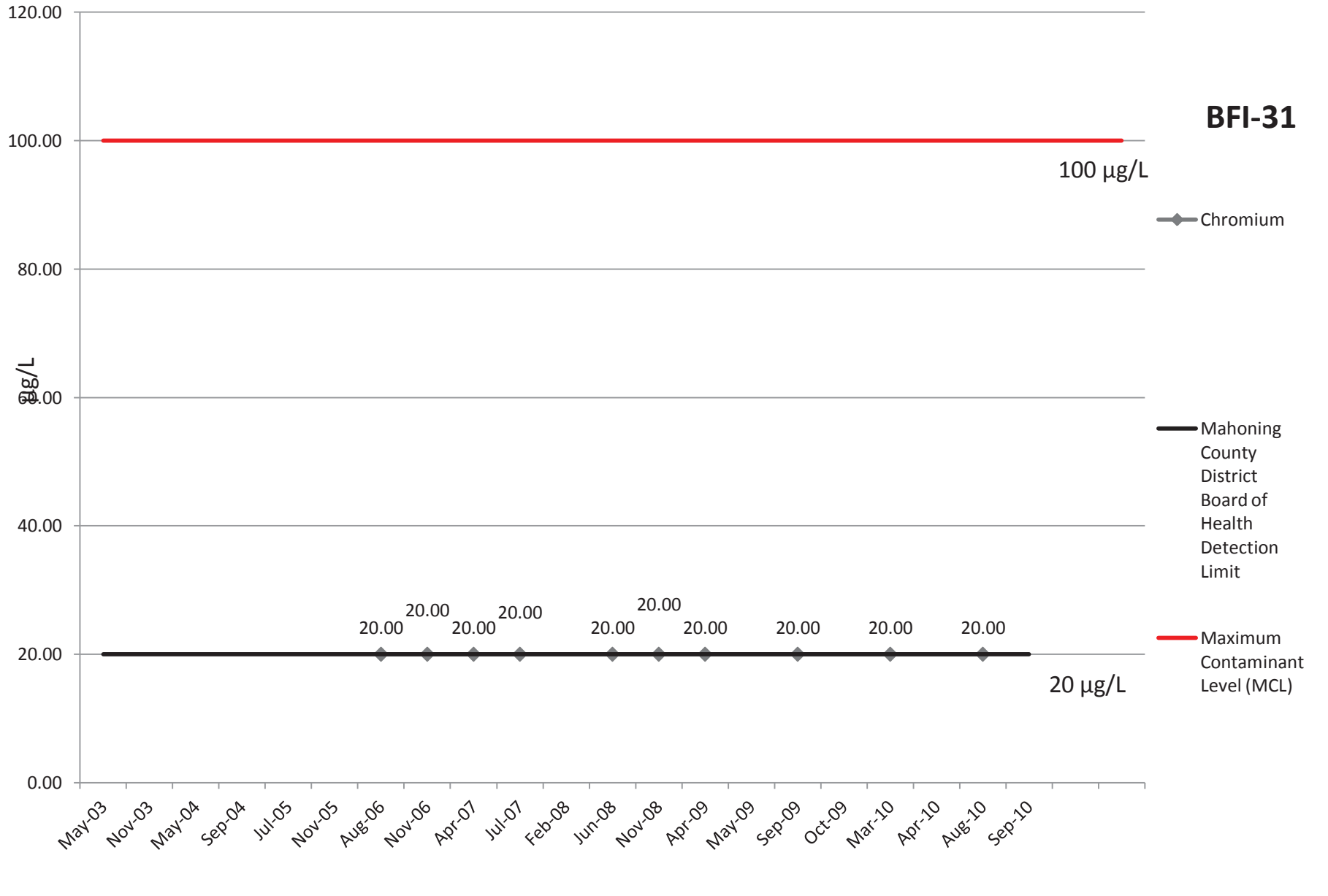


# Cadmium

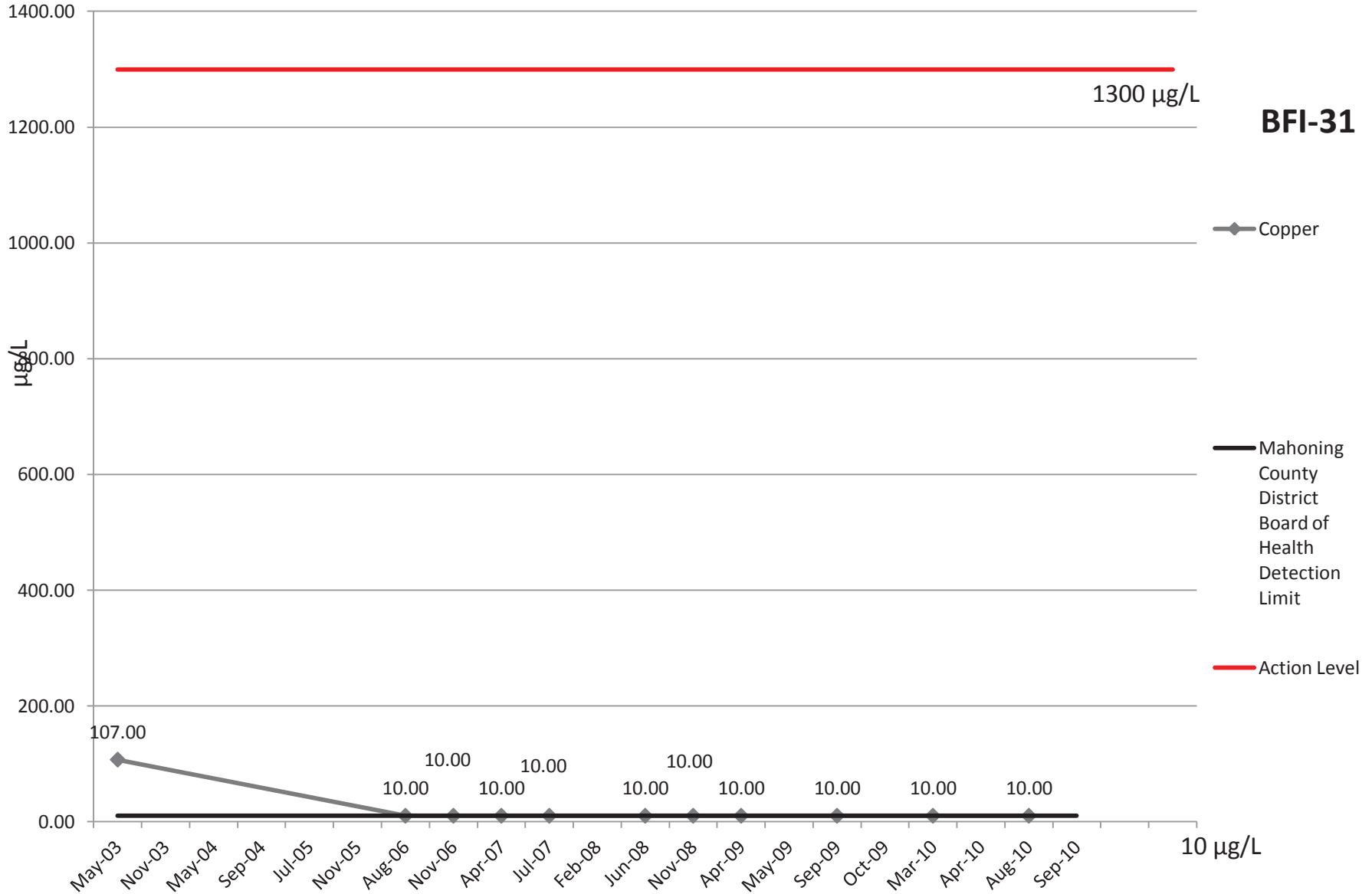
**BFI-31**



# Chromium

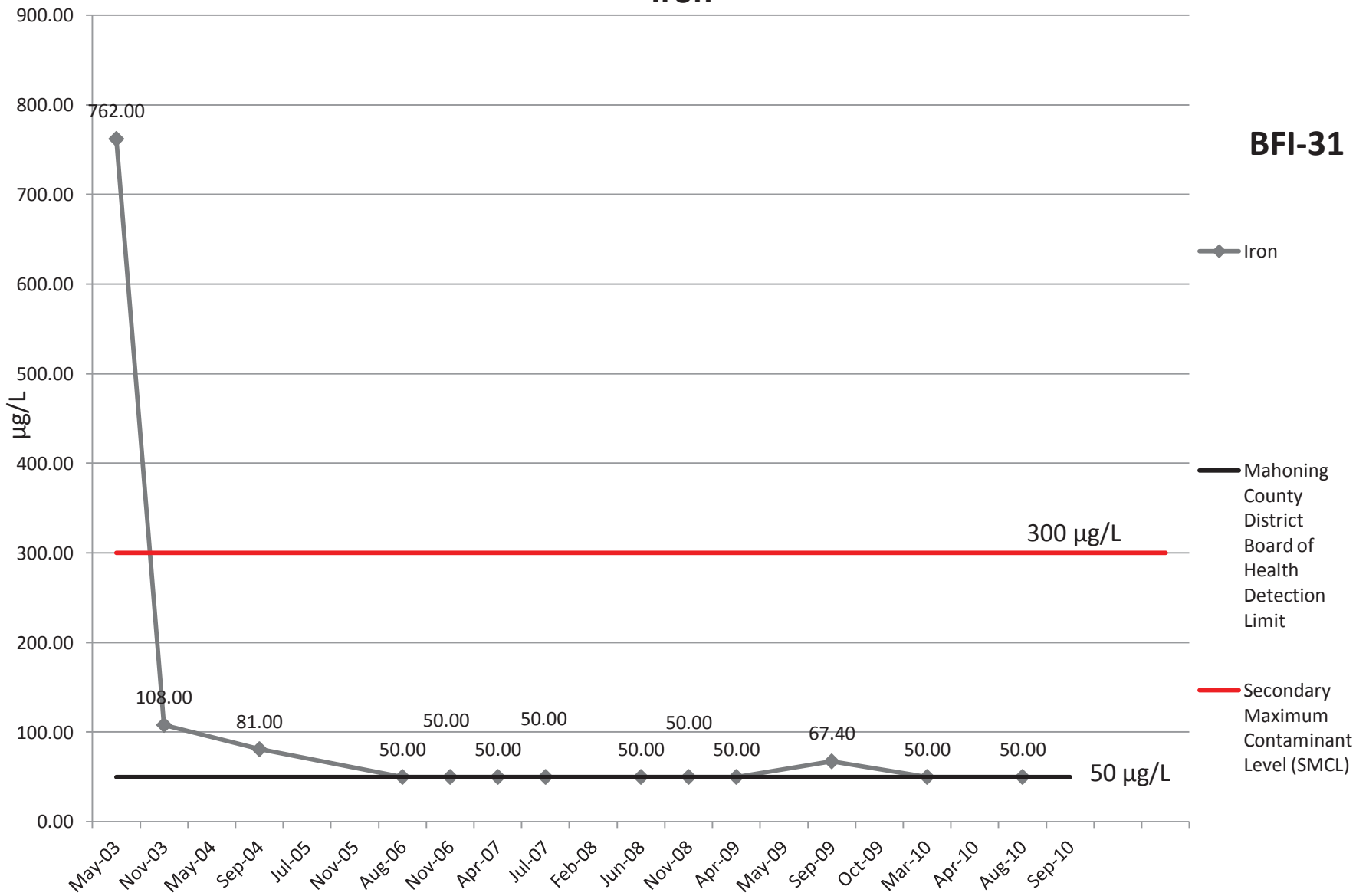


# Copper



# Iron

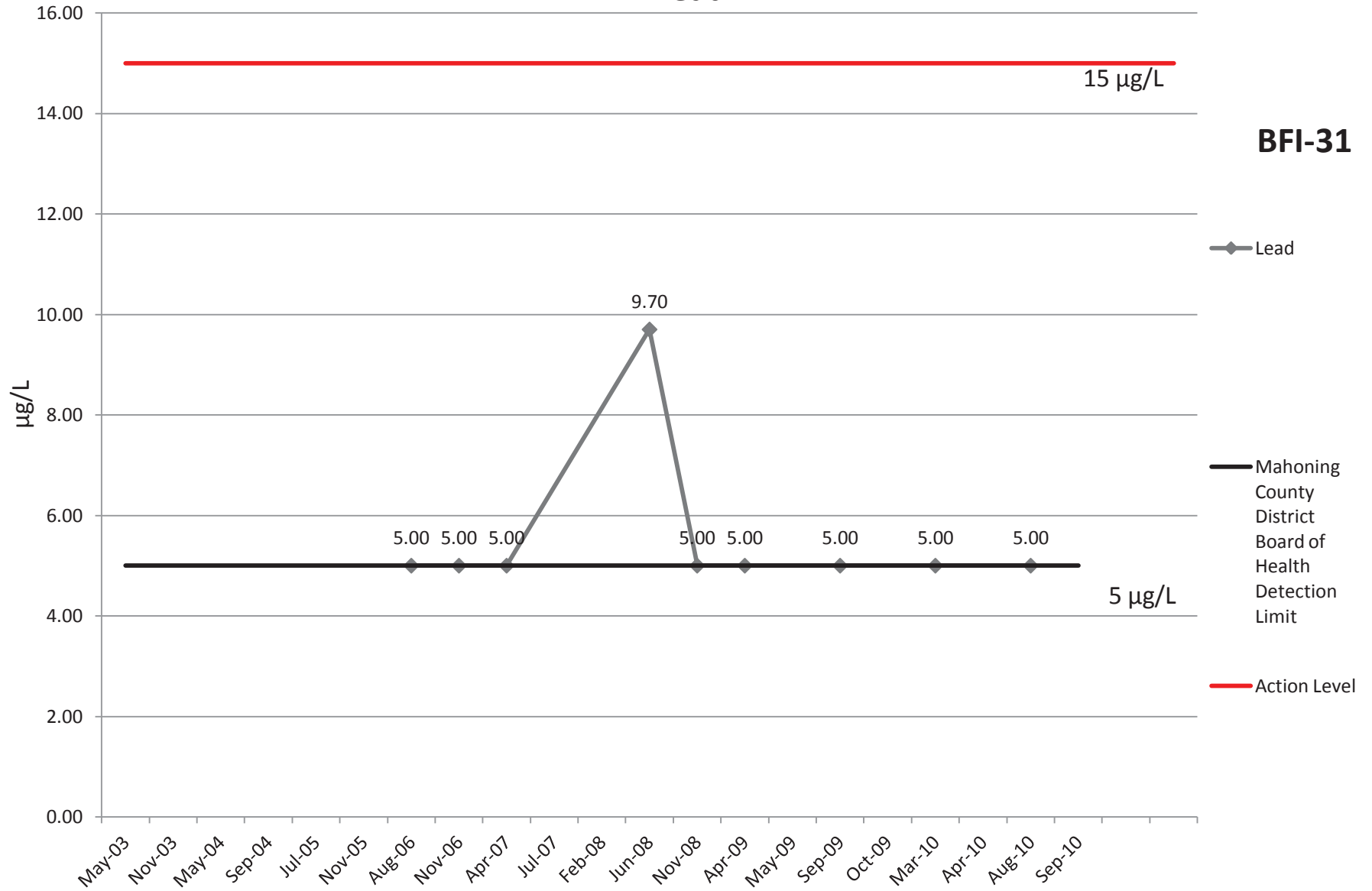
**BFI-31**



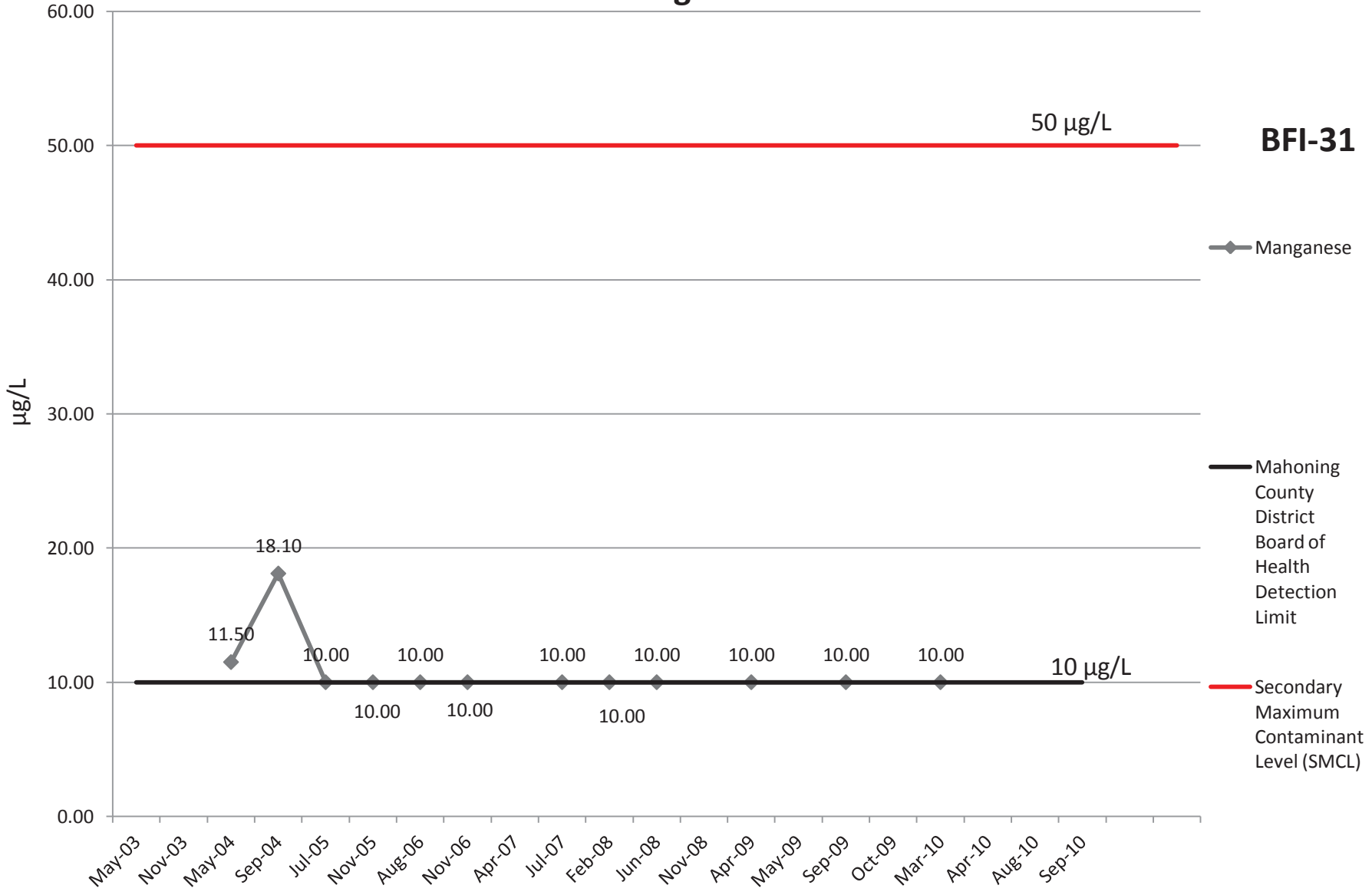


# Lead

**BFI-31**



# Manganese

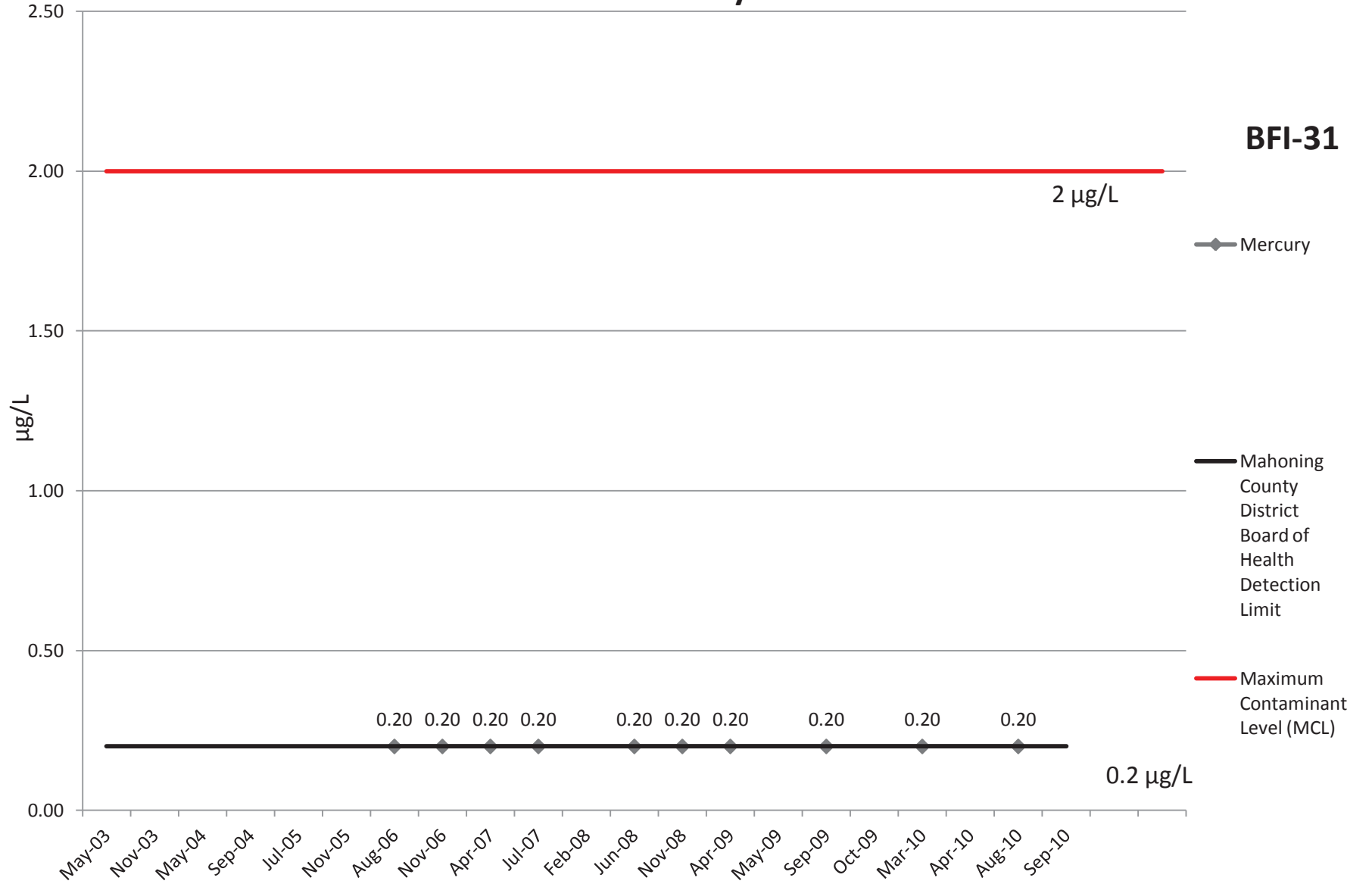


# Mercury

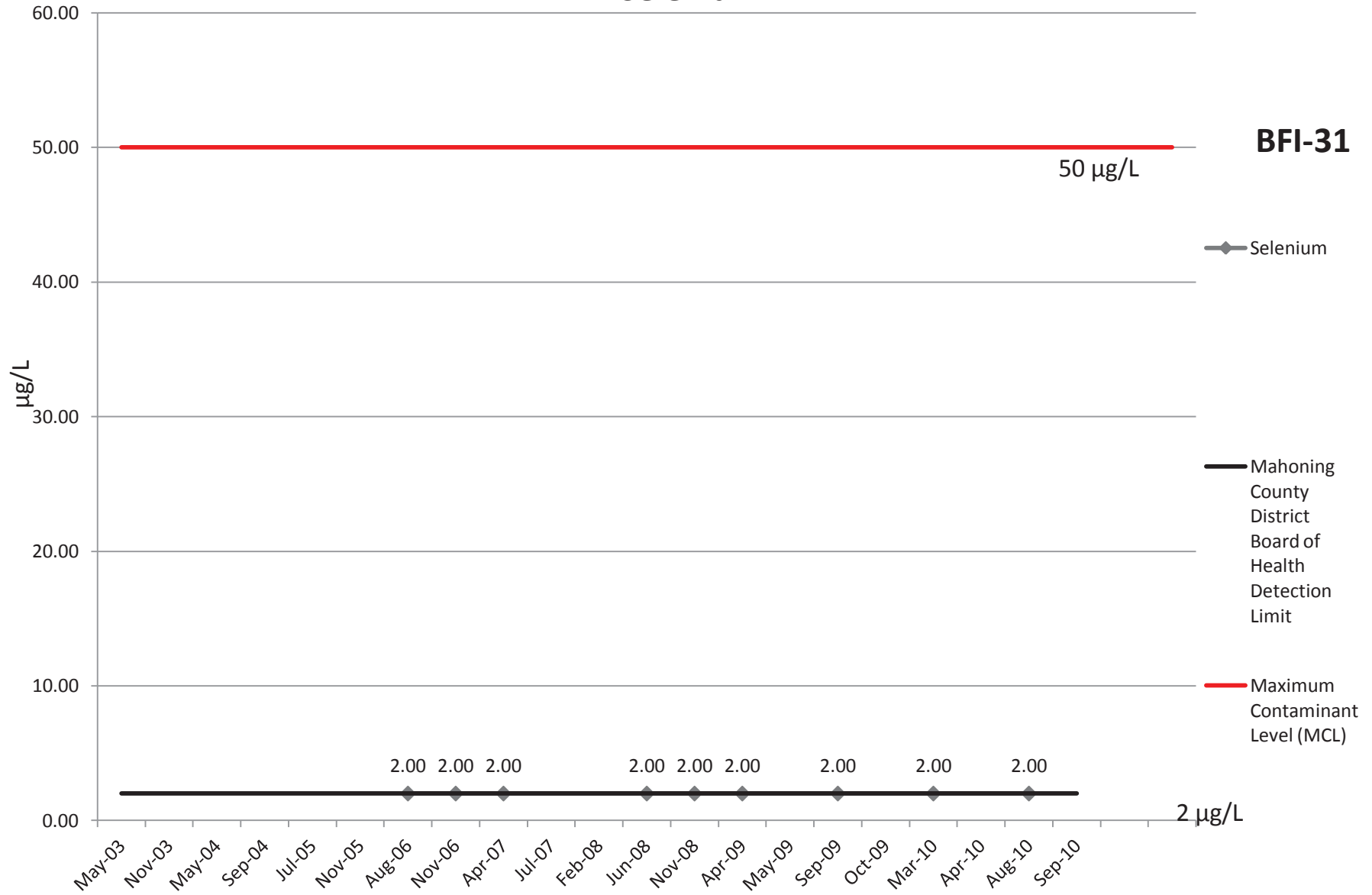
**BFI-31**

2 µg/L

0.2 µg/L

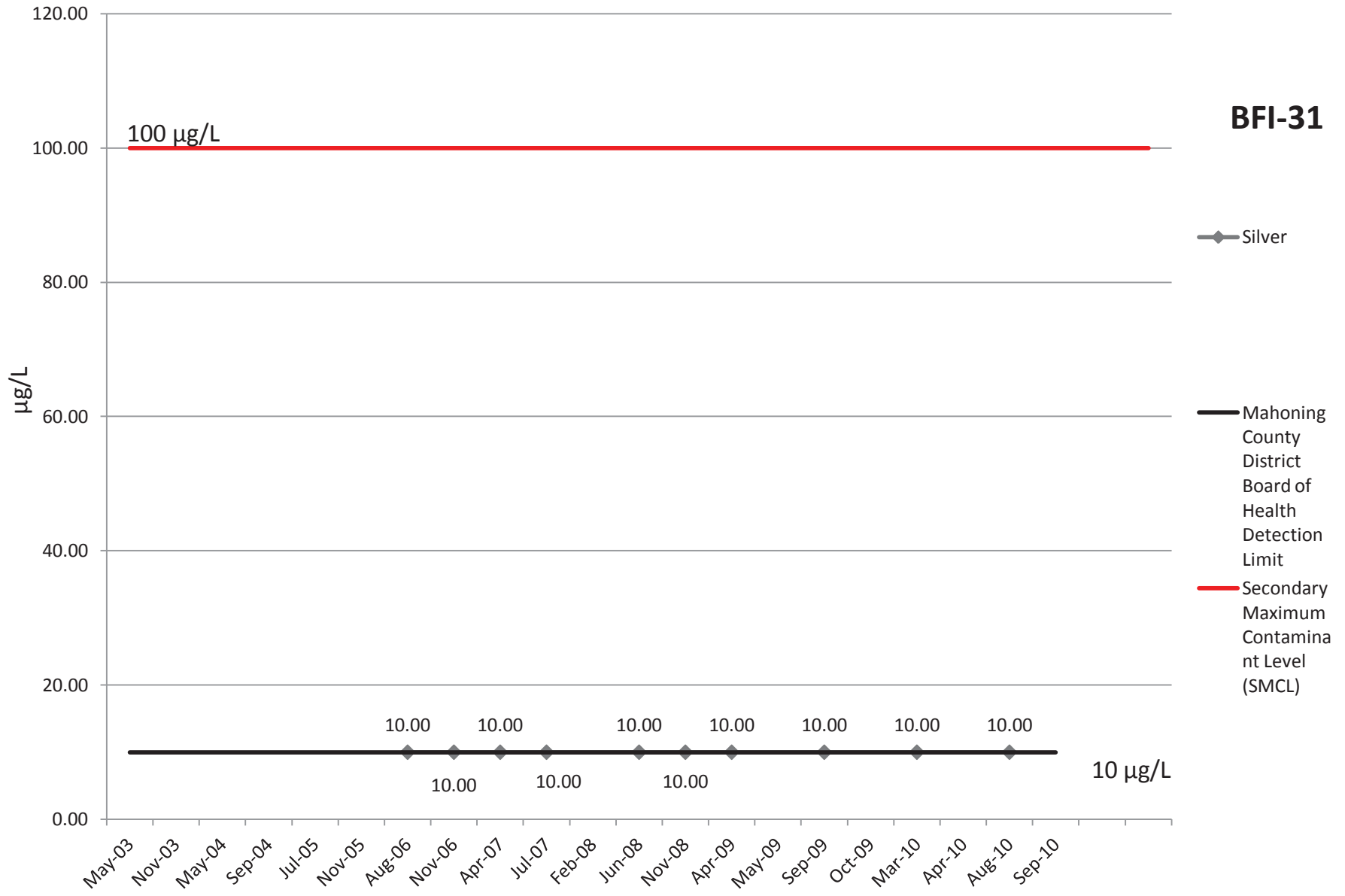


# Selenium



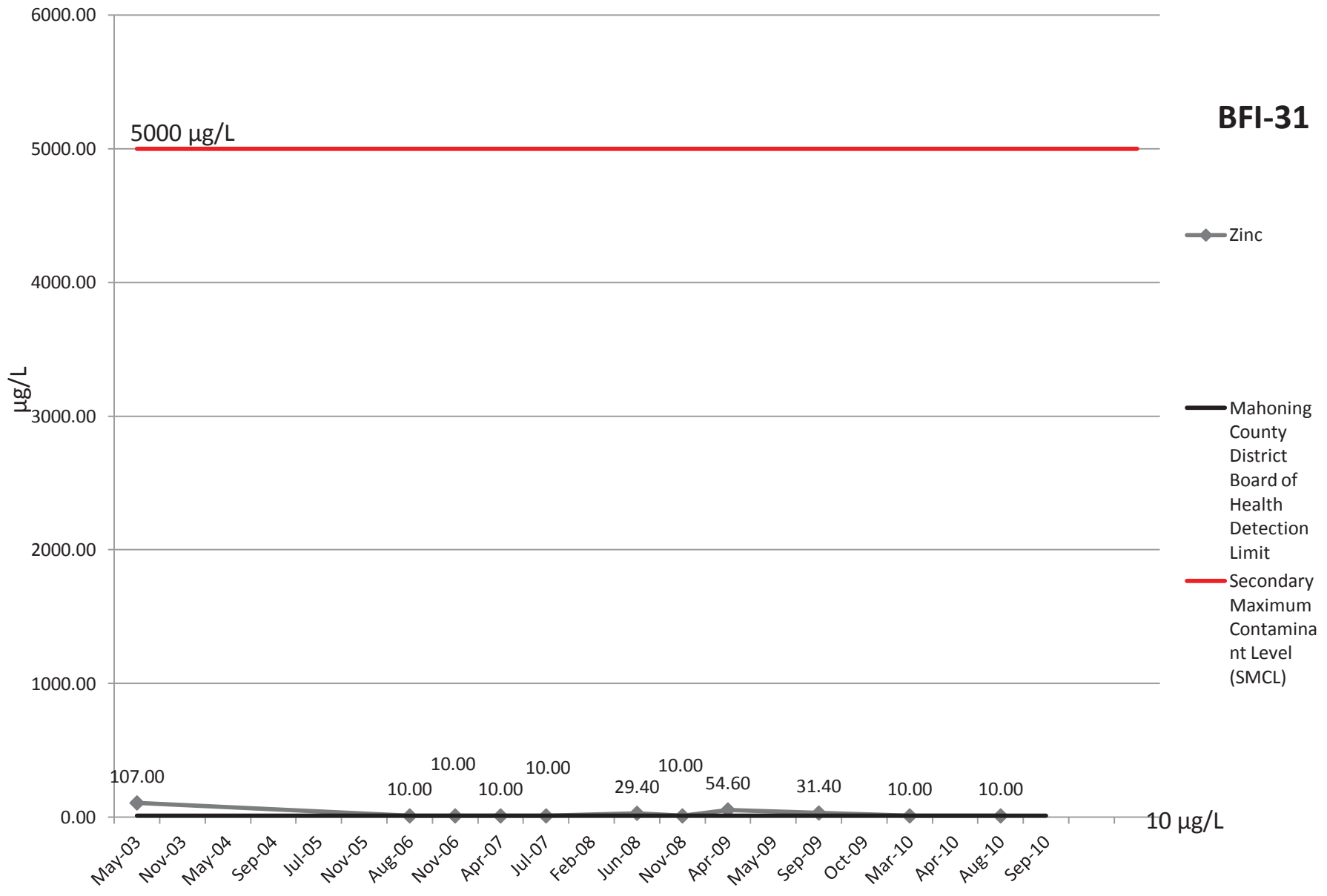
# Silver

**BFI-31**

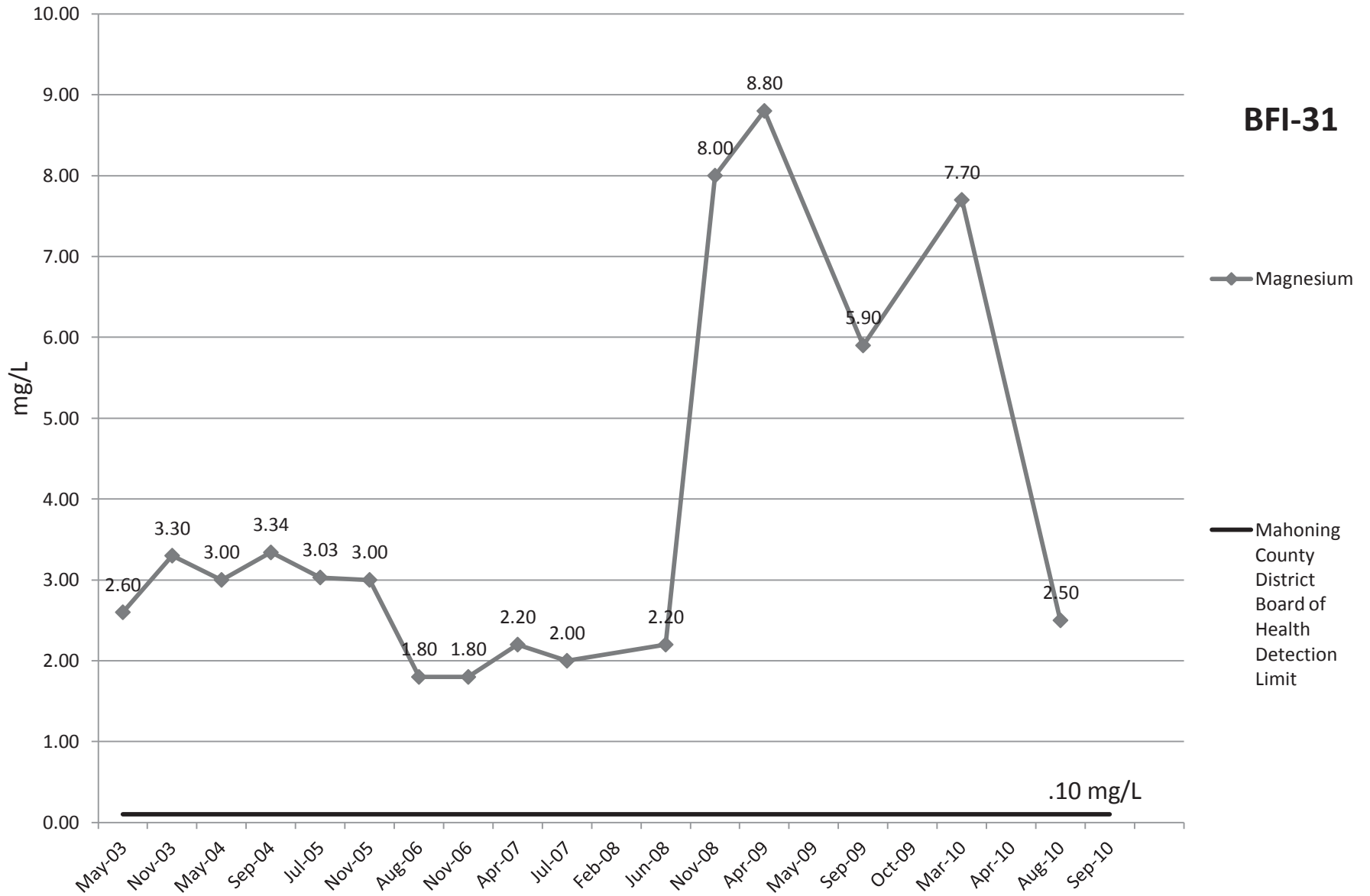


# Zinc

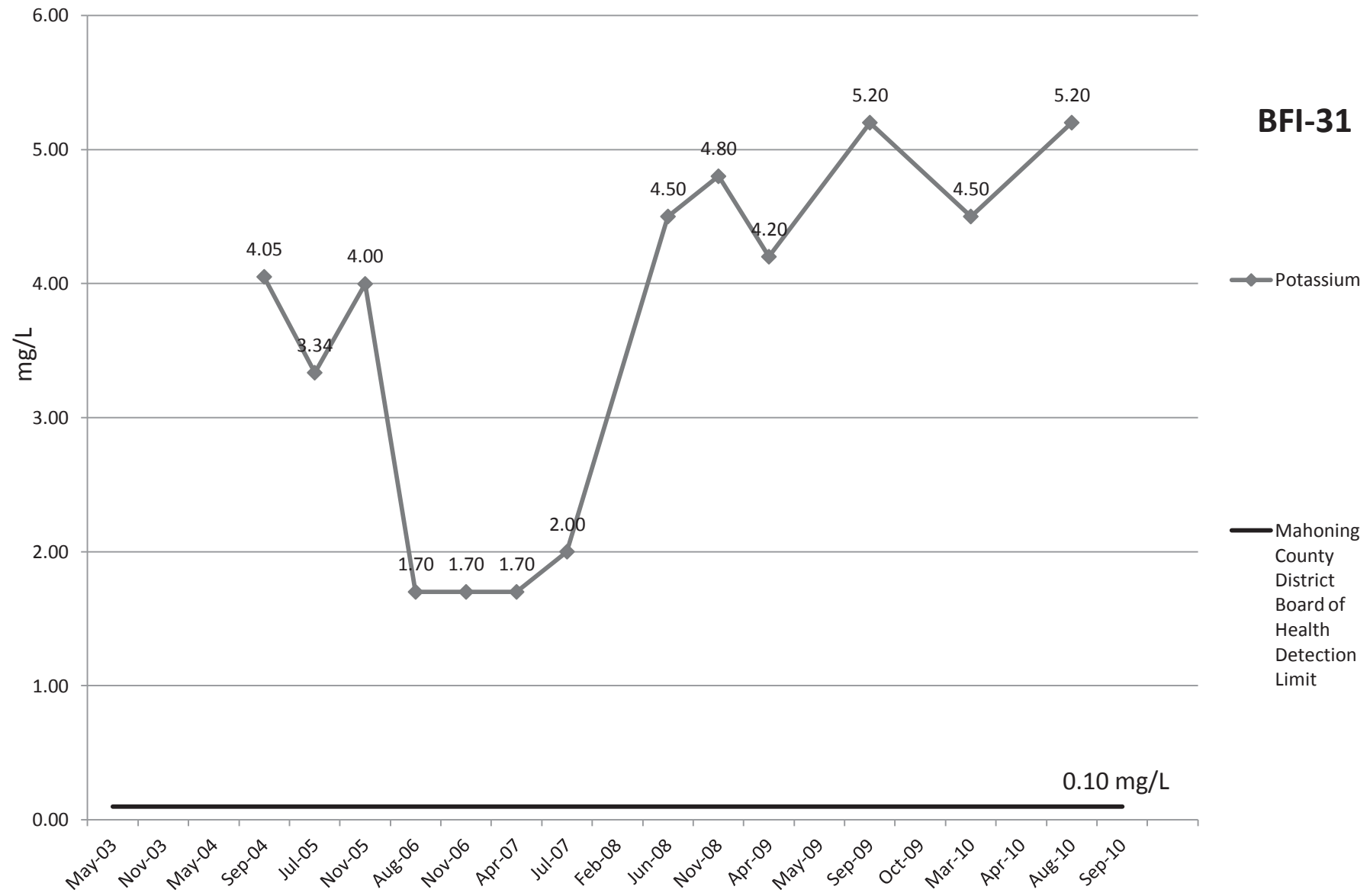
**BFI-31**



# Magnesium

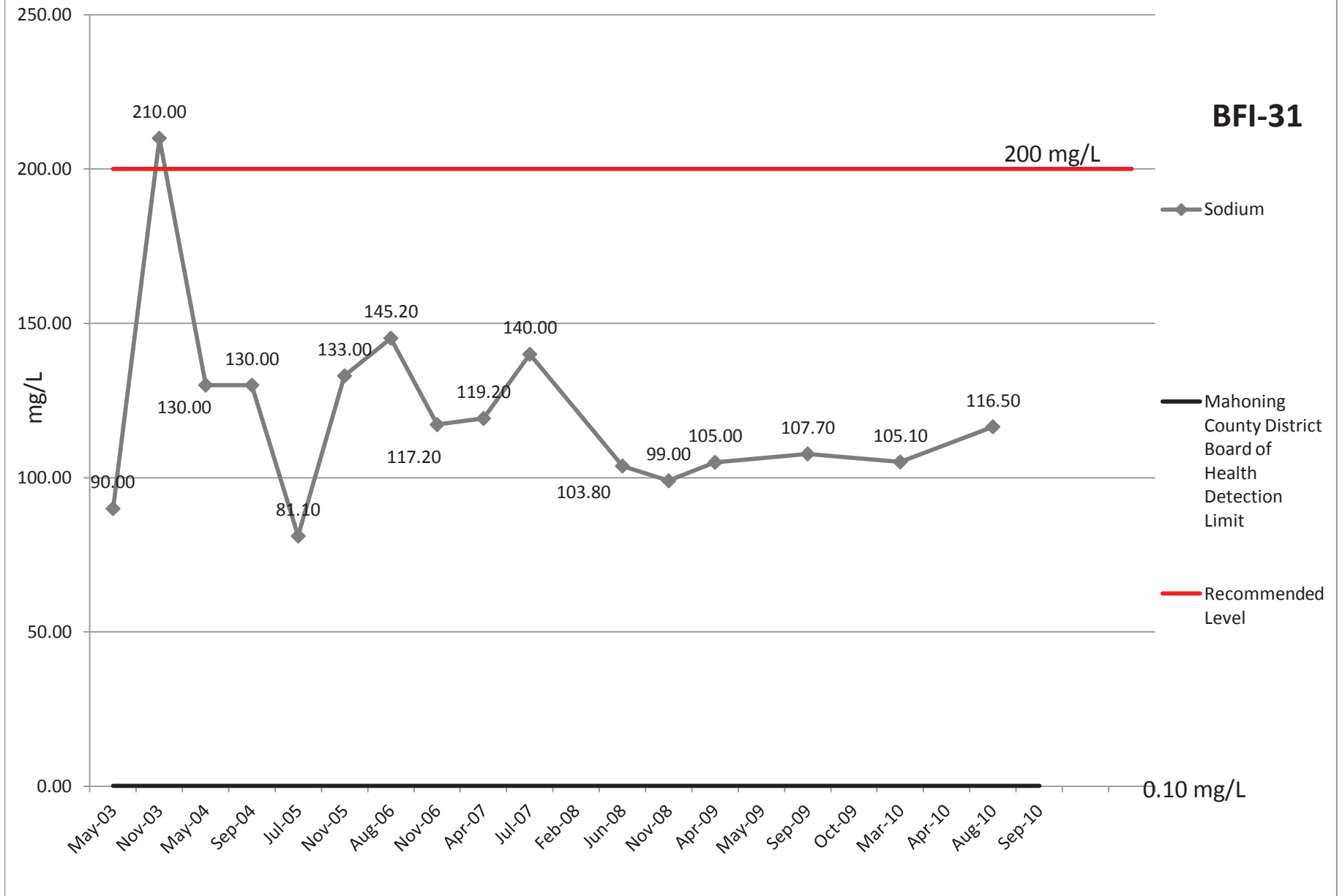


# Potassium

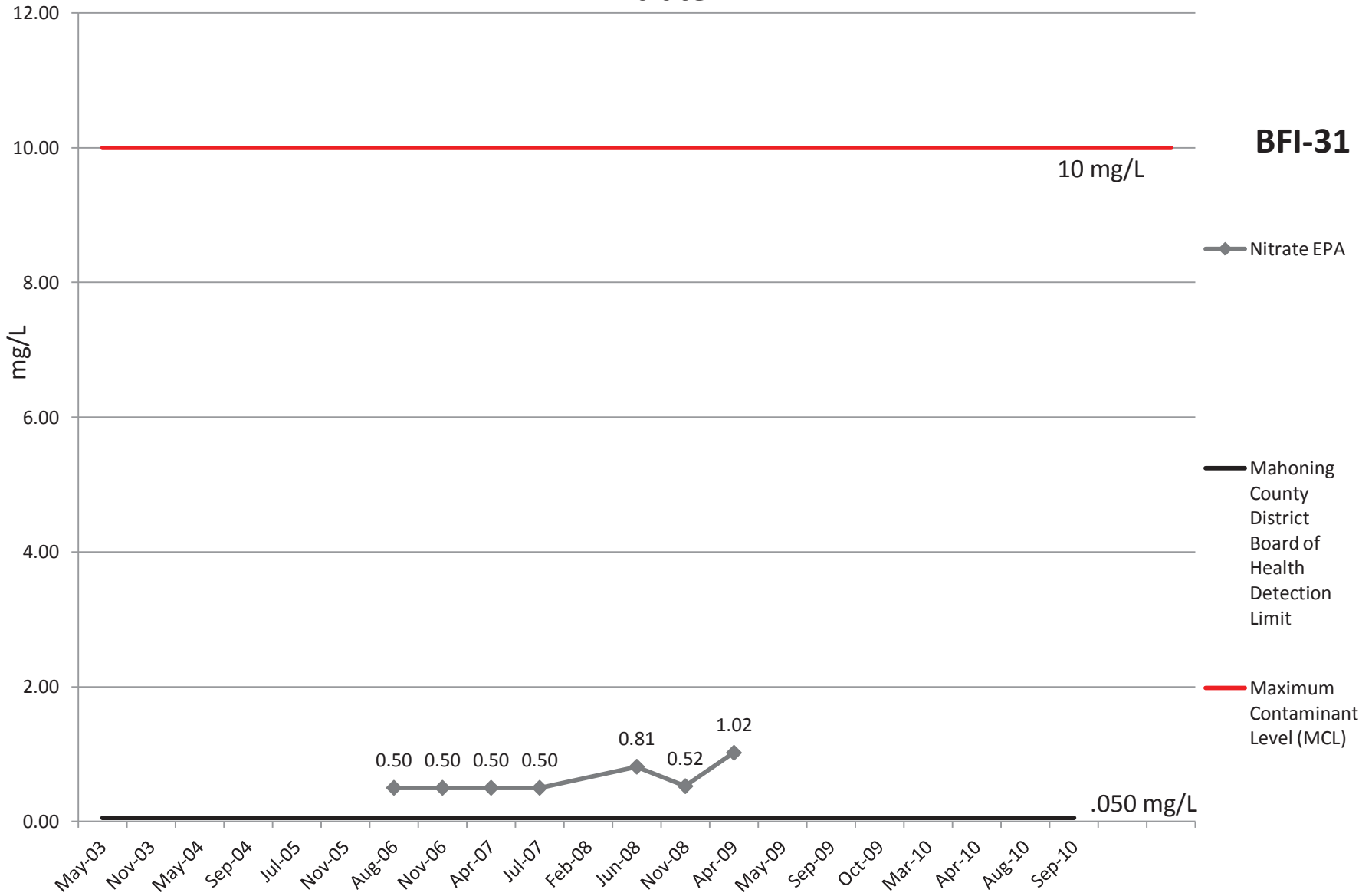




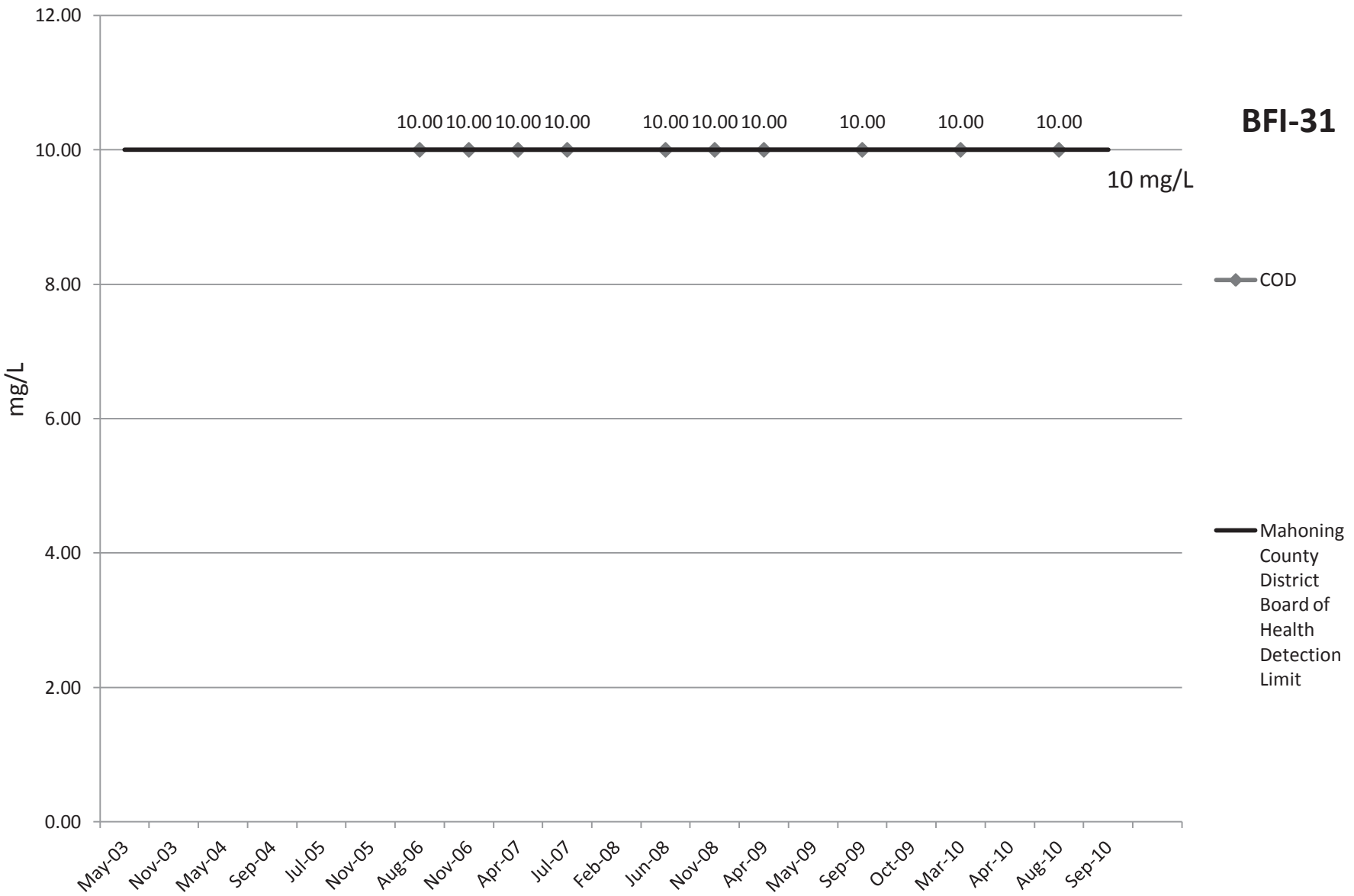
# Sodium



# Nitrate EPA



# COD



**BFI-31**

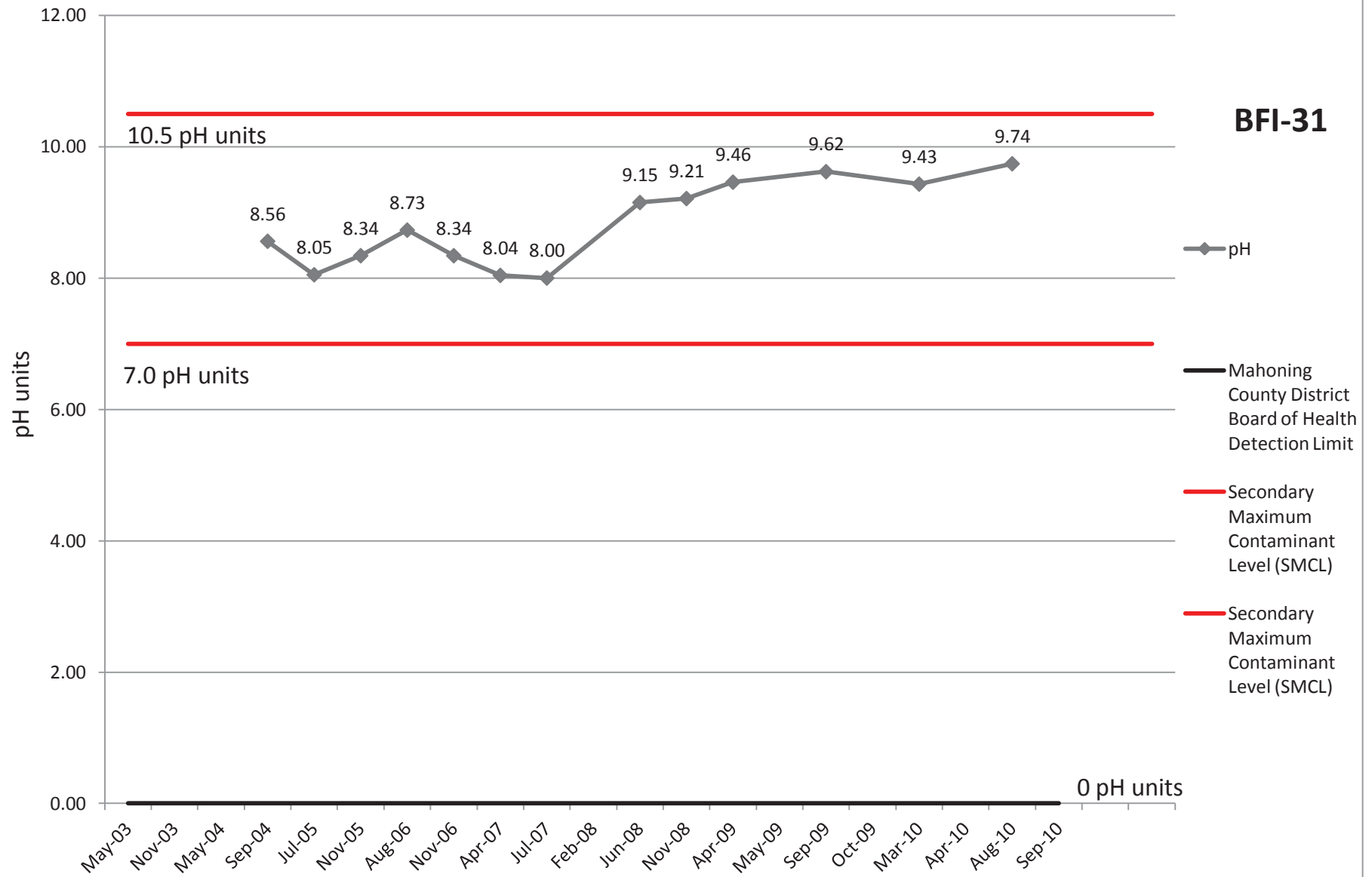
10 mg/L

◆ COD

— Mahoning County District Board of Health Detection Limit

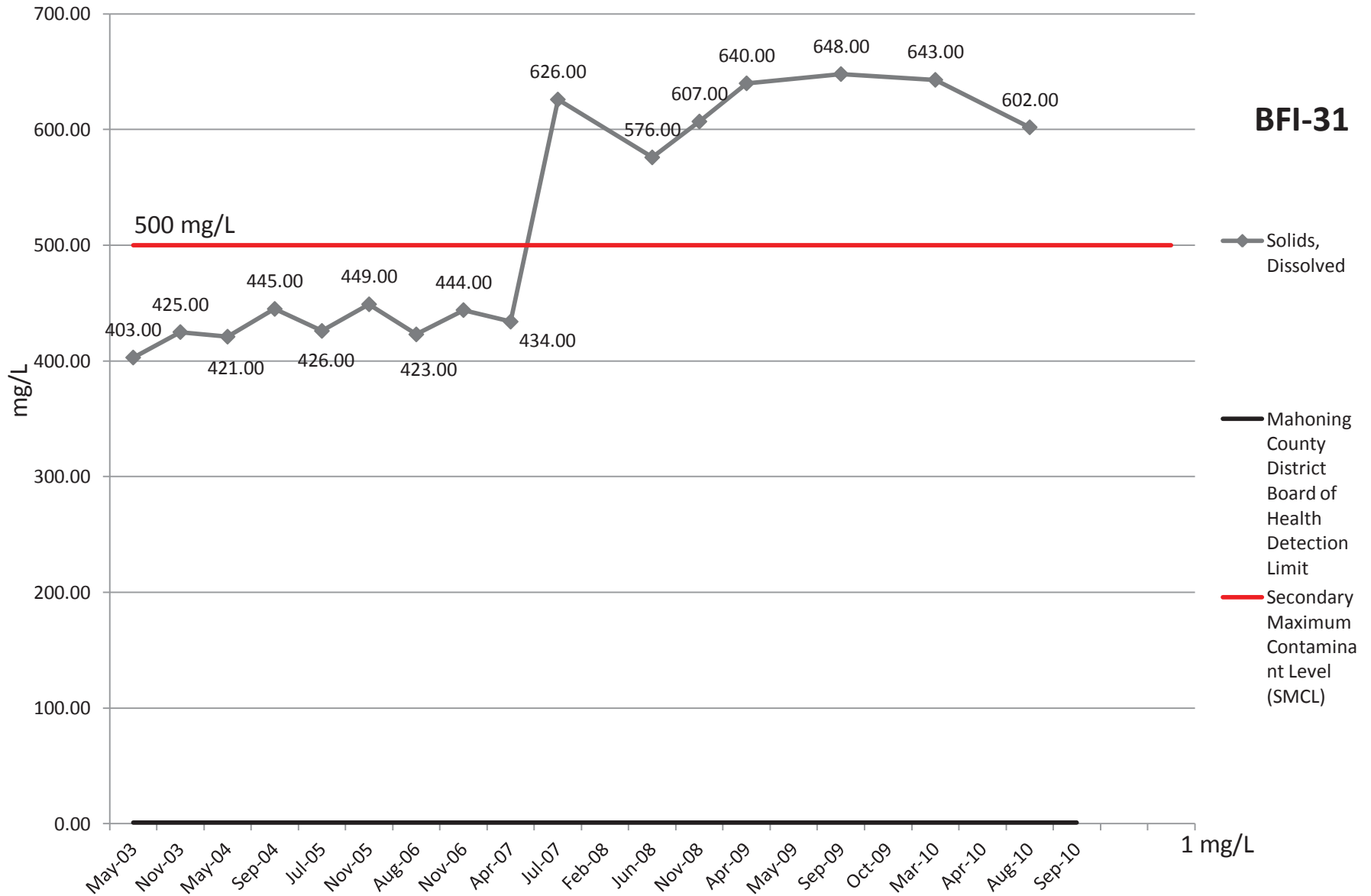
# pH

**BFI-31**

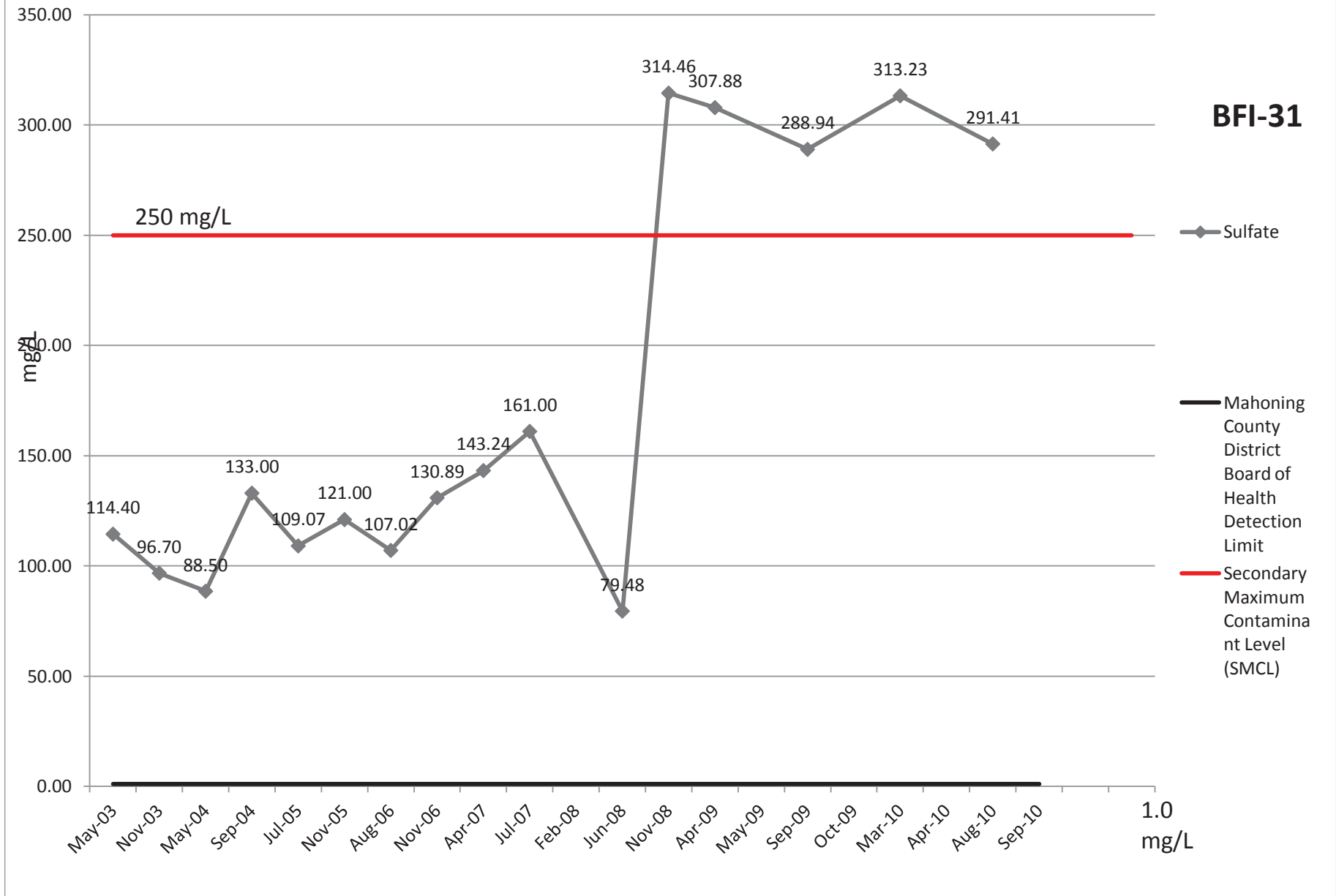


# Solids, Dissolved

**BFI-31**



# Sulfate



# Bacteria

**BFI-31**

Positive/Negative

◆ Bacteria

1.00 1.00 1.00 1.00 1.00 1.00 1.00

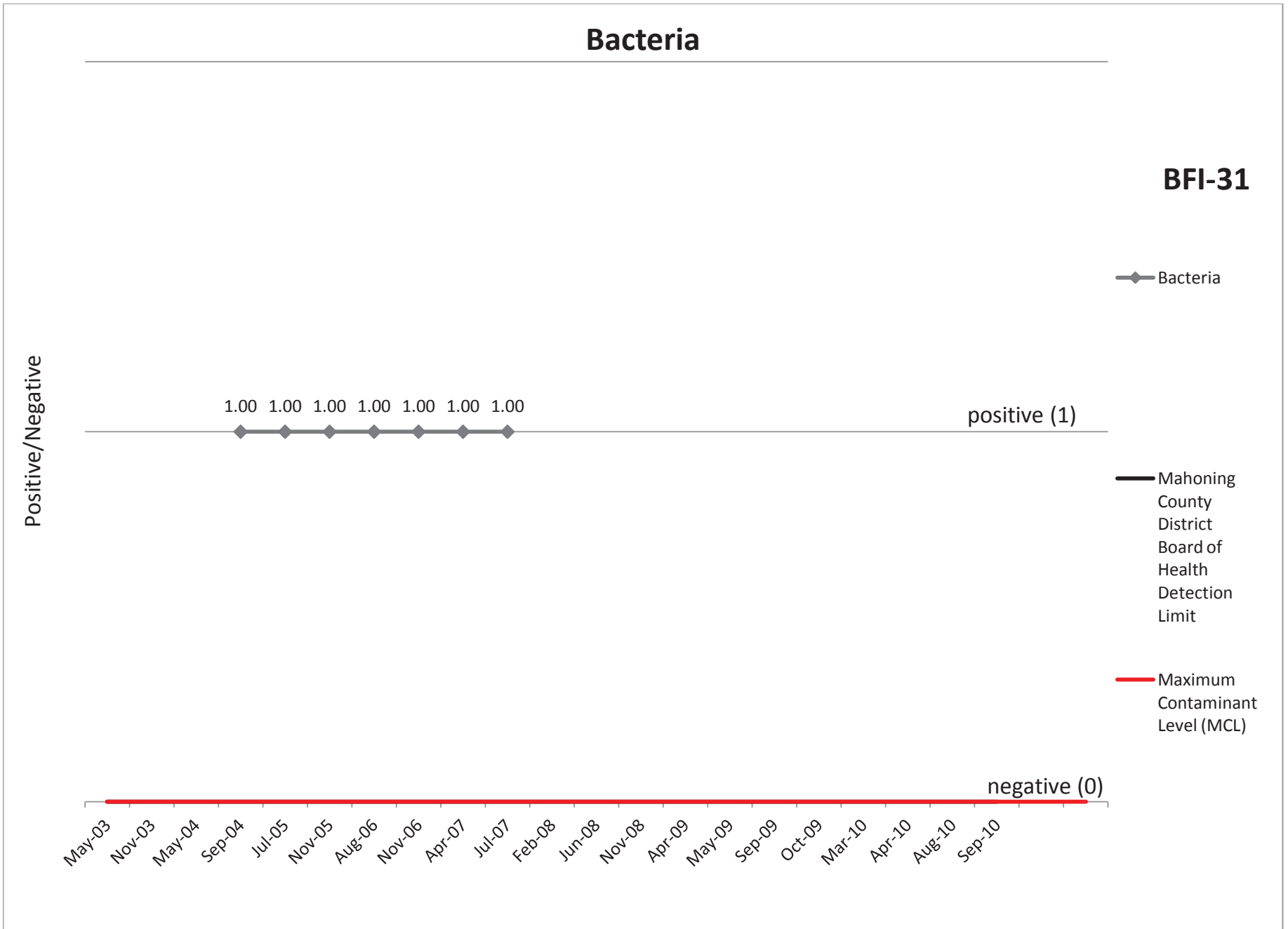
positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

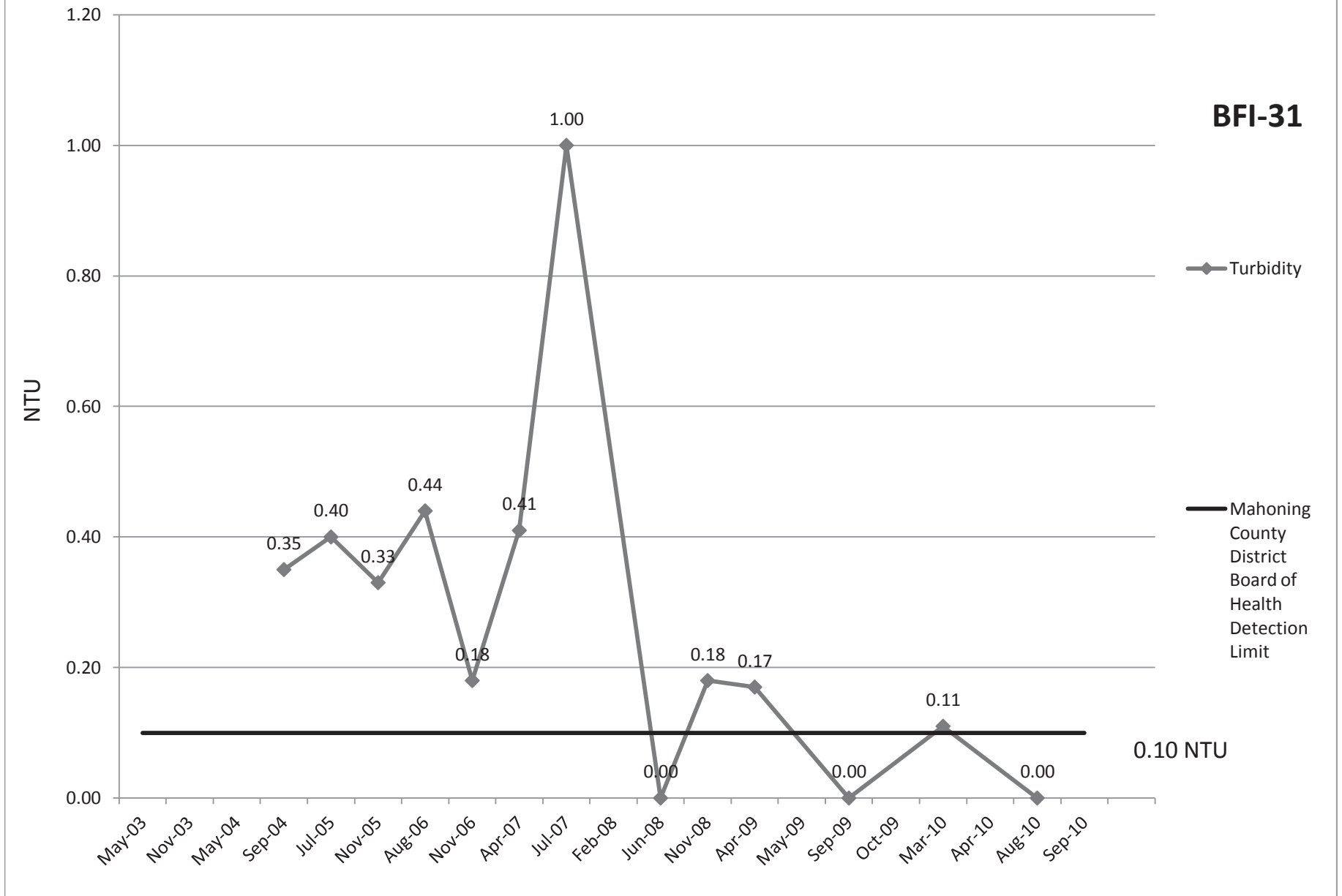
— Maximum  
Contaminant  
Level (MCL)

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



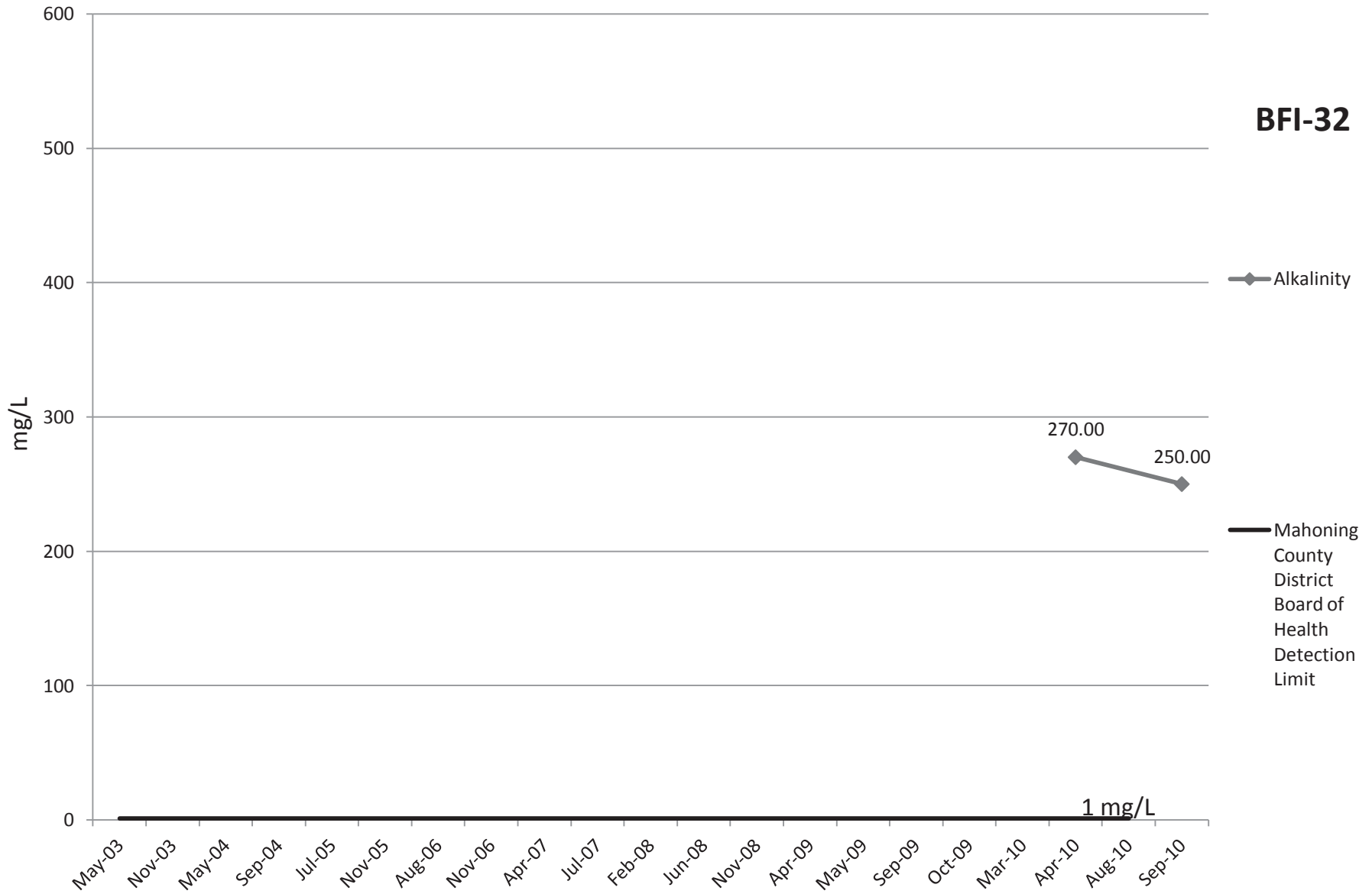
# Turbidity



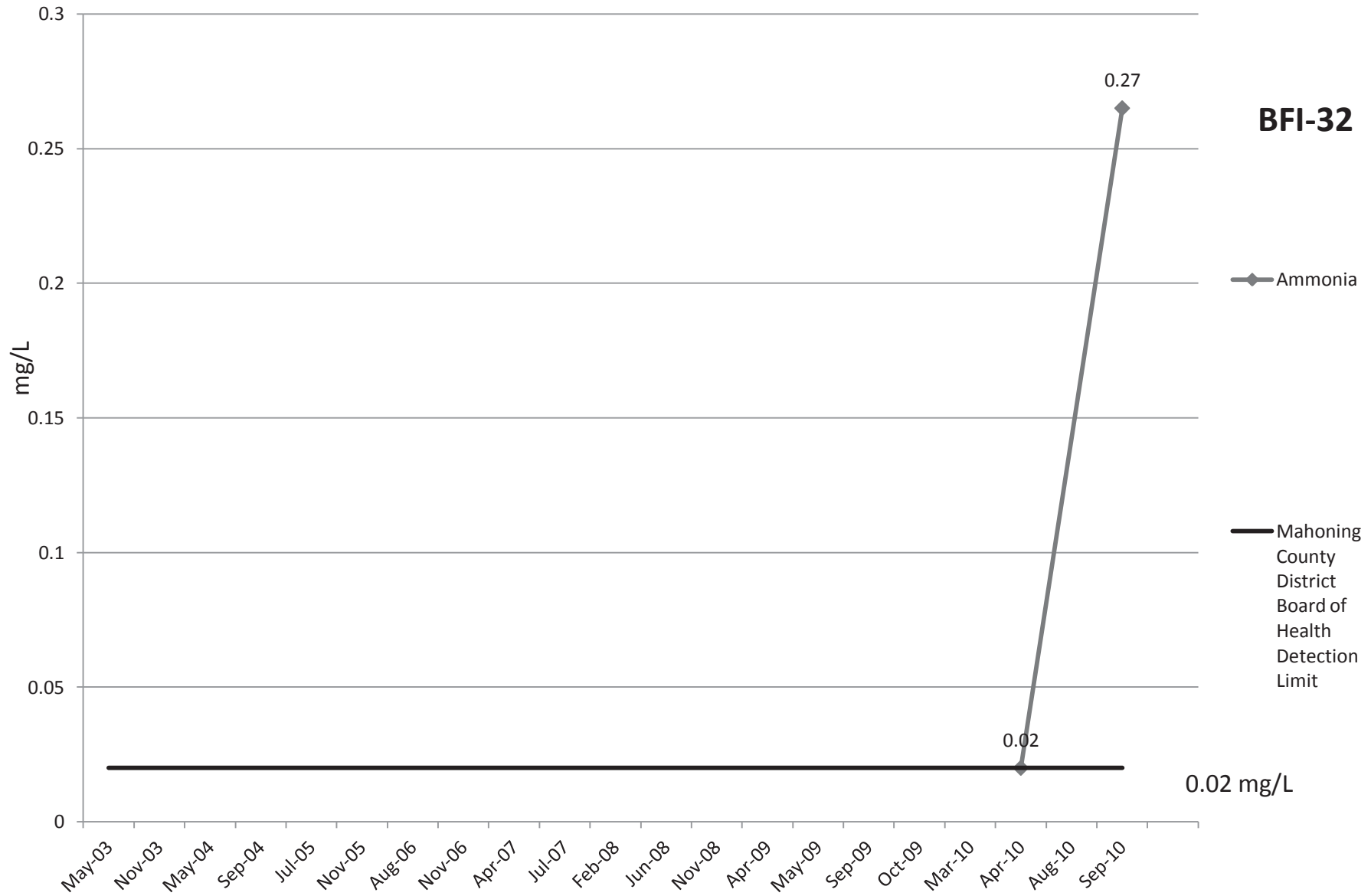


# Alkalinity

**BFI-32**



# Ammonia



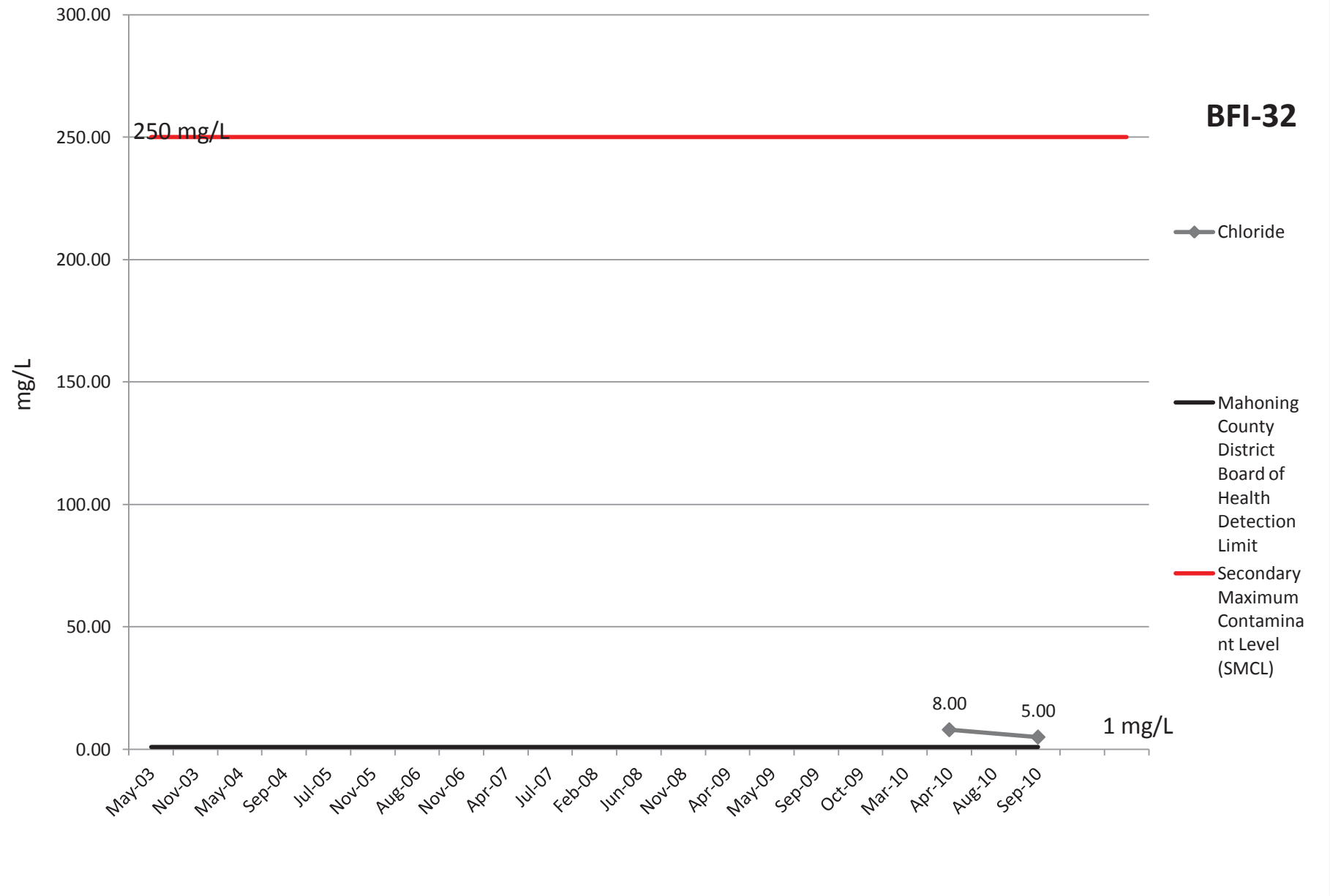
**BFI-32**

◆ Ammonia

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

0.02 mg/L

# Chloride



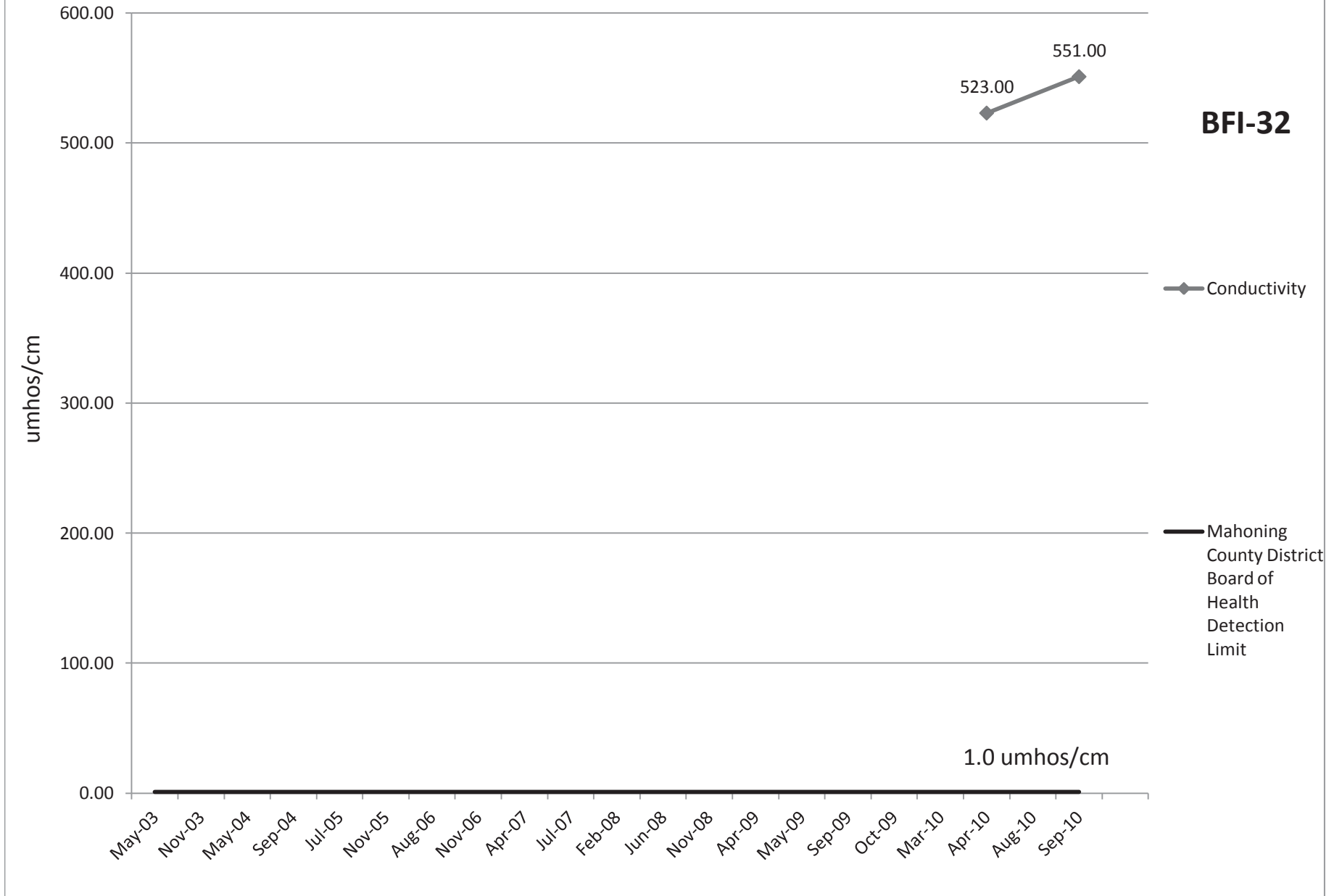
**BFI-32**

◆ Chloride

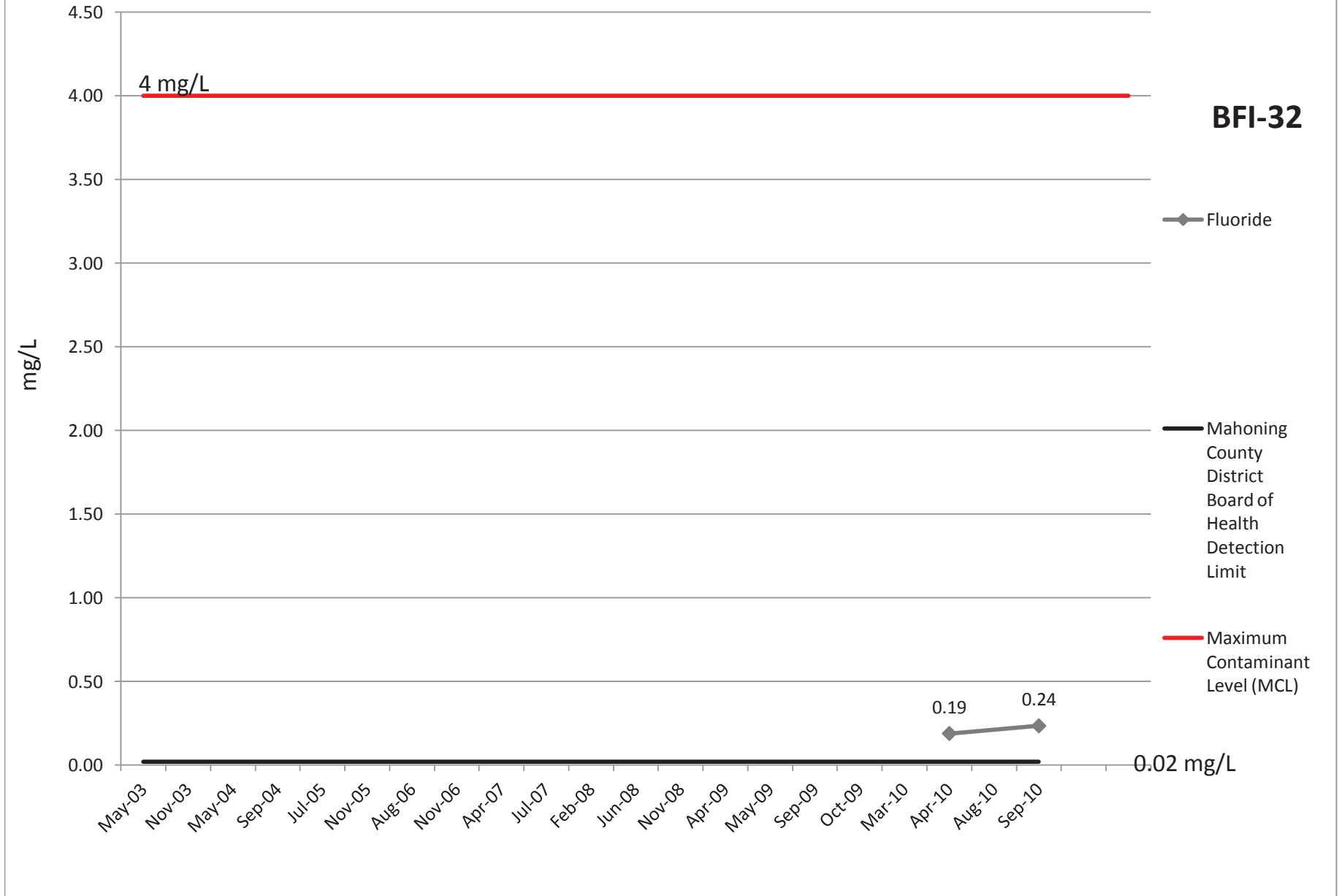
— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

# Conductivity

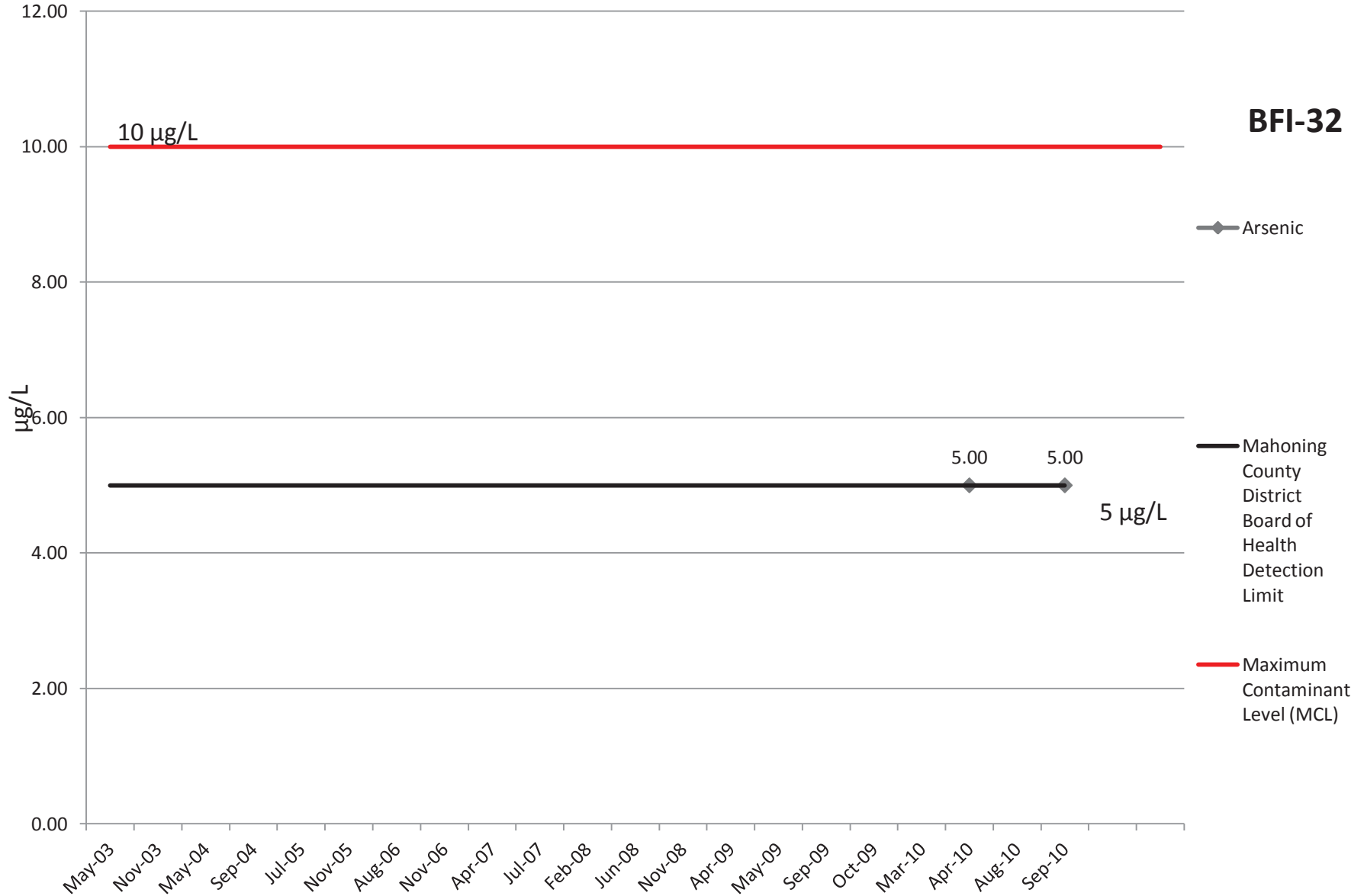


# Fluoride



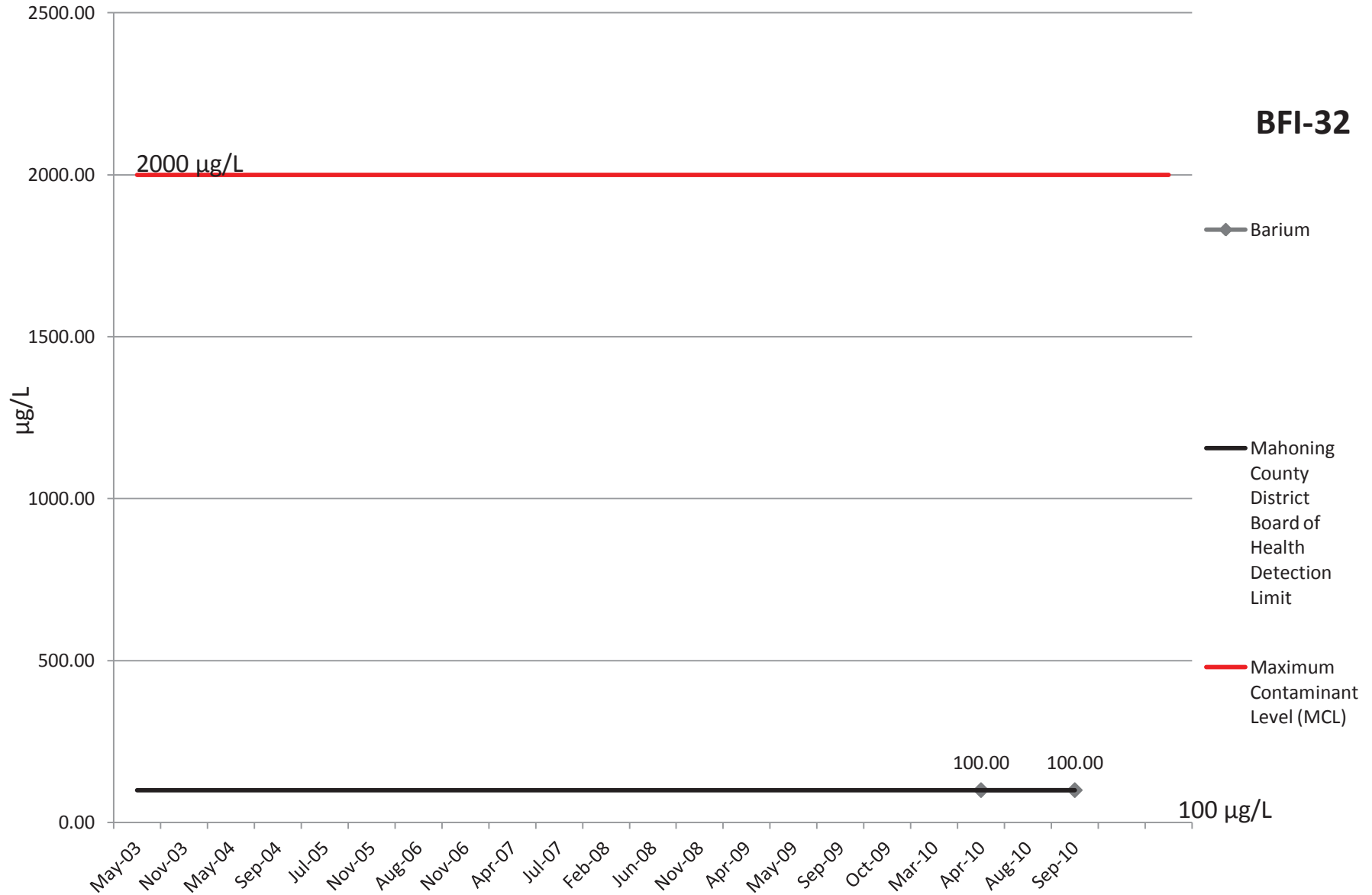
# Arsenic

**BFI-32**

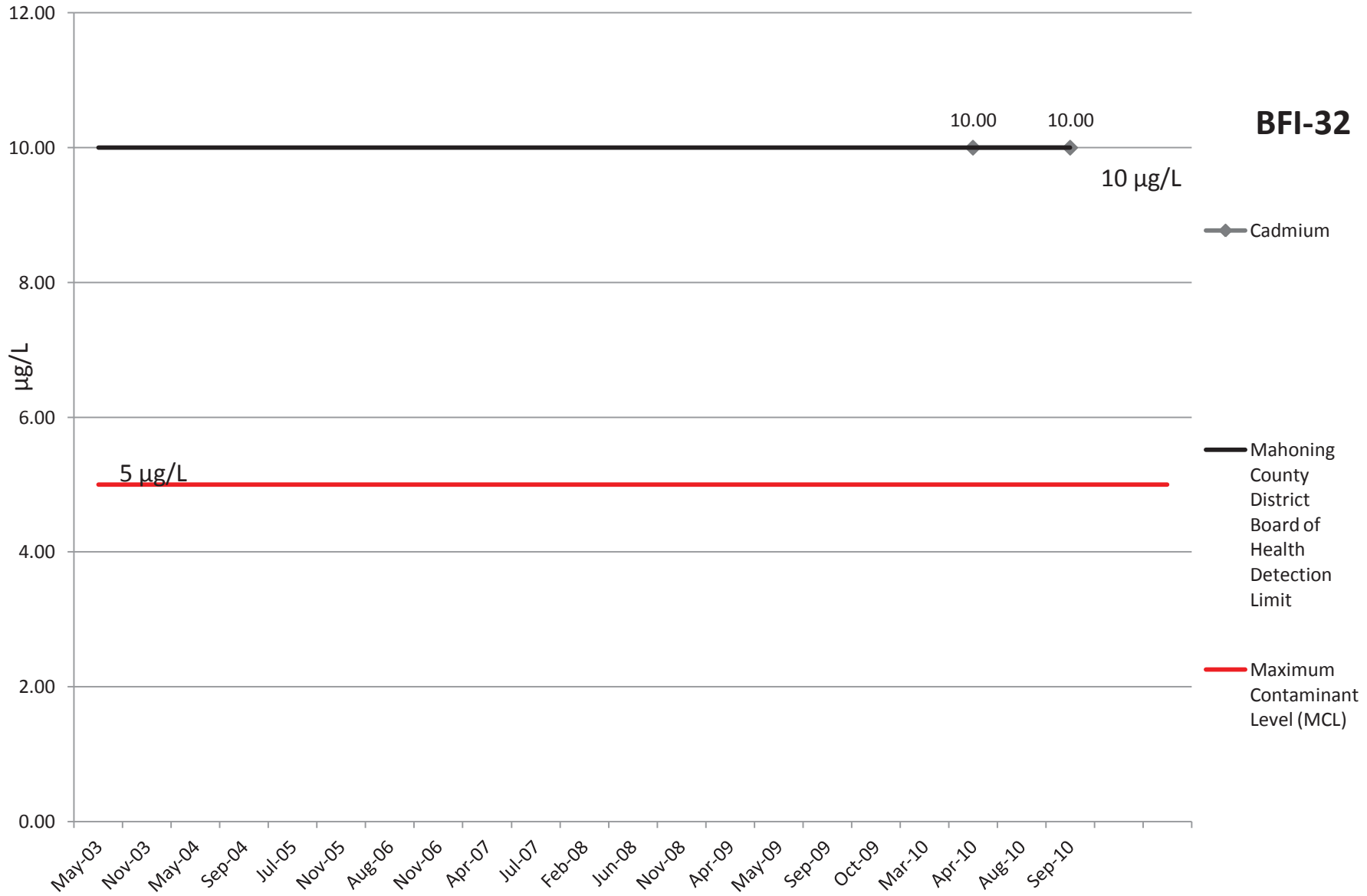


# Barium

**BFI-32**



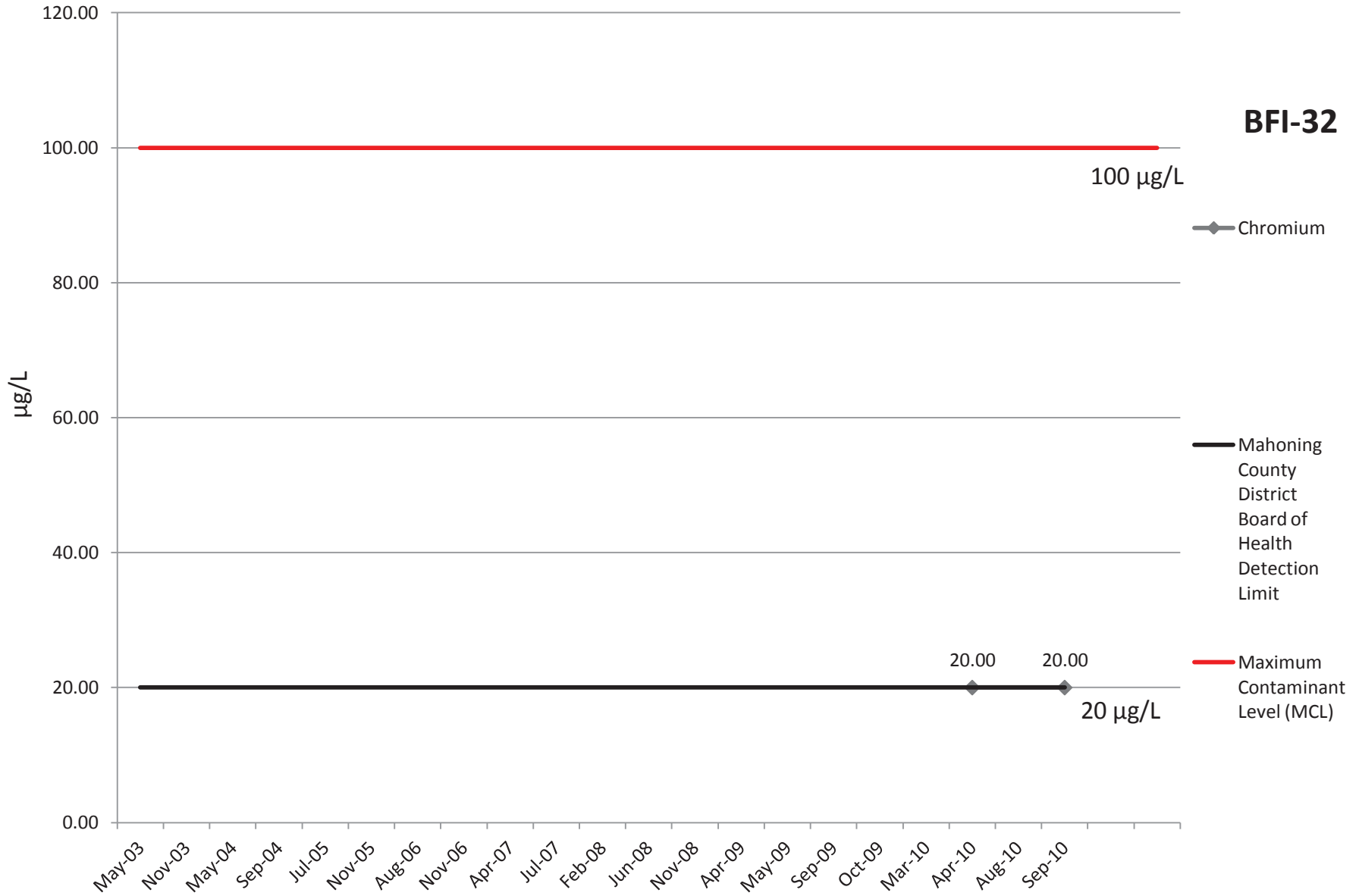
# Cadmium



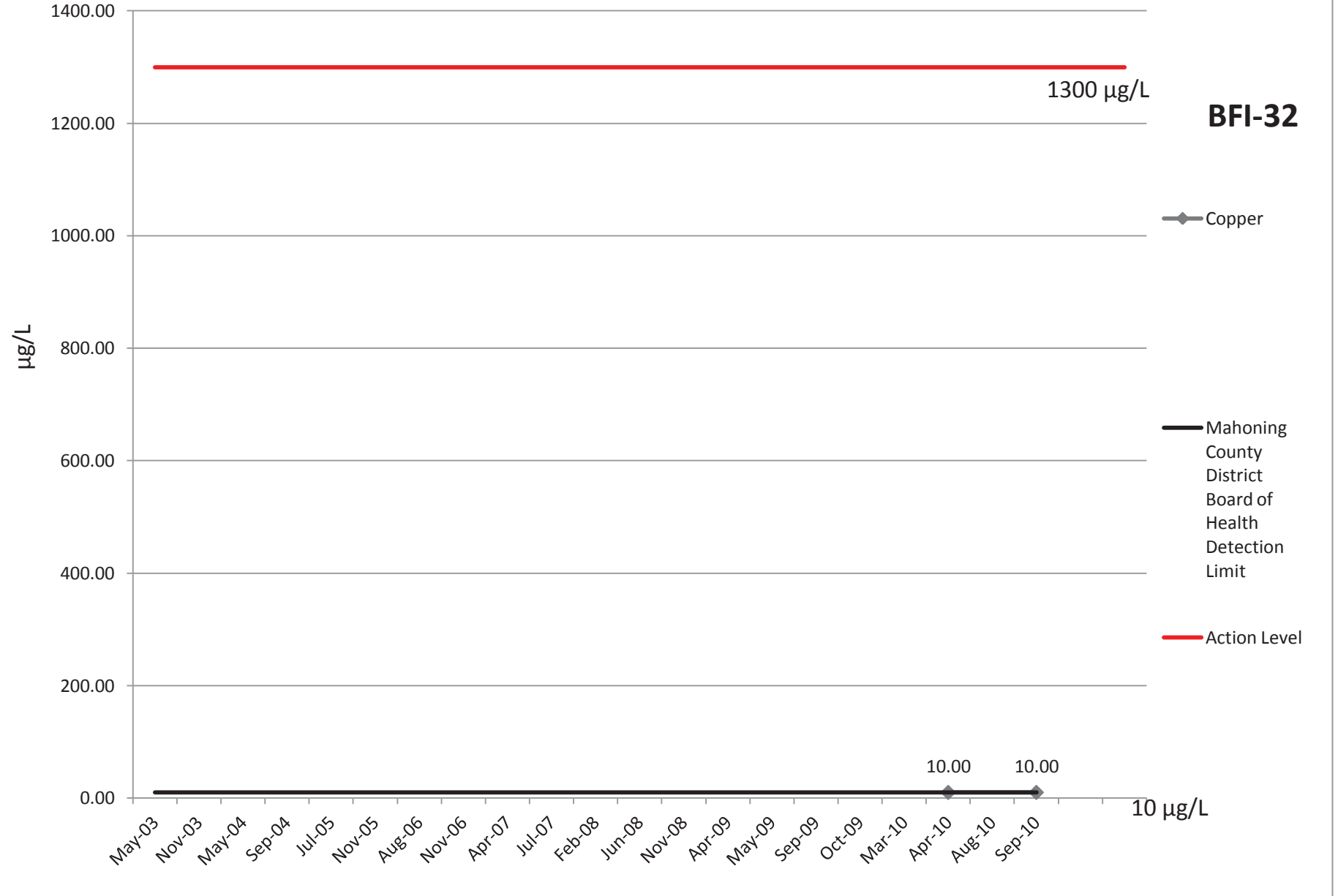


# Chromium

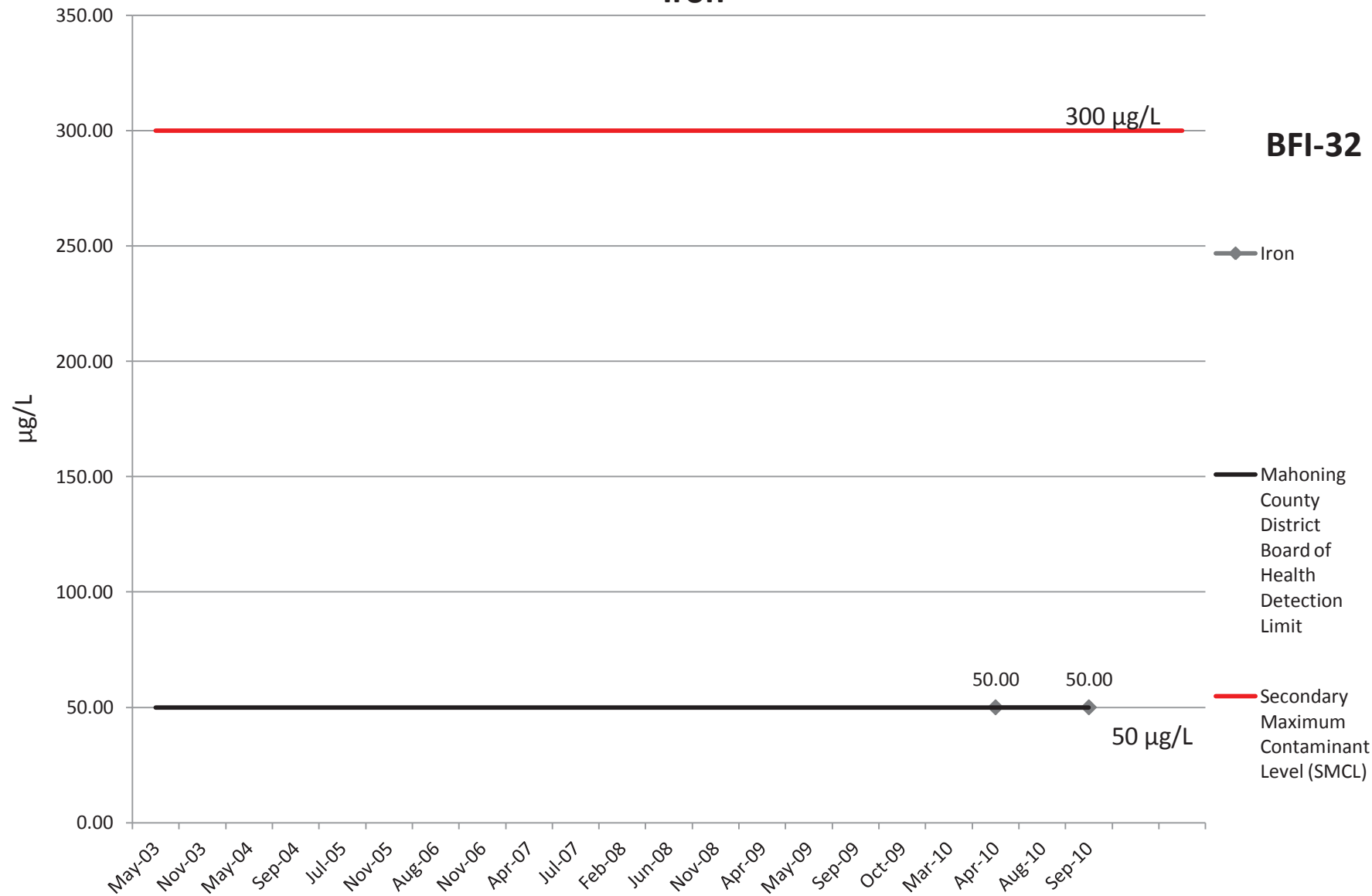
**BFI-32**



# Copper



# Iron



**BFI-32**

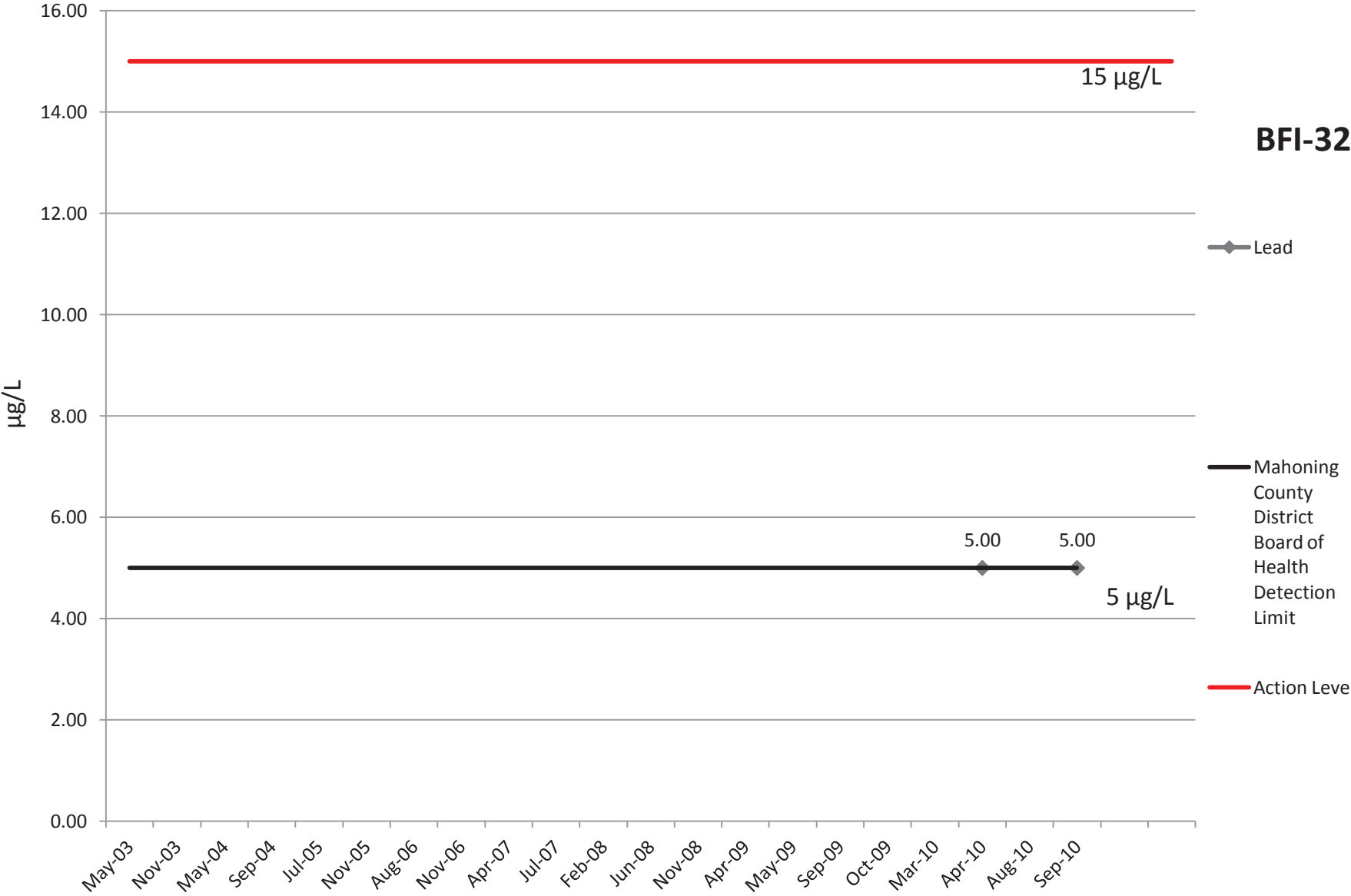
Iron

Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

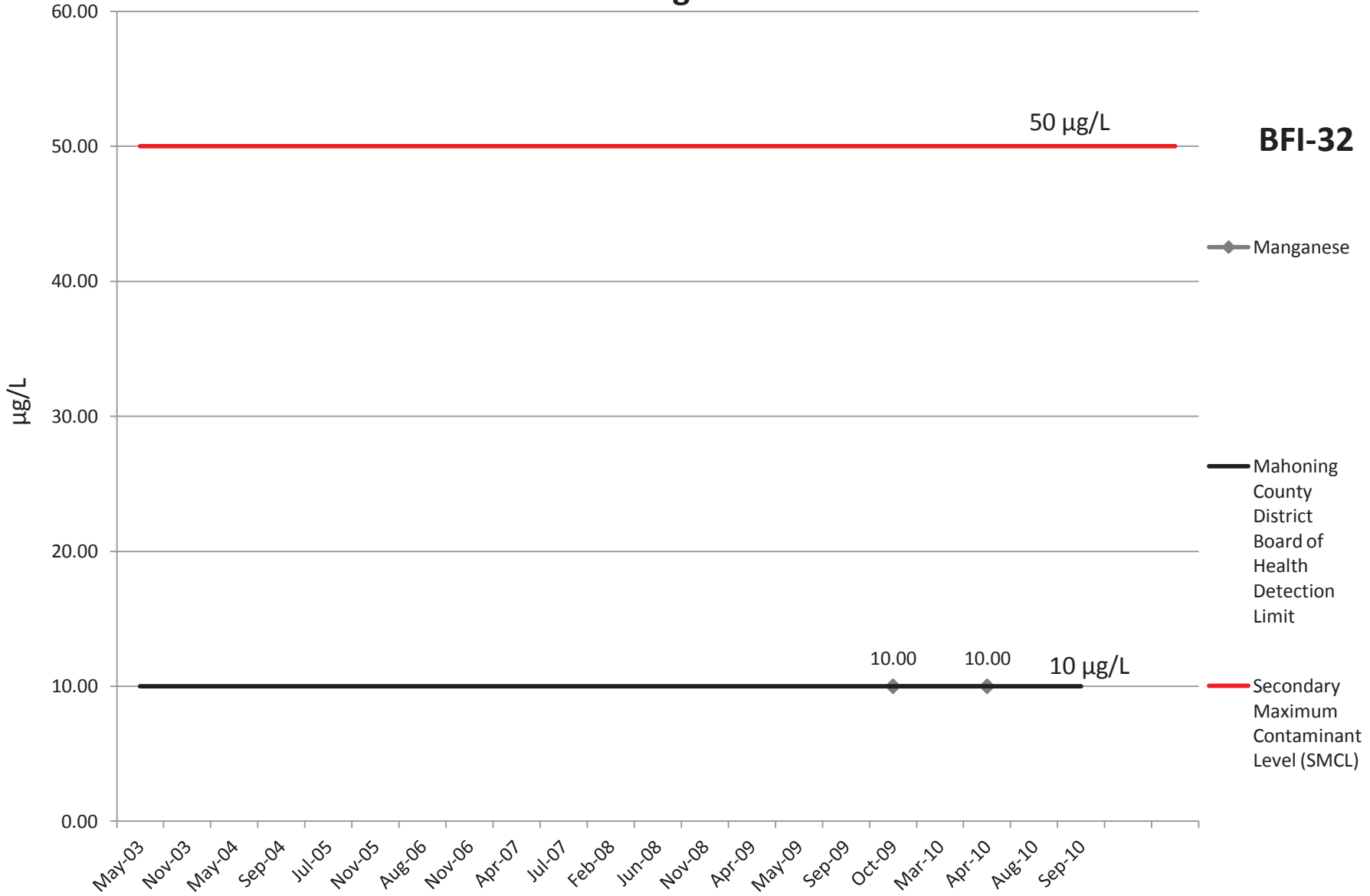
Secondary  
Maximum  
Contaminant  
Level (SMCL)

# Lead

**BFI-32**

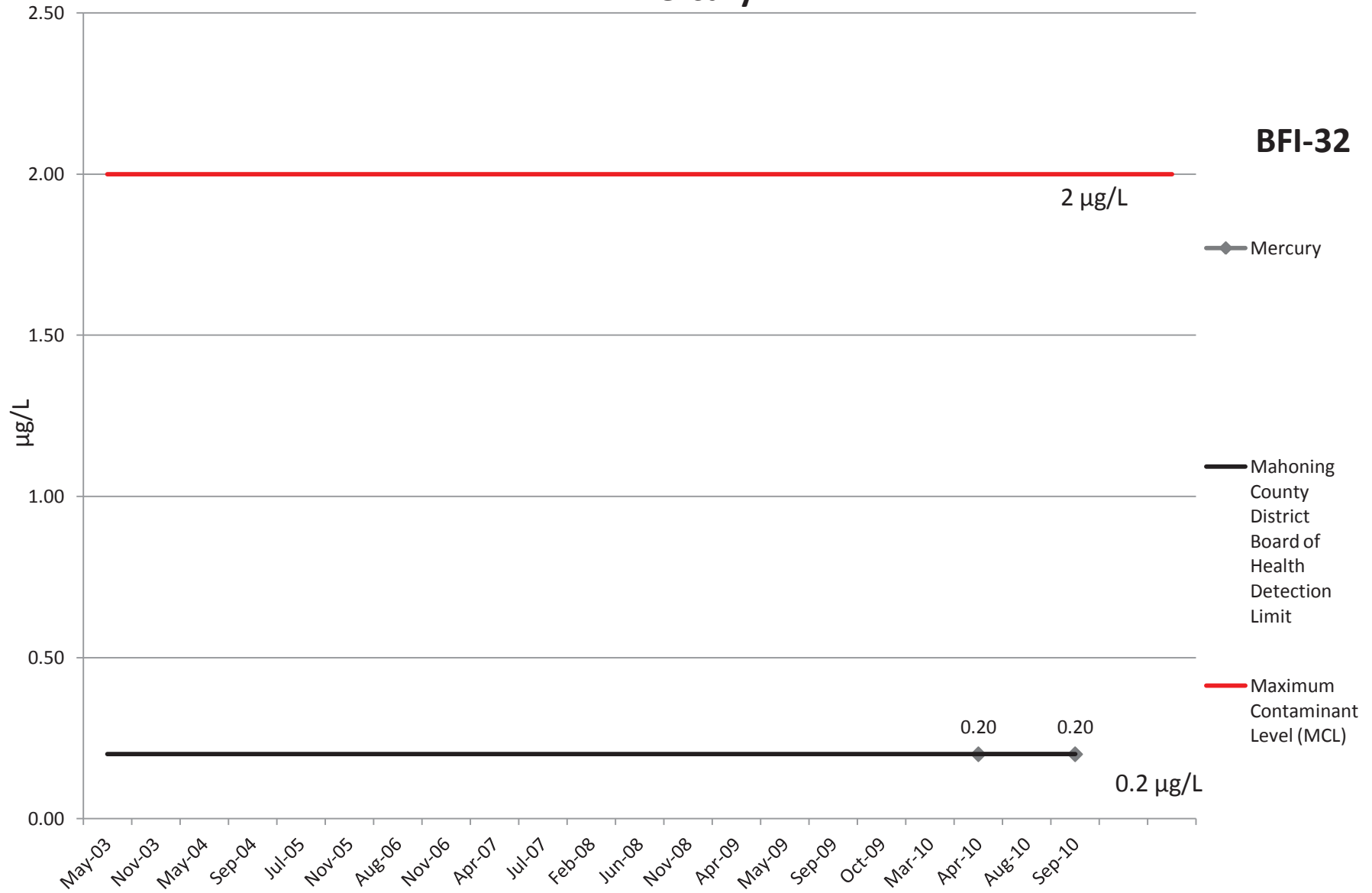


# Manganese

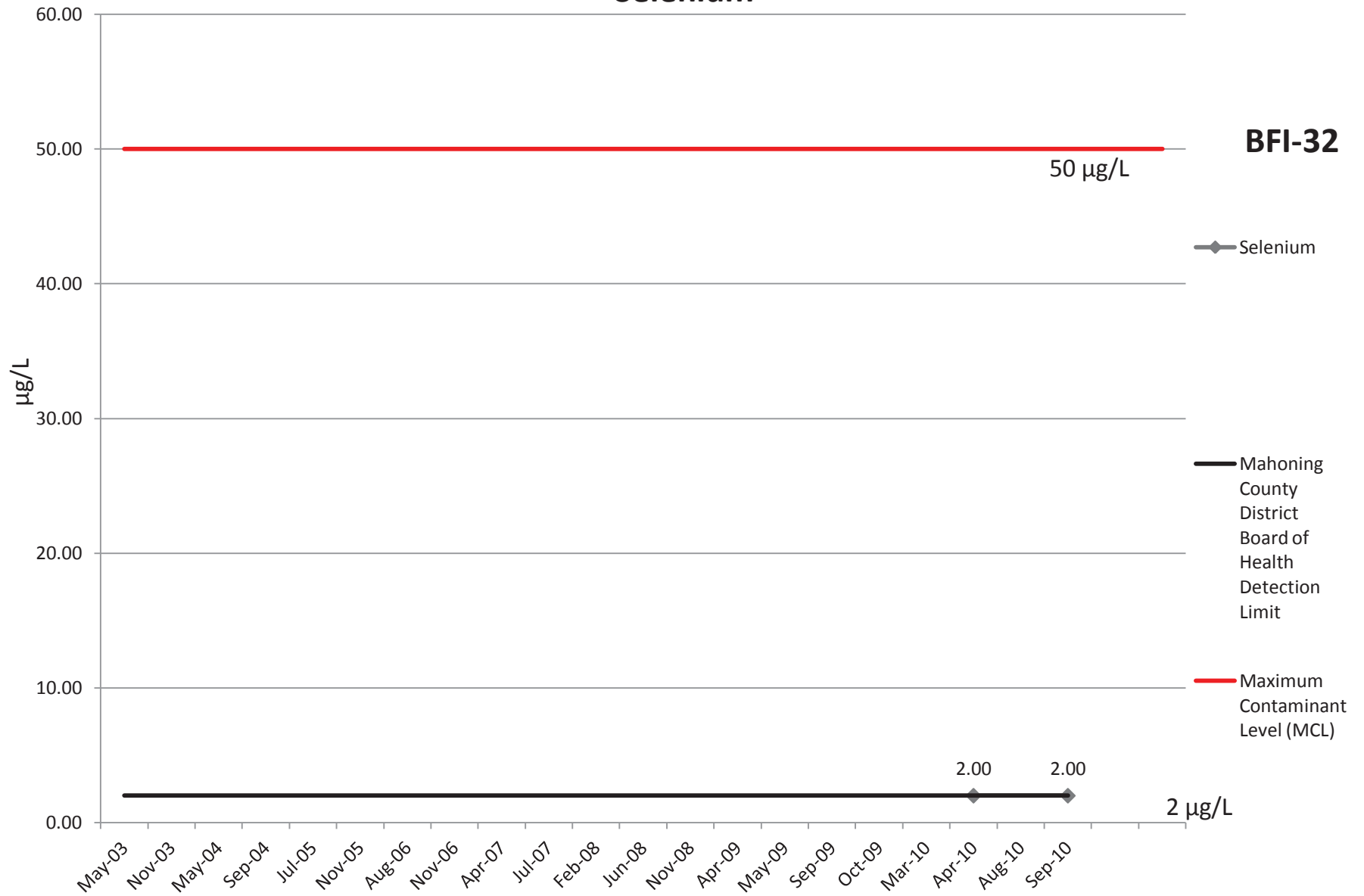


# Mercury

**BFI-32**



# Selenium



**BFI-32**

50  $\mu\text{g/L}$

◆ Selenium

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

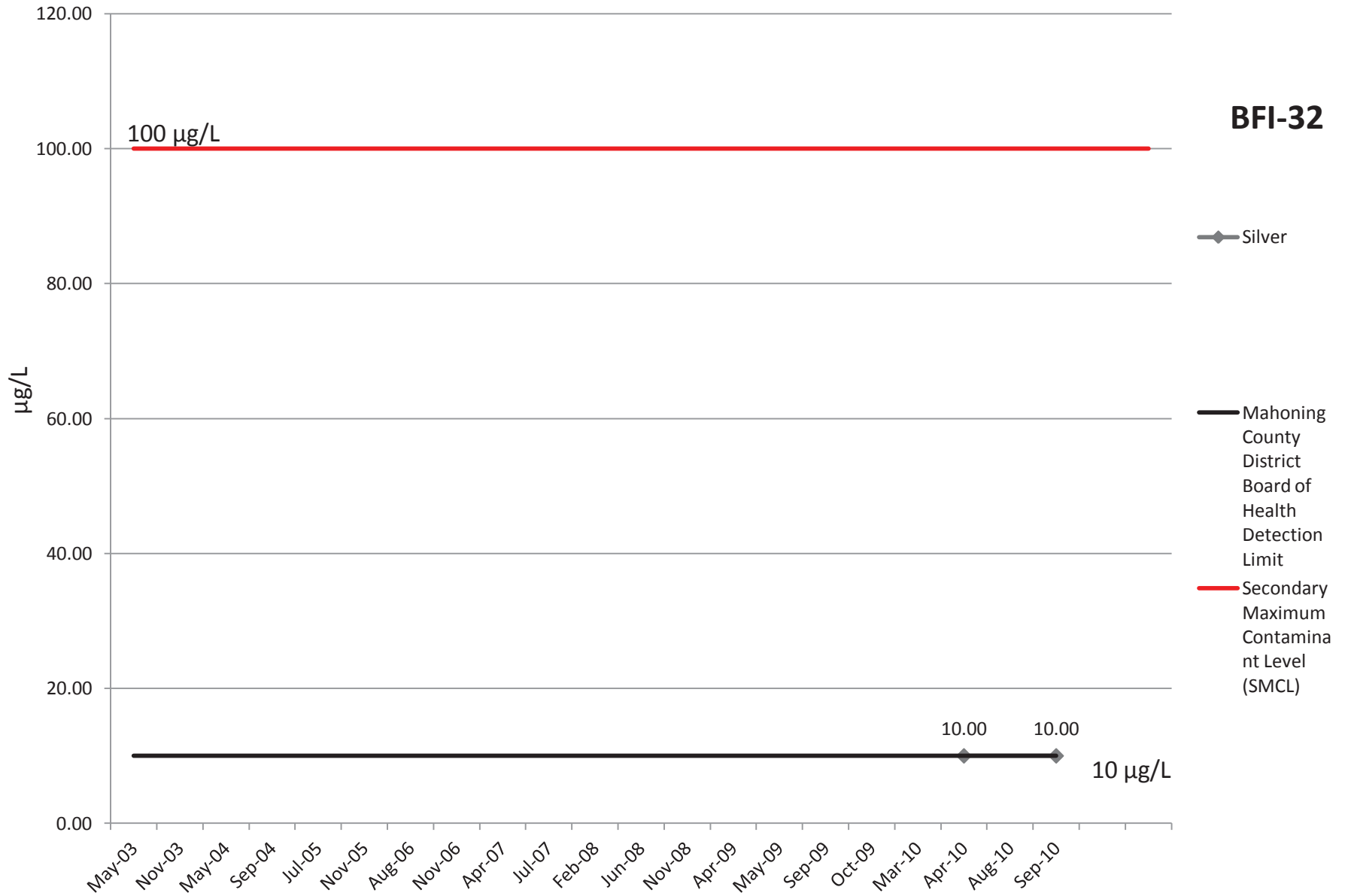
2.00

2.00

2  $\mu\text{g/L}$

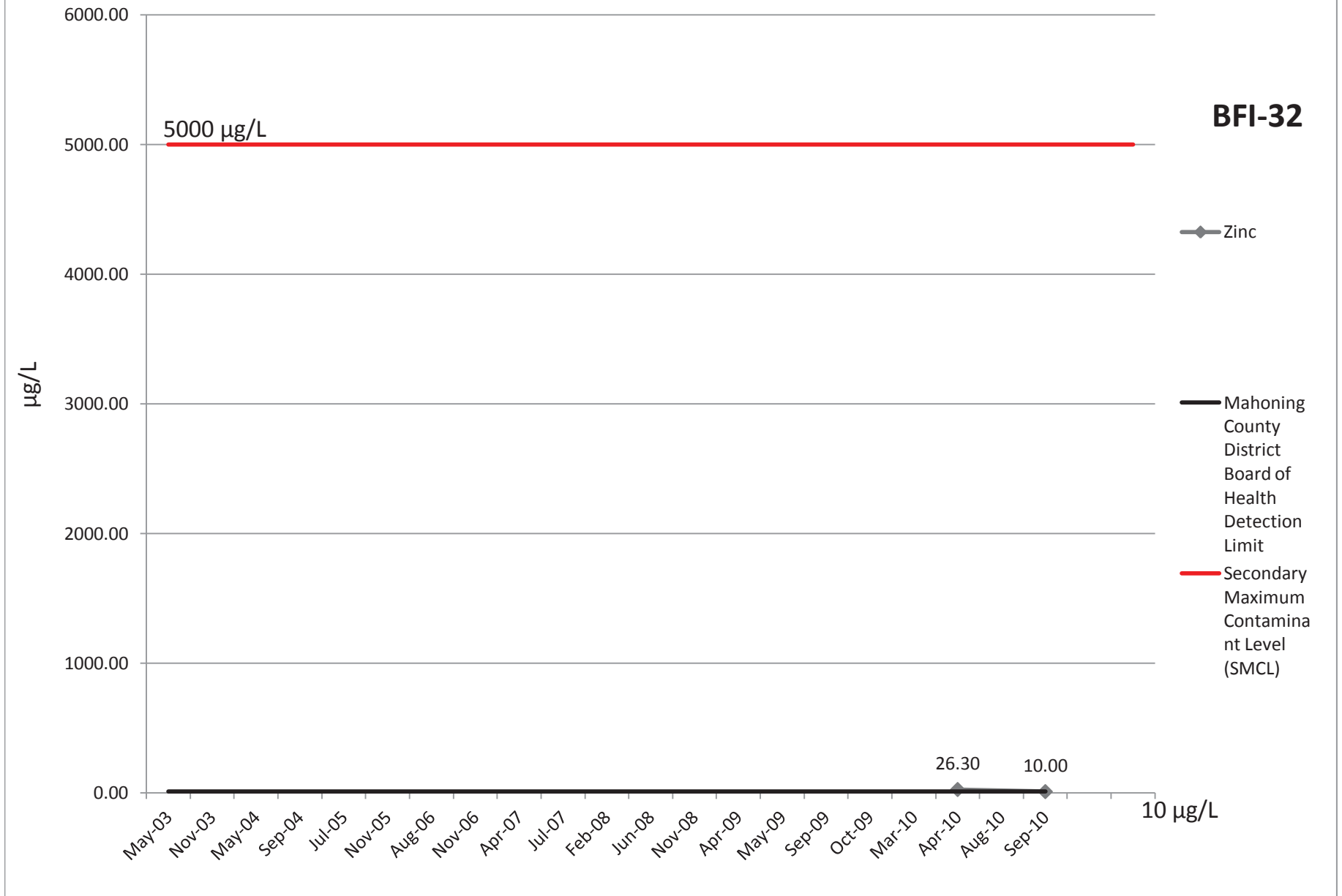
# Silver

**BFI-32**

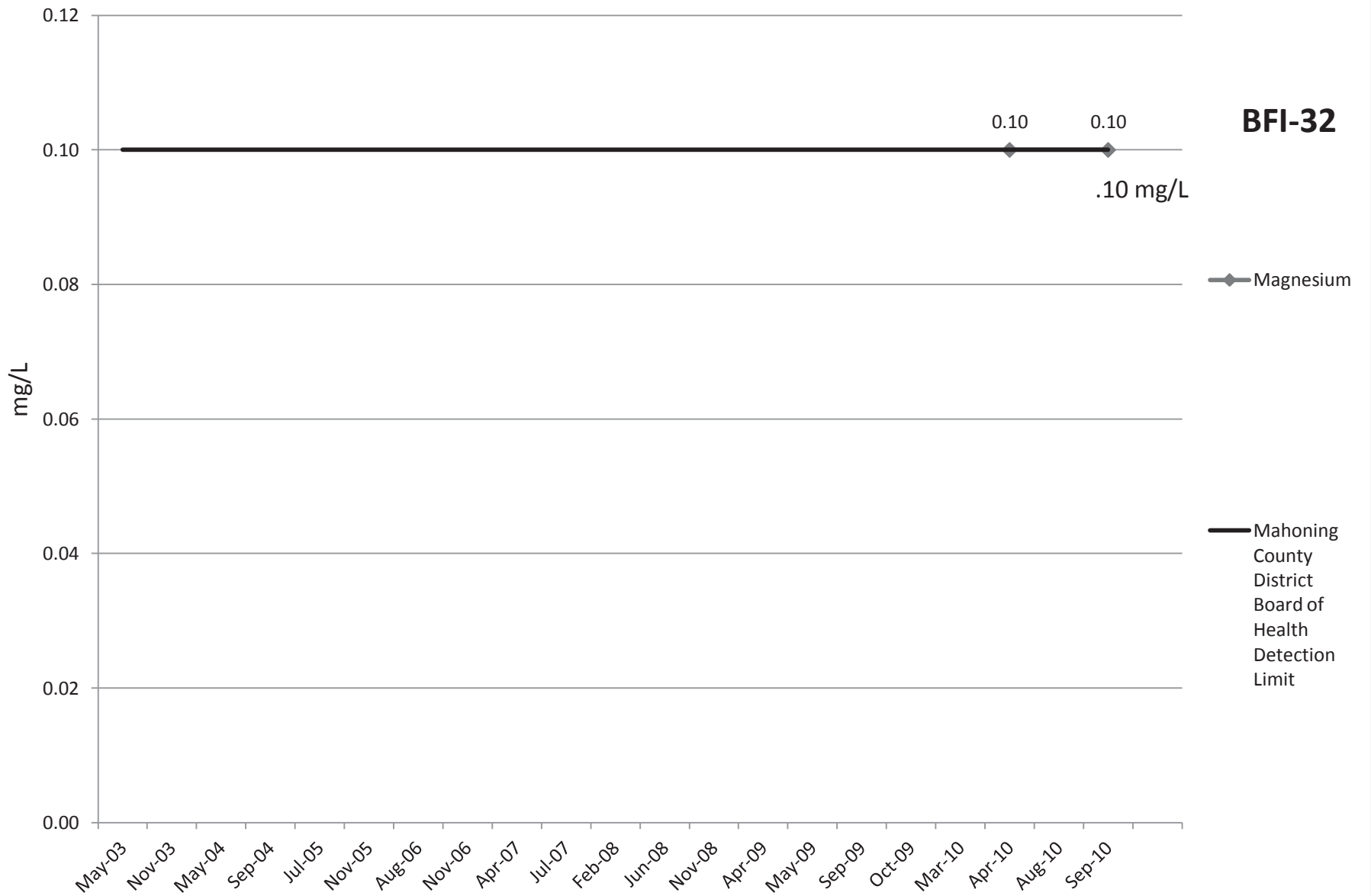




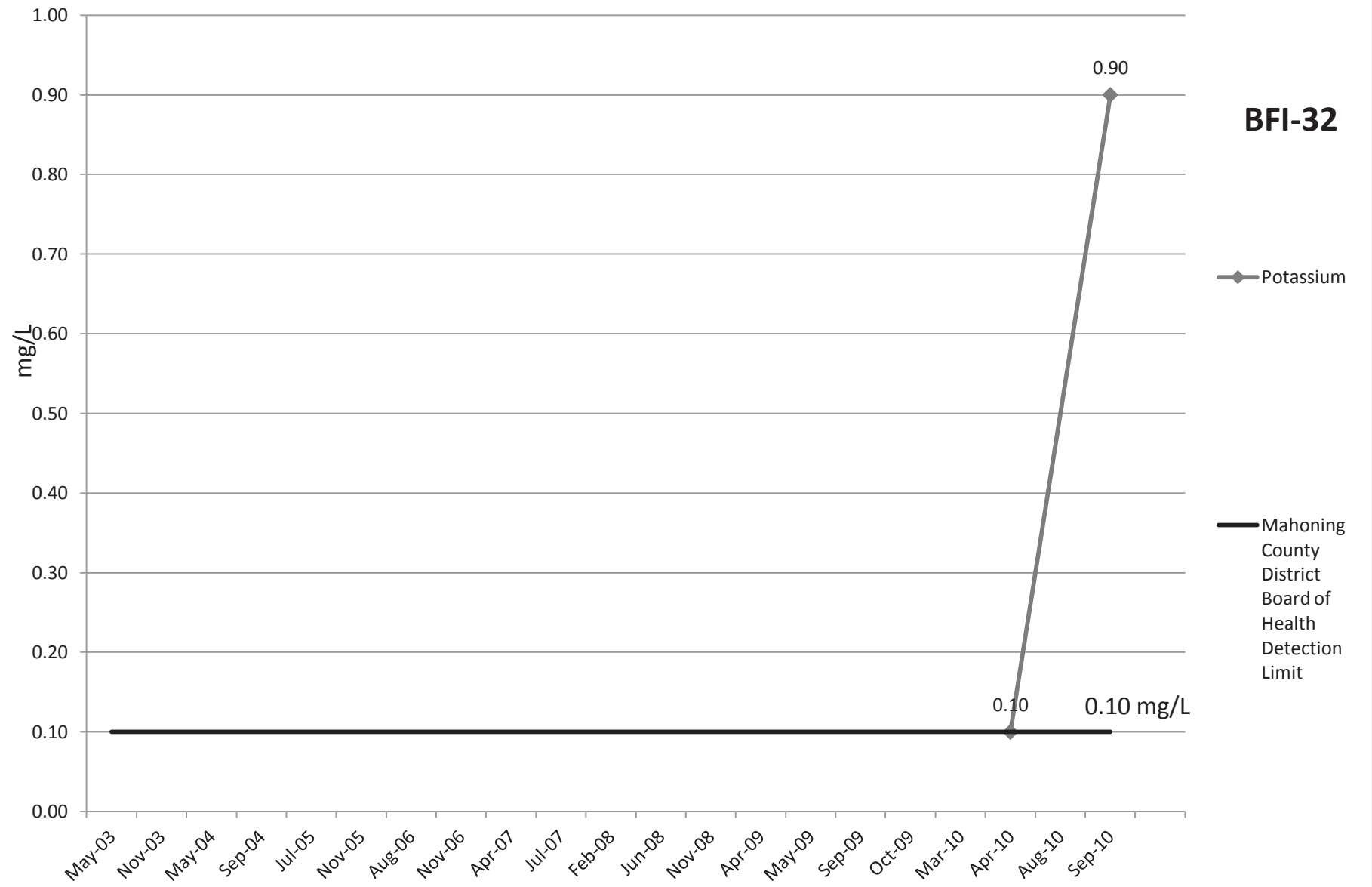
# Zinc



# Magnesium



# Potassium



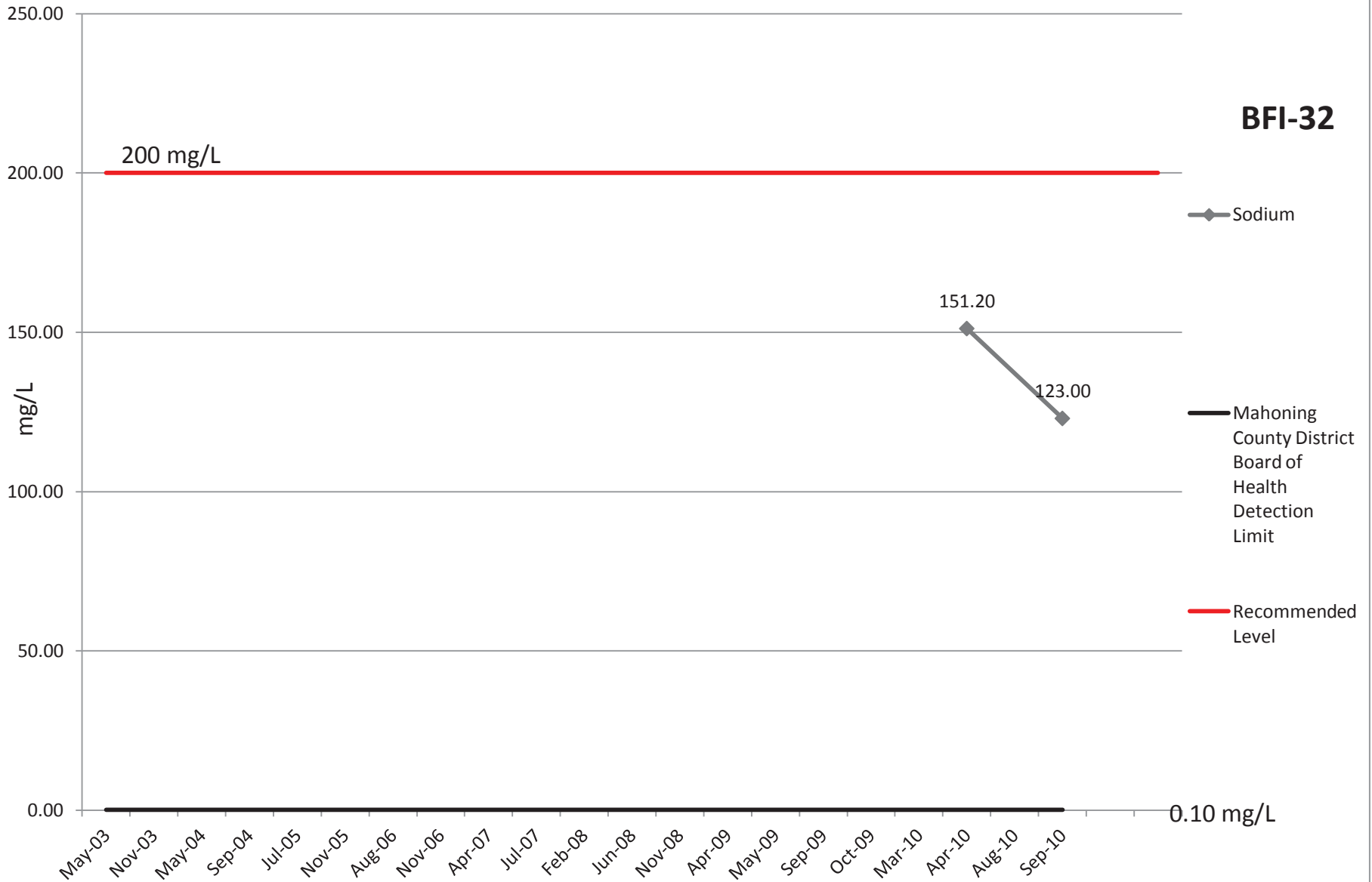
**BFI-32**

◆ Potassium

— Mahoning County District Board of Health Detection Limit

# Sodium

**BFI-32**



# Nitrate EPA

**BFI-32**

10 mg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

mg/L

◆ Nitrate EPA

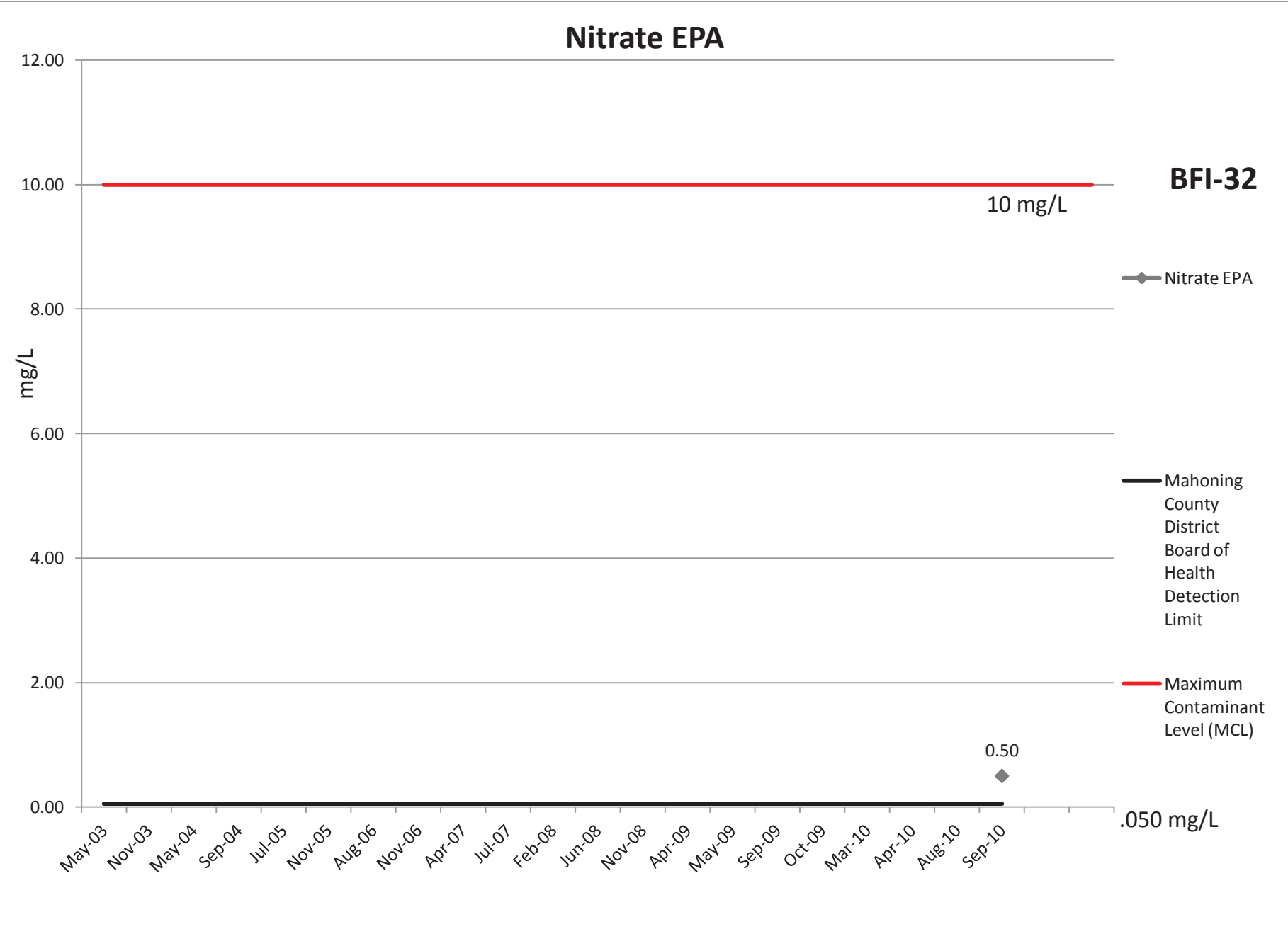
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

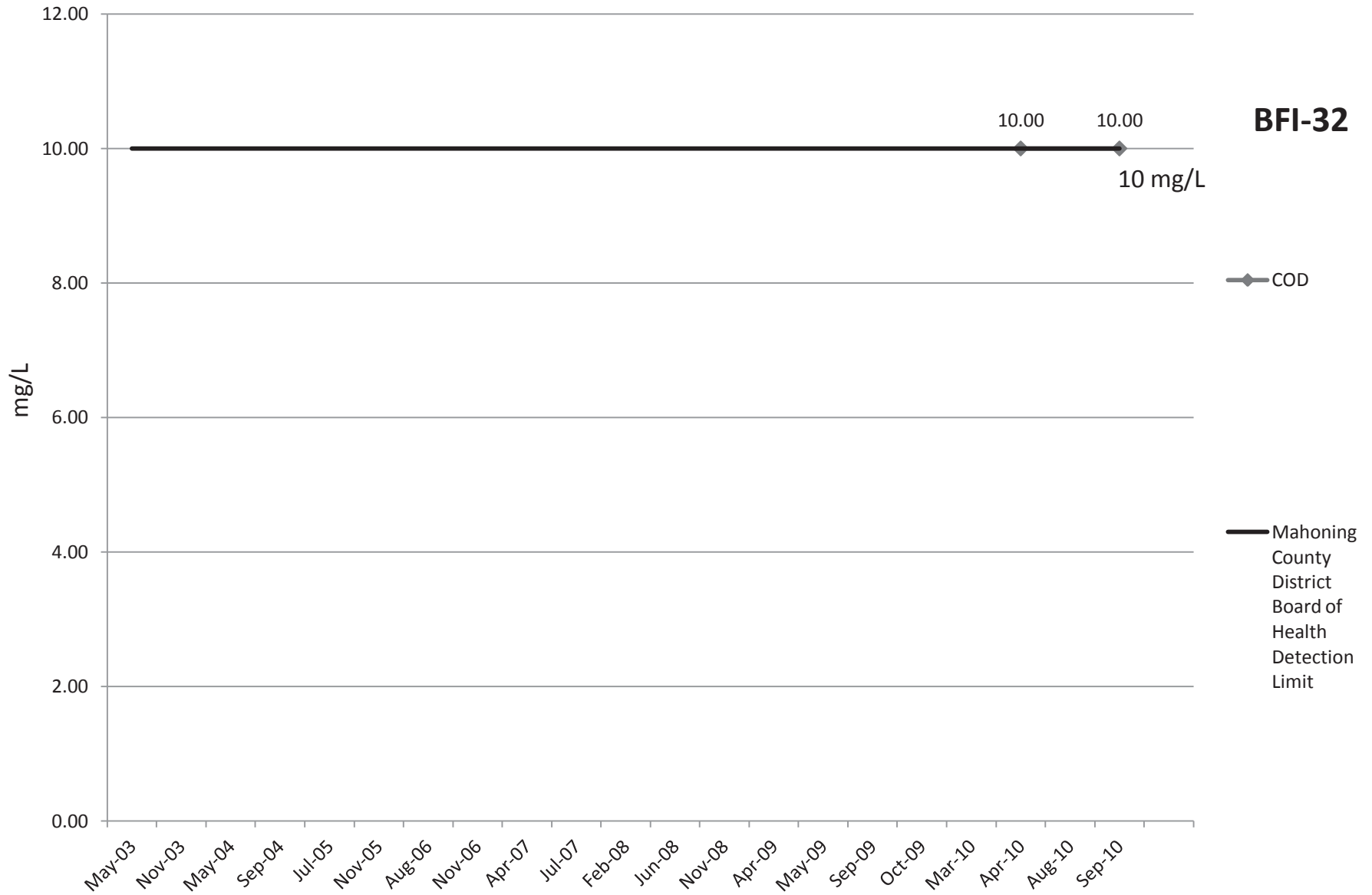
0.50

.050 mg/L

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# COD



**BFI-32**

10 mg/L

◆ COD

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

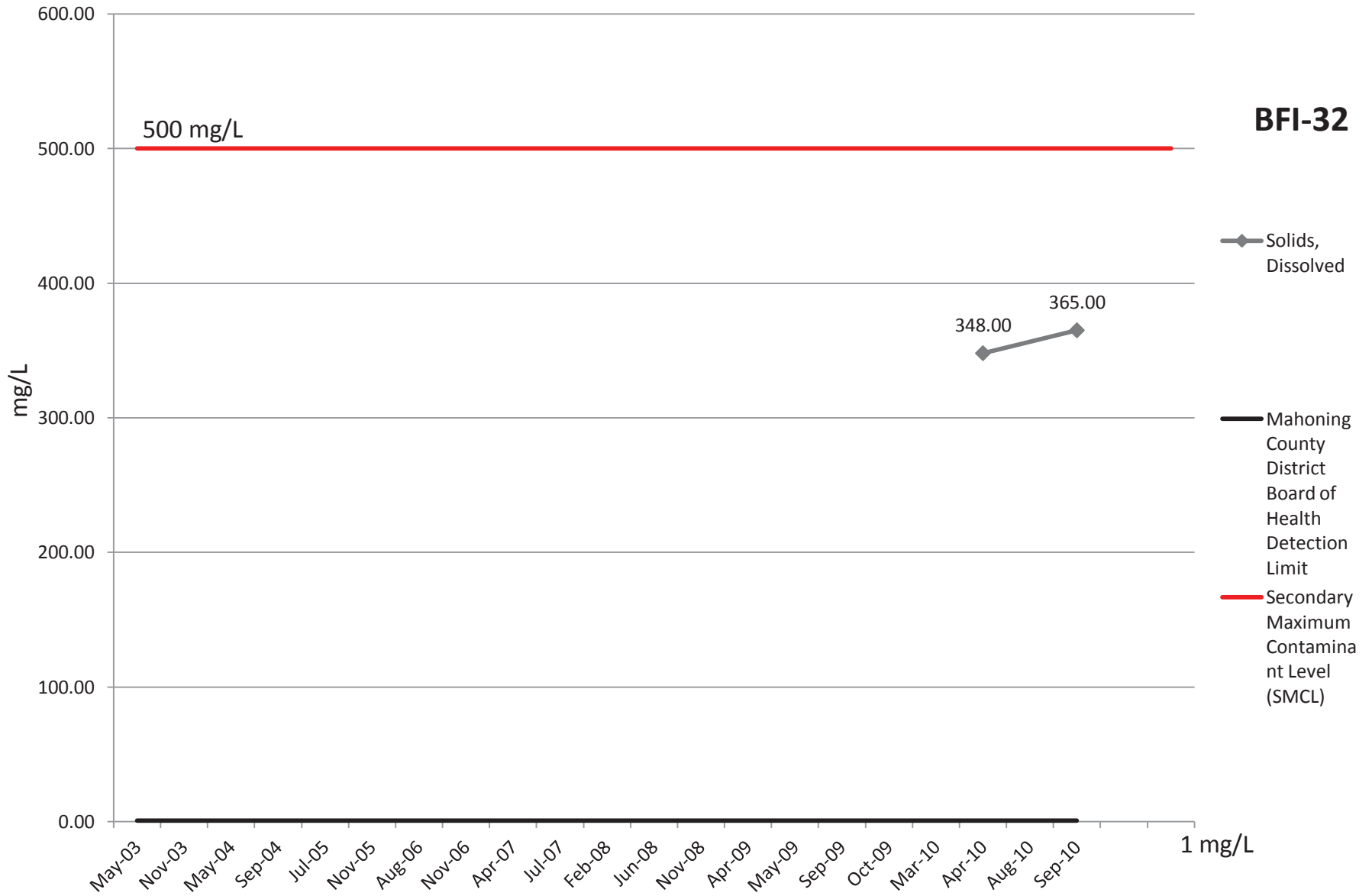
# pH

**BFI-32**



# Solids, Dissolved

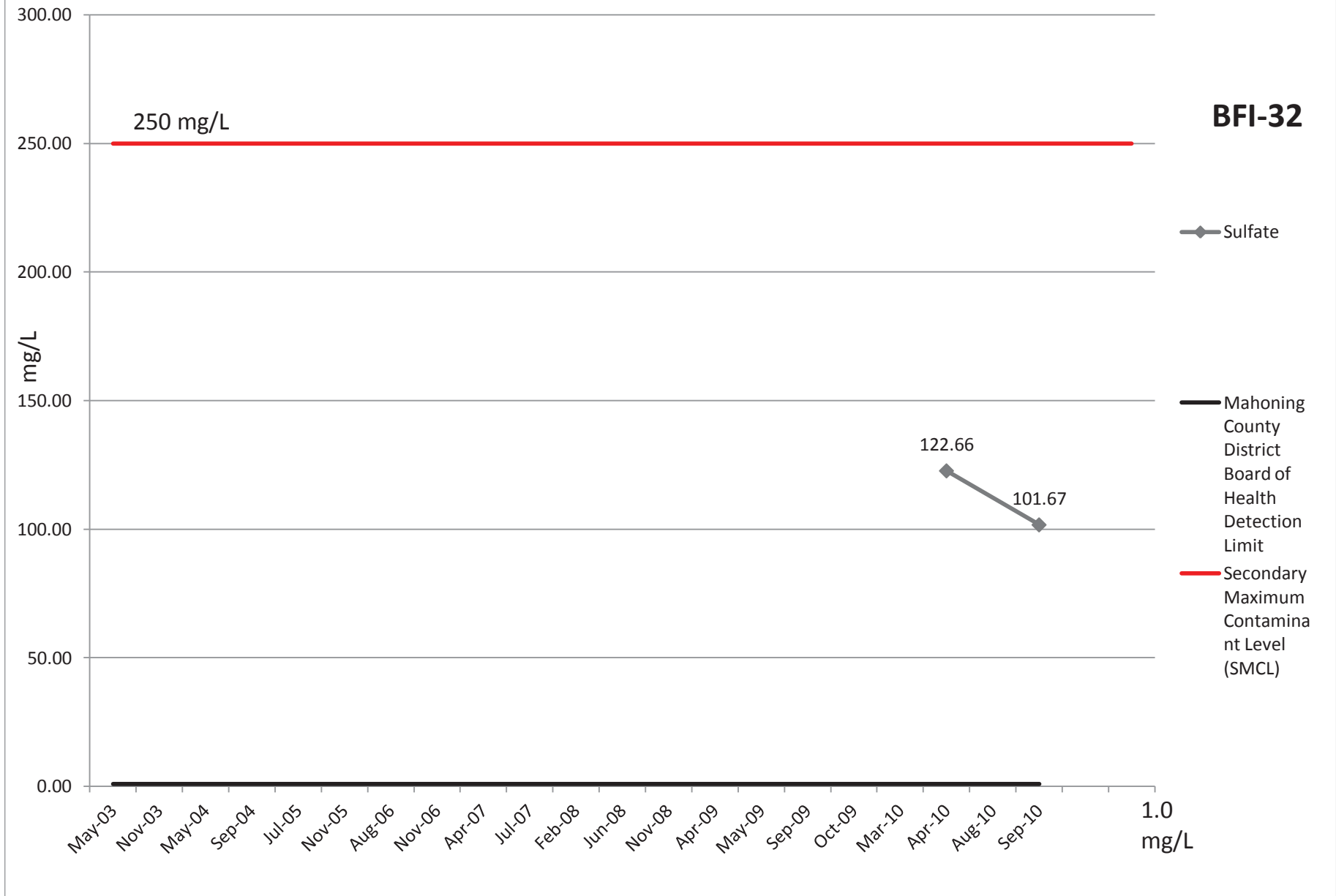
**BFI-32**





# Sulfate

**BFI-32**



# Bacteria

positive (1)

**BFI-32**

Positive/Negative

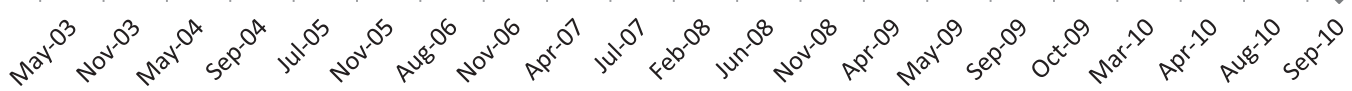
◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

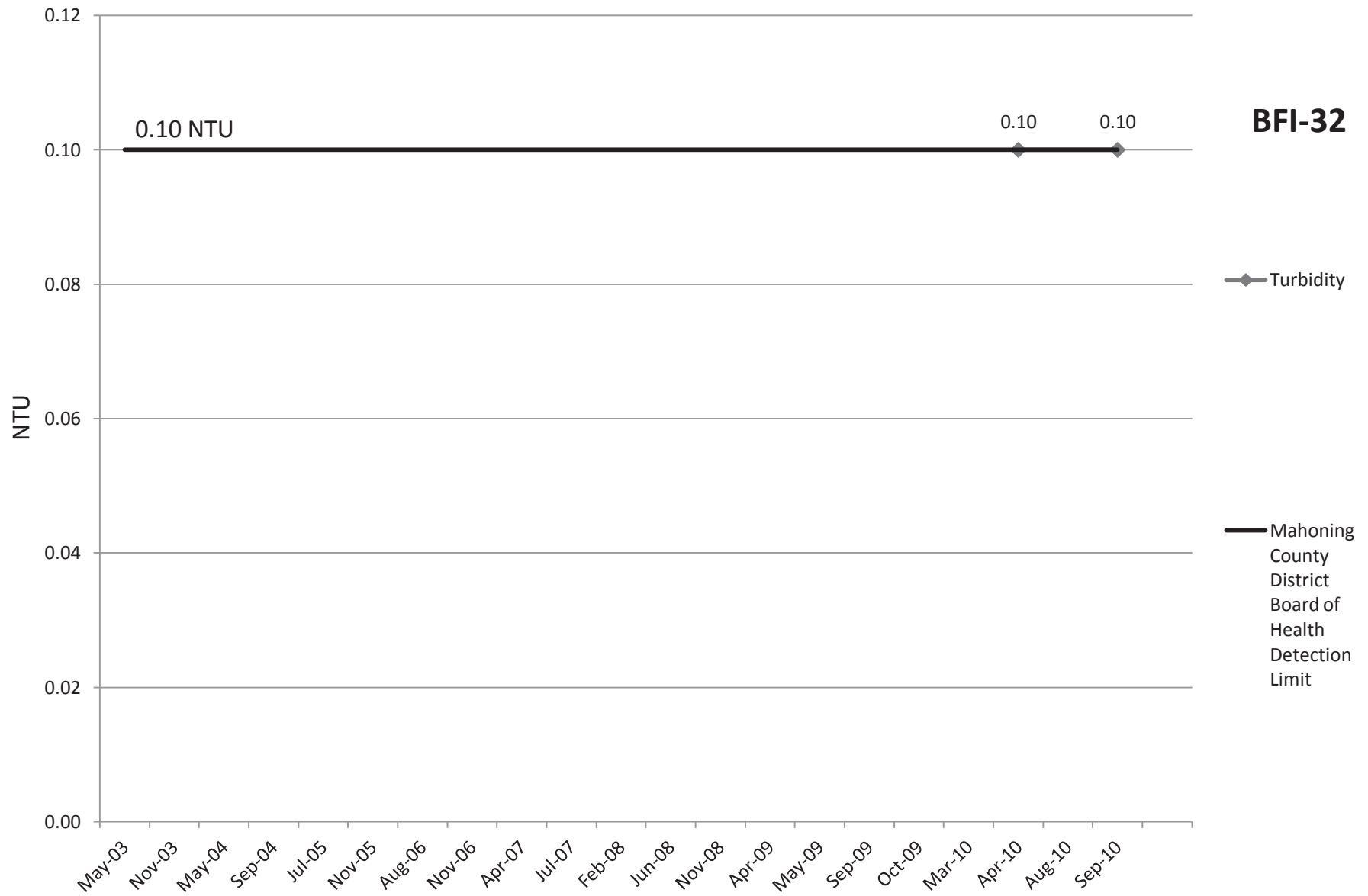
— Maximum  
Contaminant  
Level (MCL)

0.00

negative (0)

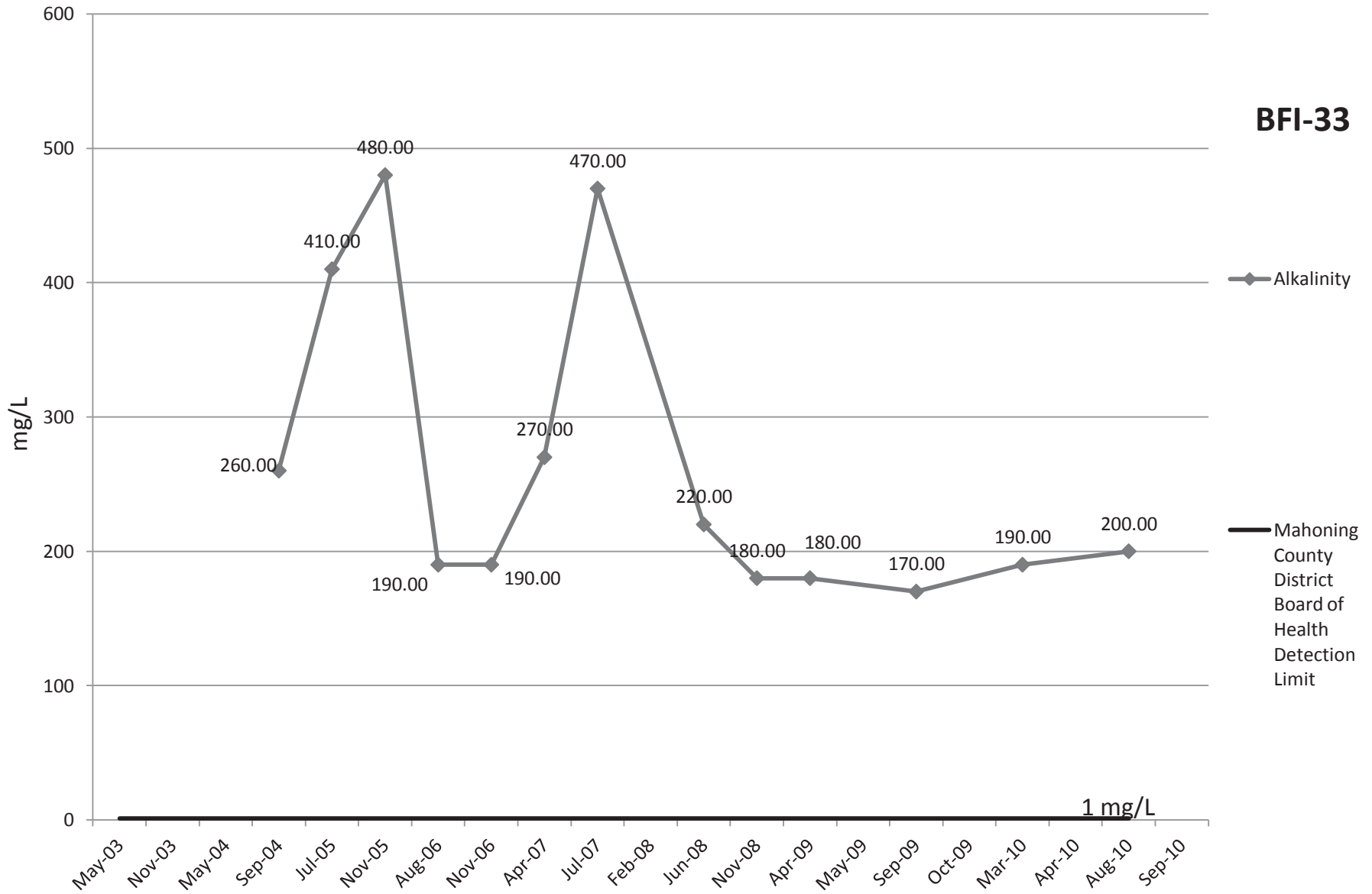


# Turbidity



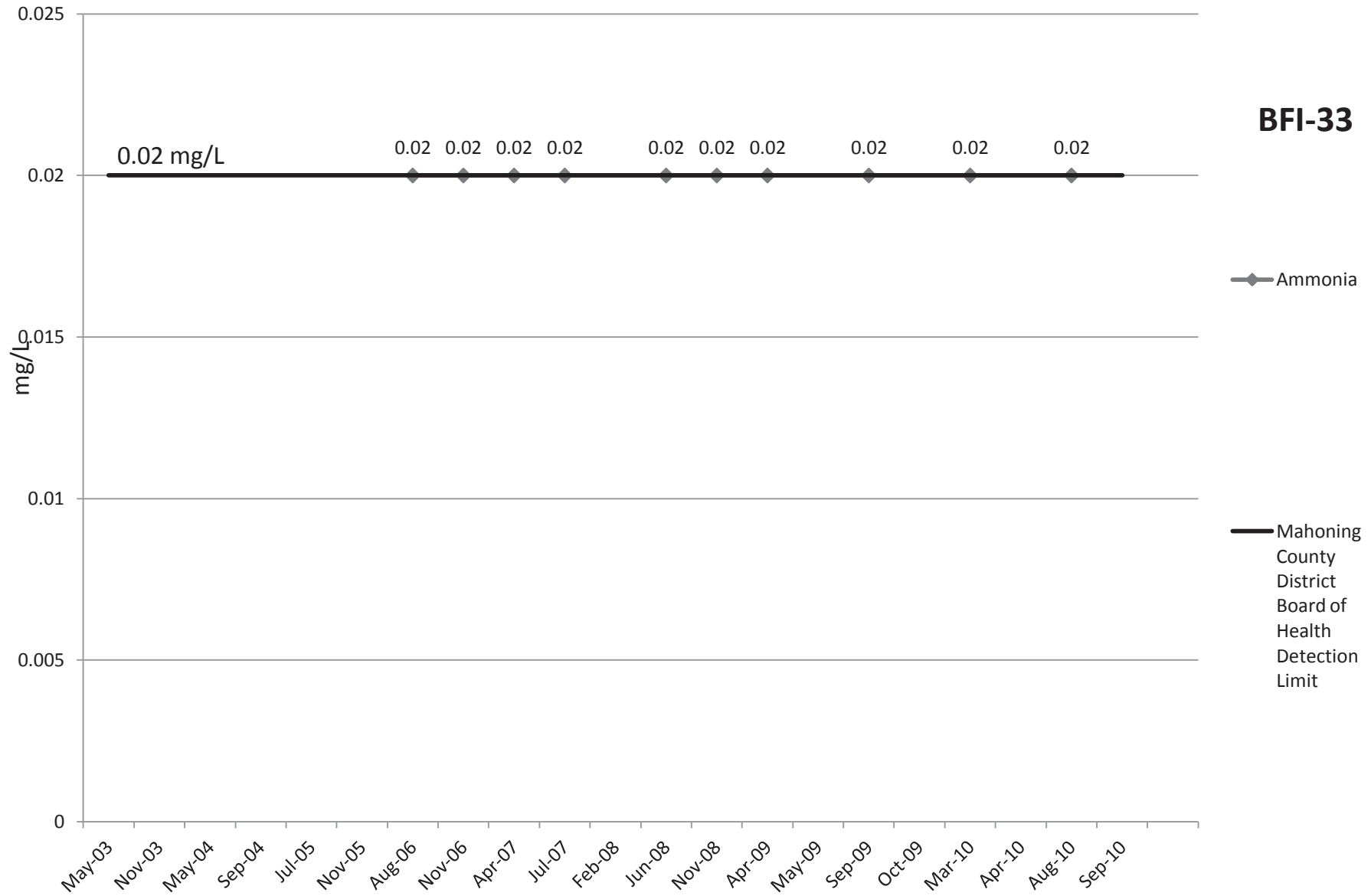
# Alkalinity

**BFI-33**

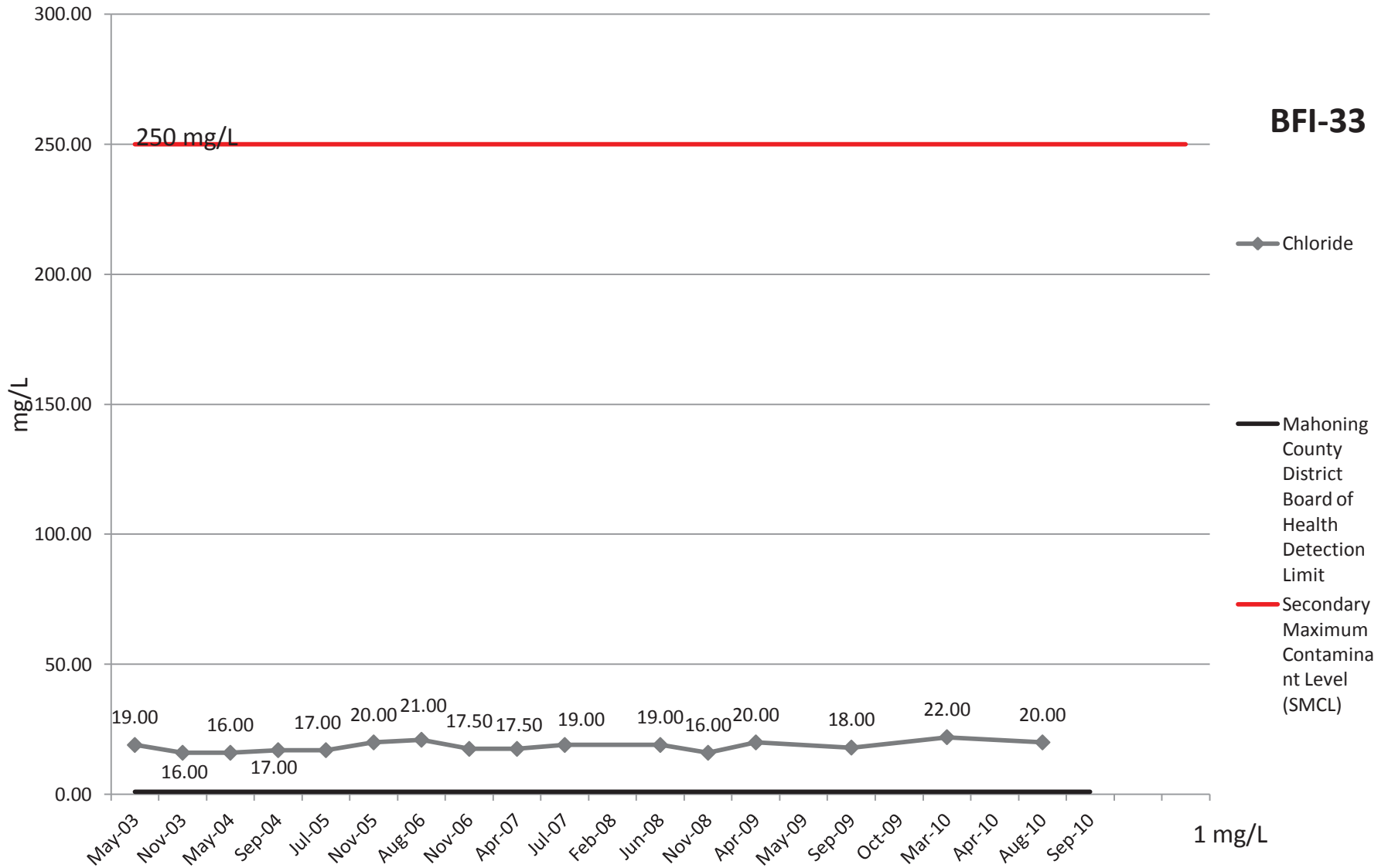


# Ammonia

**BFI-33**

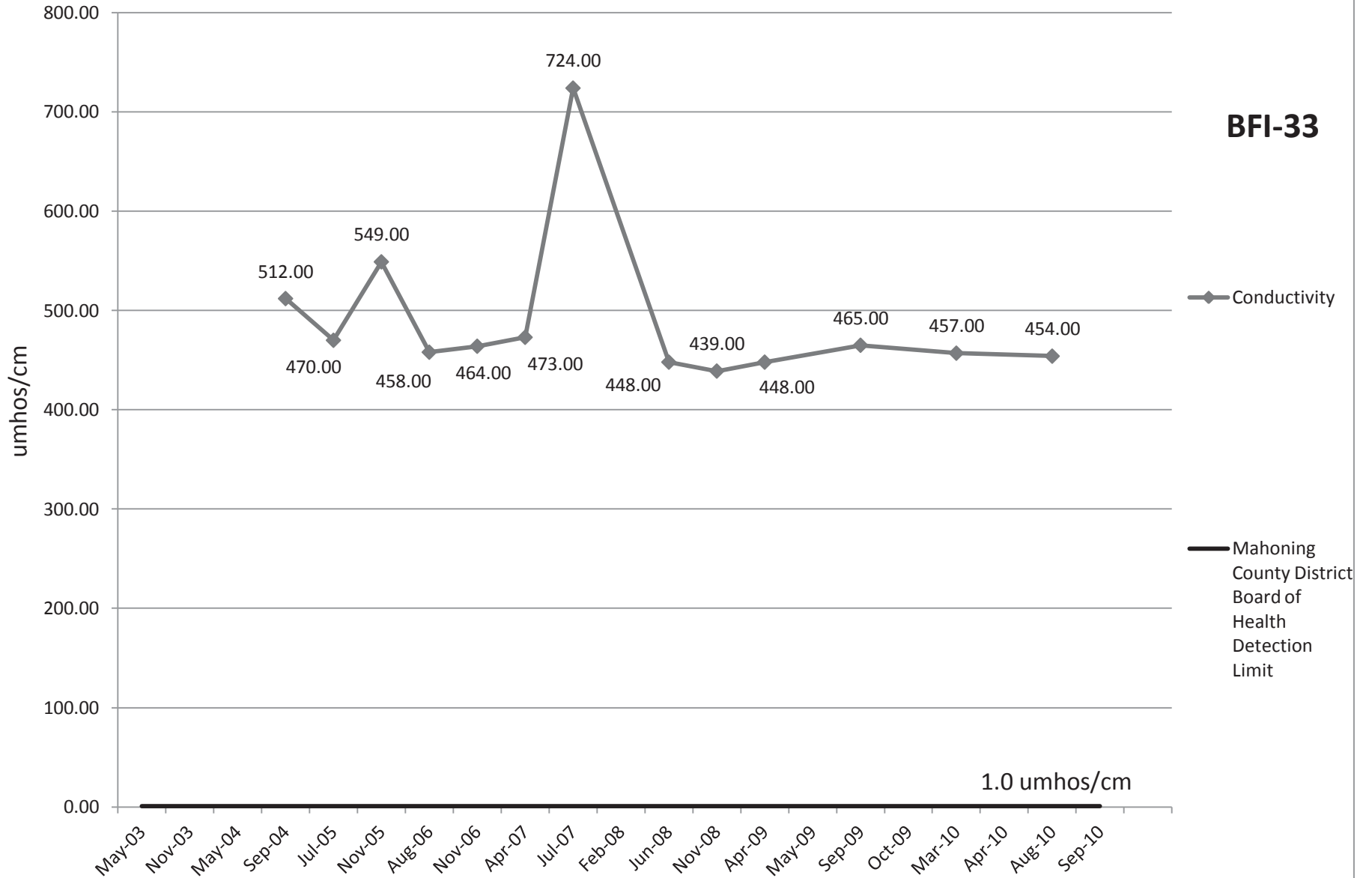


# Chloride

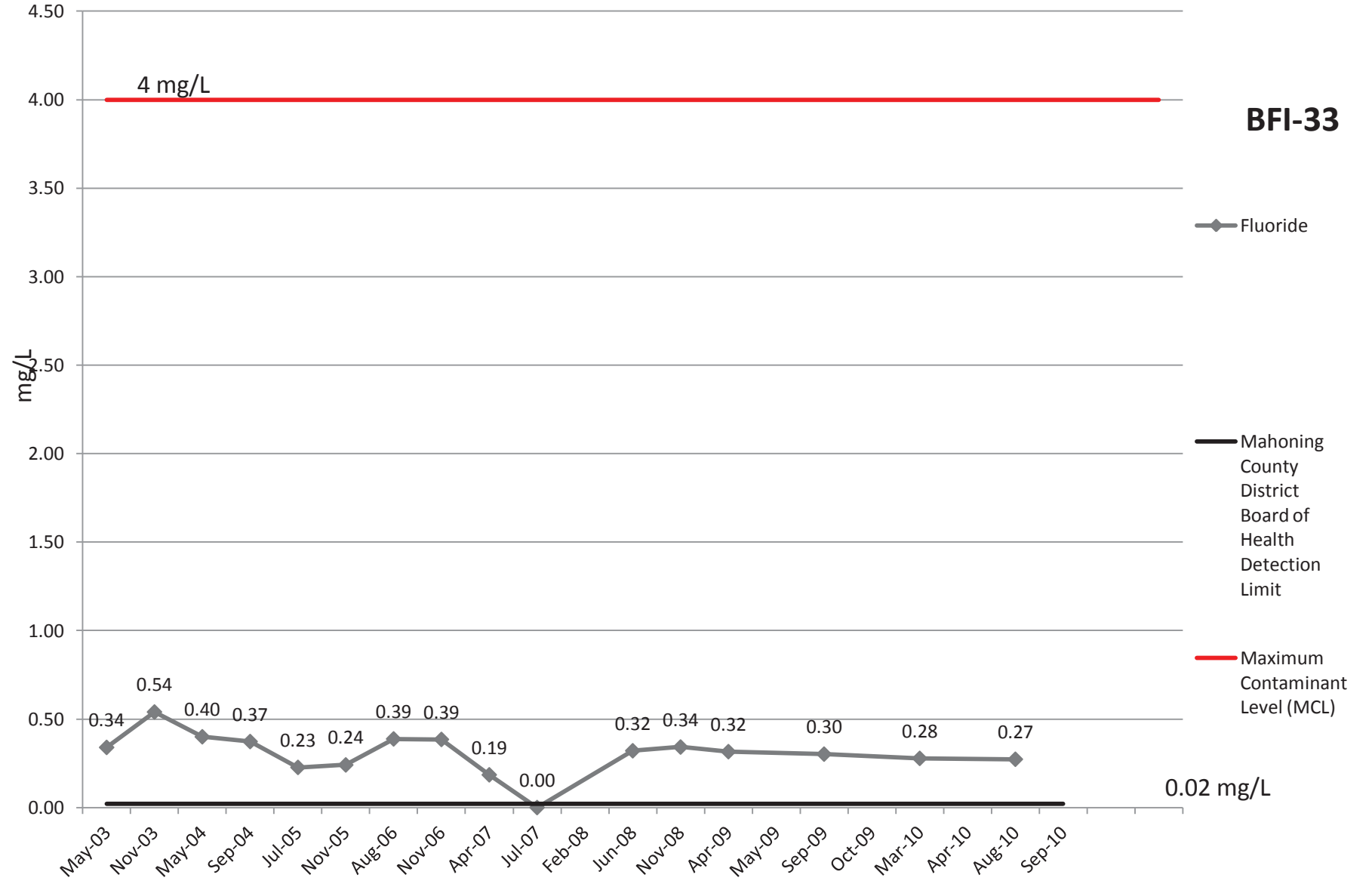


# Conductivity

**BFI-33**

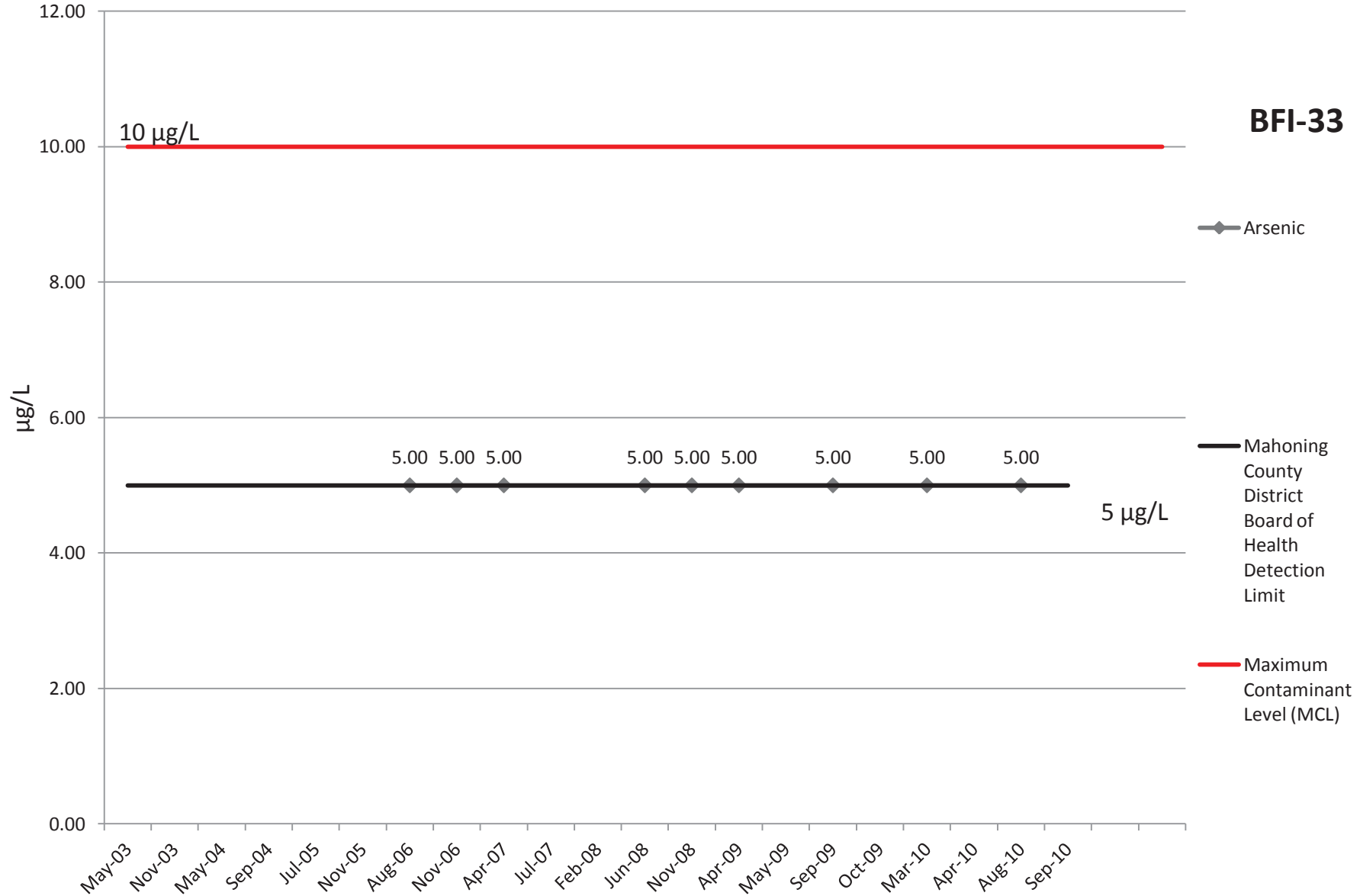


# Fluoride





# Arsenic



**BFI-33**

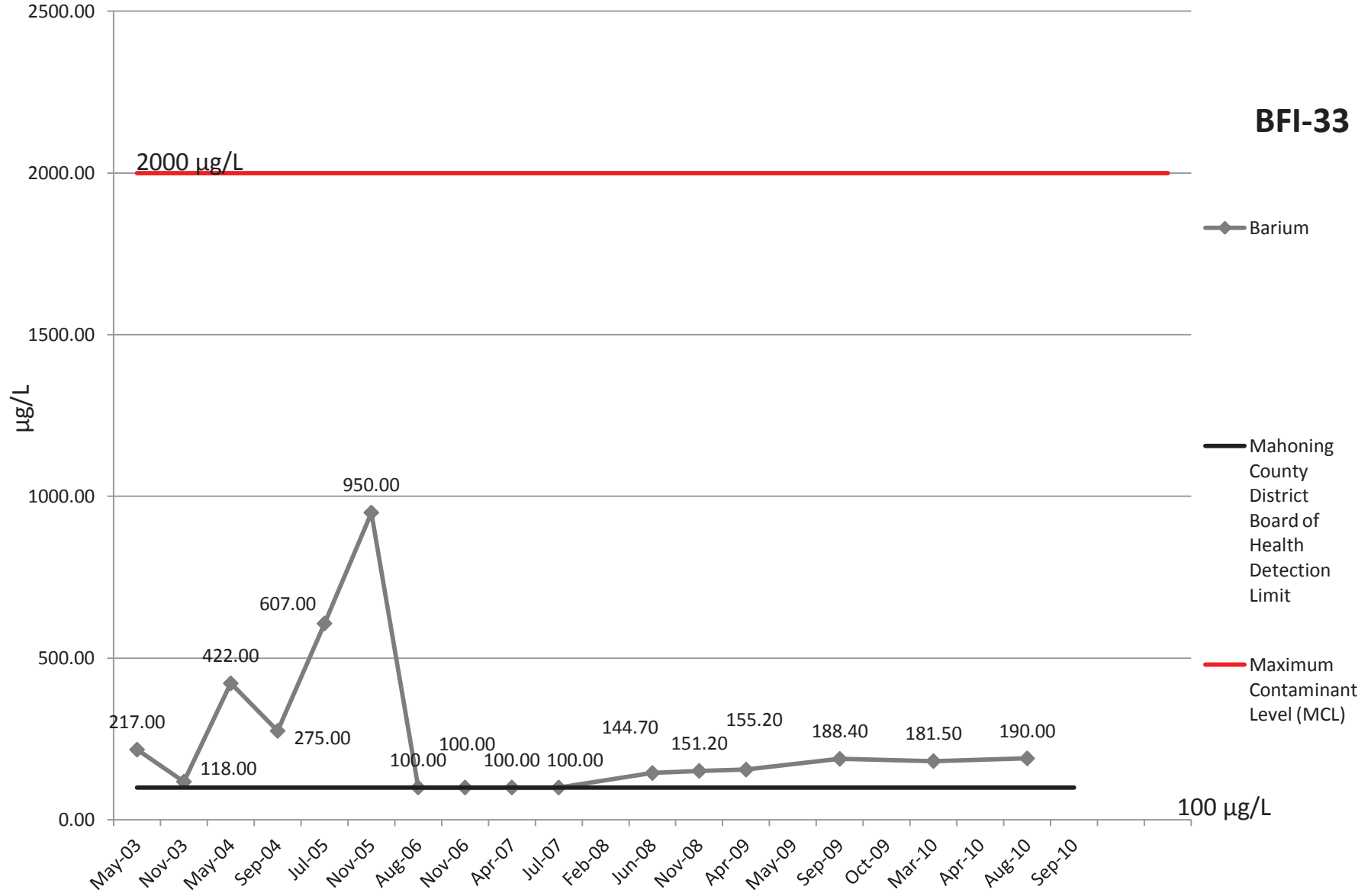
◆ Arsenic

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

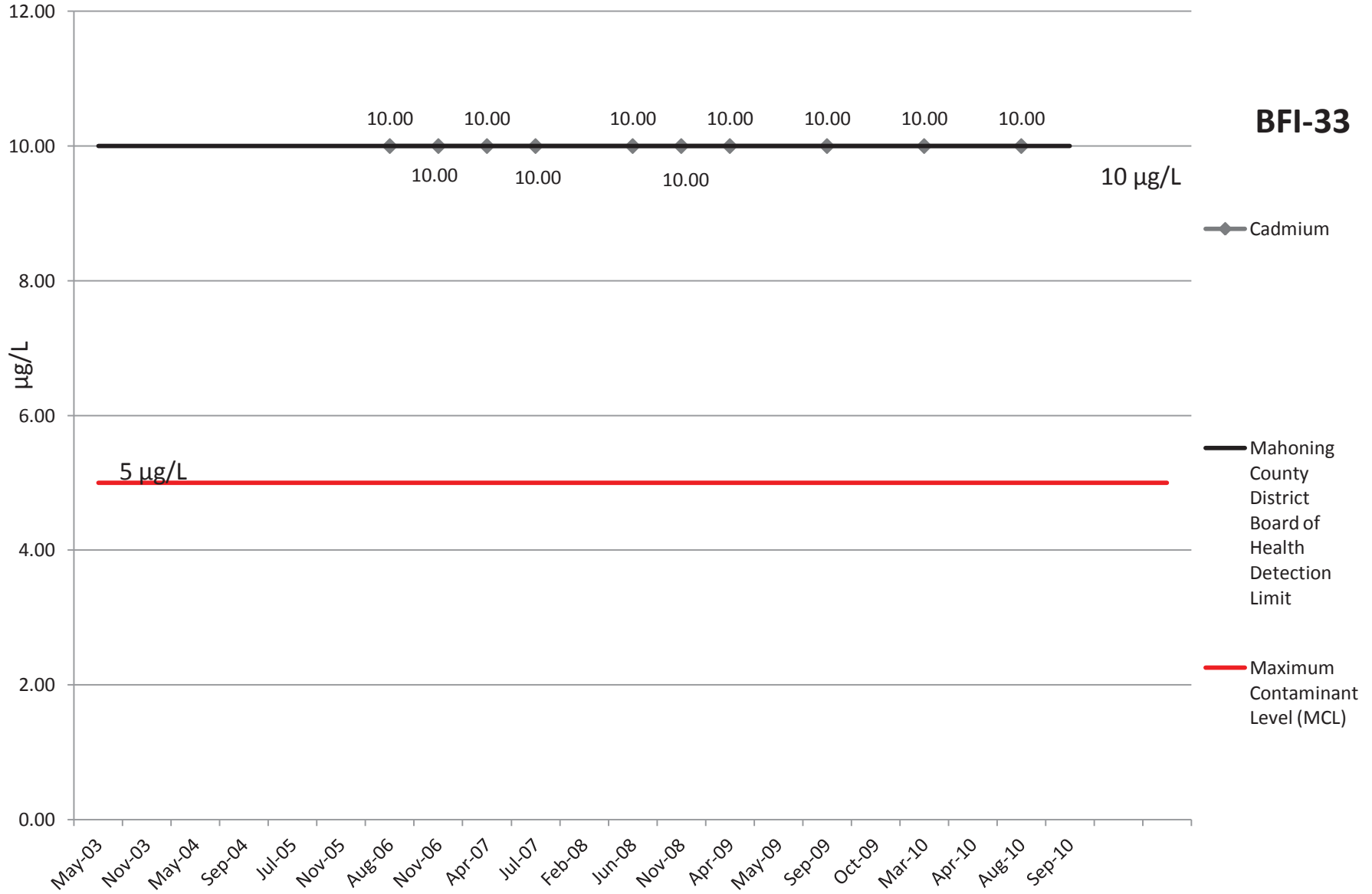
# Barium

**BFI-33**



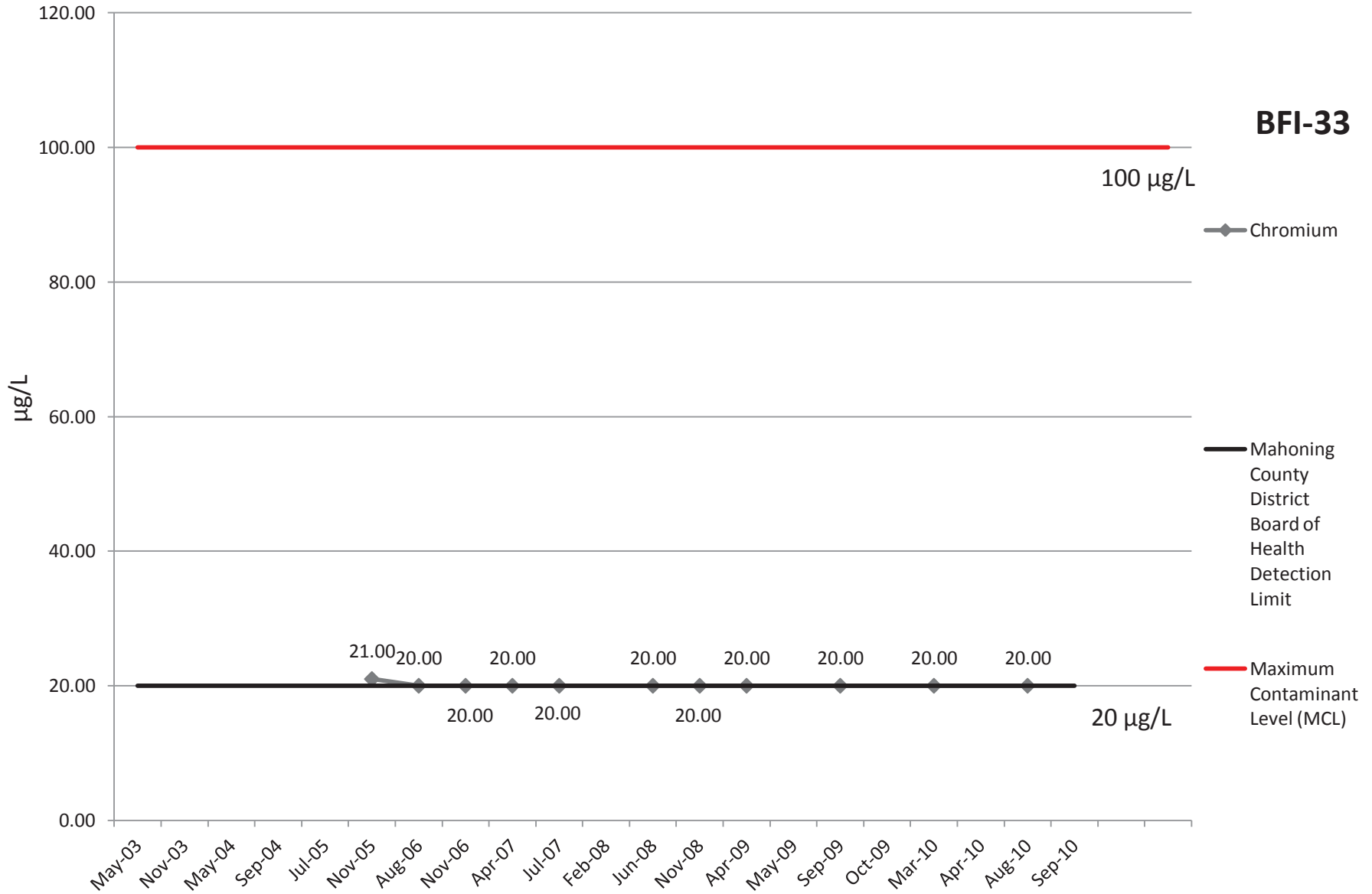
# Cadmium

**BFI-33**

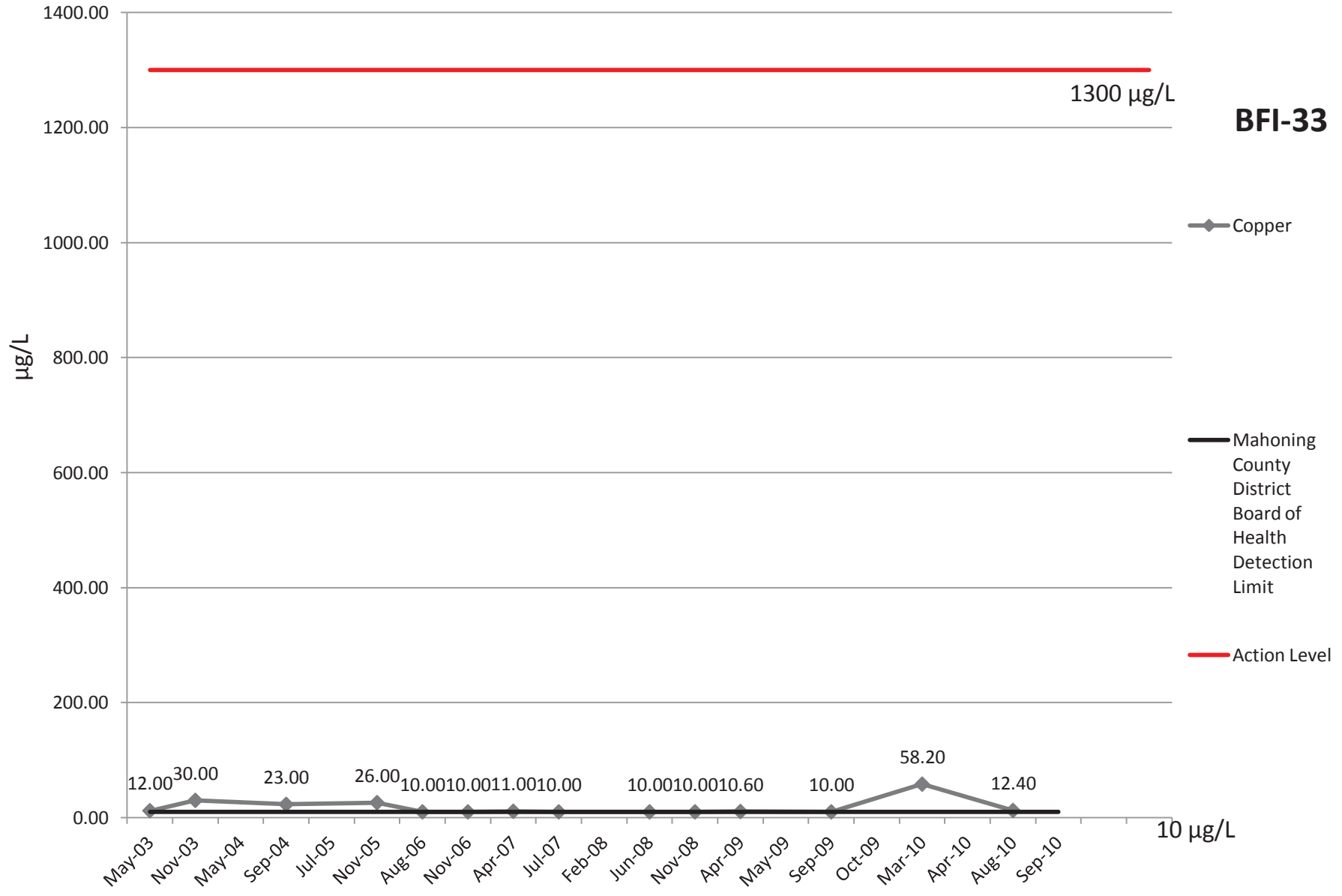


# Chromium

**BFI-33**

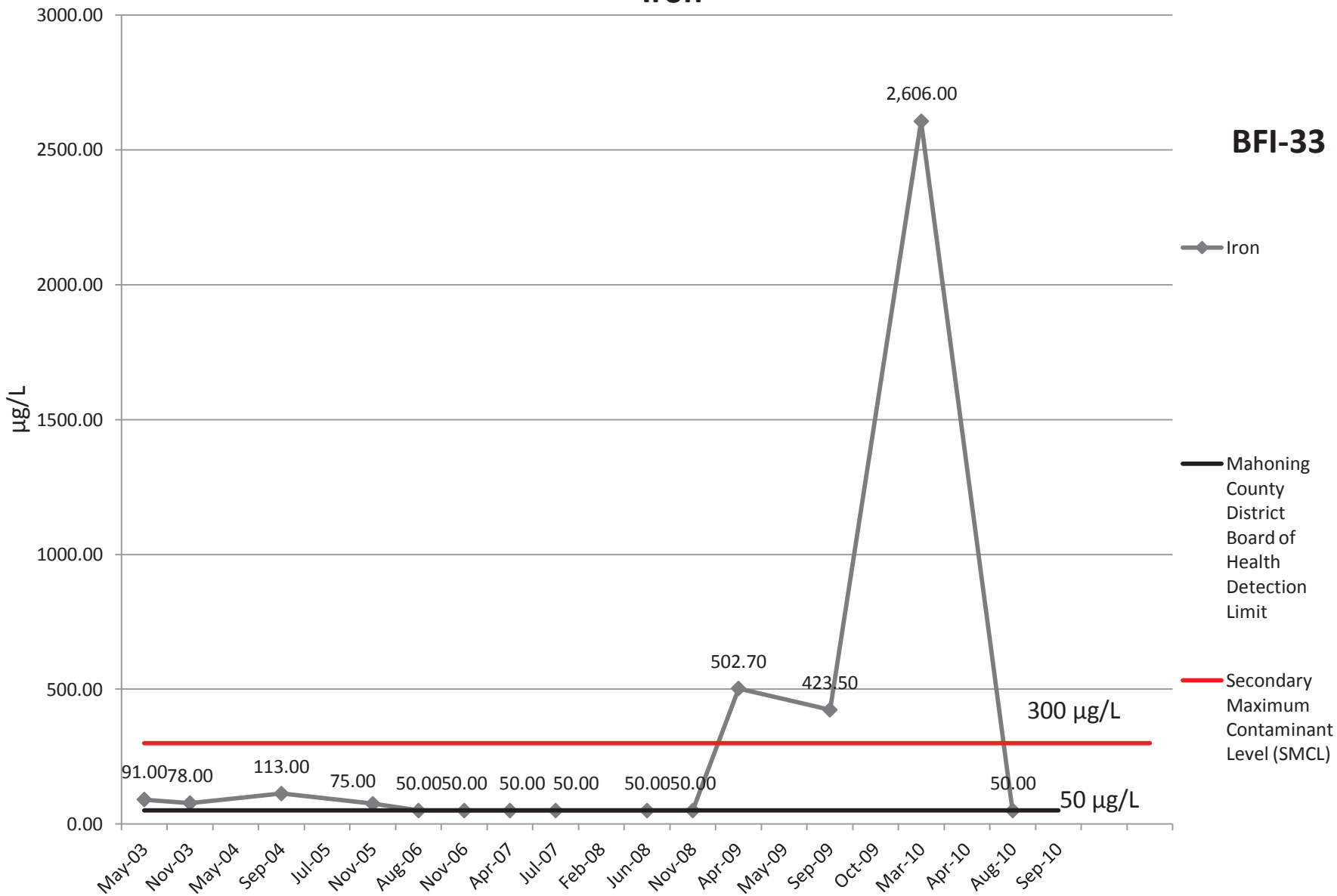


# Copper



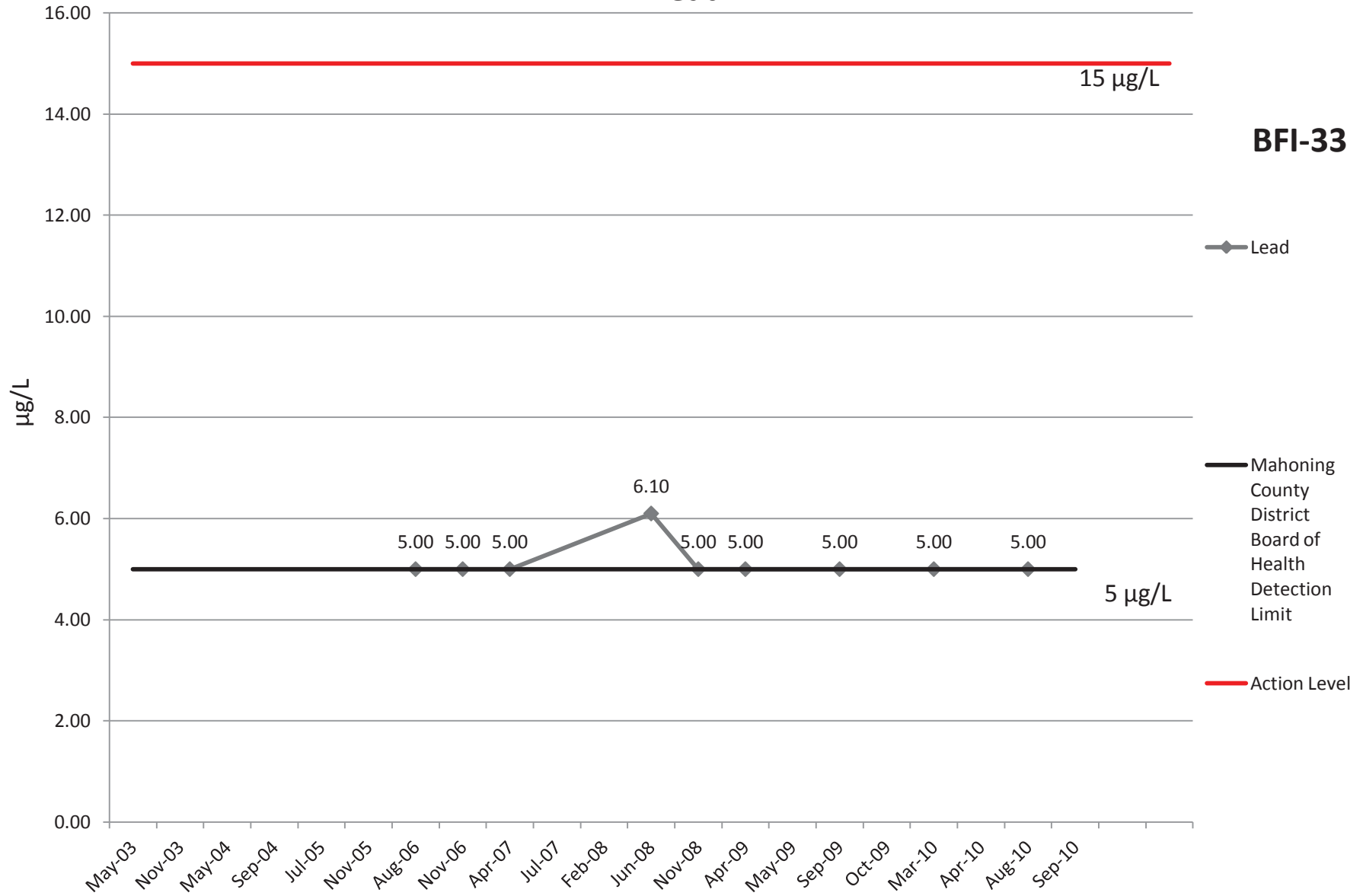
# Iron

**BFI-33**



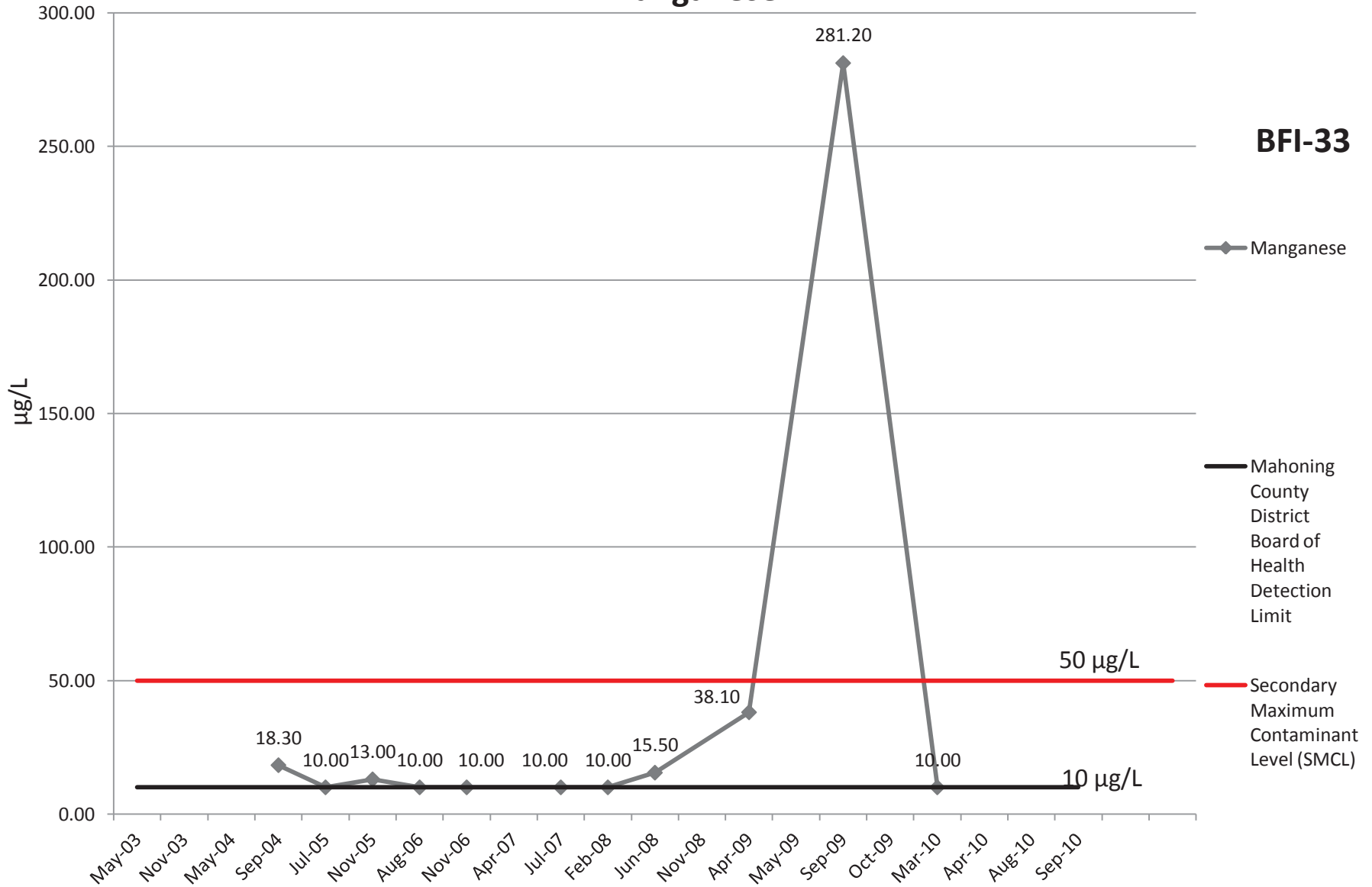
# Lead

**BFI-33**



# Manganese

**BFI-33**





# Mercury

**BFI-33**

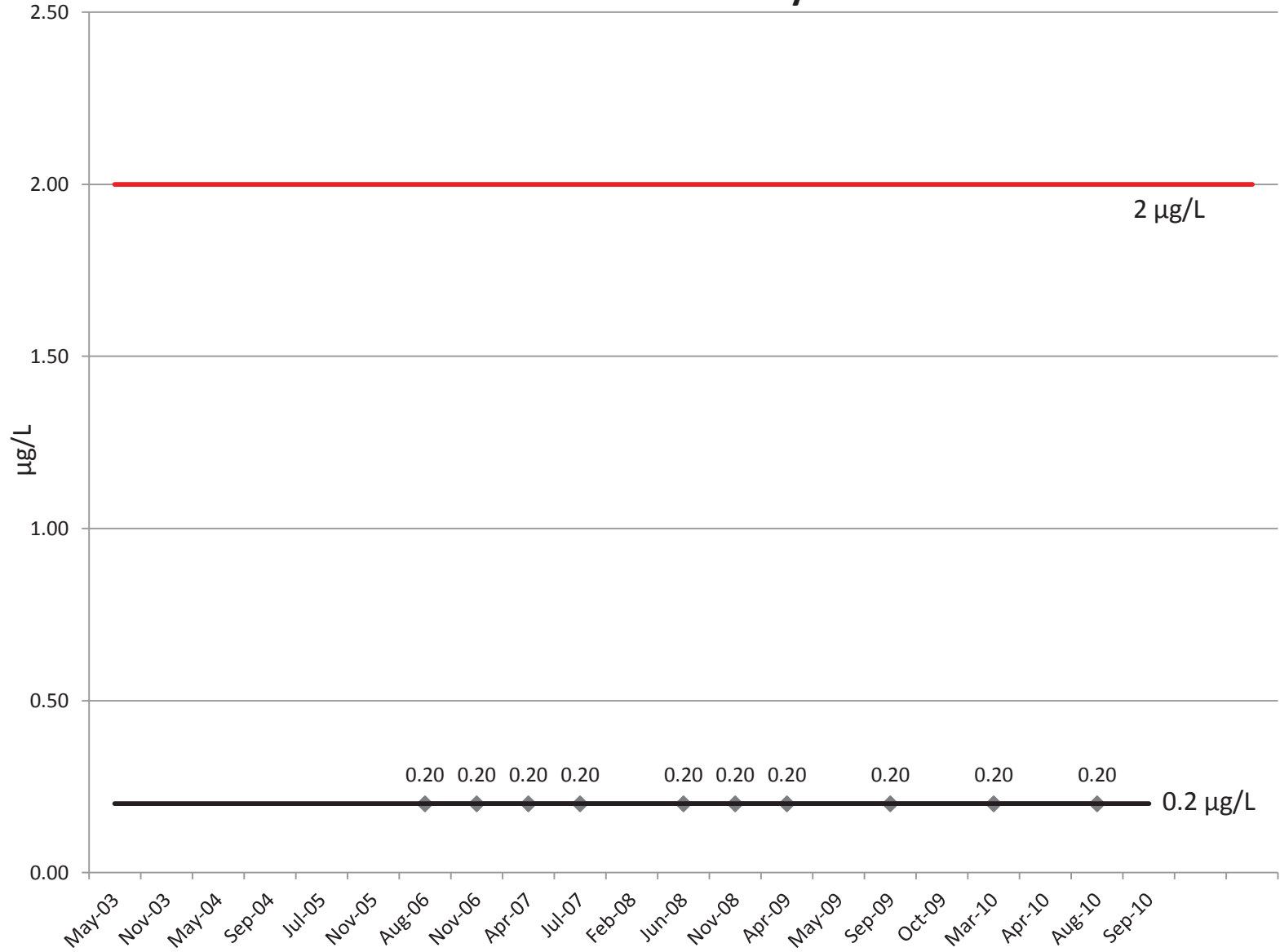
2 µg/L

Mercury

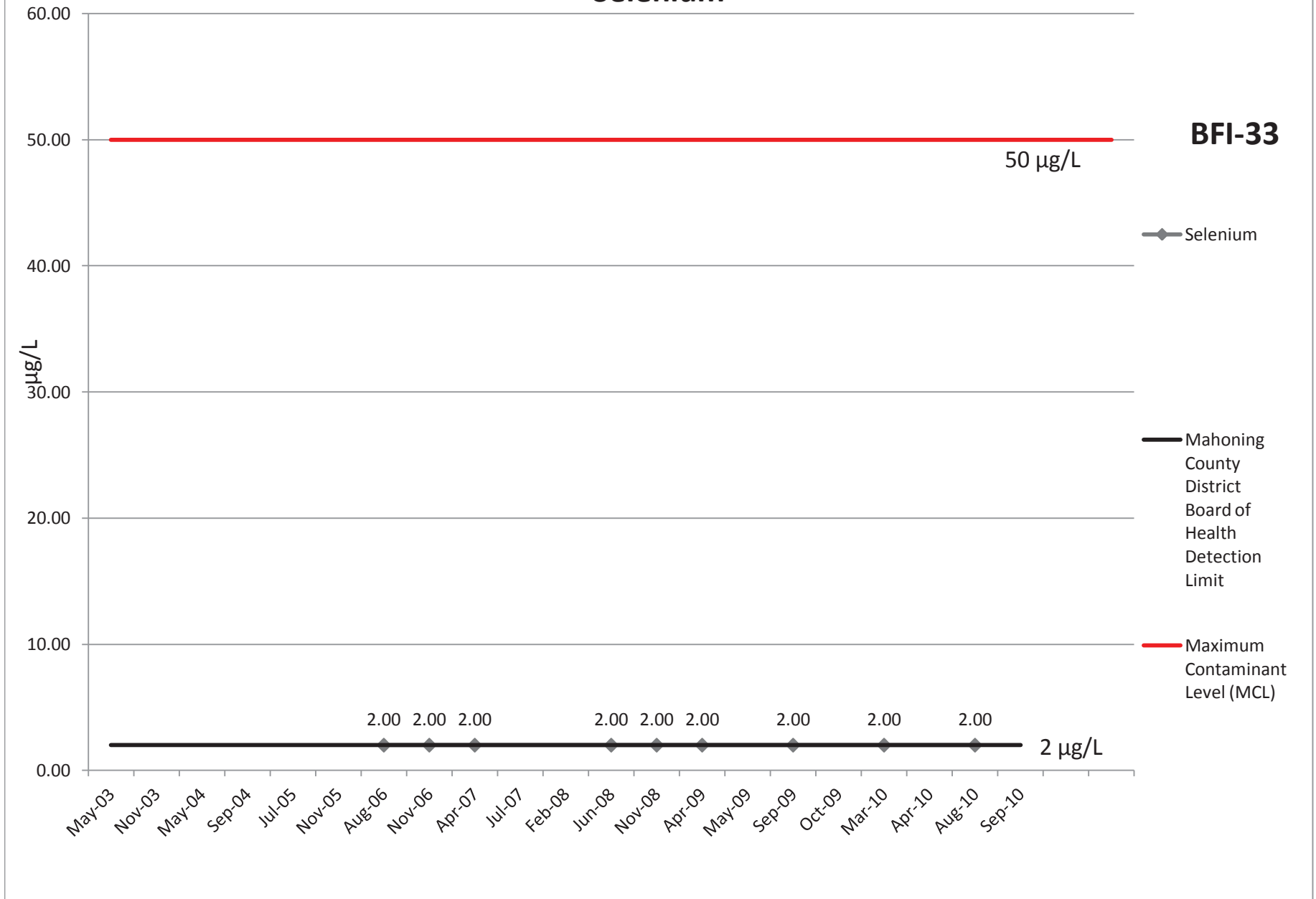
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

0.2 µg/L

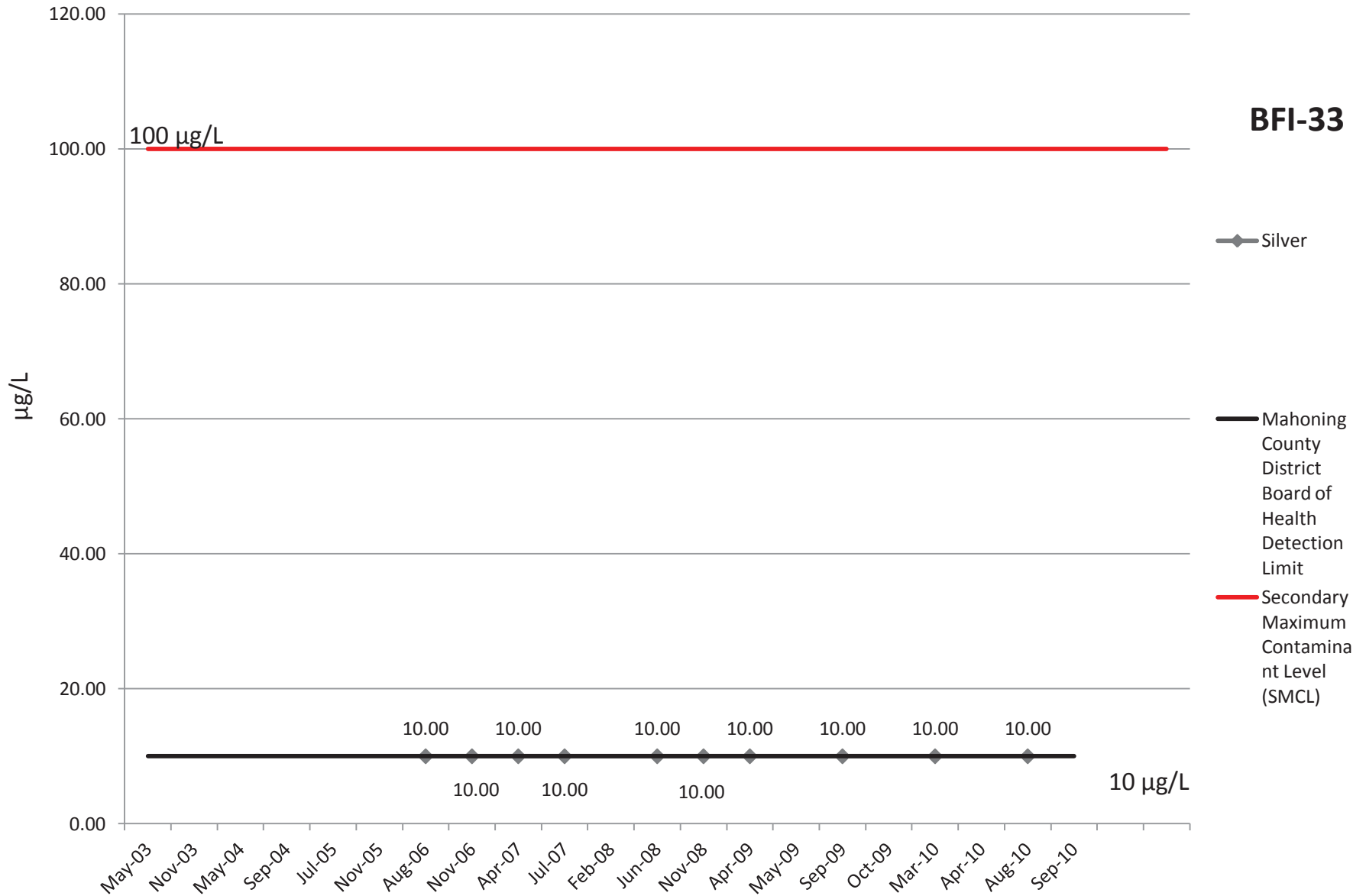


# Selenium



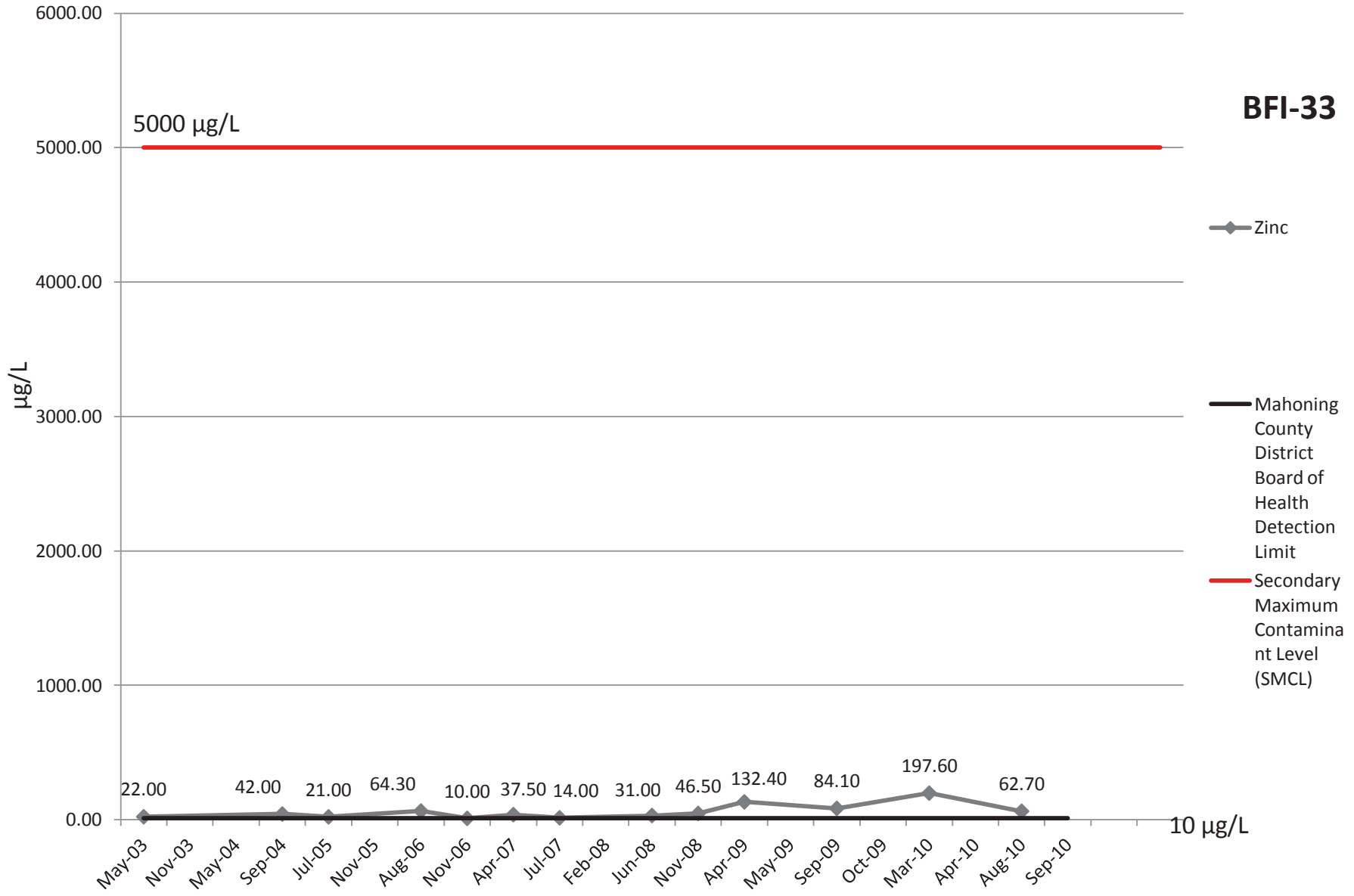
# Silver

**BFI-33**

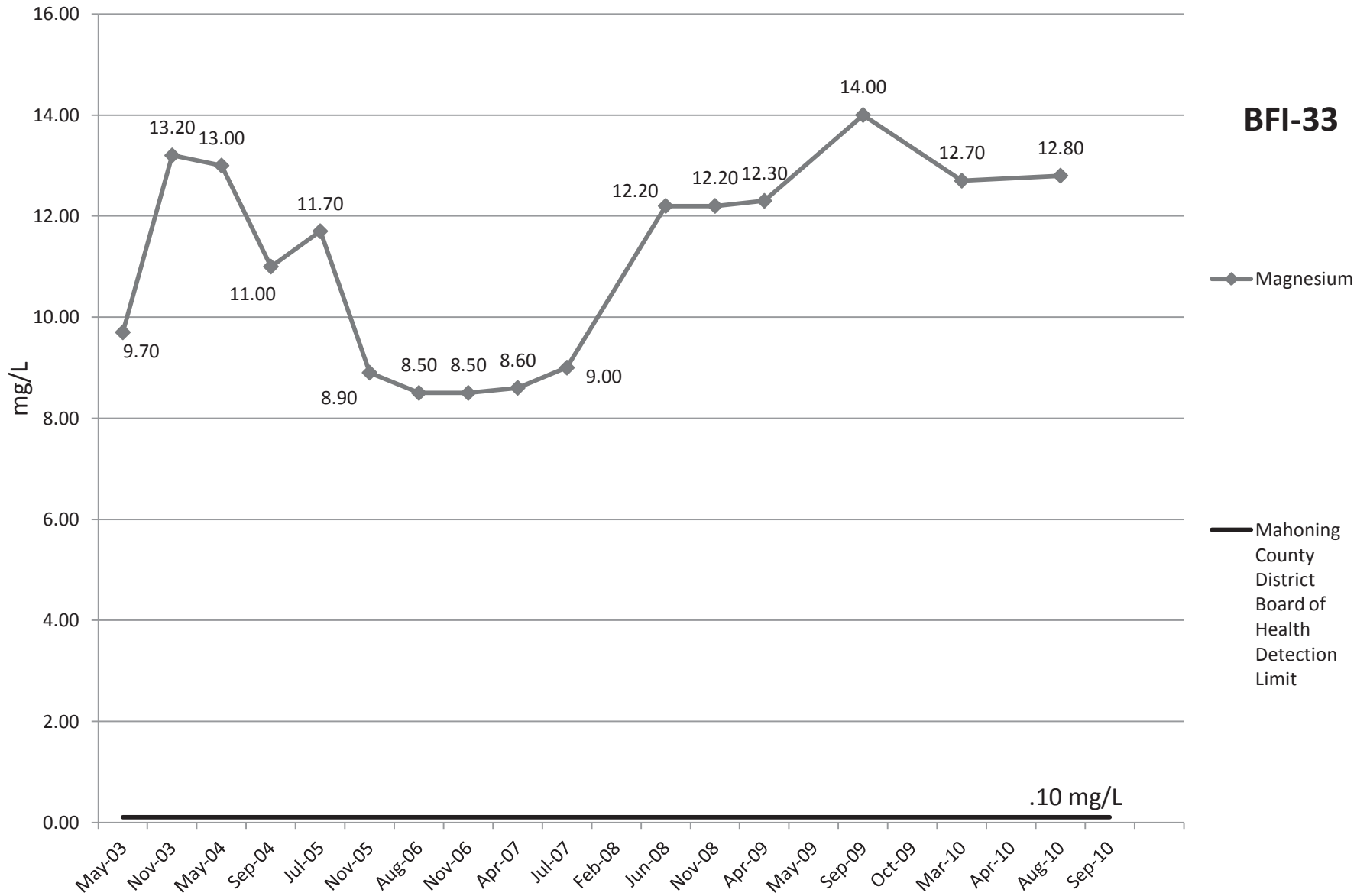


# Zinc

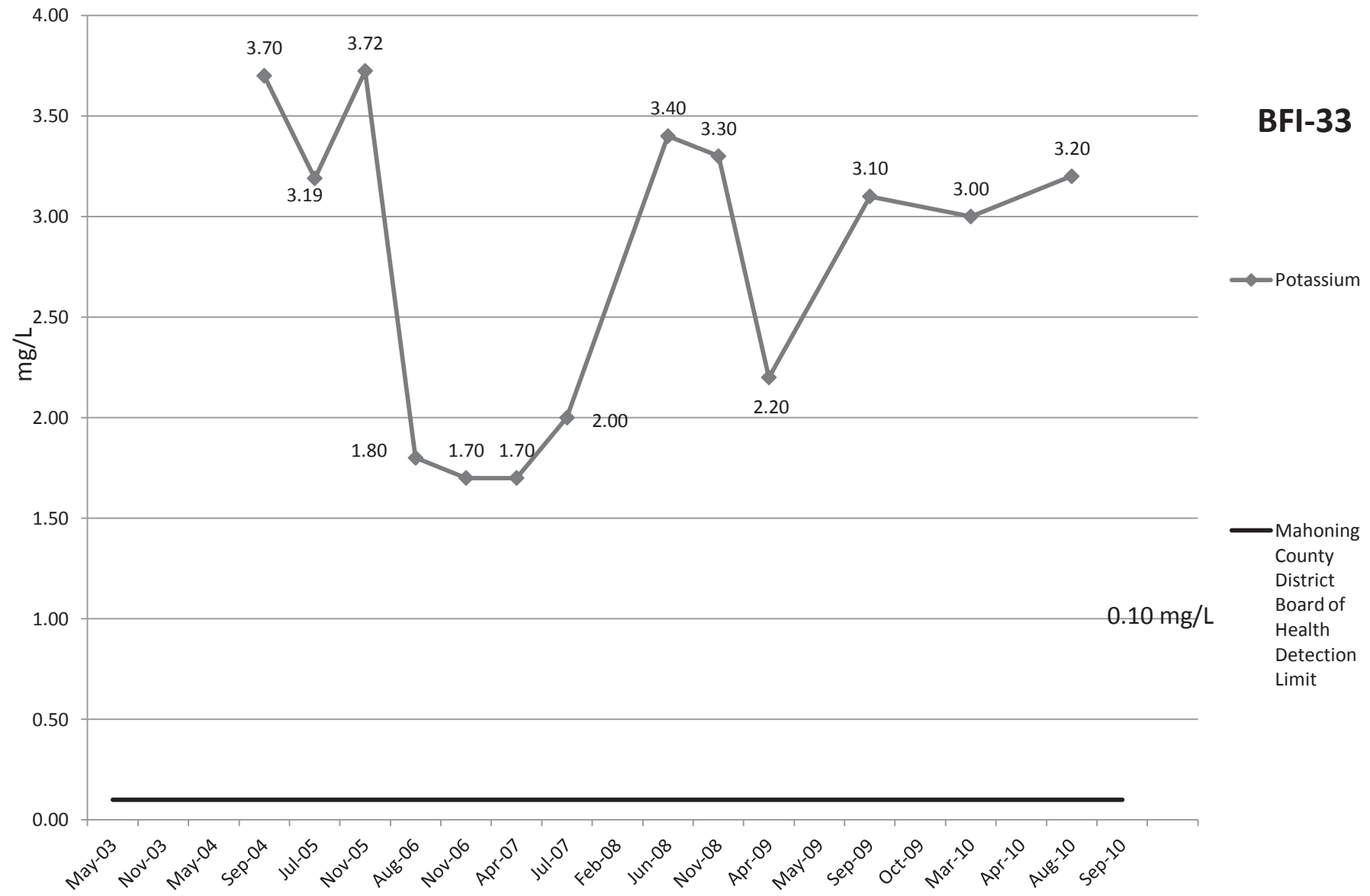
**BFI-33**



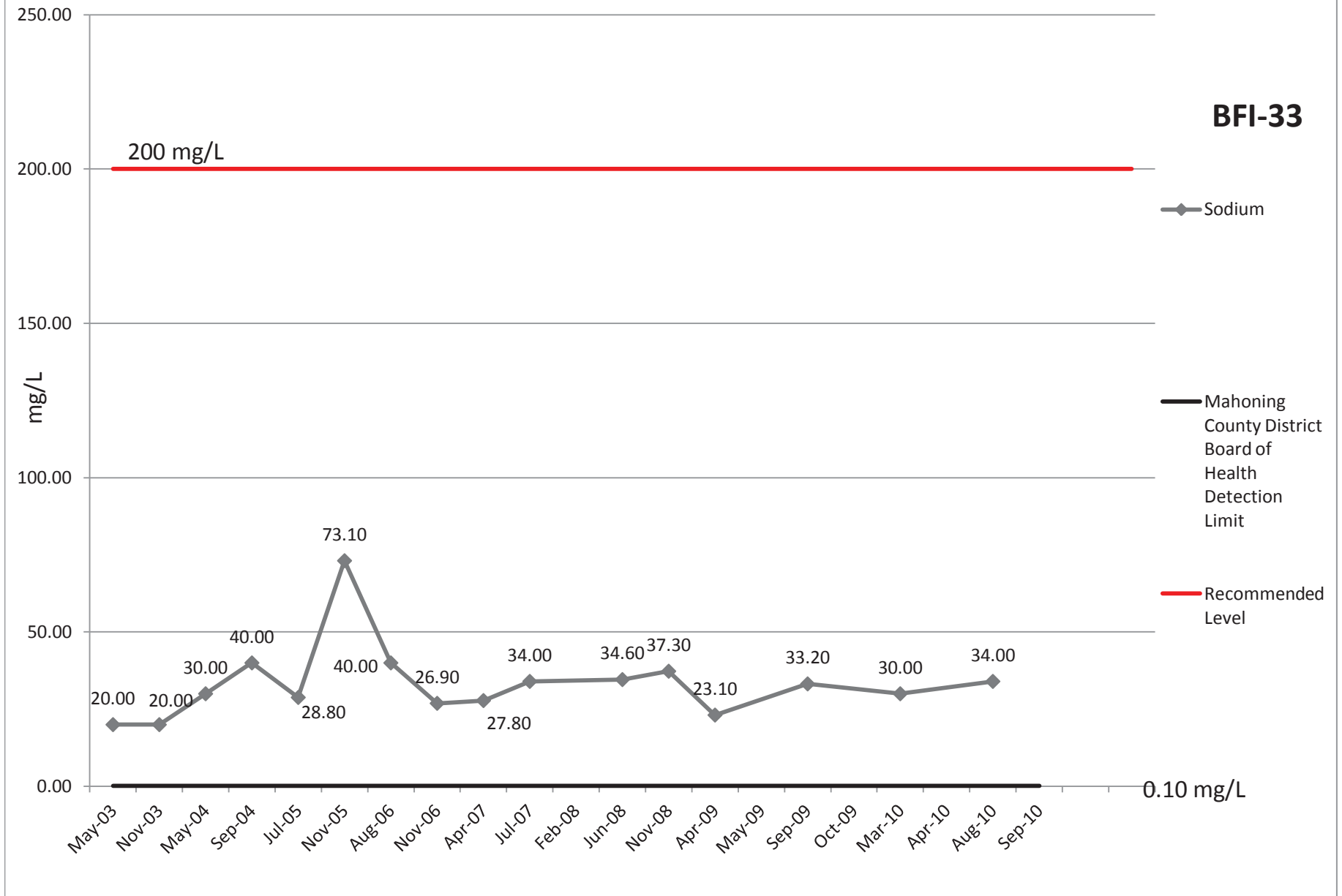
# Magnesium



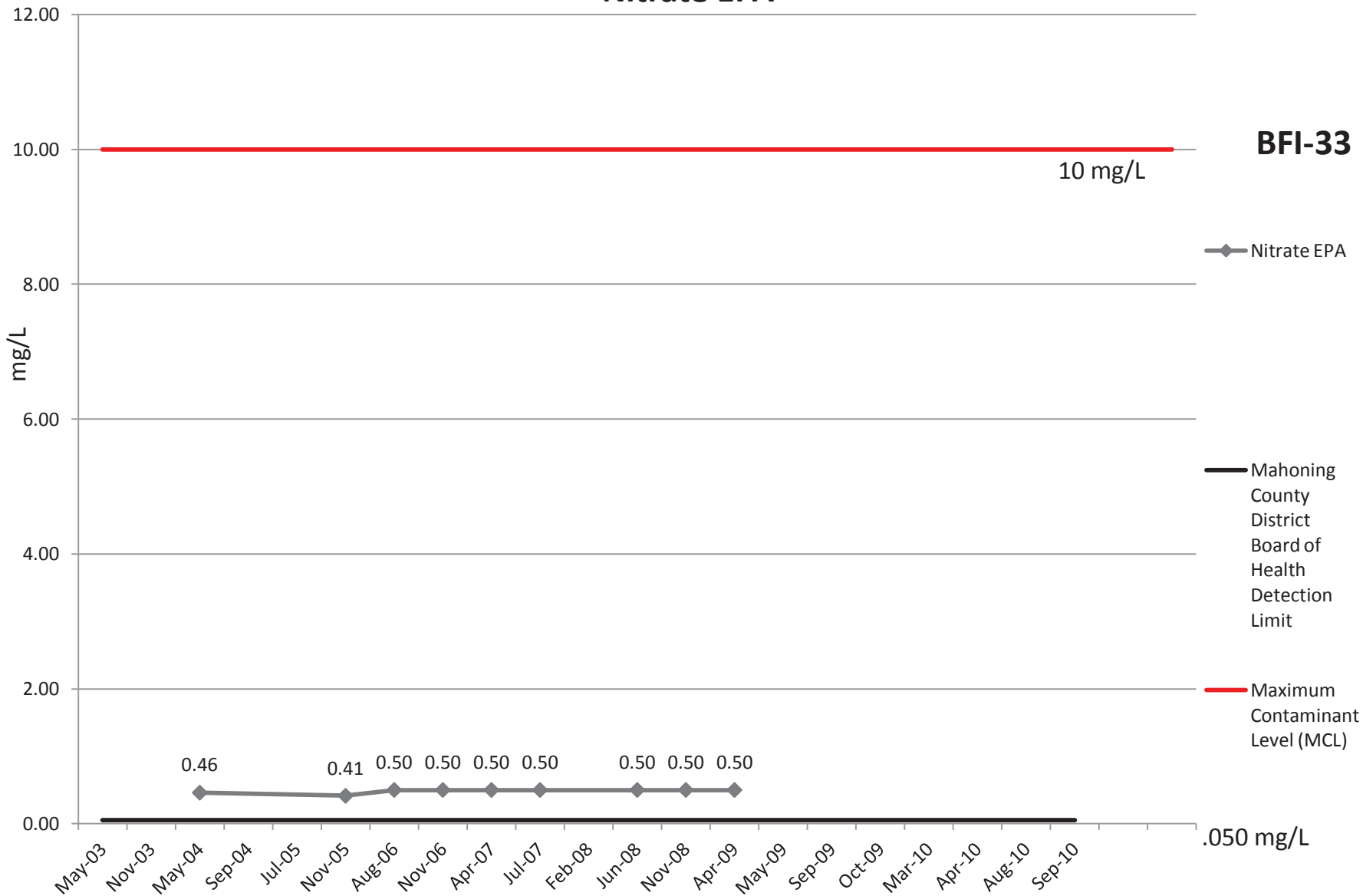
# Potassium



# Sodium



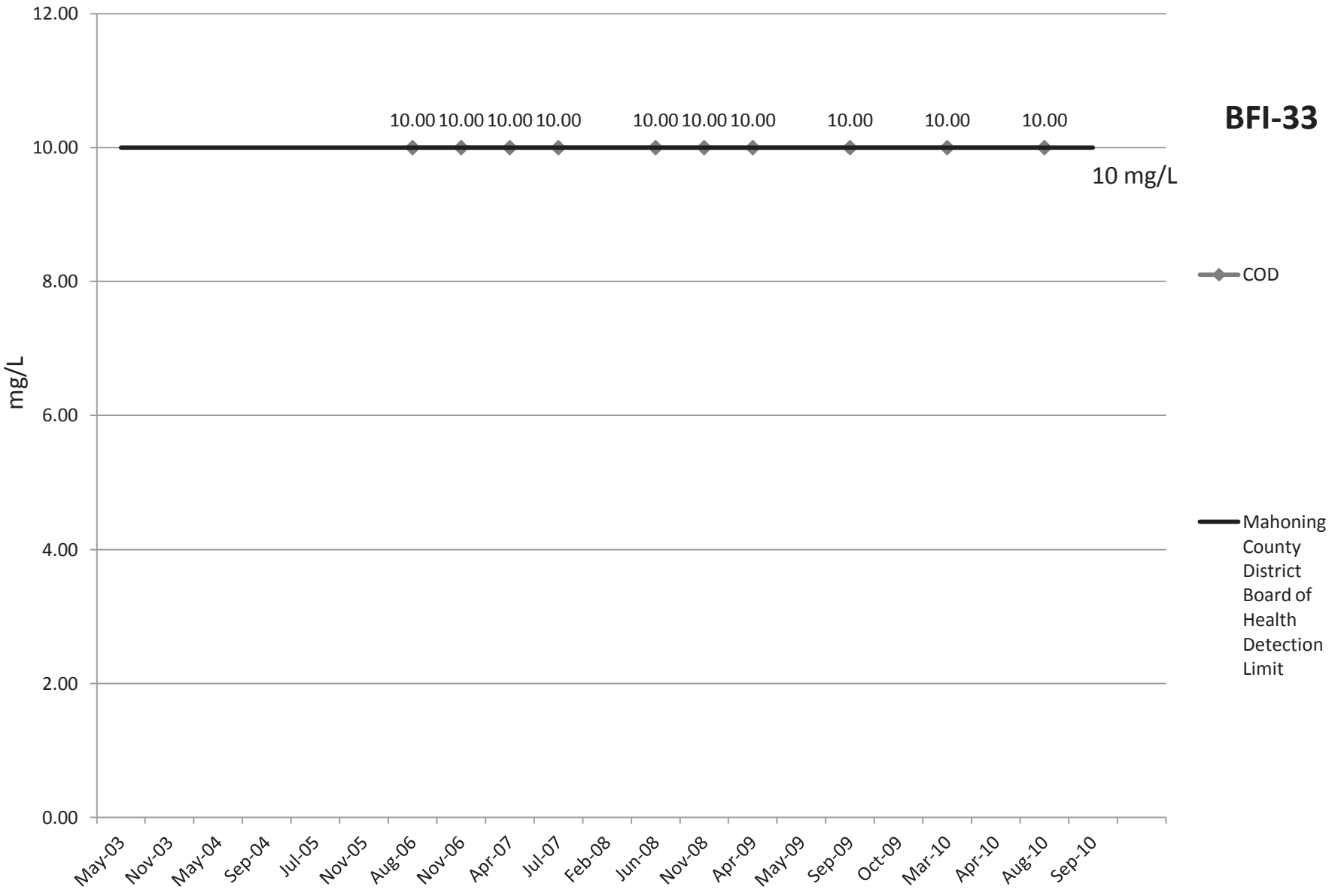
# Nitrate EPA



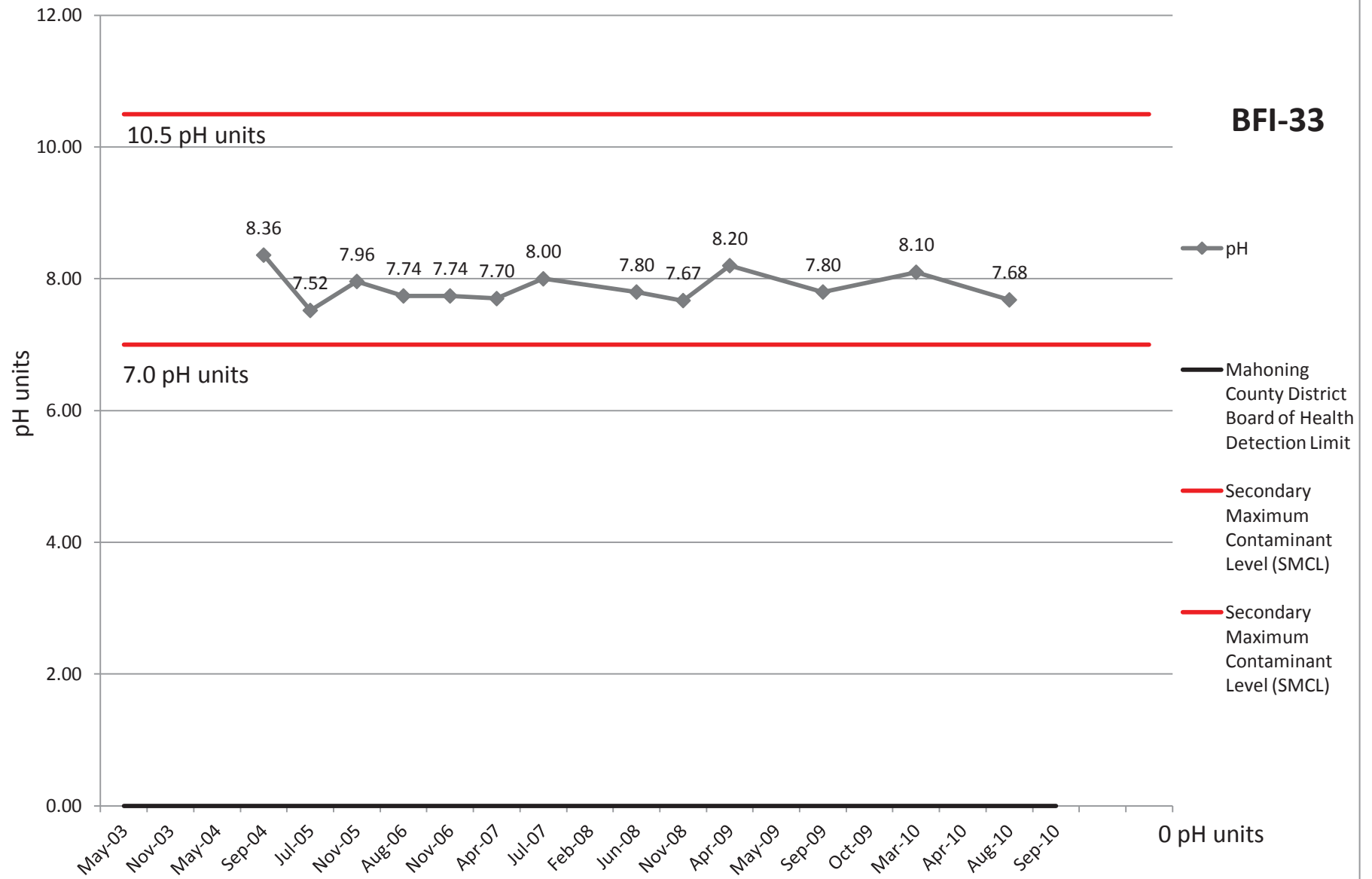


# COD

**BFI-33**

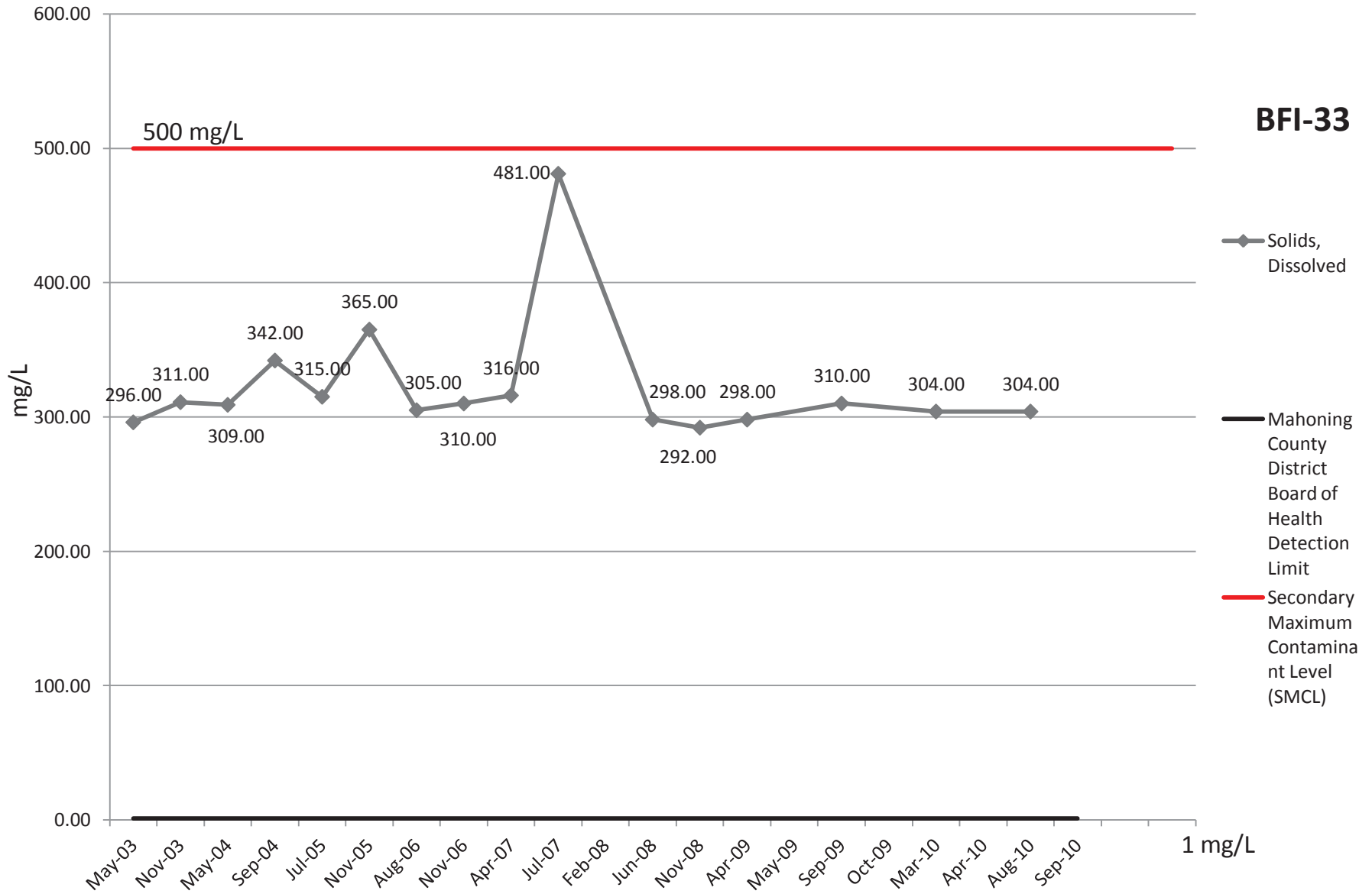


# pH



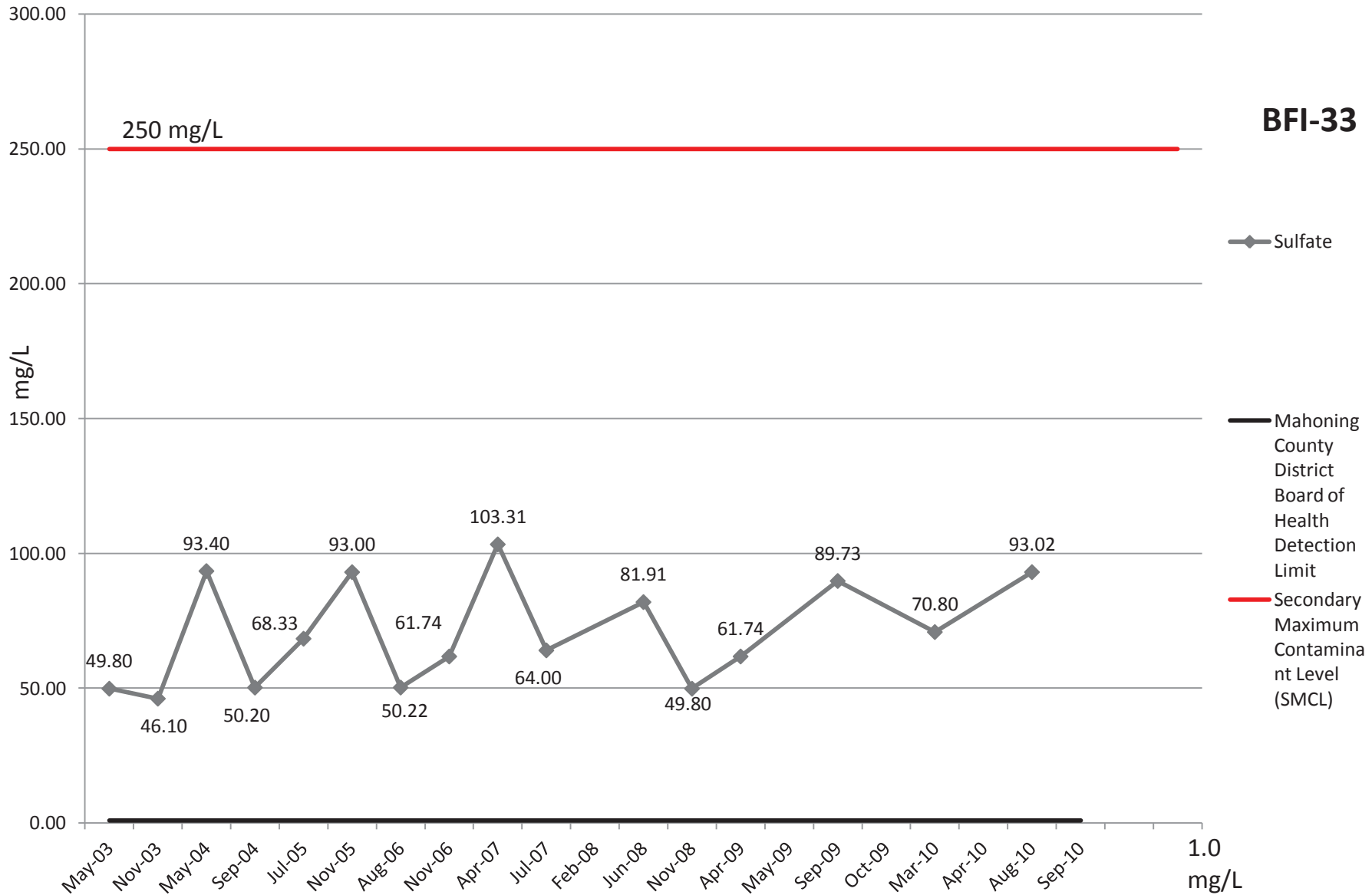
# Solids, Dissolved

**BFI-33**



# Sulfate

**BFI-33**



# Bacteria

## BFI-33

Positive/Negative

◆ Bacteria

positive (1)

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

negative (0)

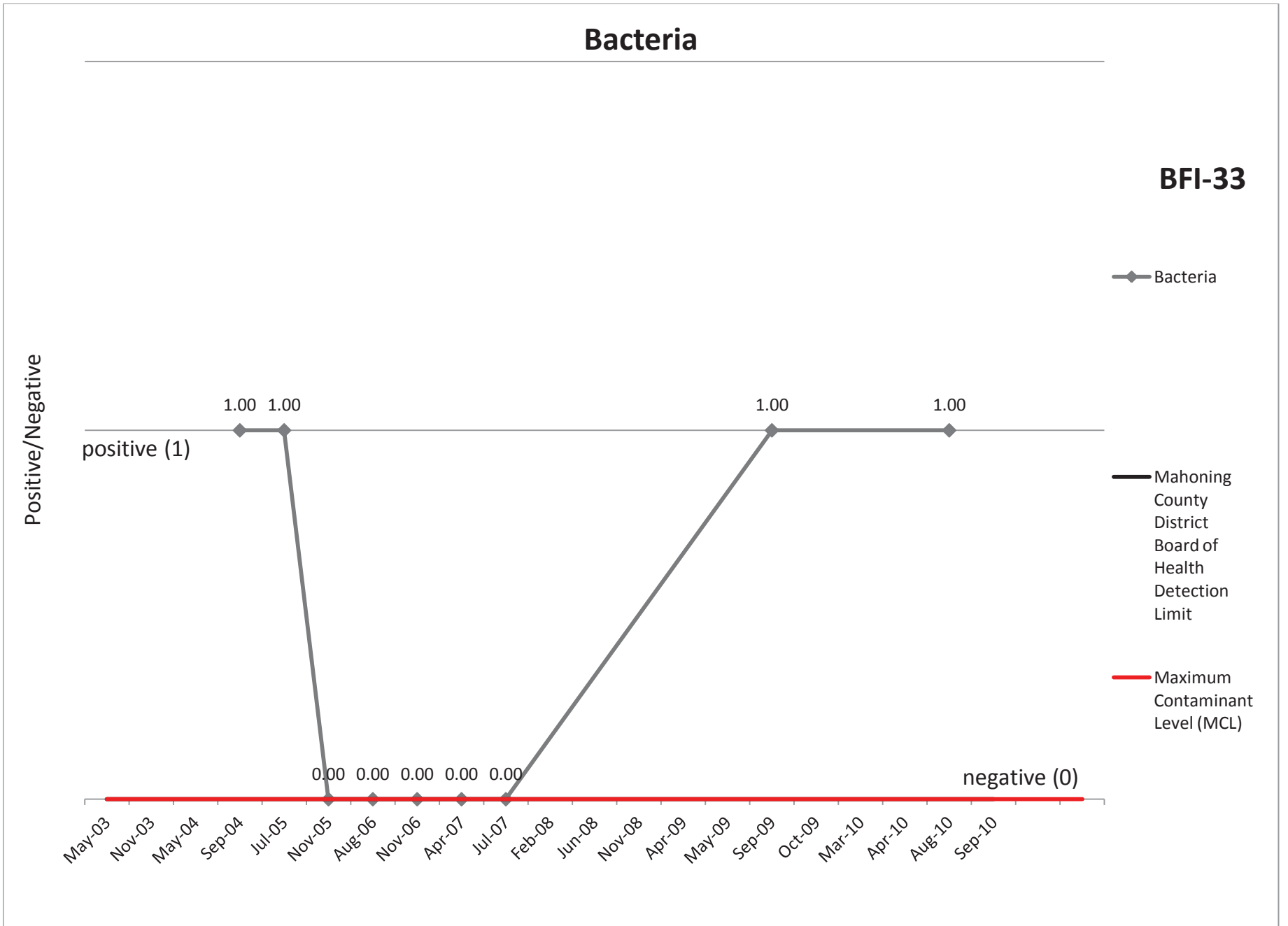
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

1.00 1.00

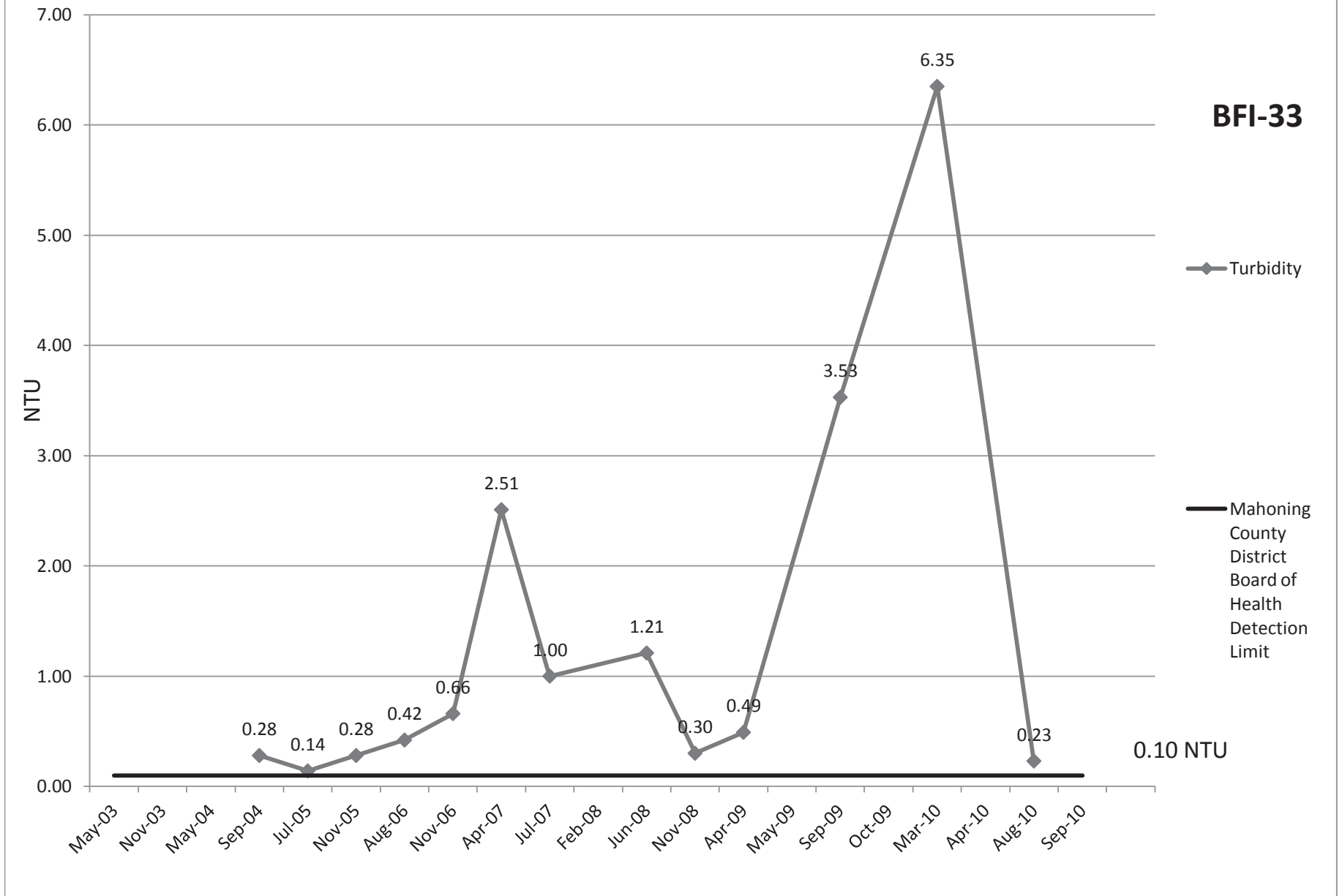
1.00

1.00

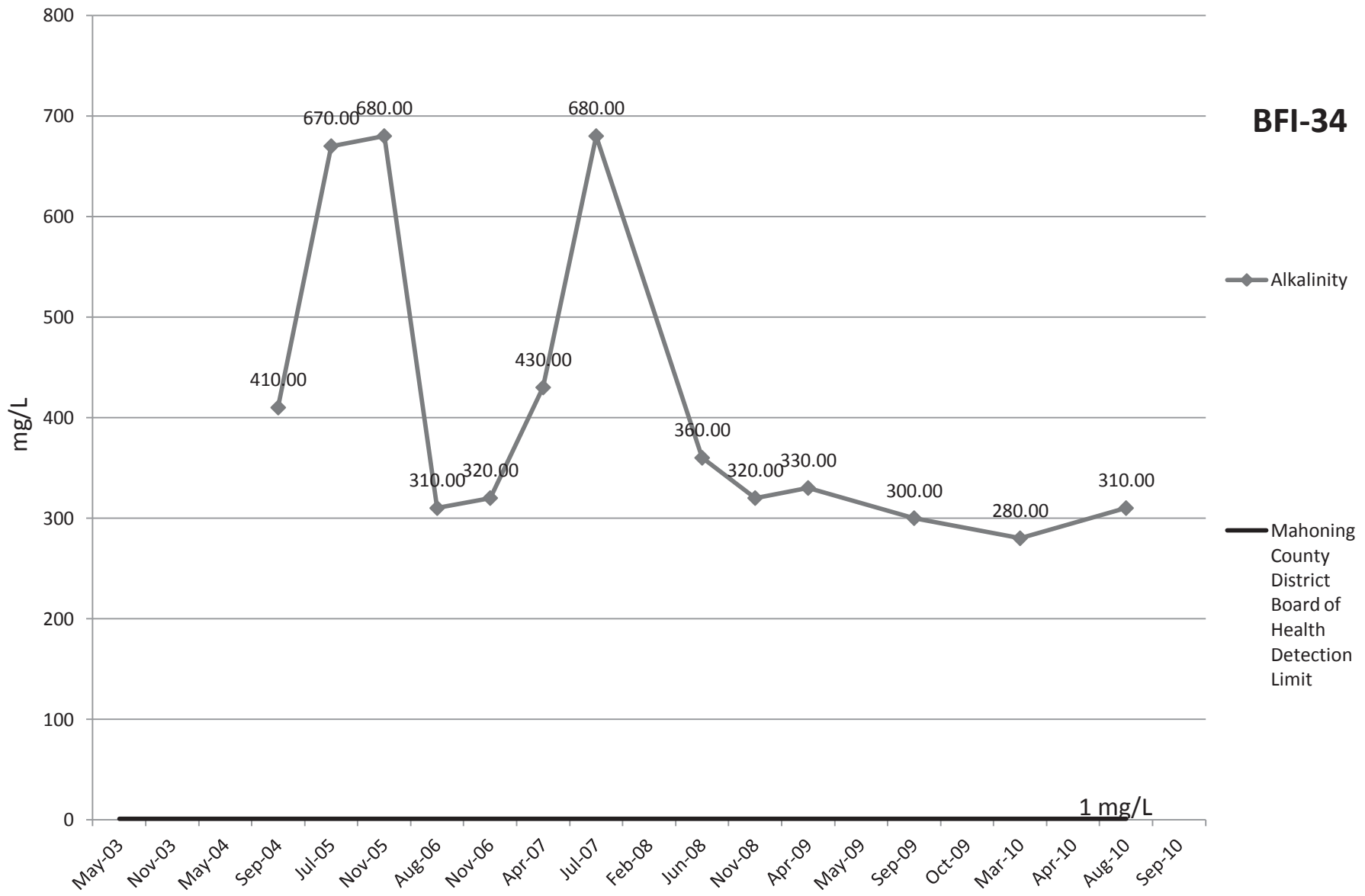
0.00 0.00 0.00 0.00 0.00



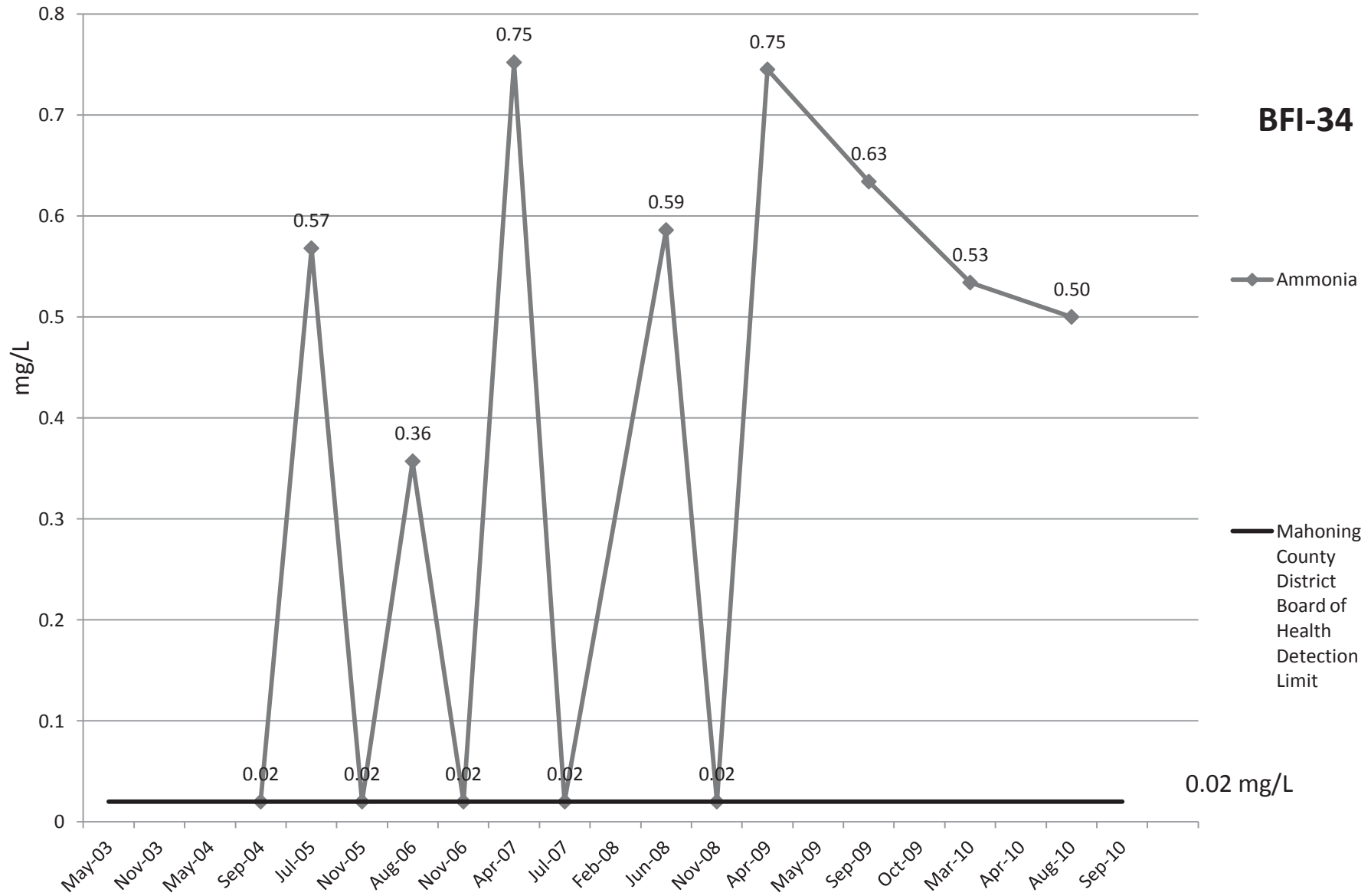
# Turbidity



# Alkalinity

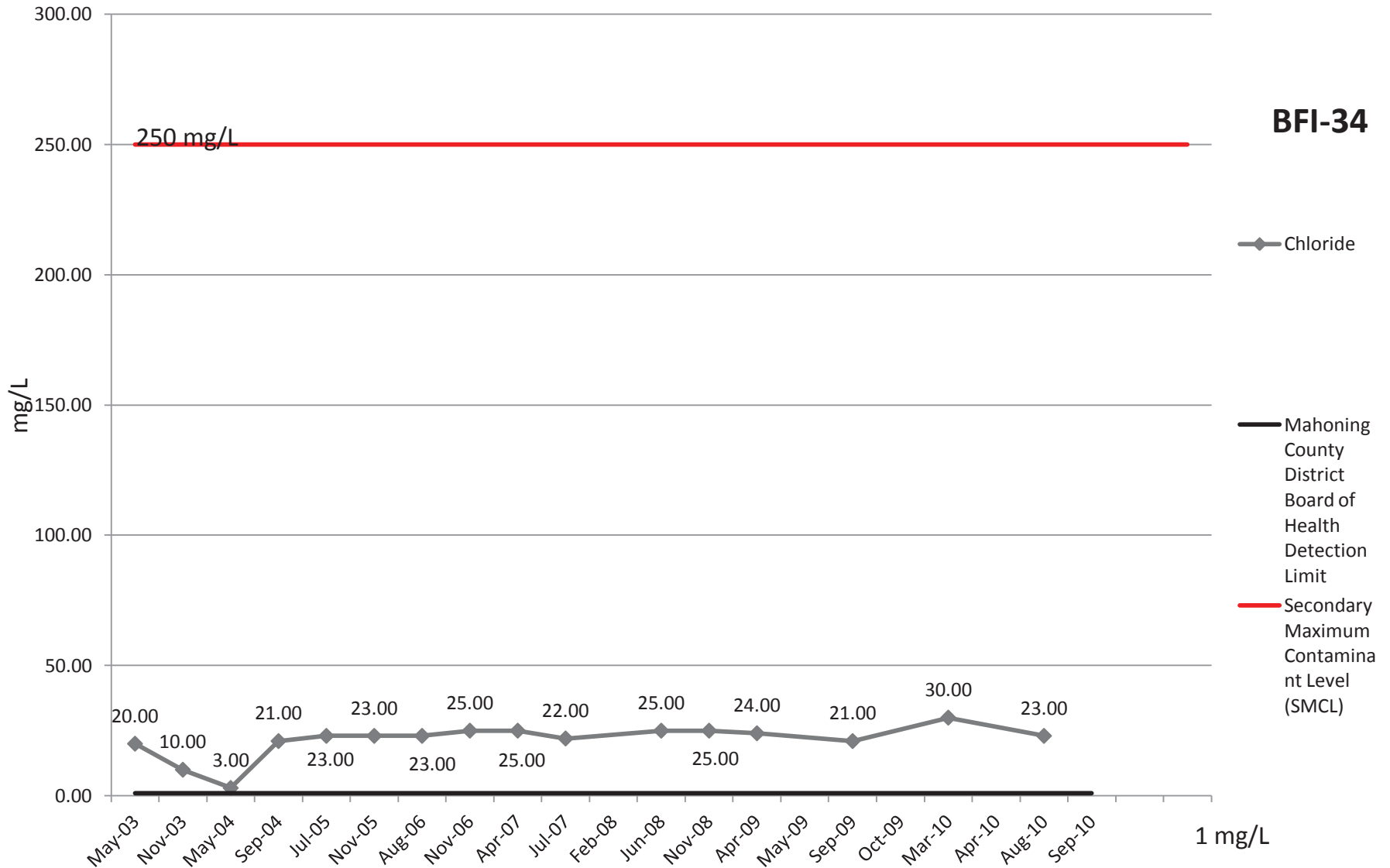


# Ammonia



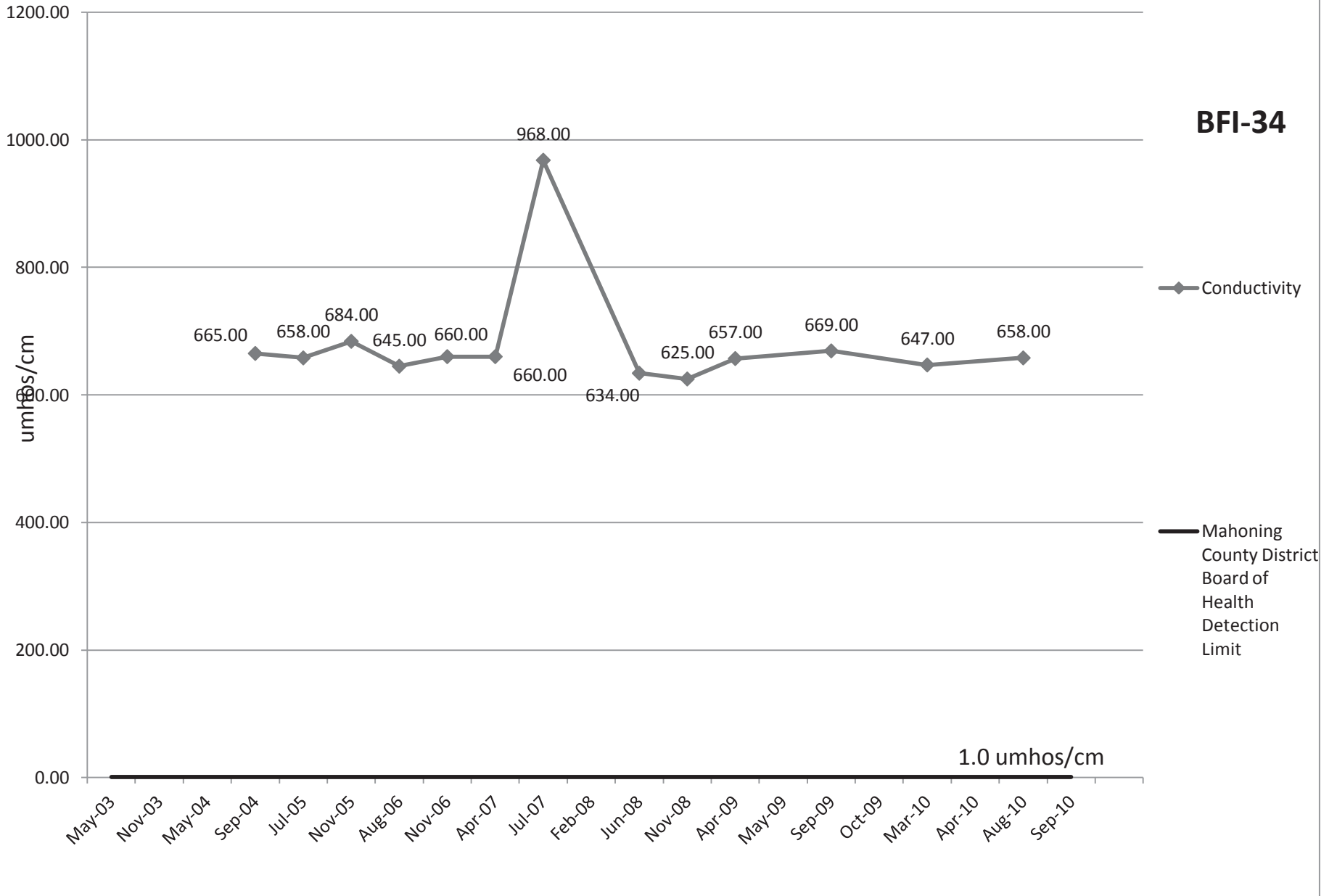


# Chloride

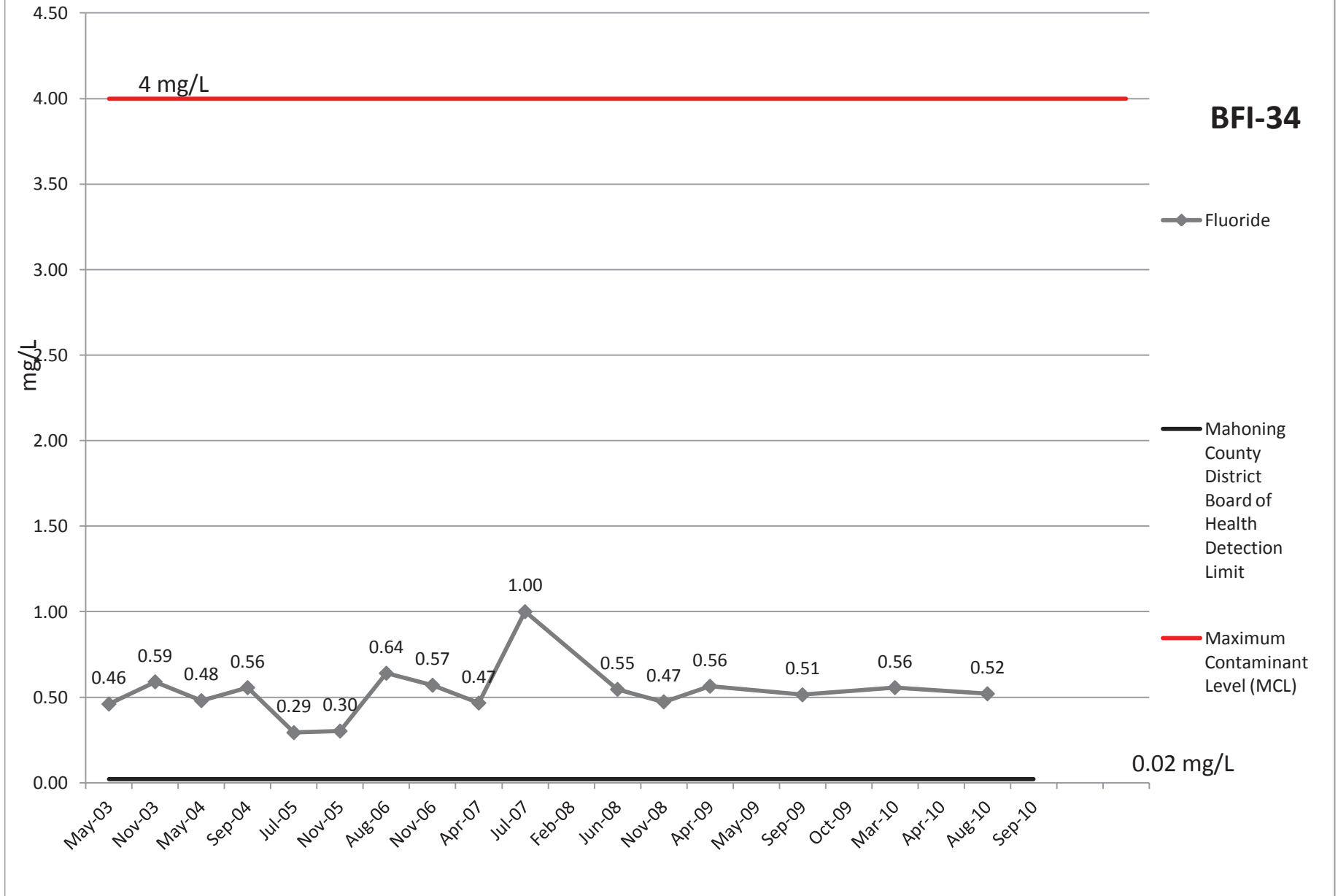


# Conductivity

**BFI-34**

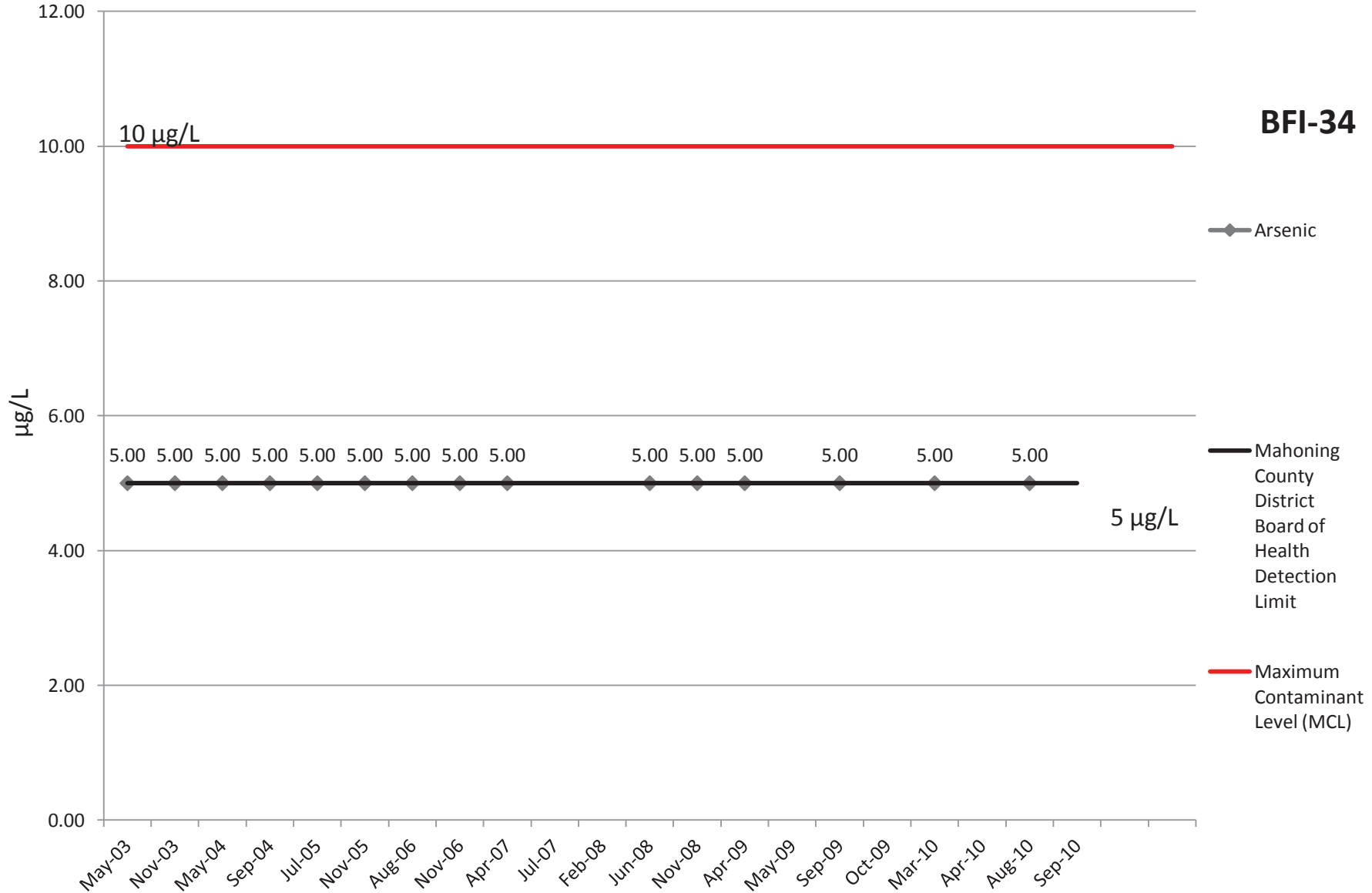


# Fluoride



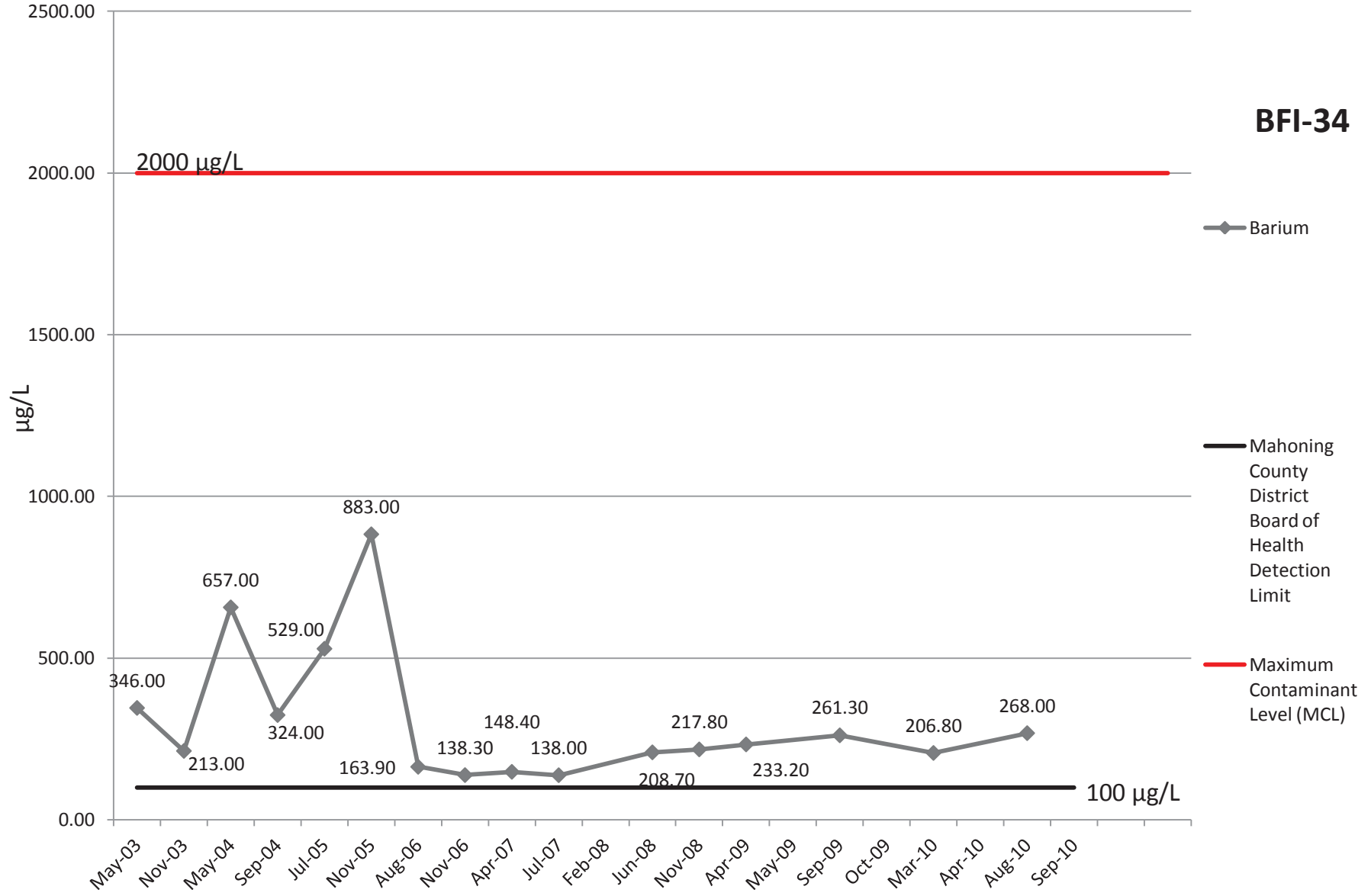
# Arsenic

**BFI-34**



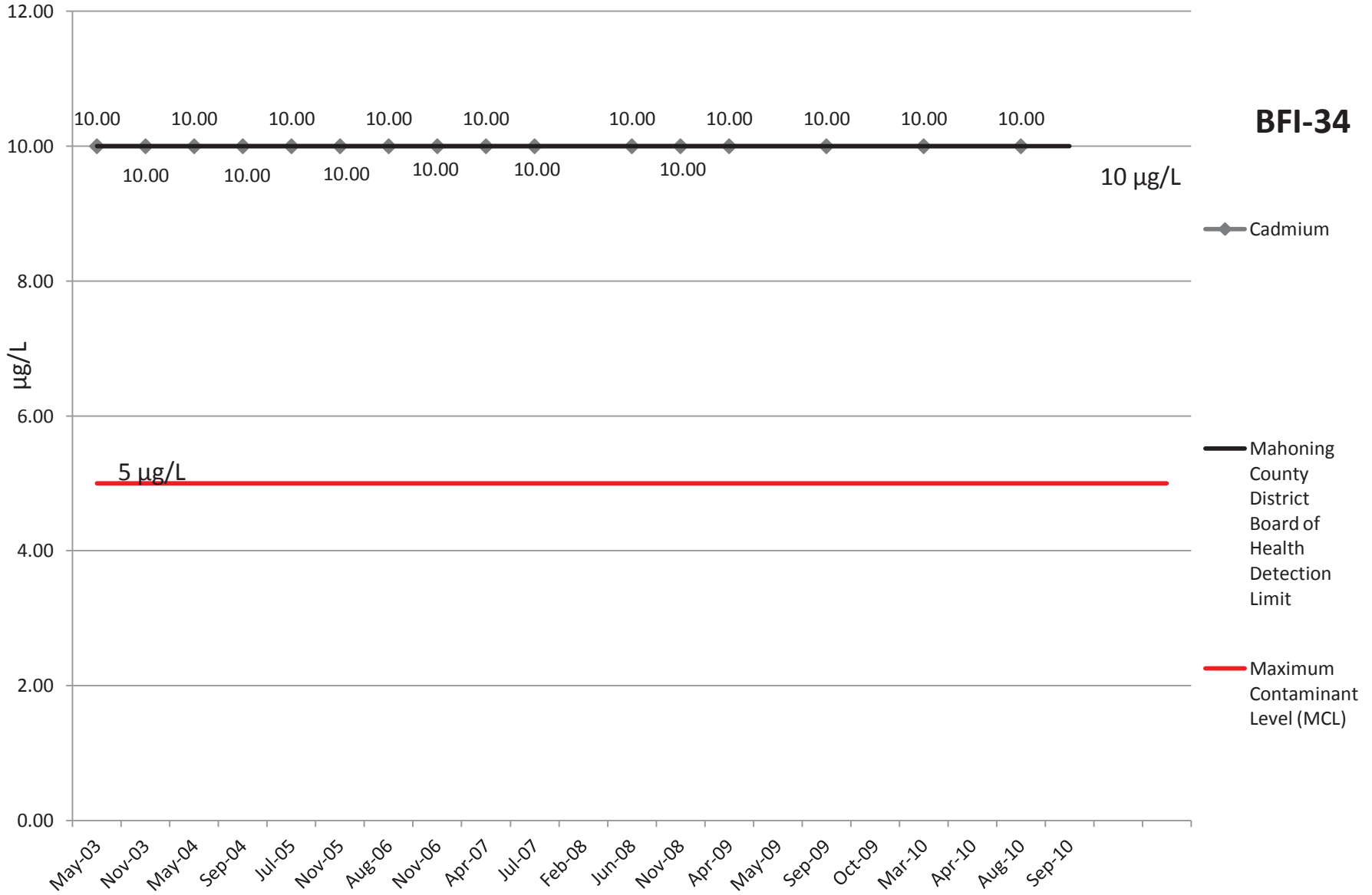
# Barium

**BFI-34**



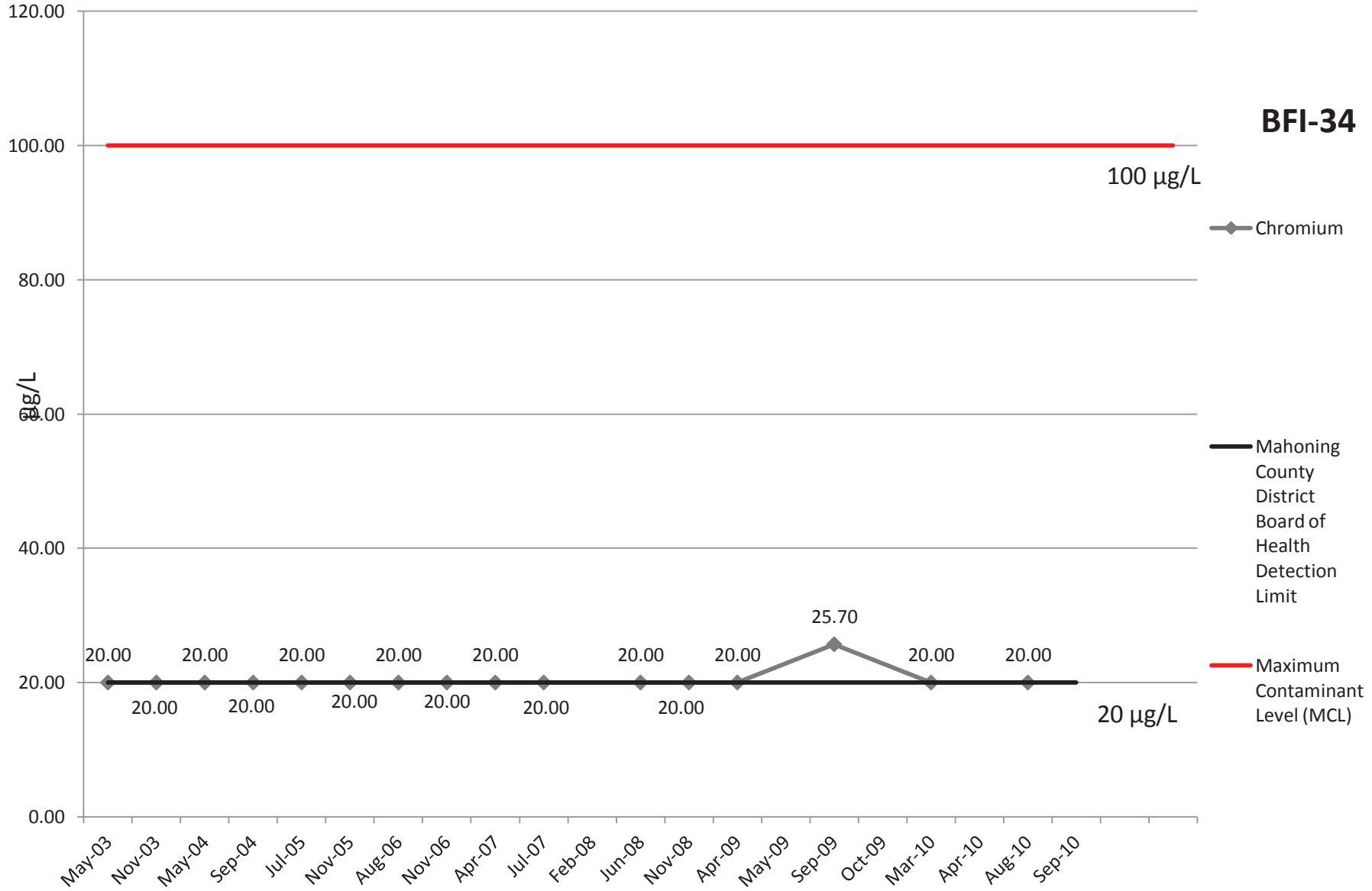
# Cadmium

**BFI-34**

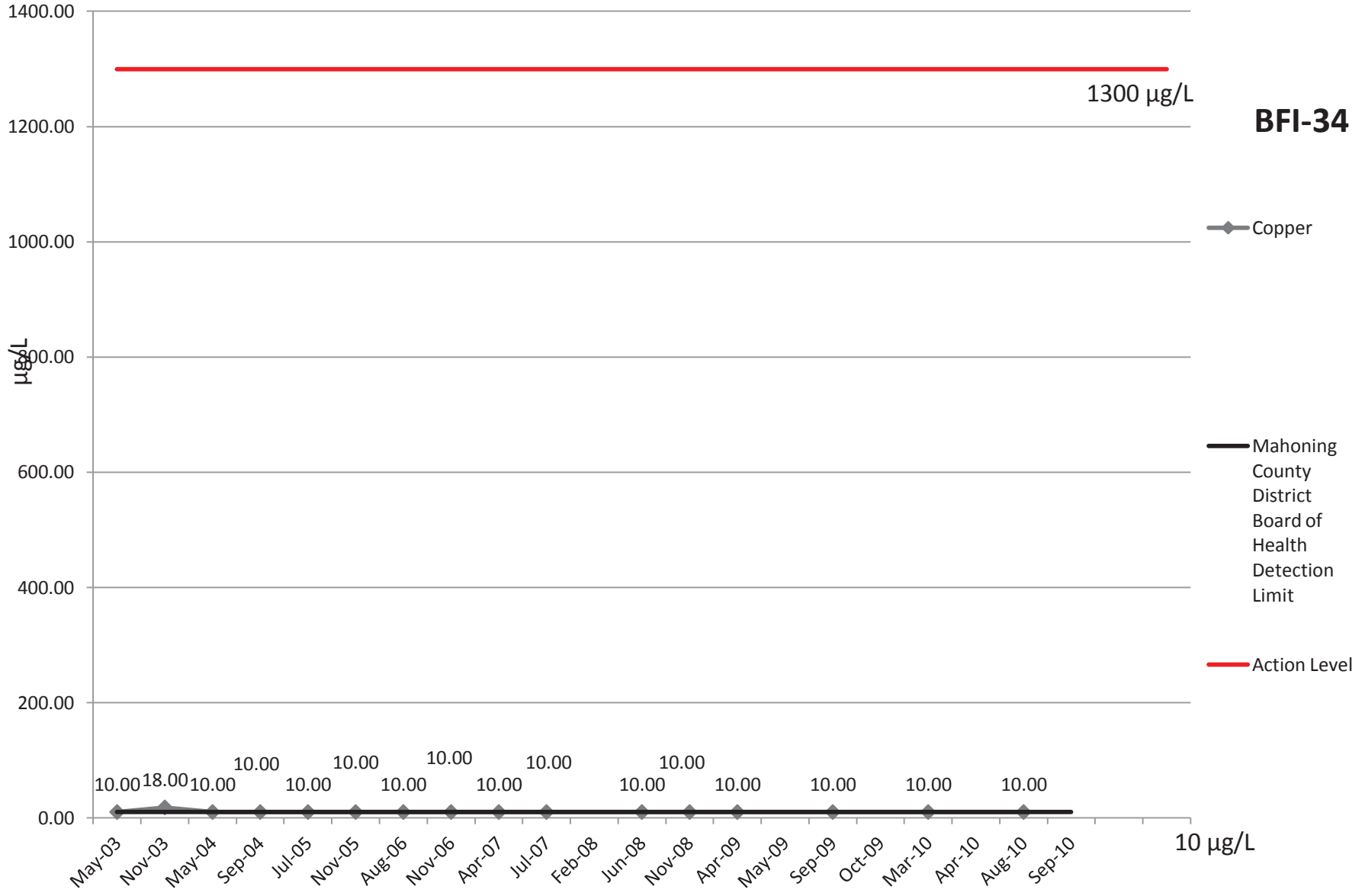


# Chromium

**BFI-34**

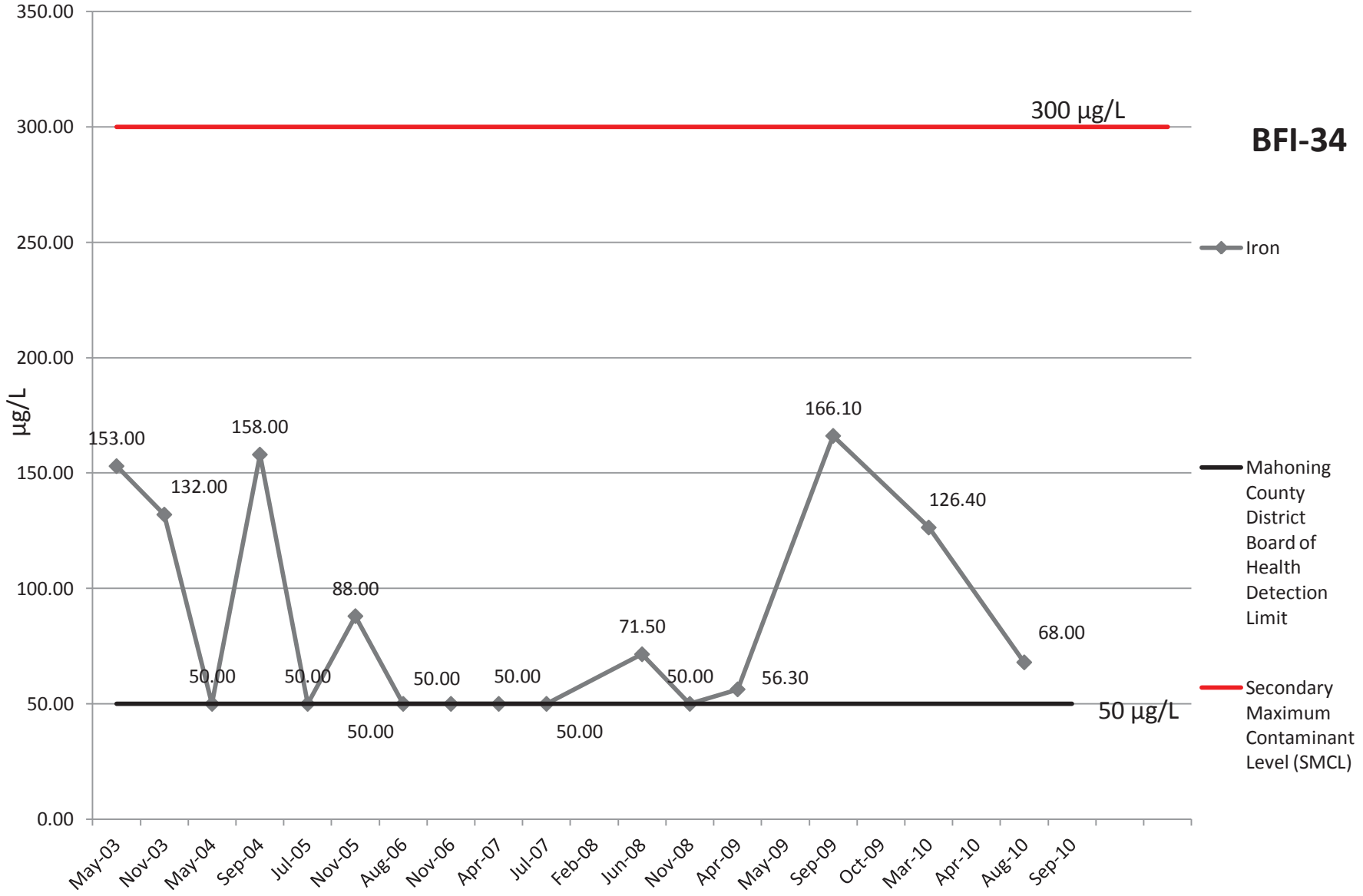


# Copper





# Iron



**BFI-34**

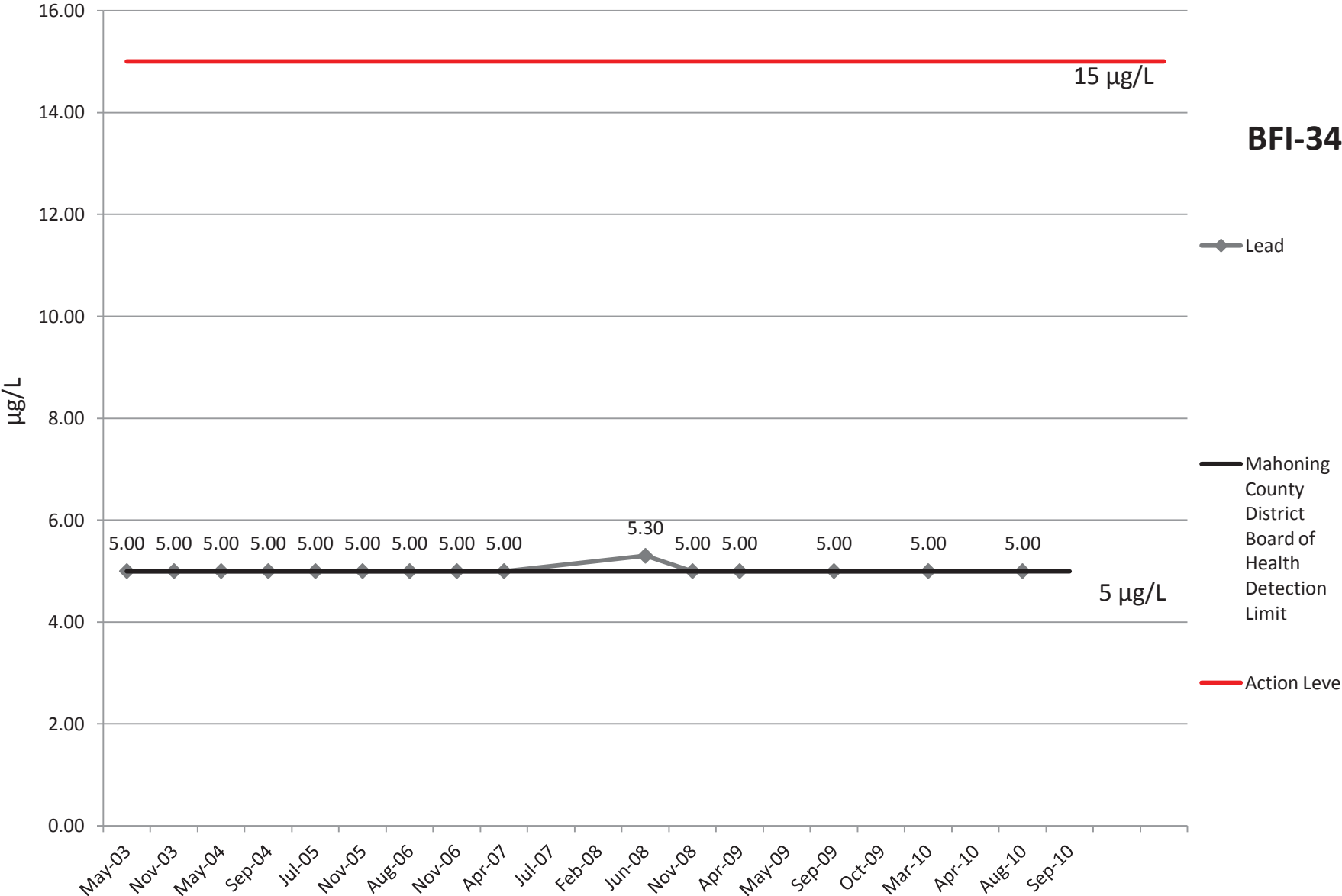
Iron

Mahoning County District Board of Health Detection Limit

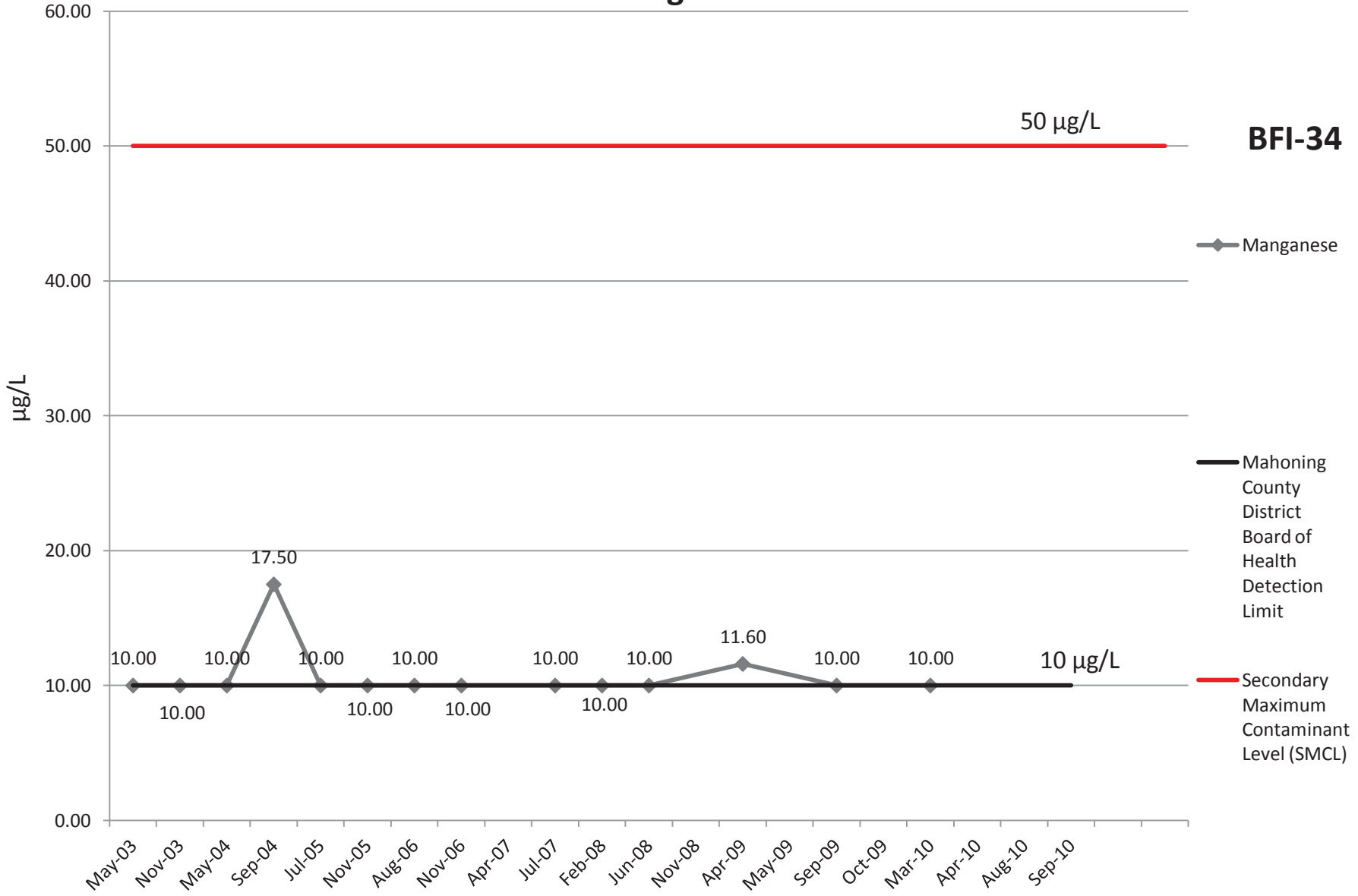
Secondary Maximum Contaminant Level (SMCL)

# Lead

**BFI-34**



# Manganese

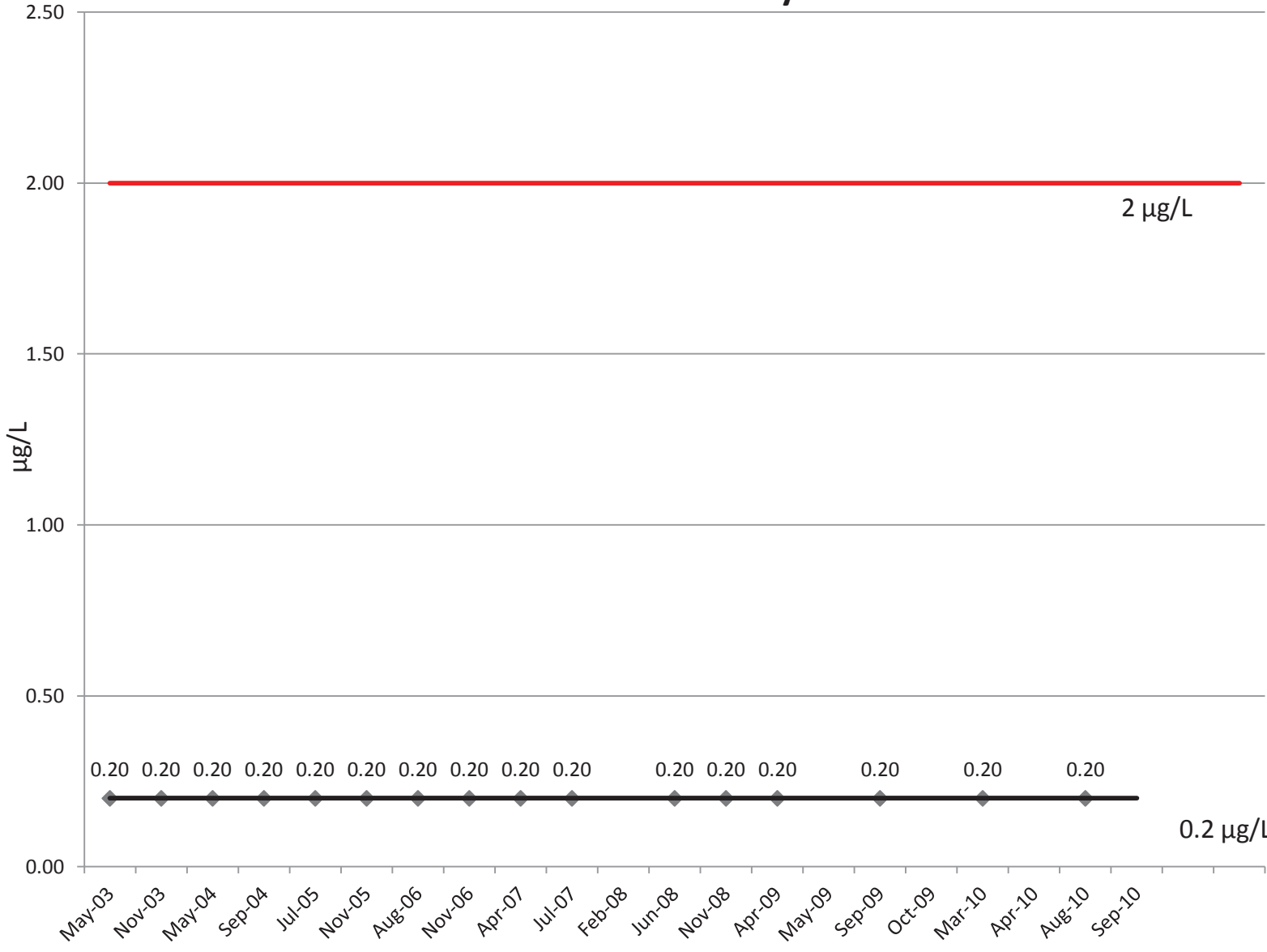


# Mercury

**BFI-34**

2 µg/L

0.2 µg/L

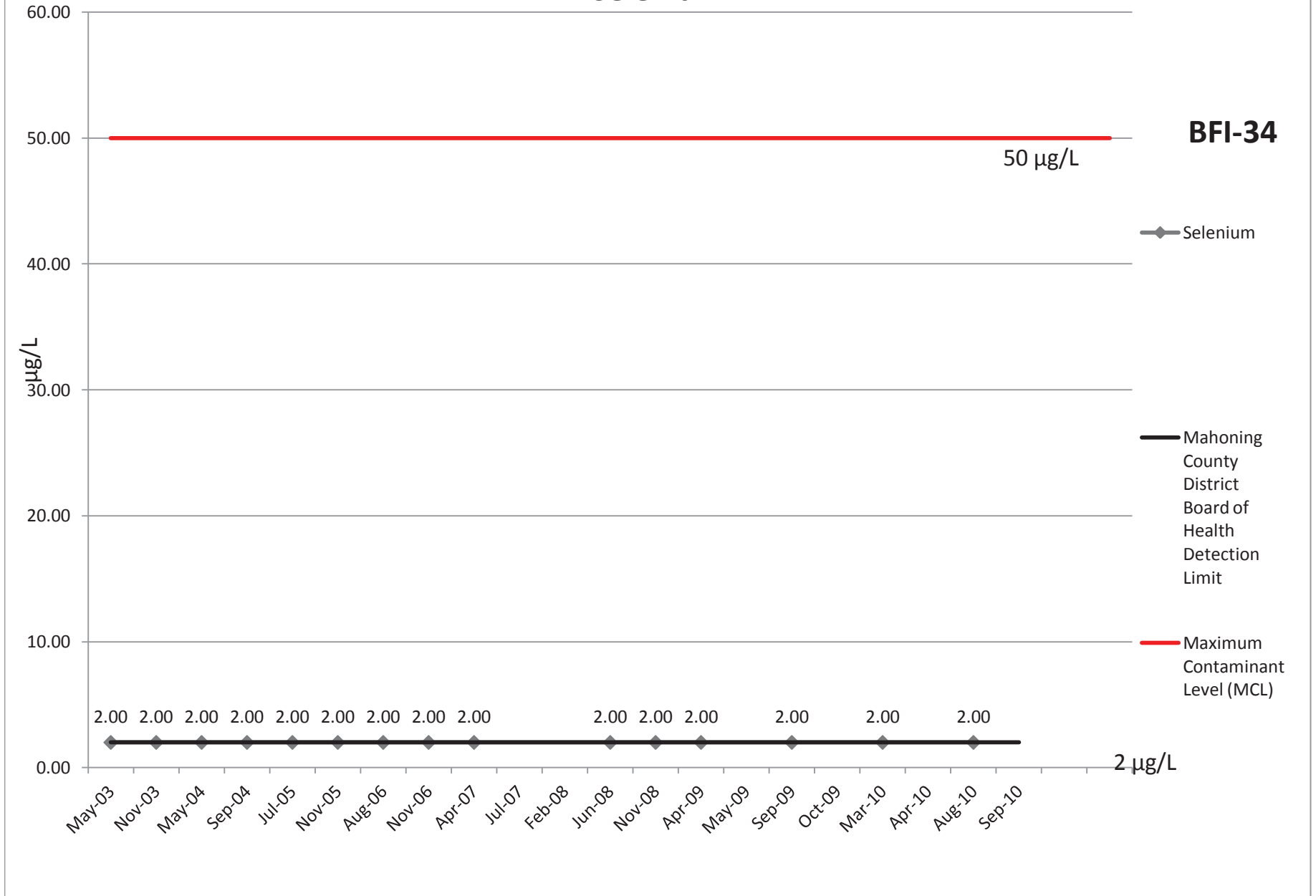


◆ Mercury

— Mahoning County District Board of Health Detection Limit

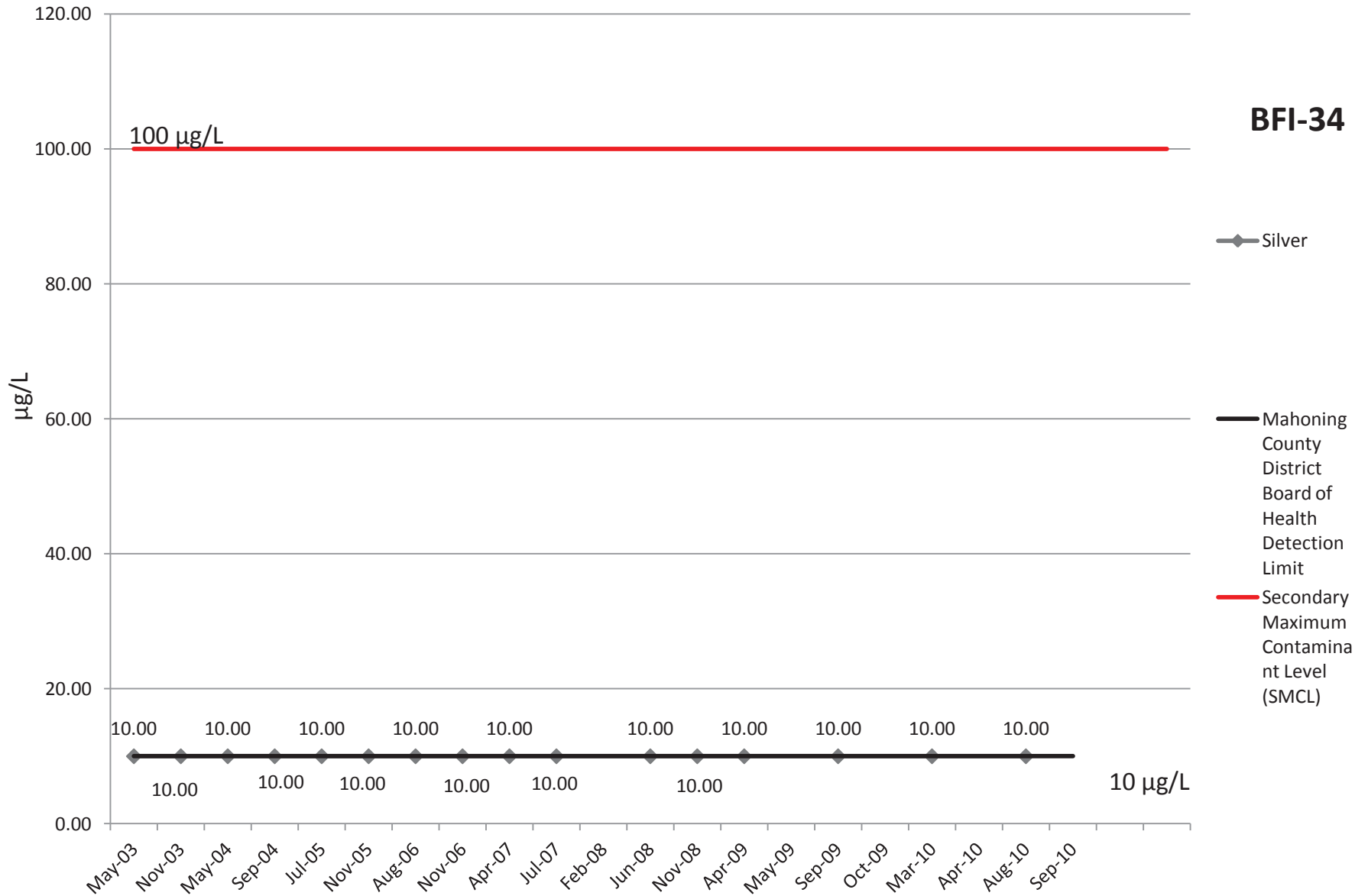
— Maximum Contaminant Level (MCL)

# Selenium

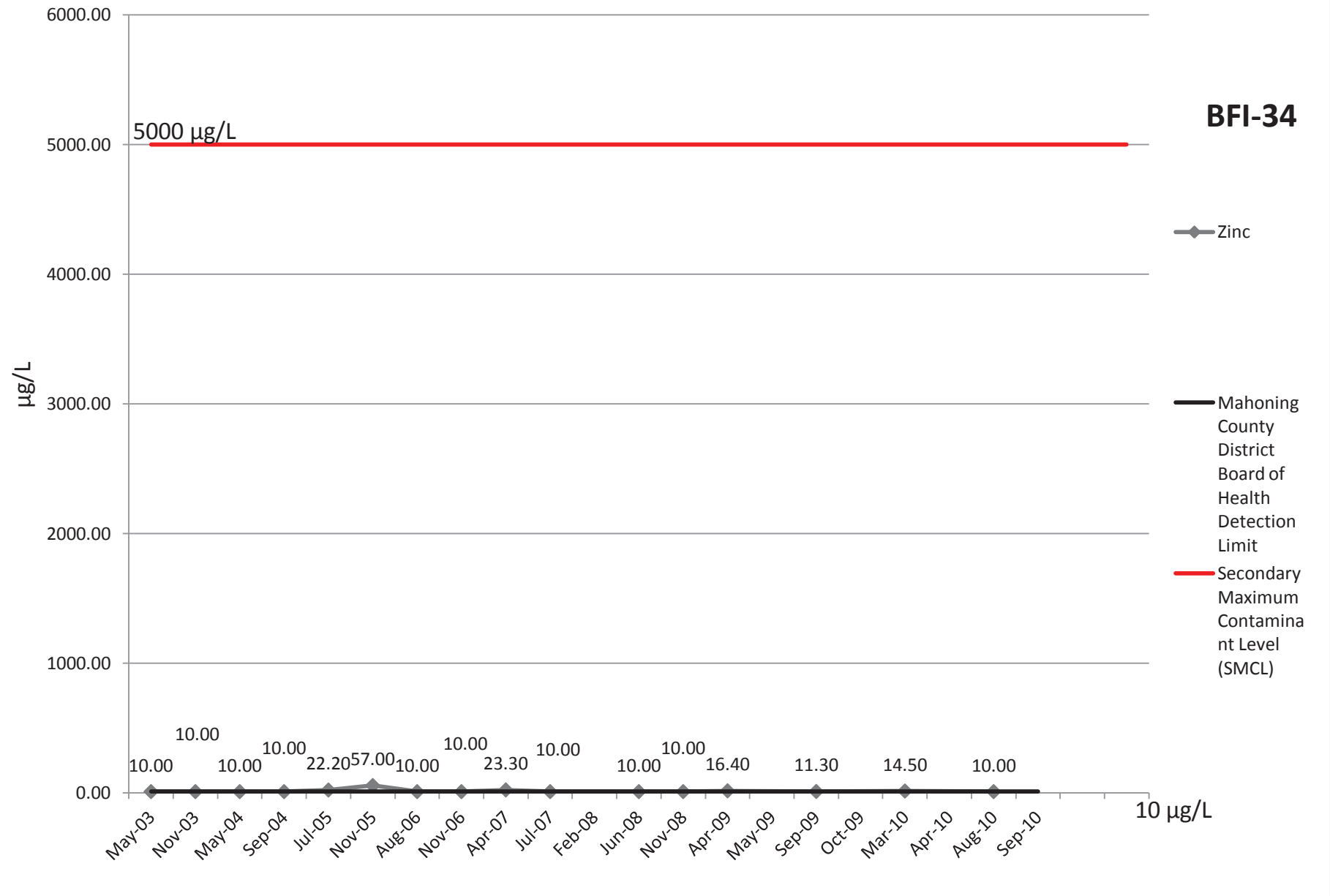


# Silver

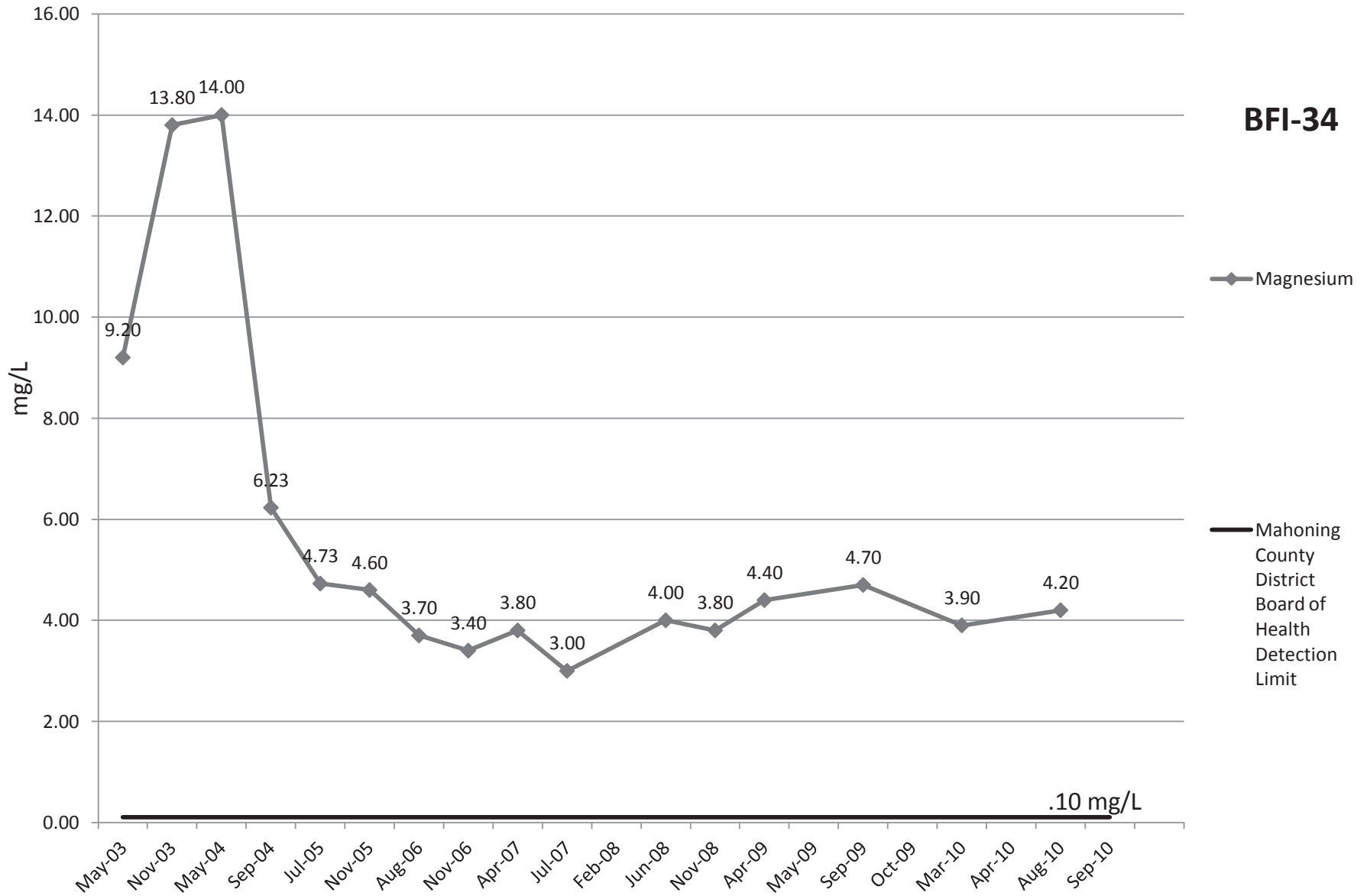
**BFI-34**



# Zinc



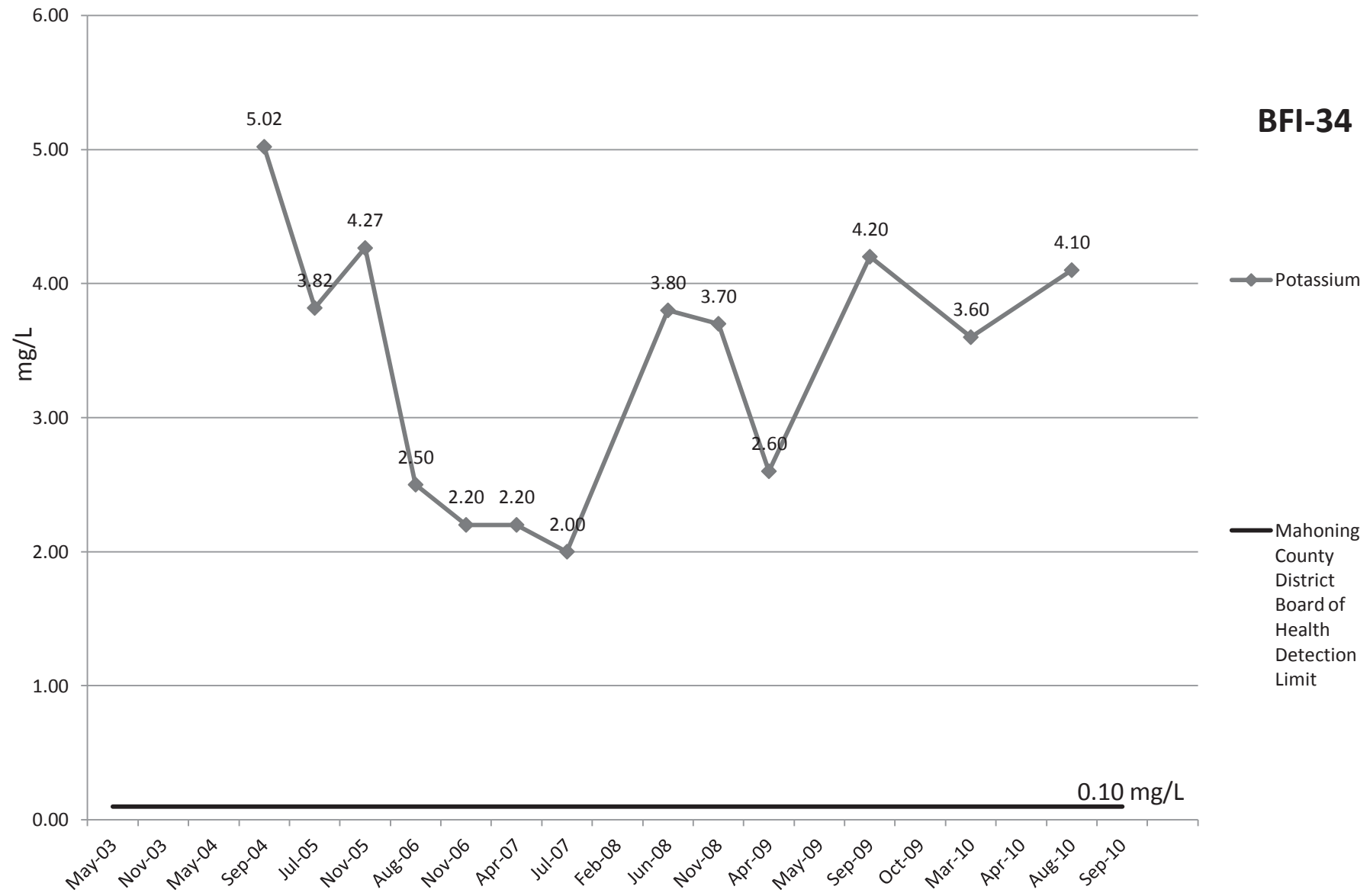
# Magnesium



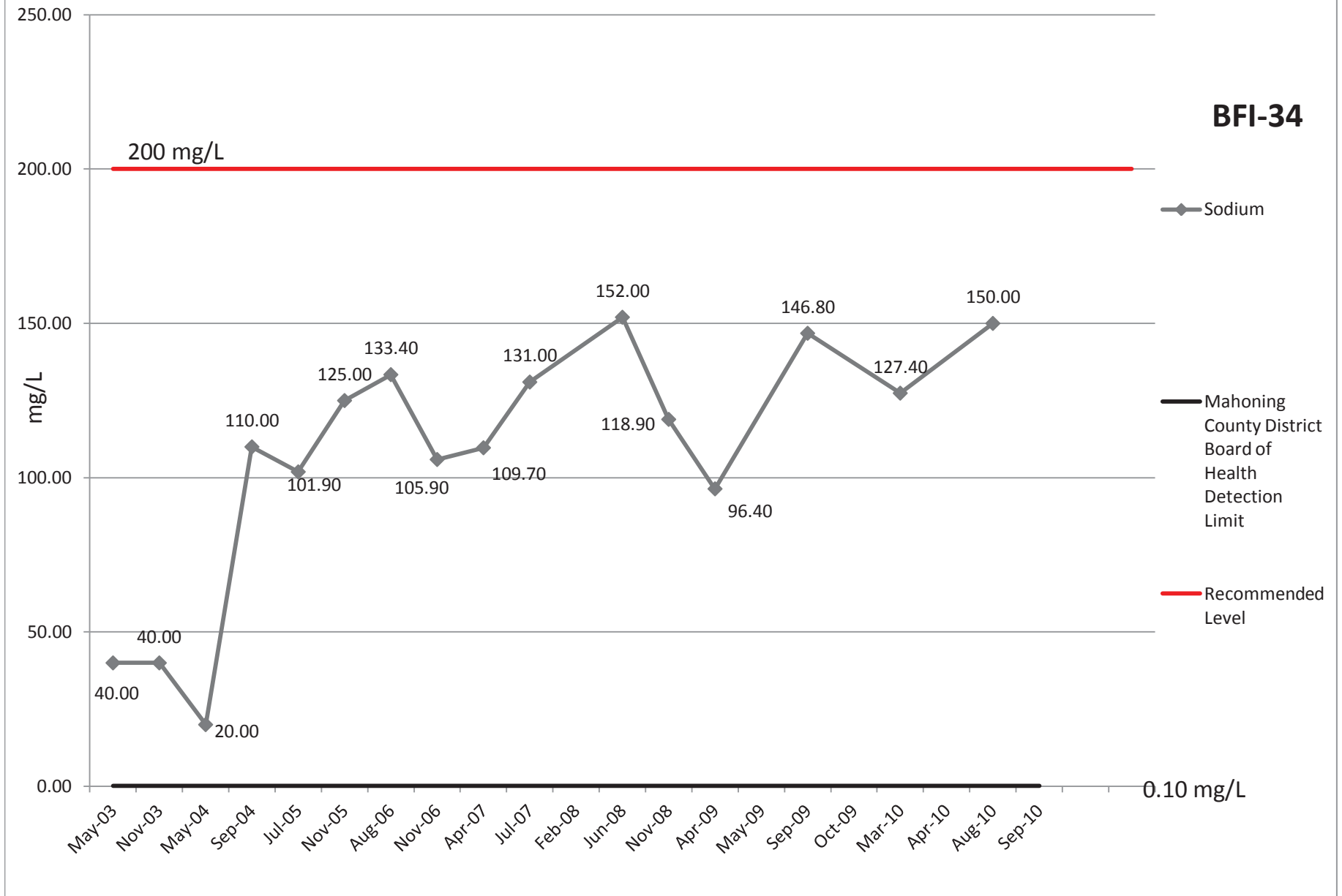


# Potassium

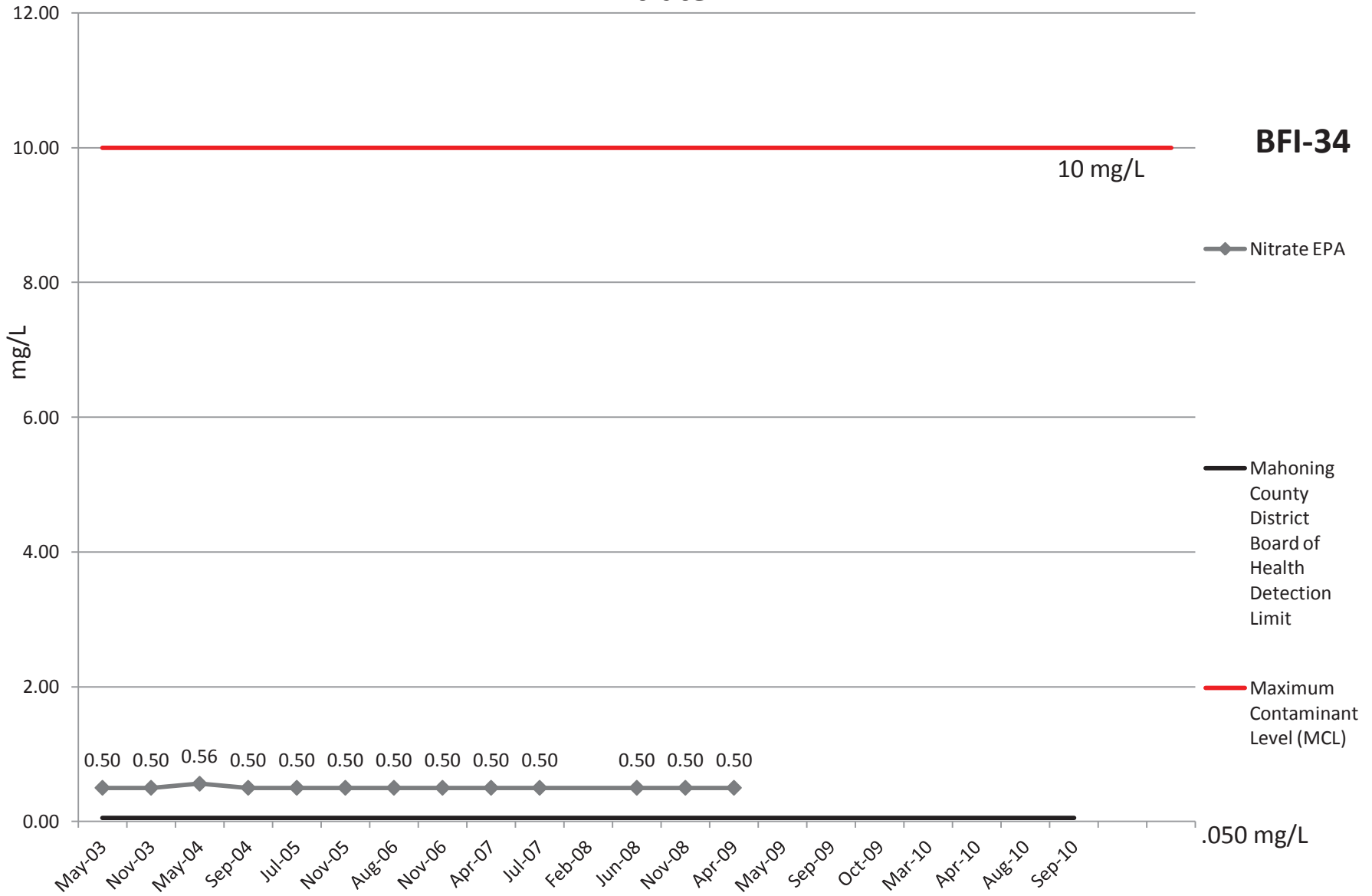
**BFI-34**



# Sodium

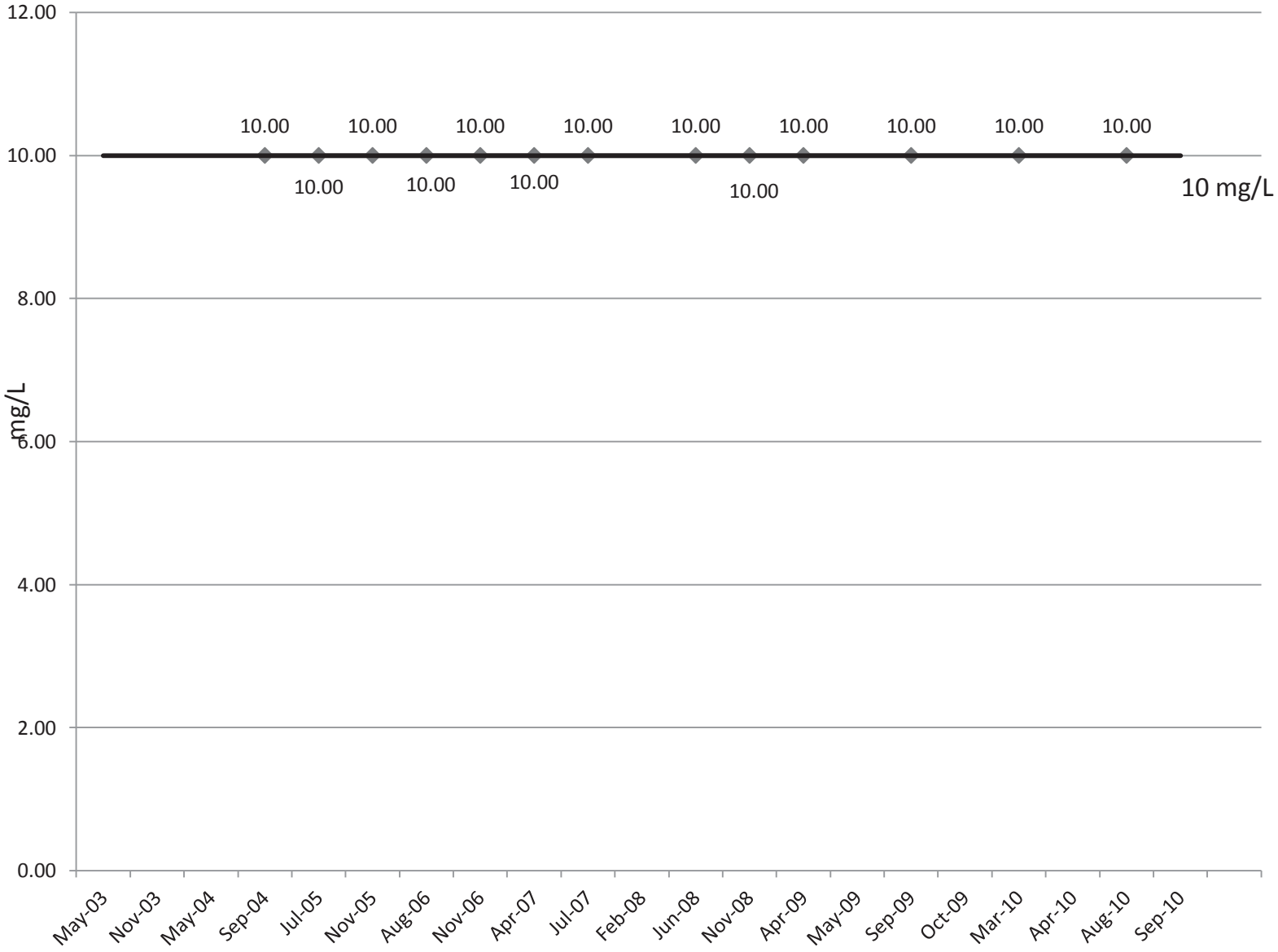


# Nitrate EPA



# COD

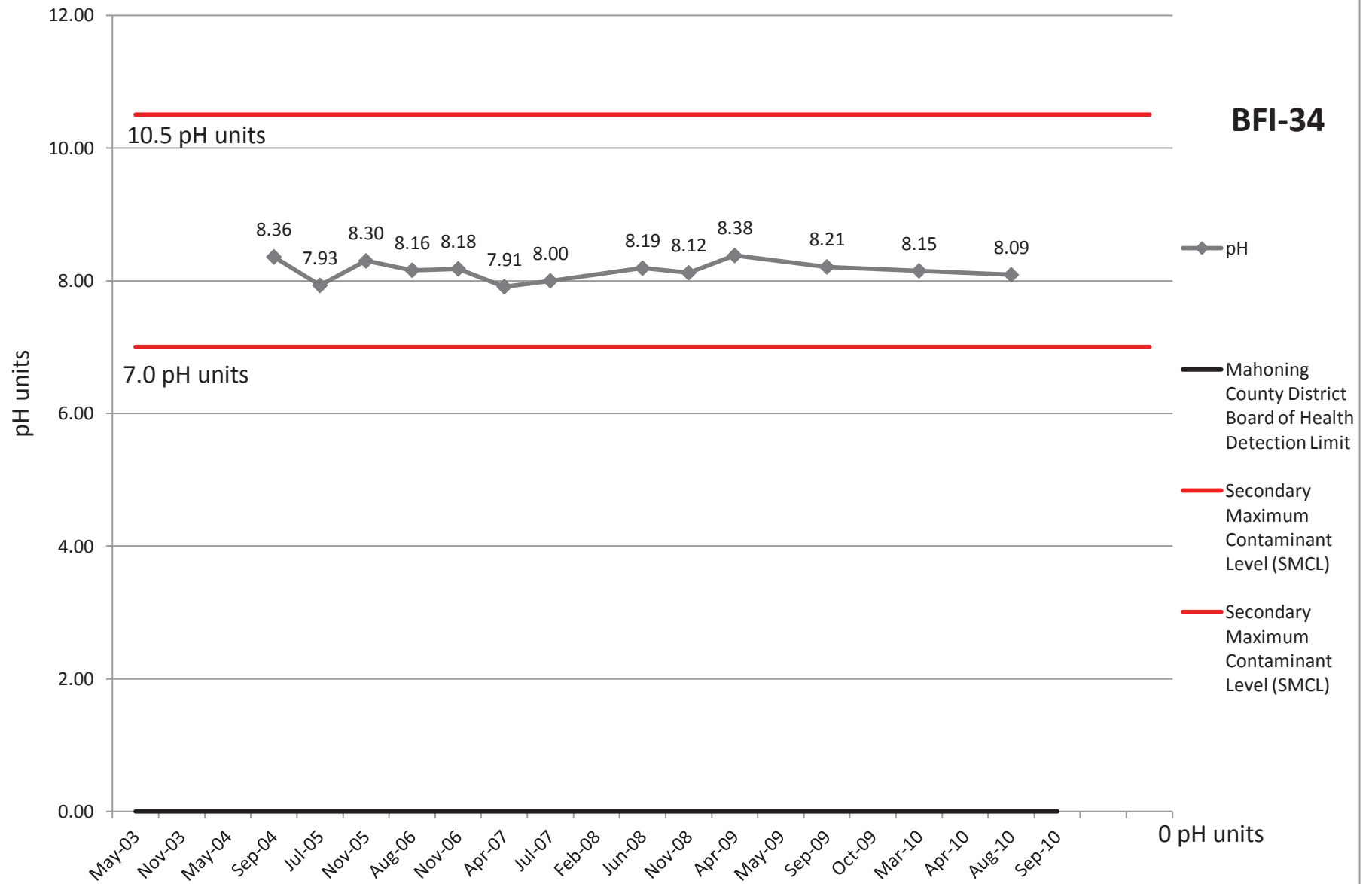
**BFI-34**



◆ COD

— Mahoning County District Board of Health Detection Limit

# pH



**BFI-34**

—◆— pH

— Mahoning  
County District  
Board of Health  
Detection Limit

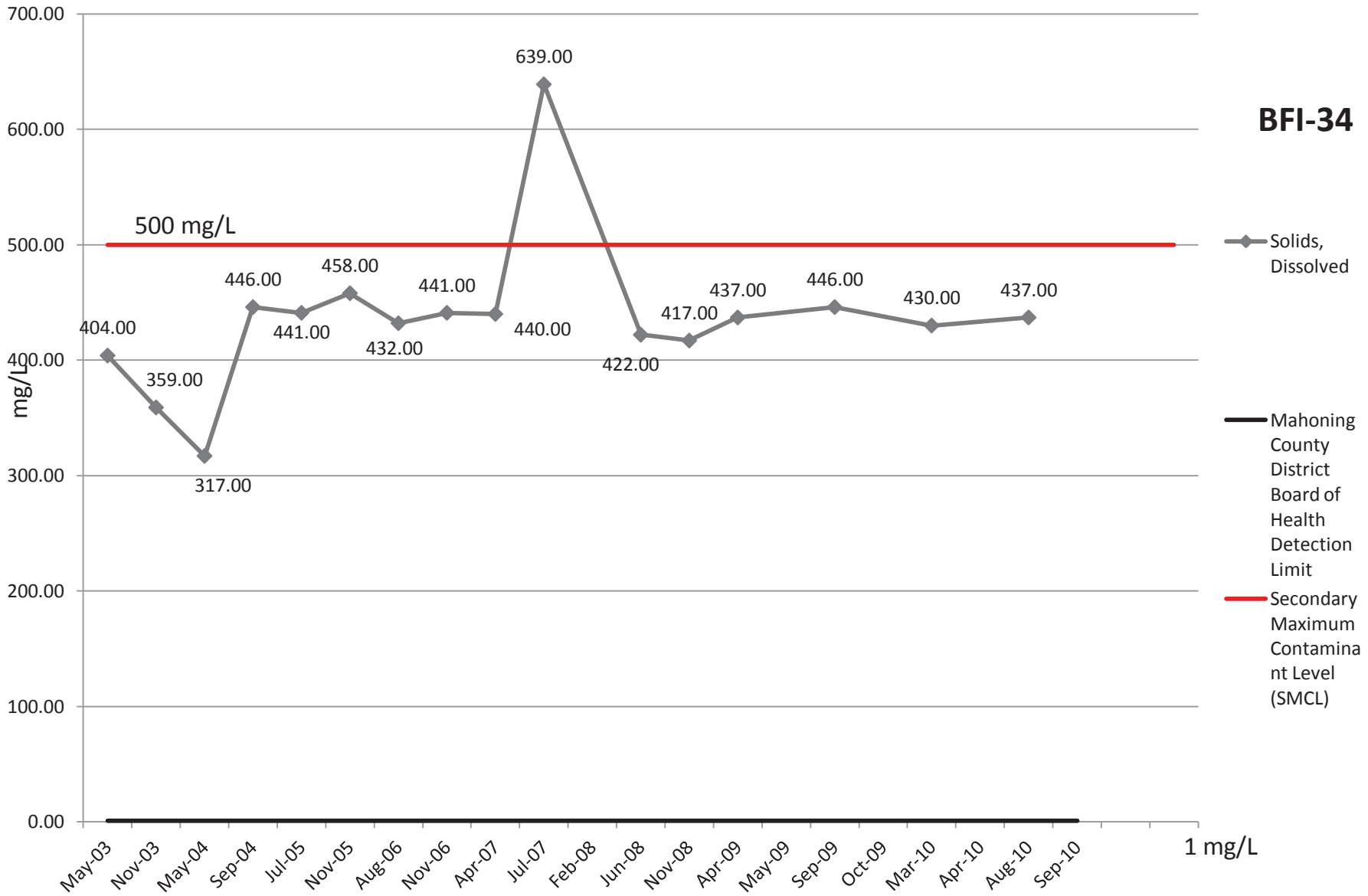
— Secondary  
Maximum  
Contaminant  
Level (SMCL)

— Secondary  
Maximum  
Contaminant  
Level (SMCL)

0 pH units

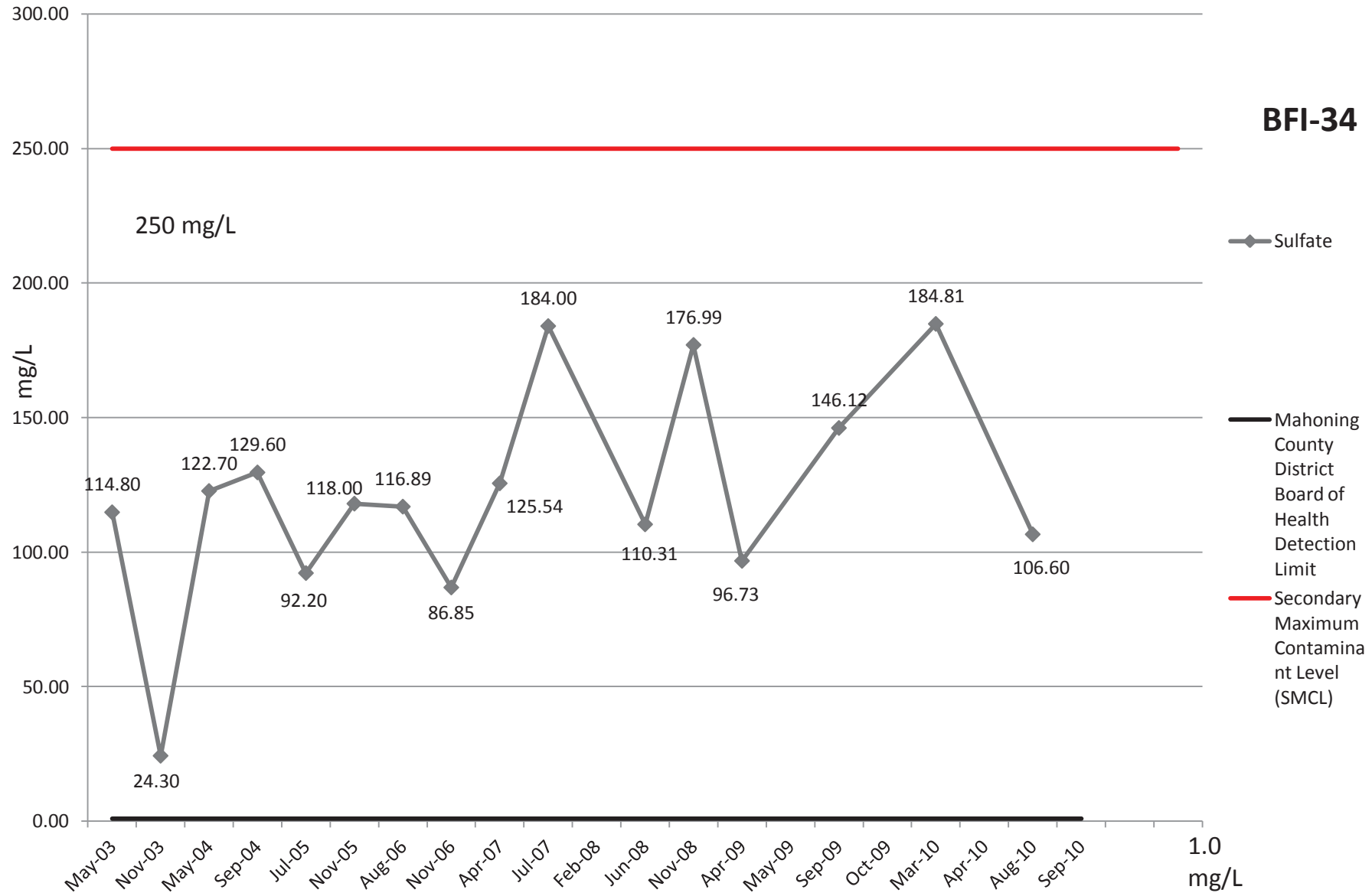
# Solids, Dissolved

**BFI-34**



# Sulfate

**BFI-34**



# Bacteria

**BFI-34**

Positive/Negative

◆ Bacteria

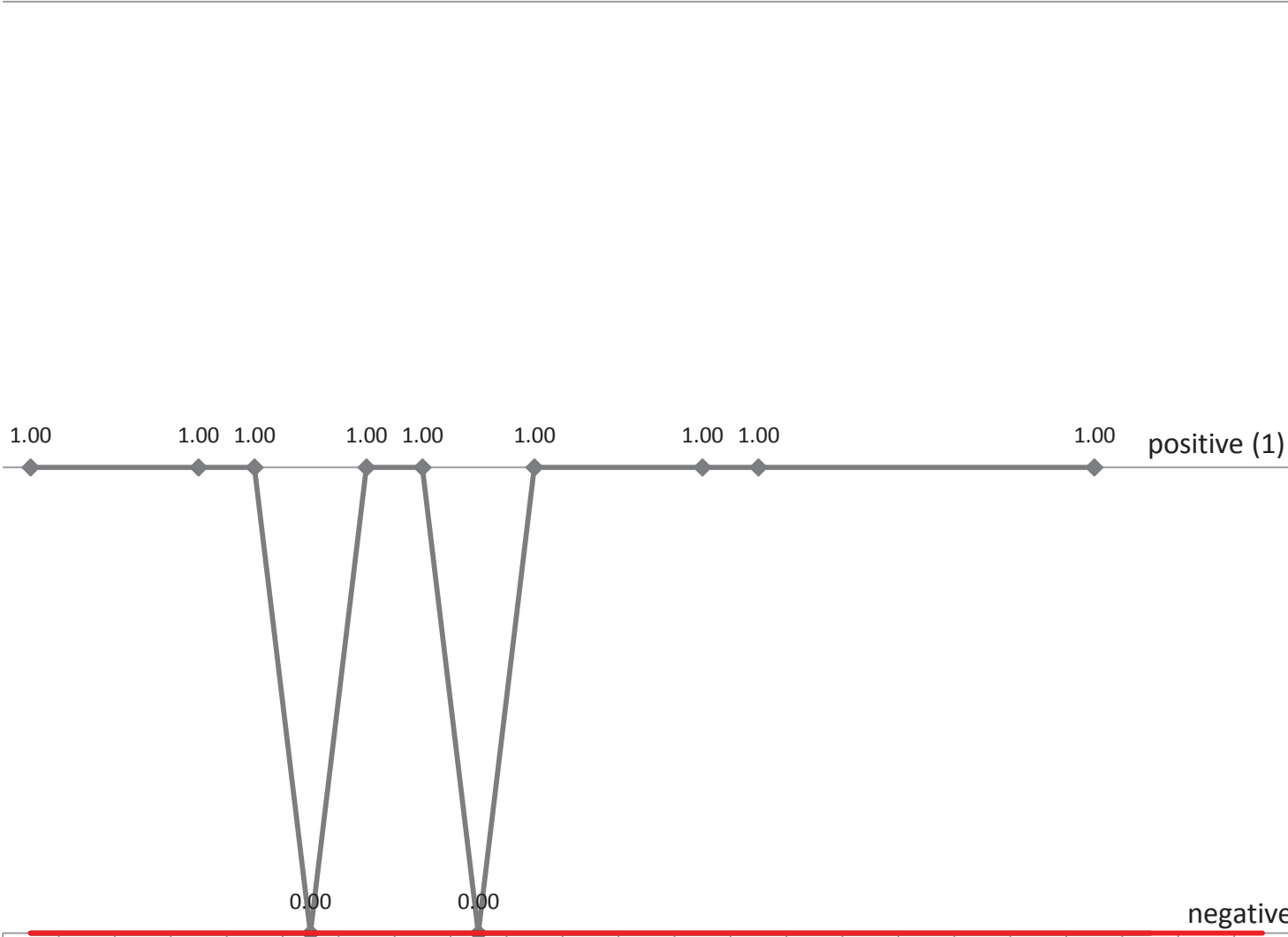
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

0.00 0.00 negative (0)

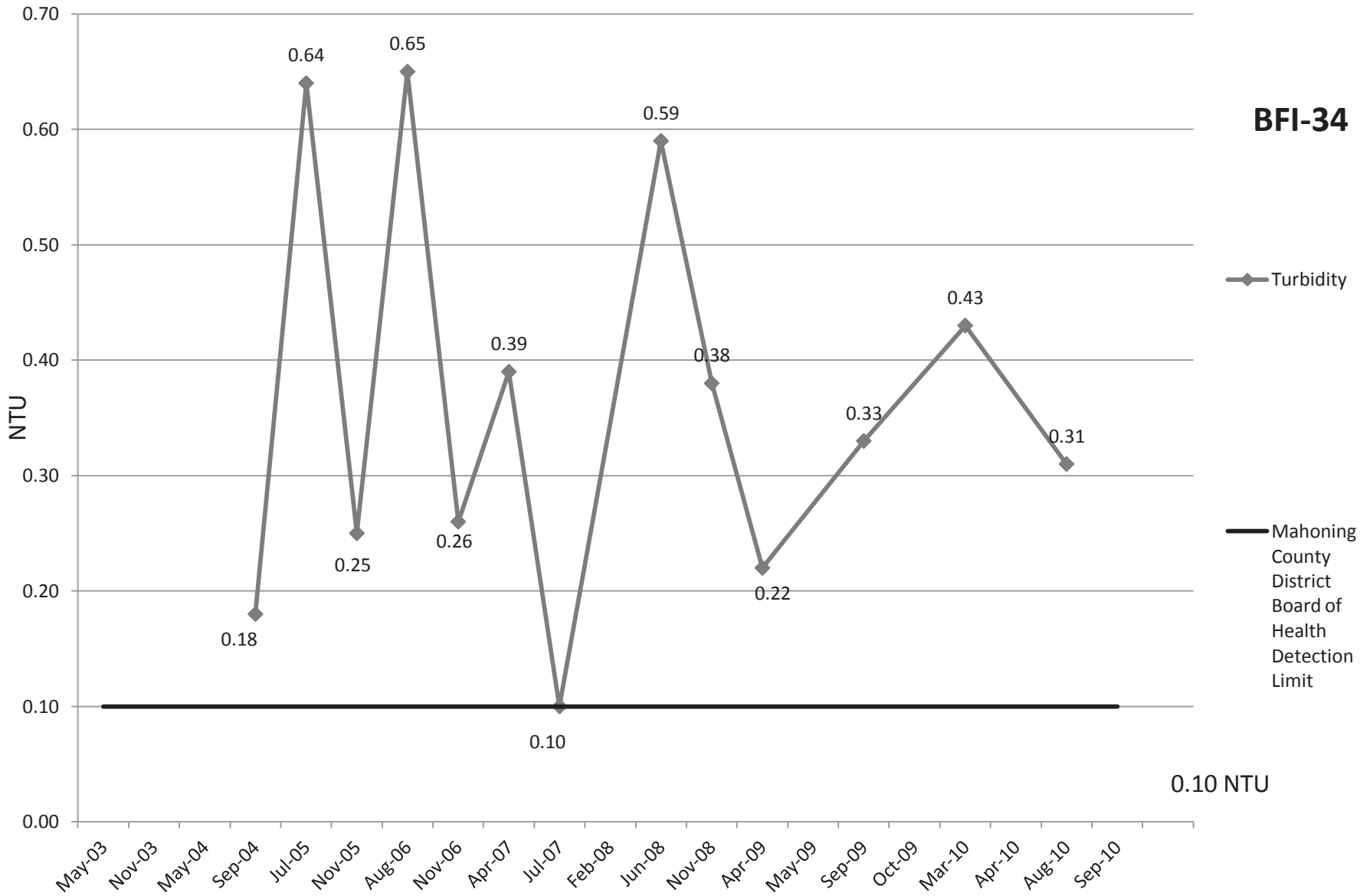
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10





# Turbidity

**BFI-34**

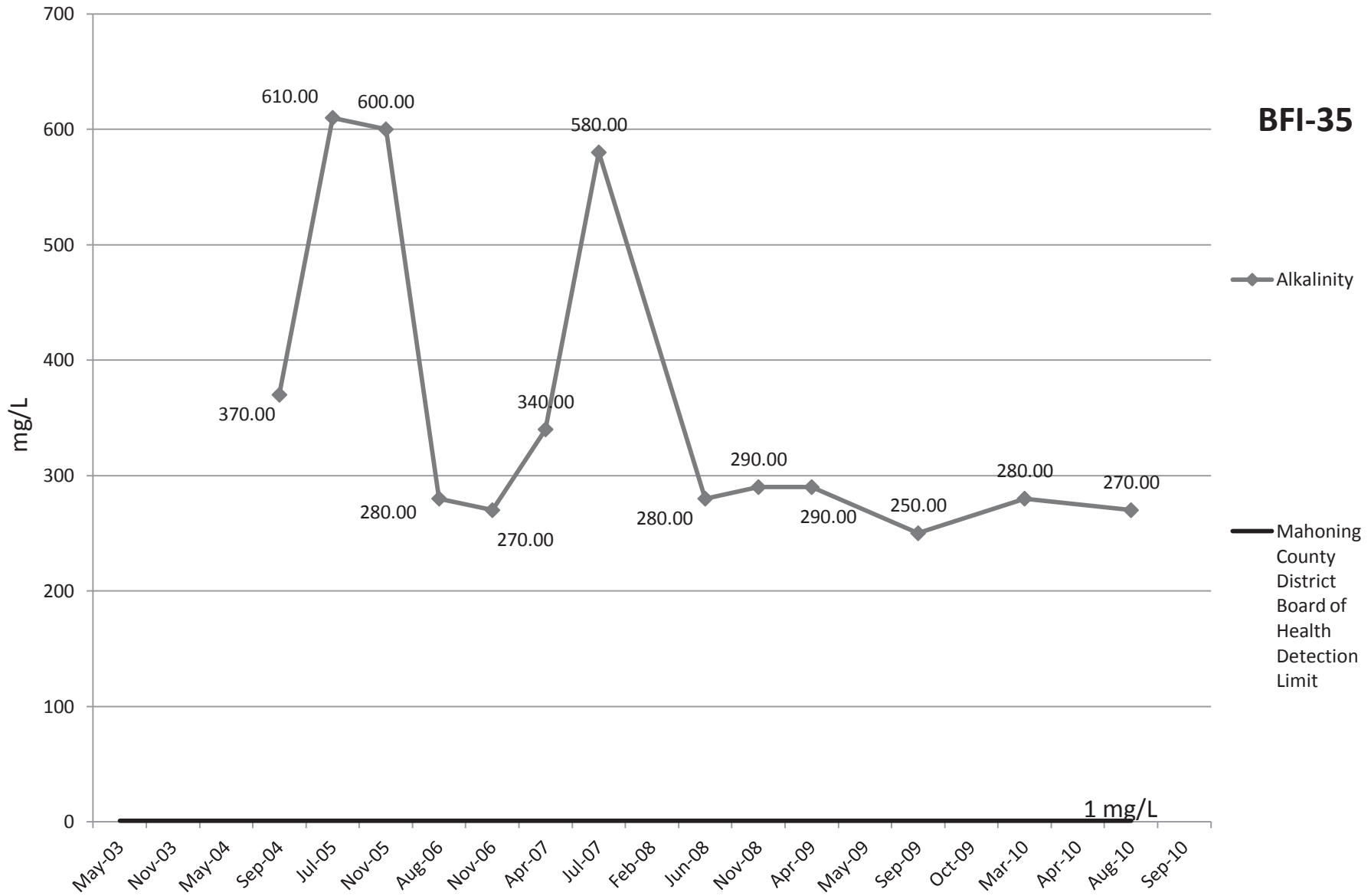


◆ Turbidity

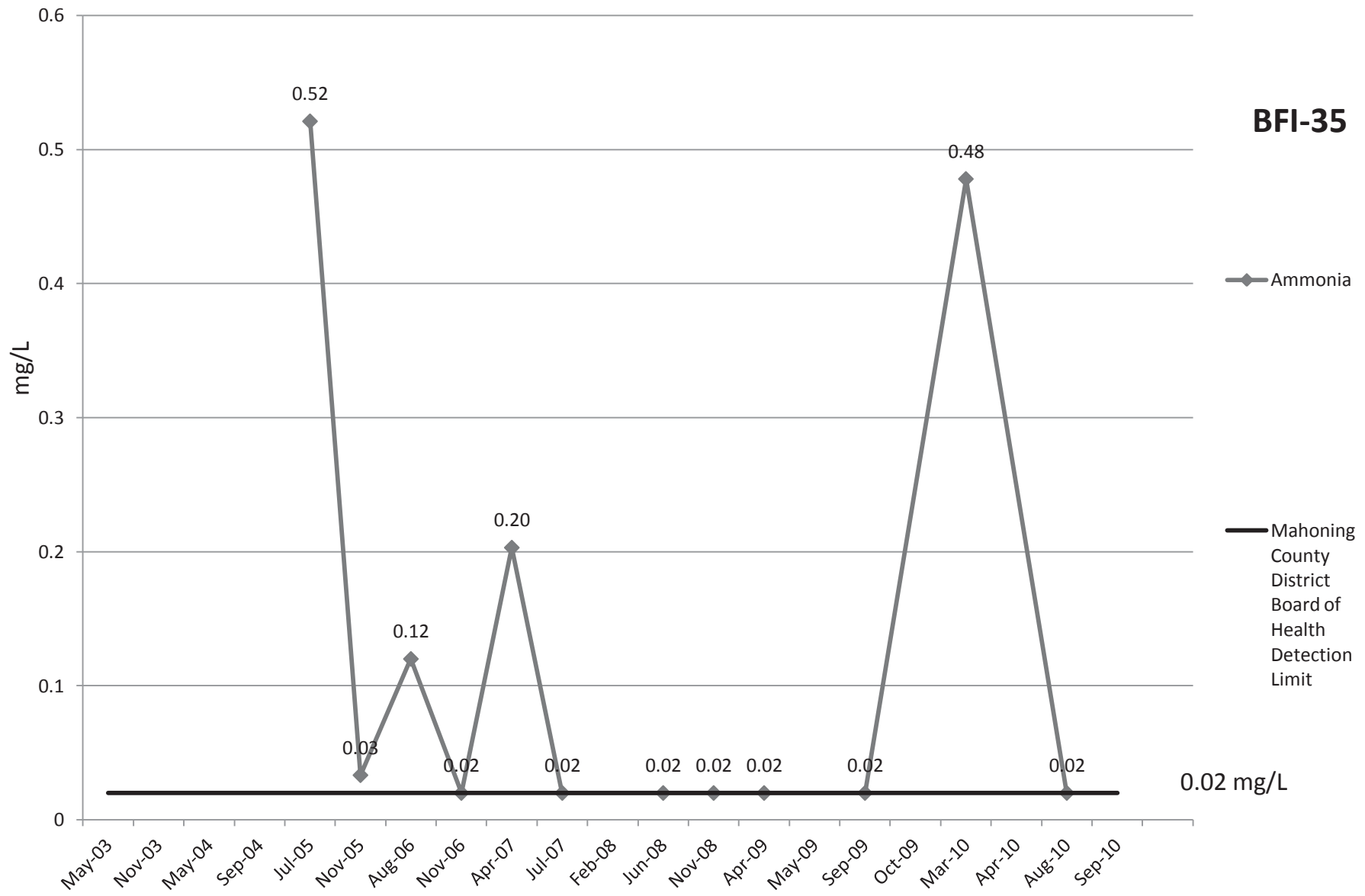
— Mahoning County District Board of Health Detection Limit

0.10 NTU

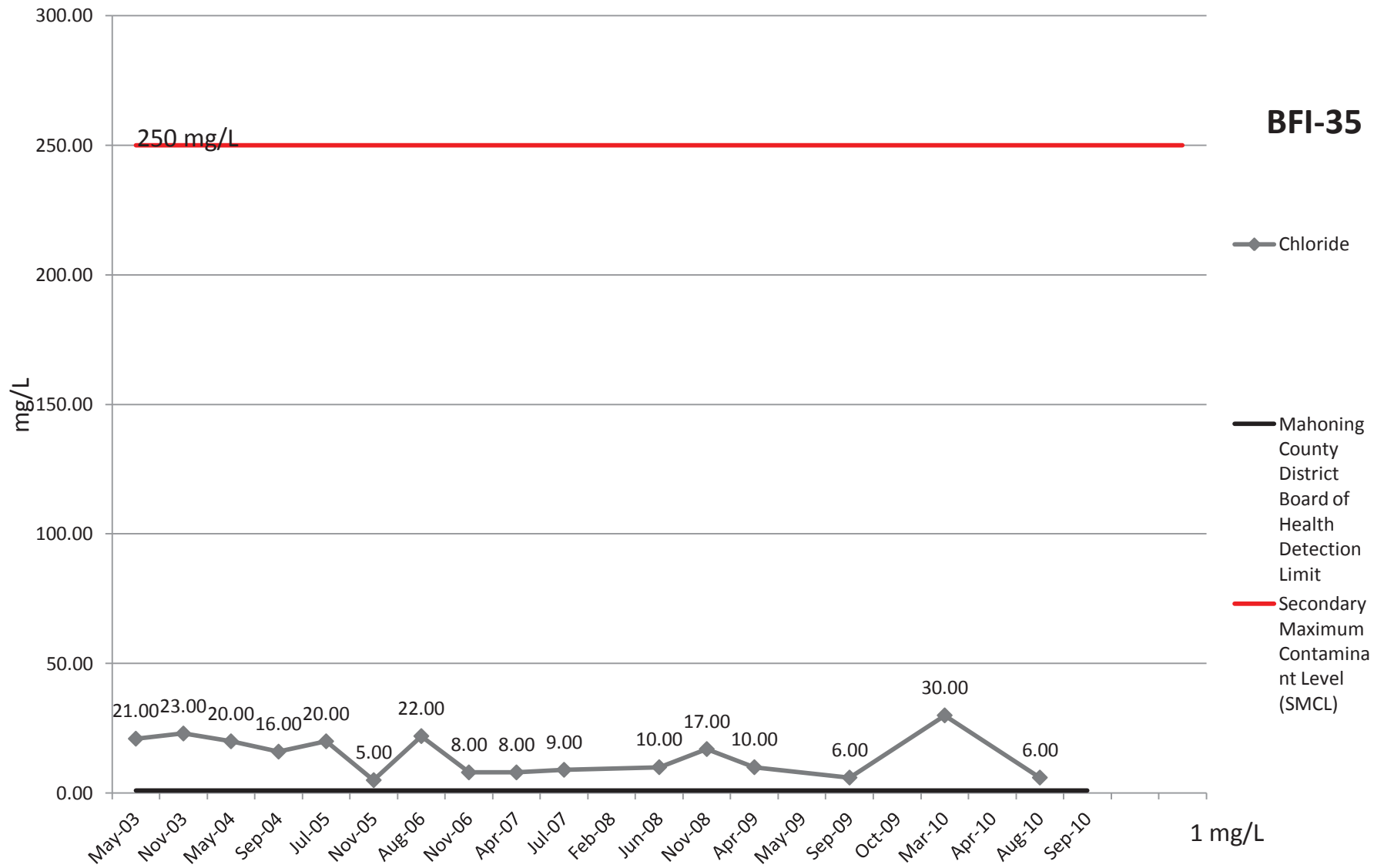
# Alkalinity



# Ammonia

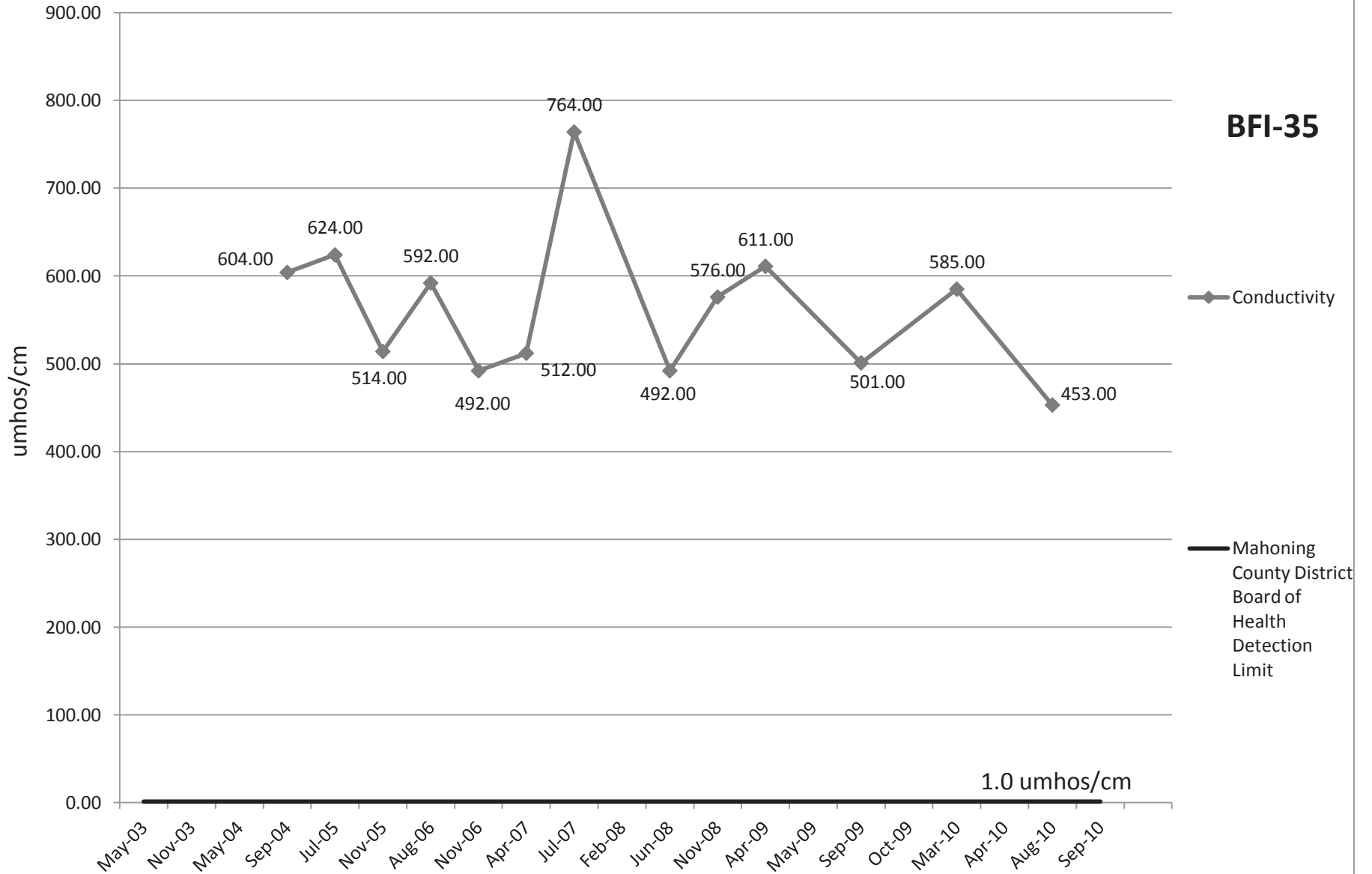


# Chloride

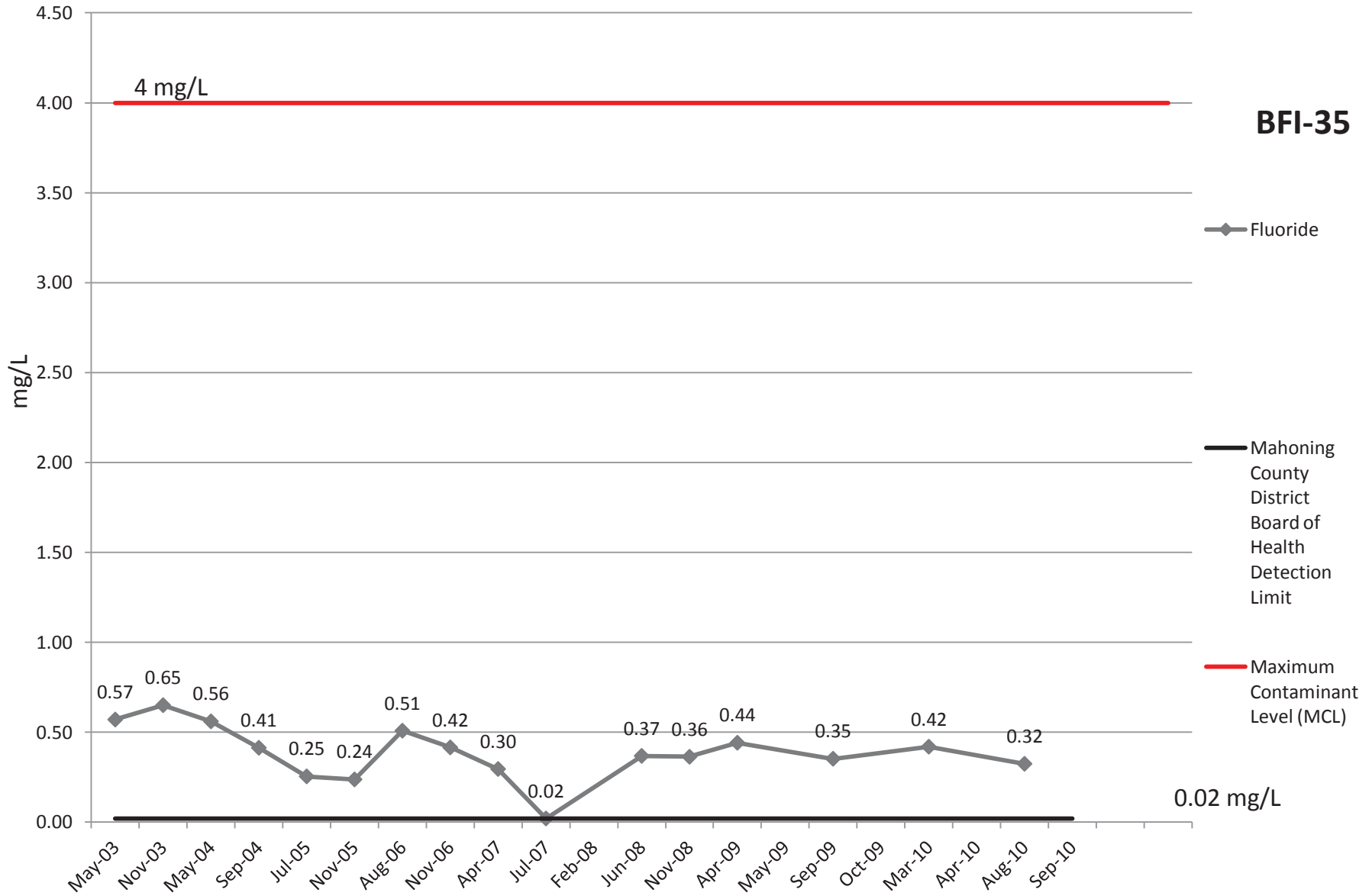


# Conductivity

**BFI-35**

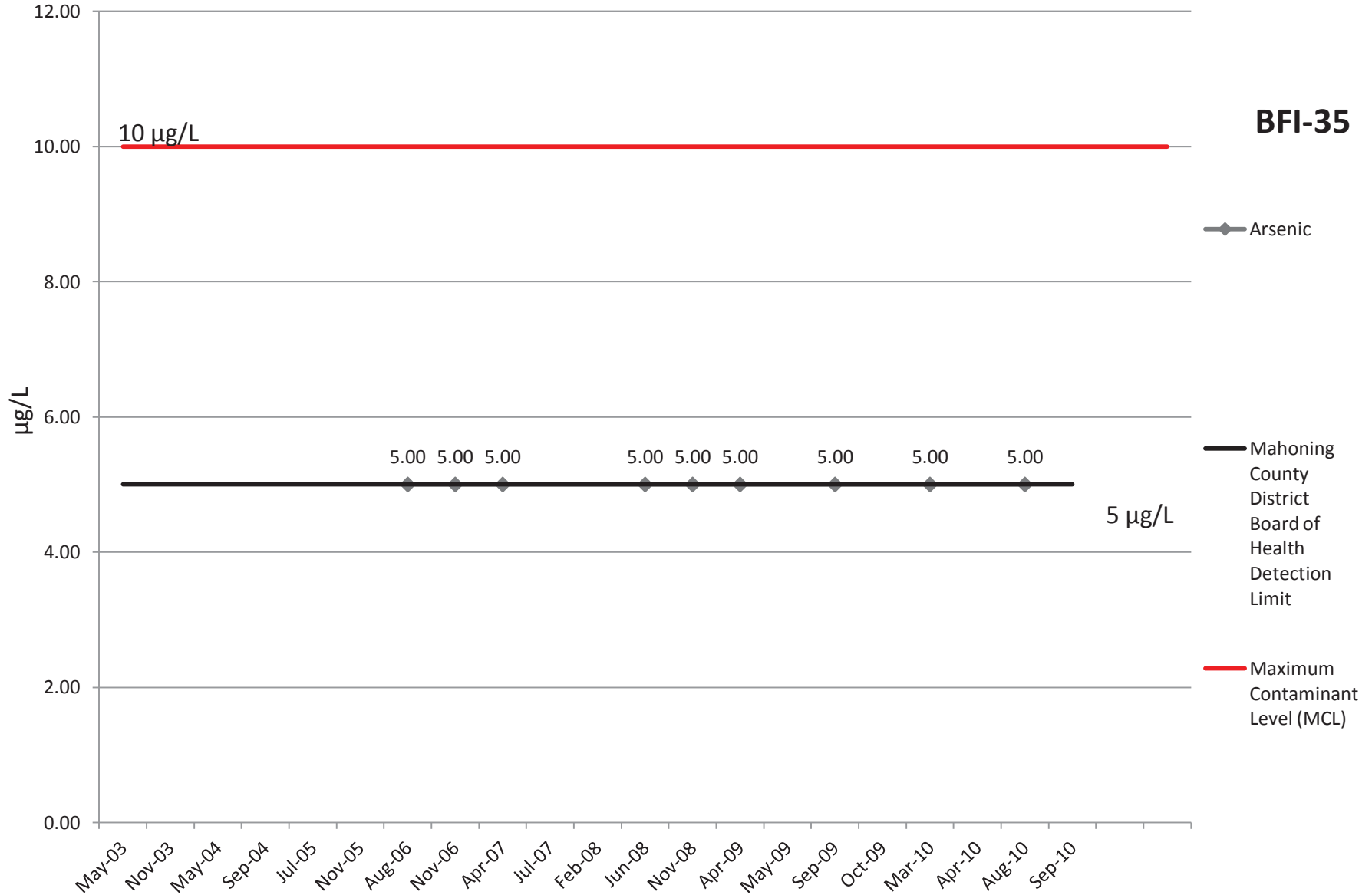


# Fluoride



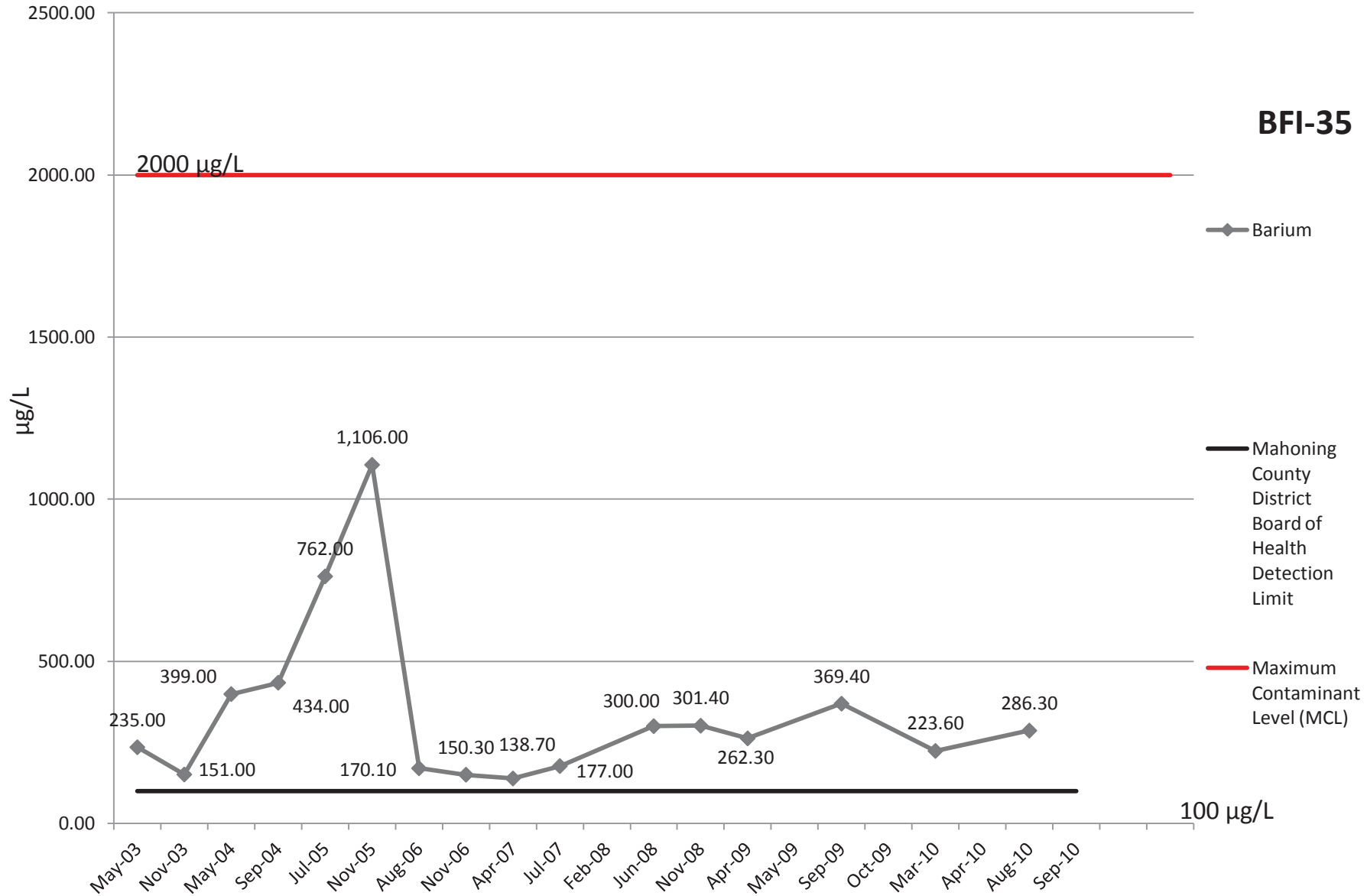
# Arsenic

**BFI-35**



# Barium

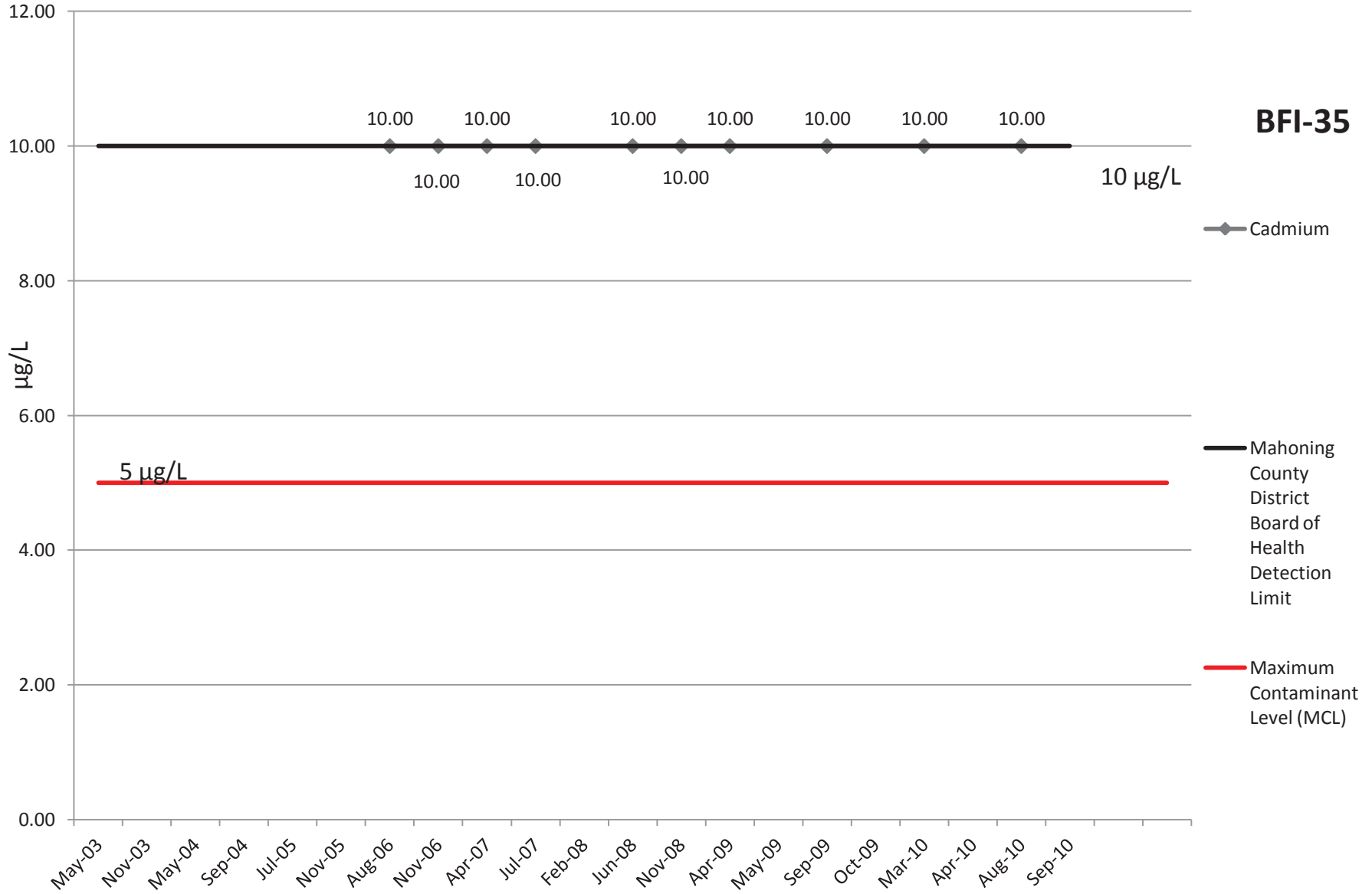
**BFI-35**



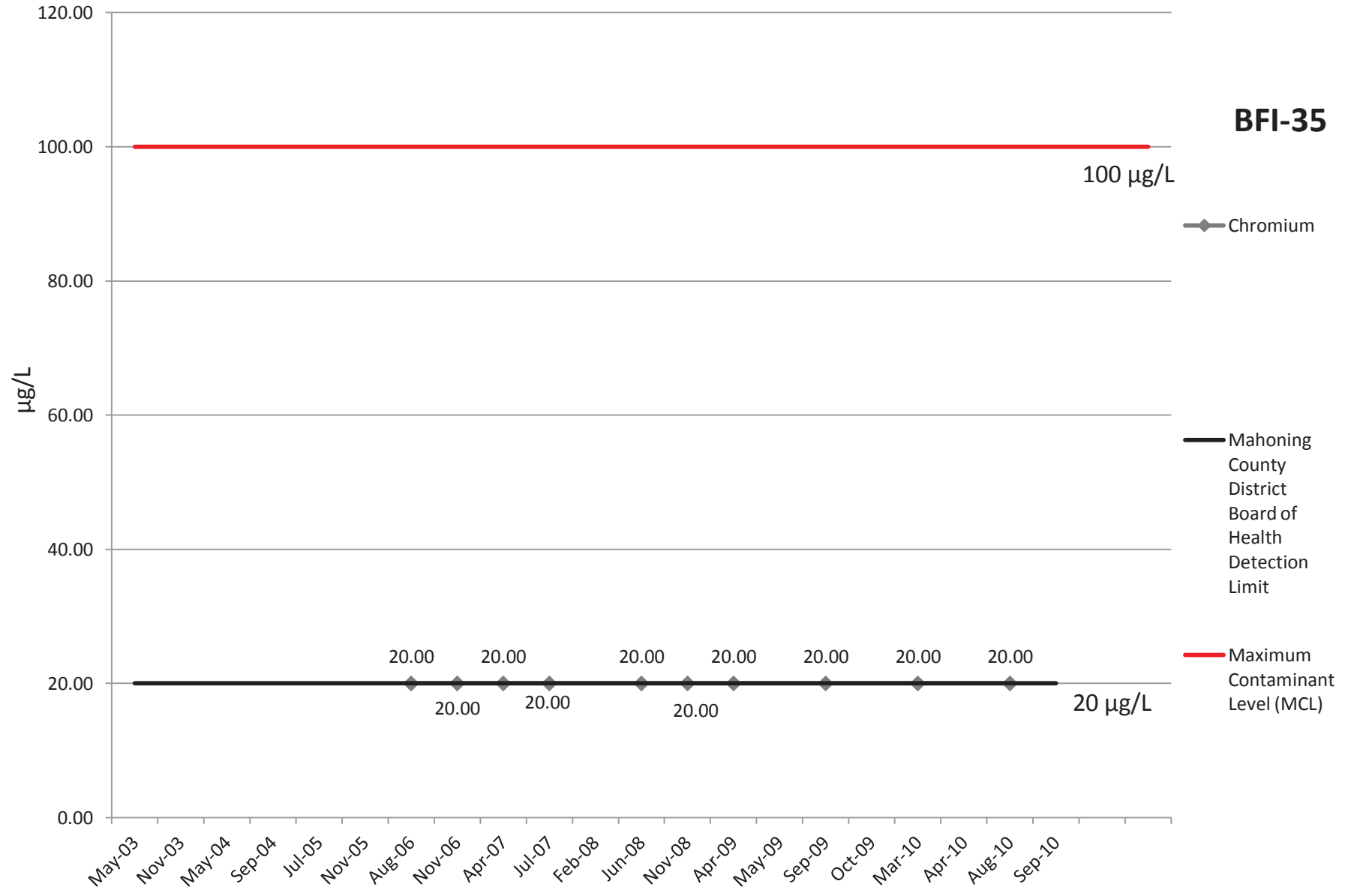


# Cadmium

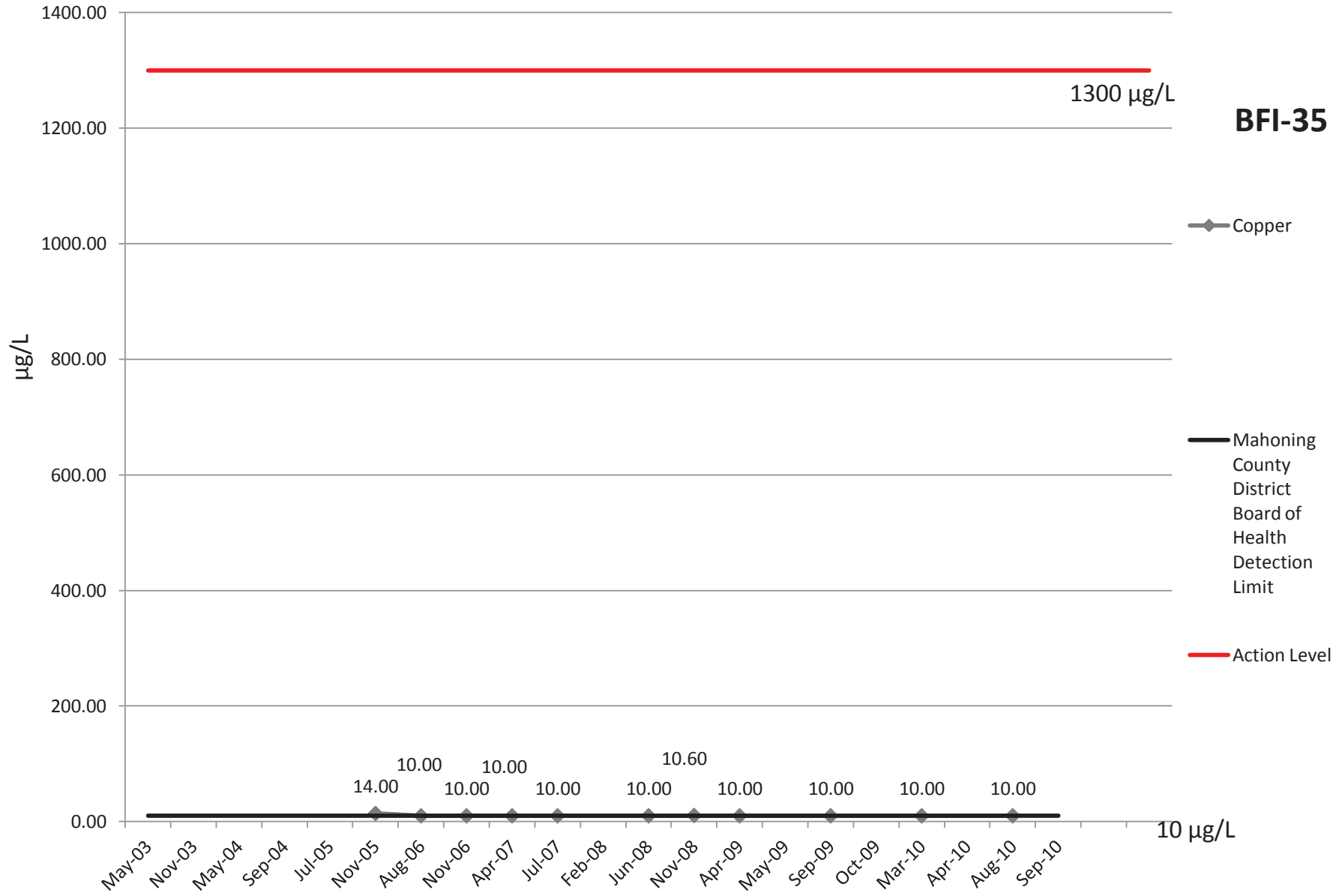
**BFI-35**



# Chromium

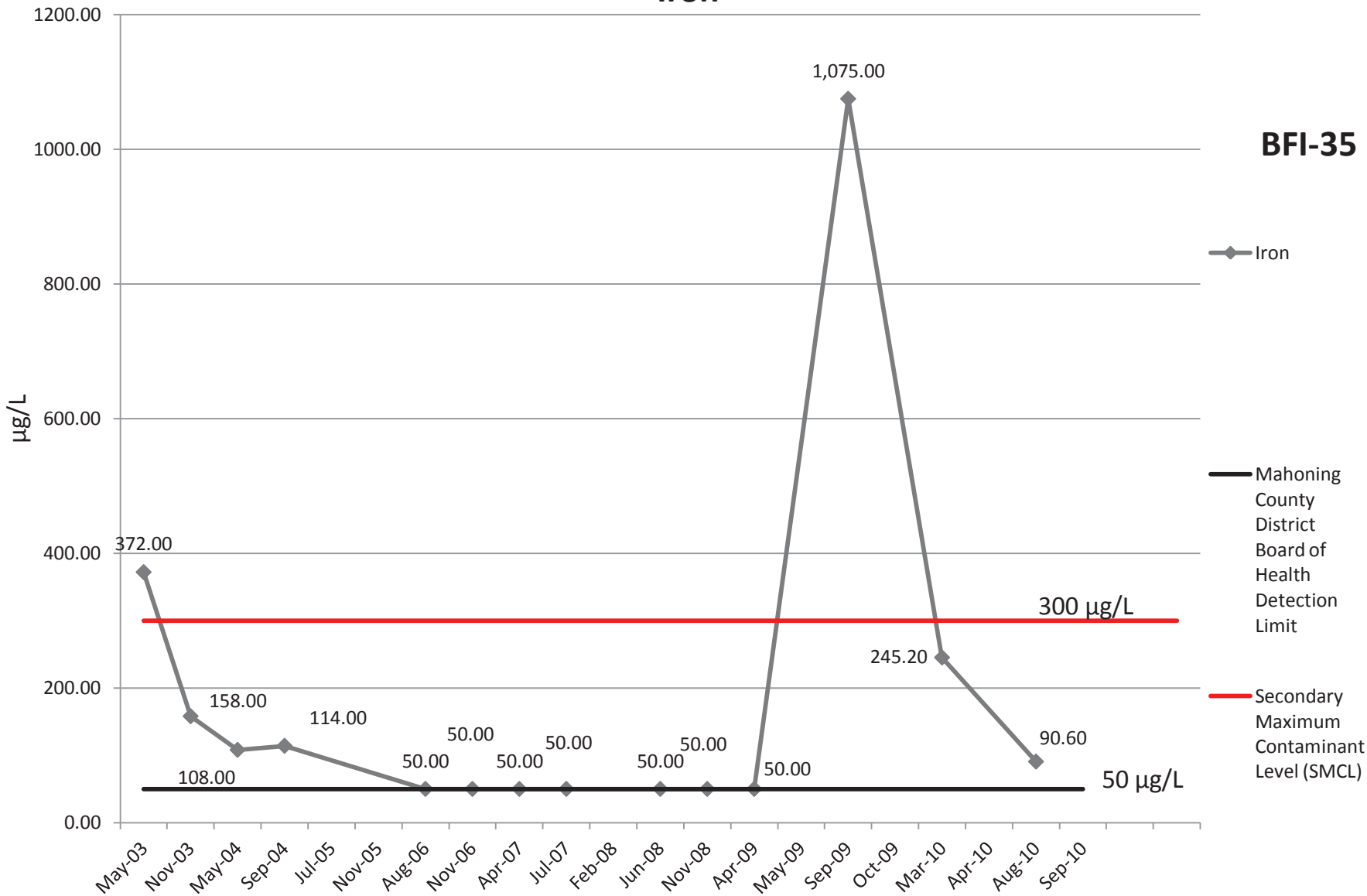


# Copper



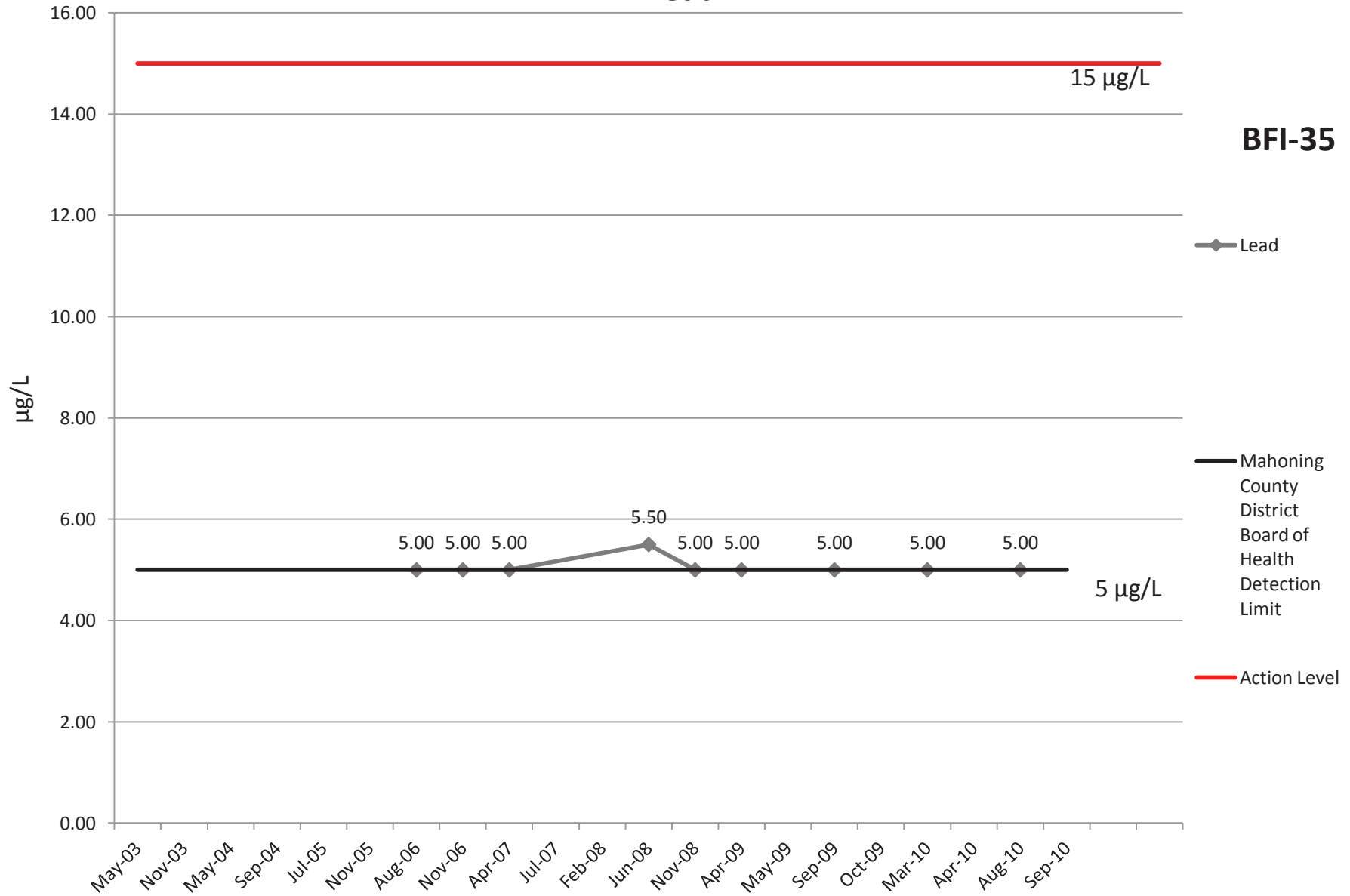
# Iron

**BFI-35**

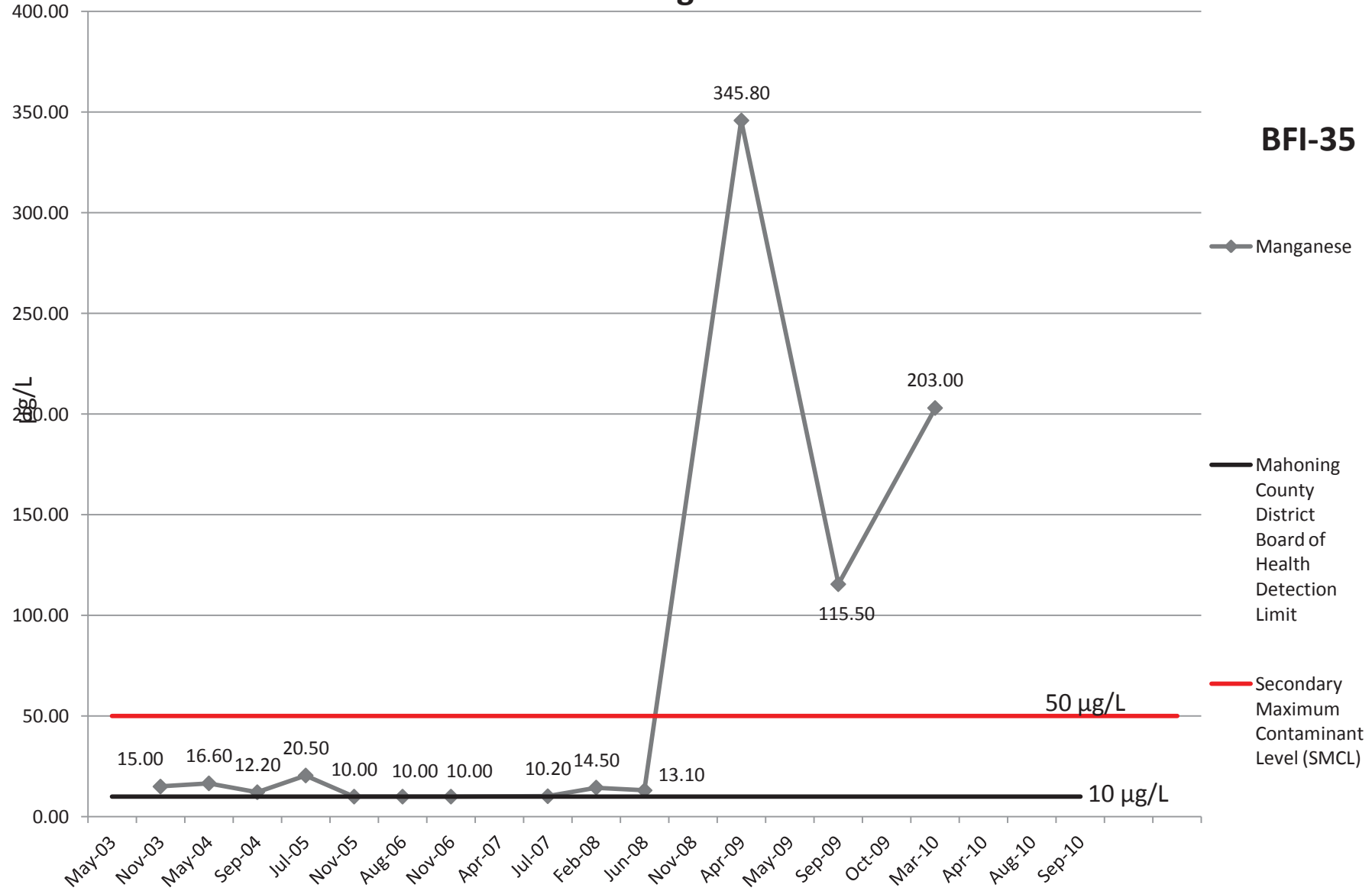


# Lead

**BFI-35**

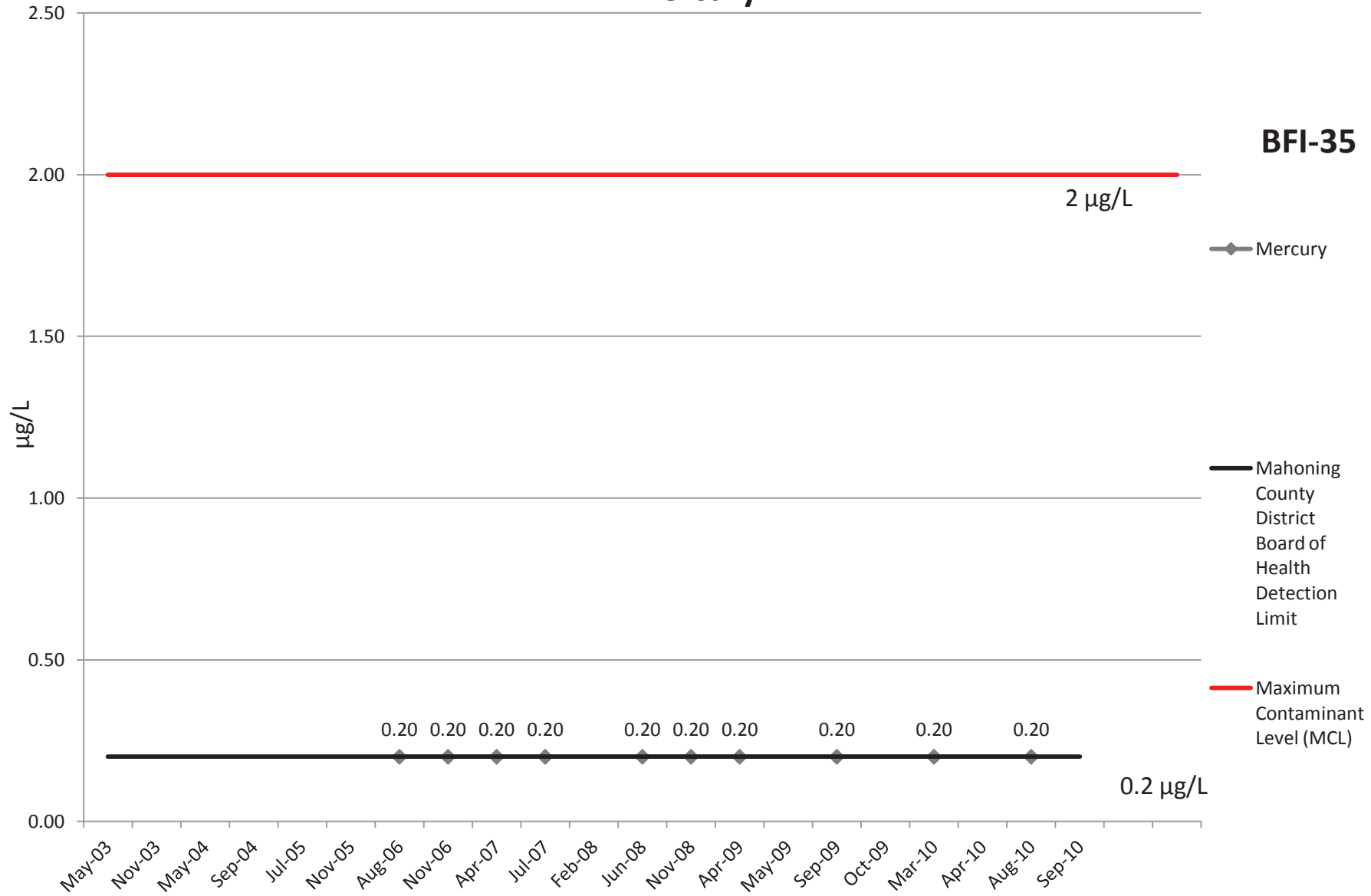


# Manganese

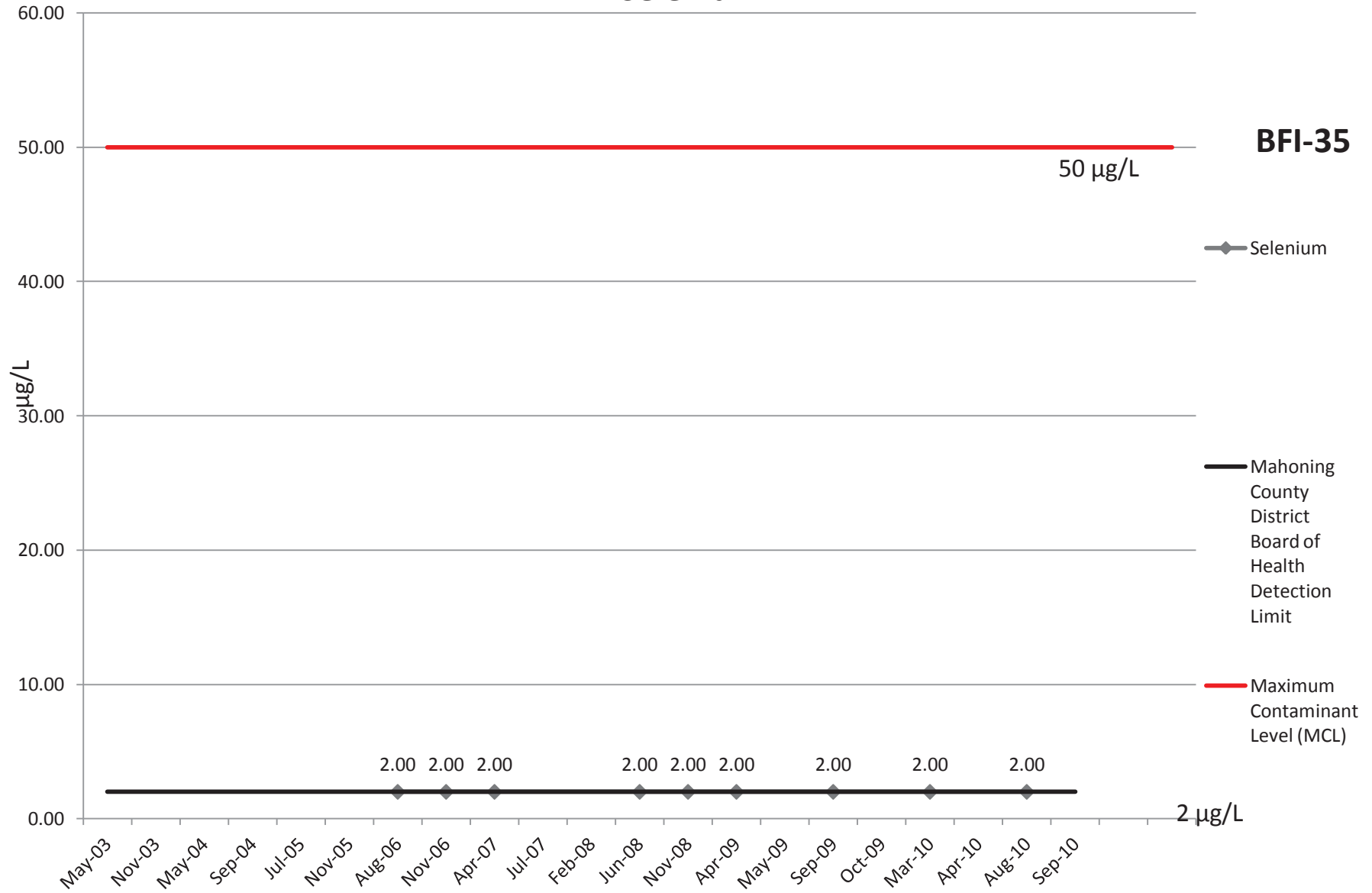


# Mercury

**BFI-35**



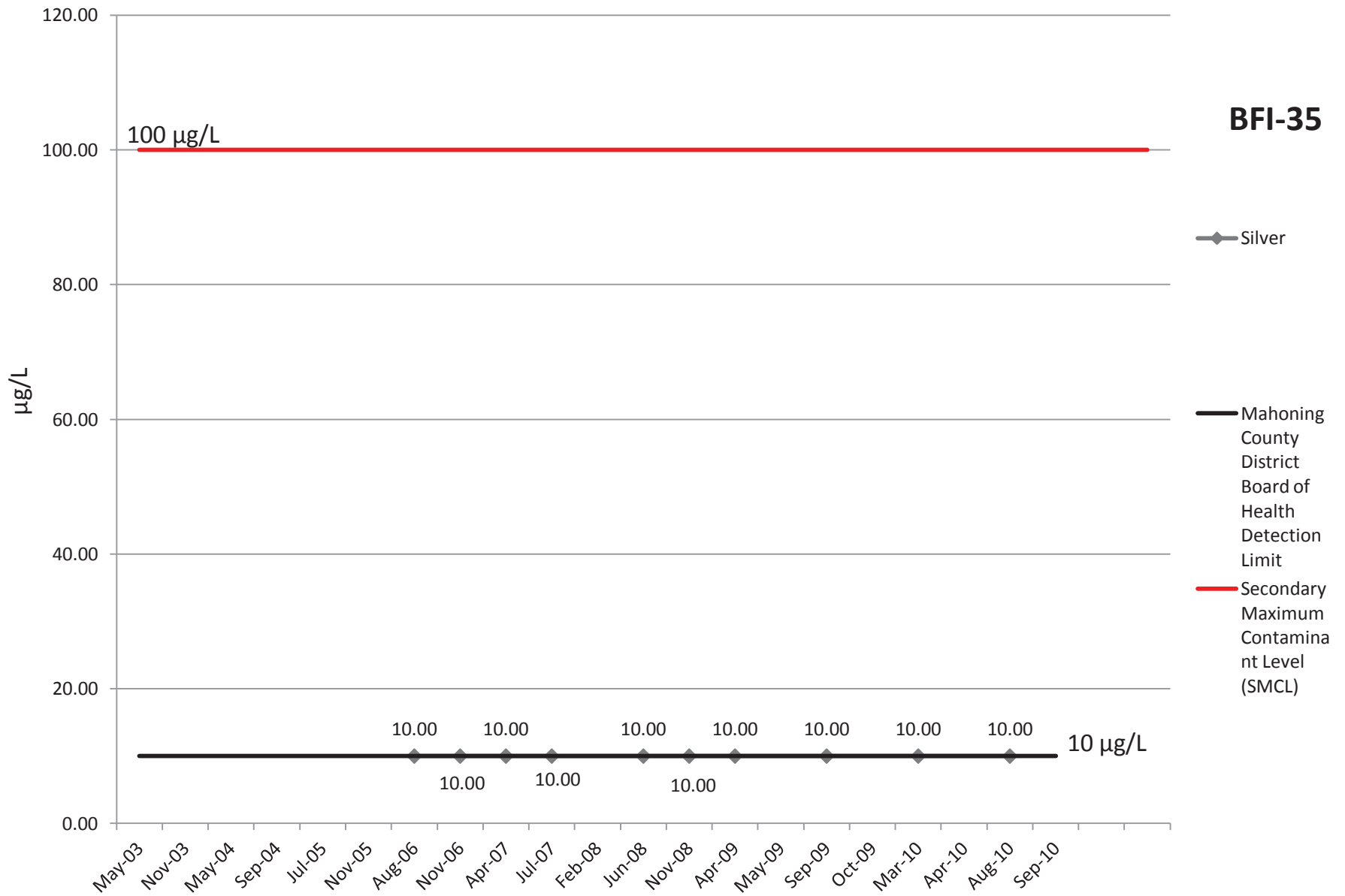
# Selenium



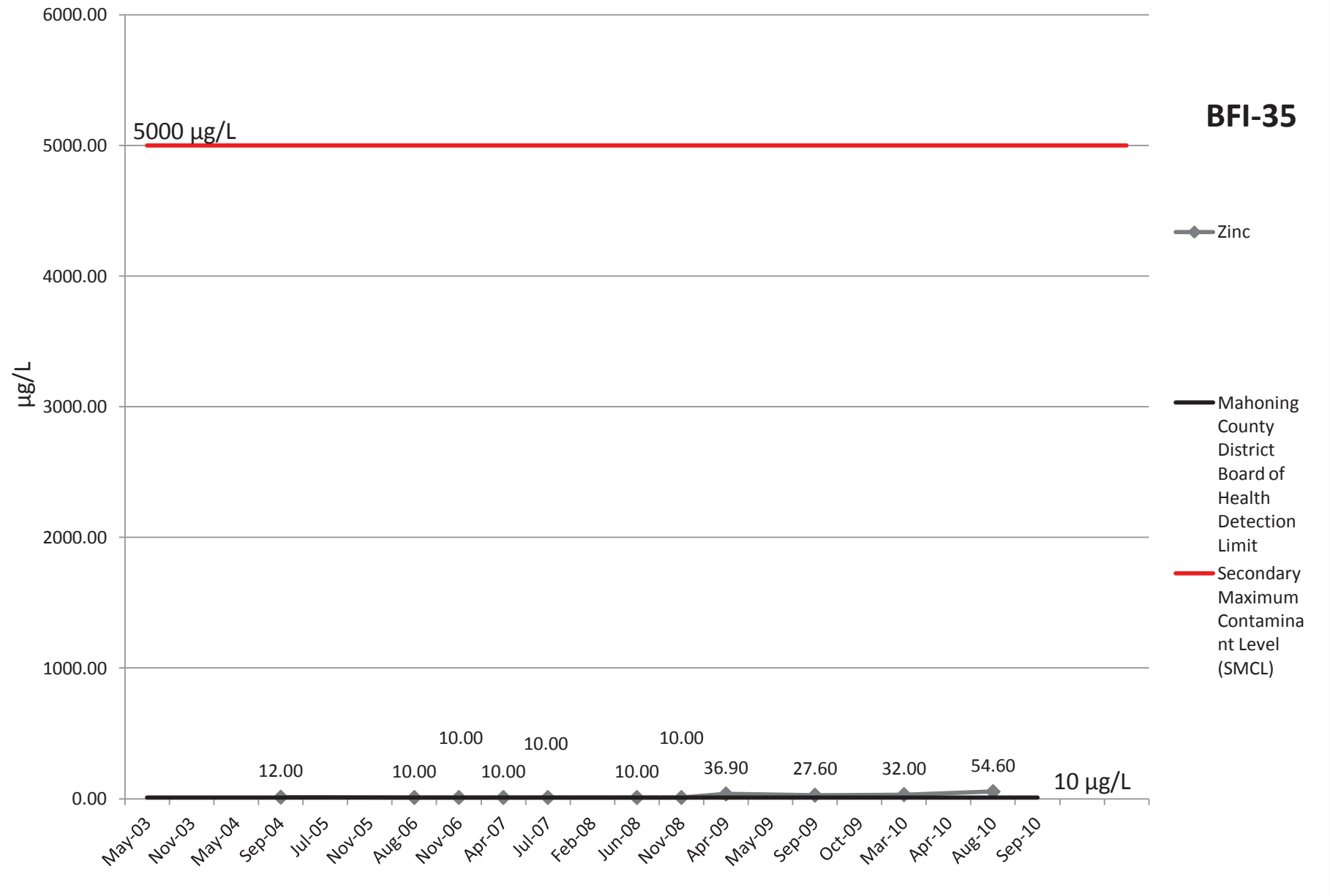


# Silver

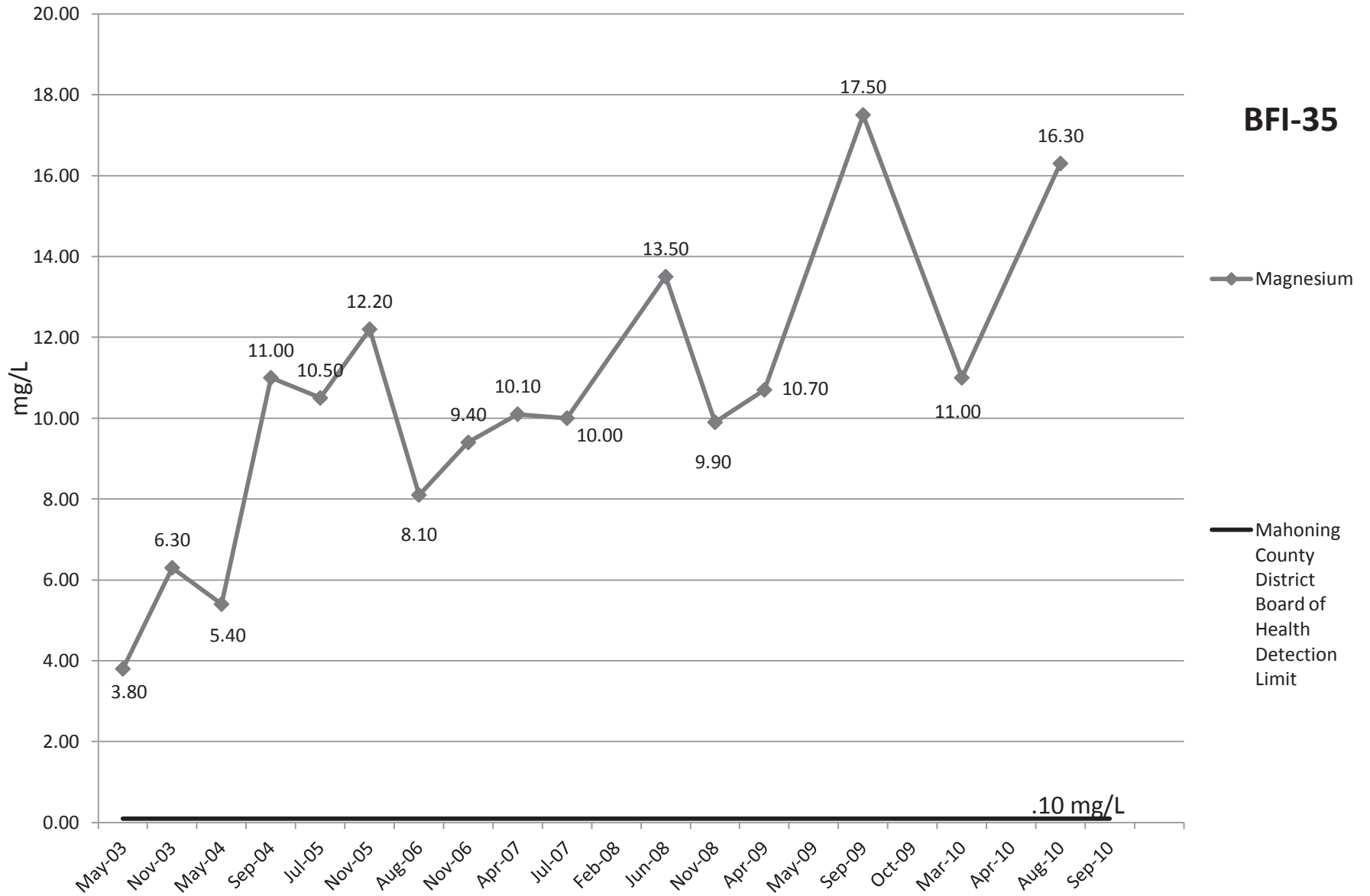
**BFI-35**



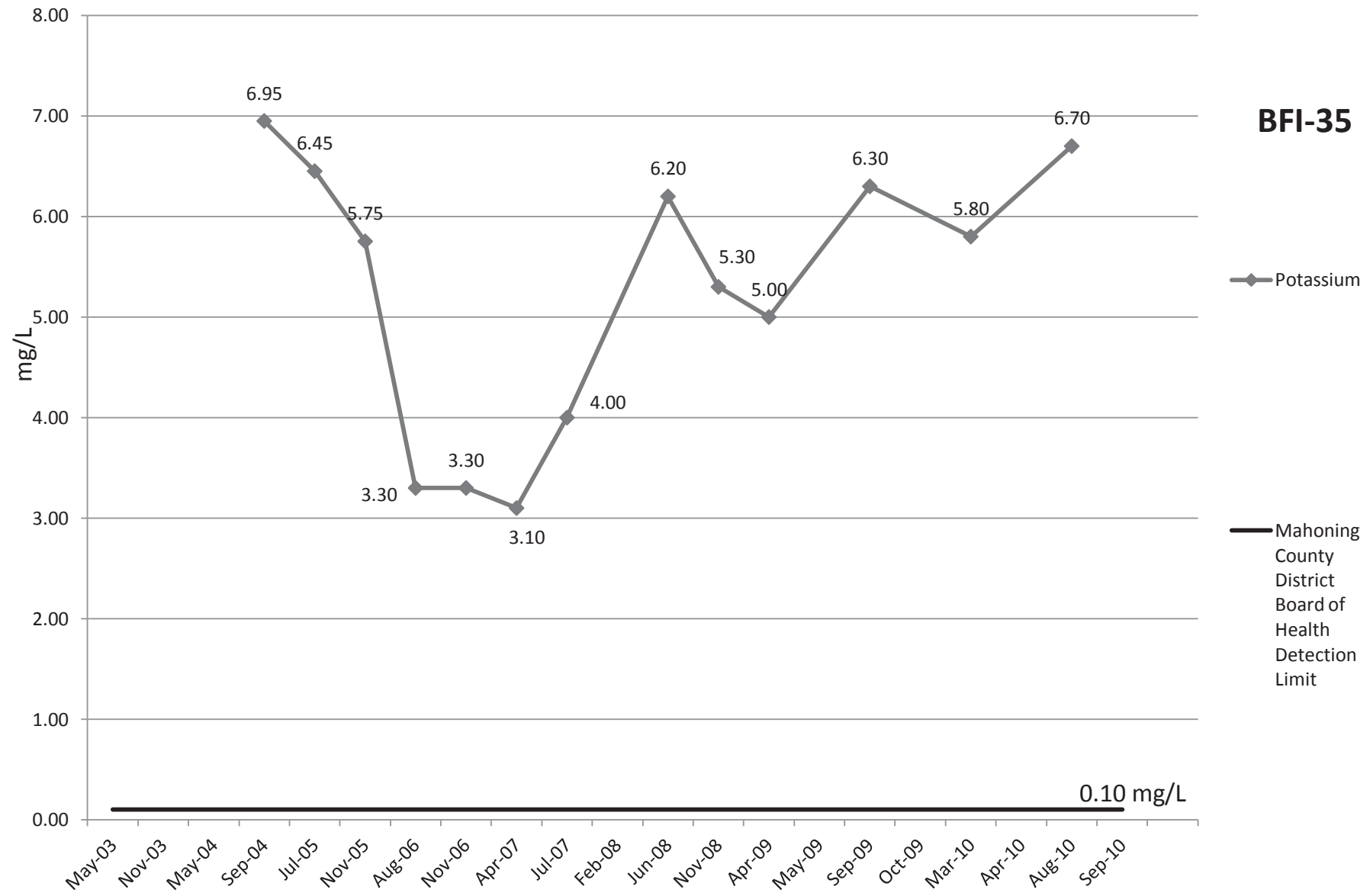
# Zinc



# Magnesium

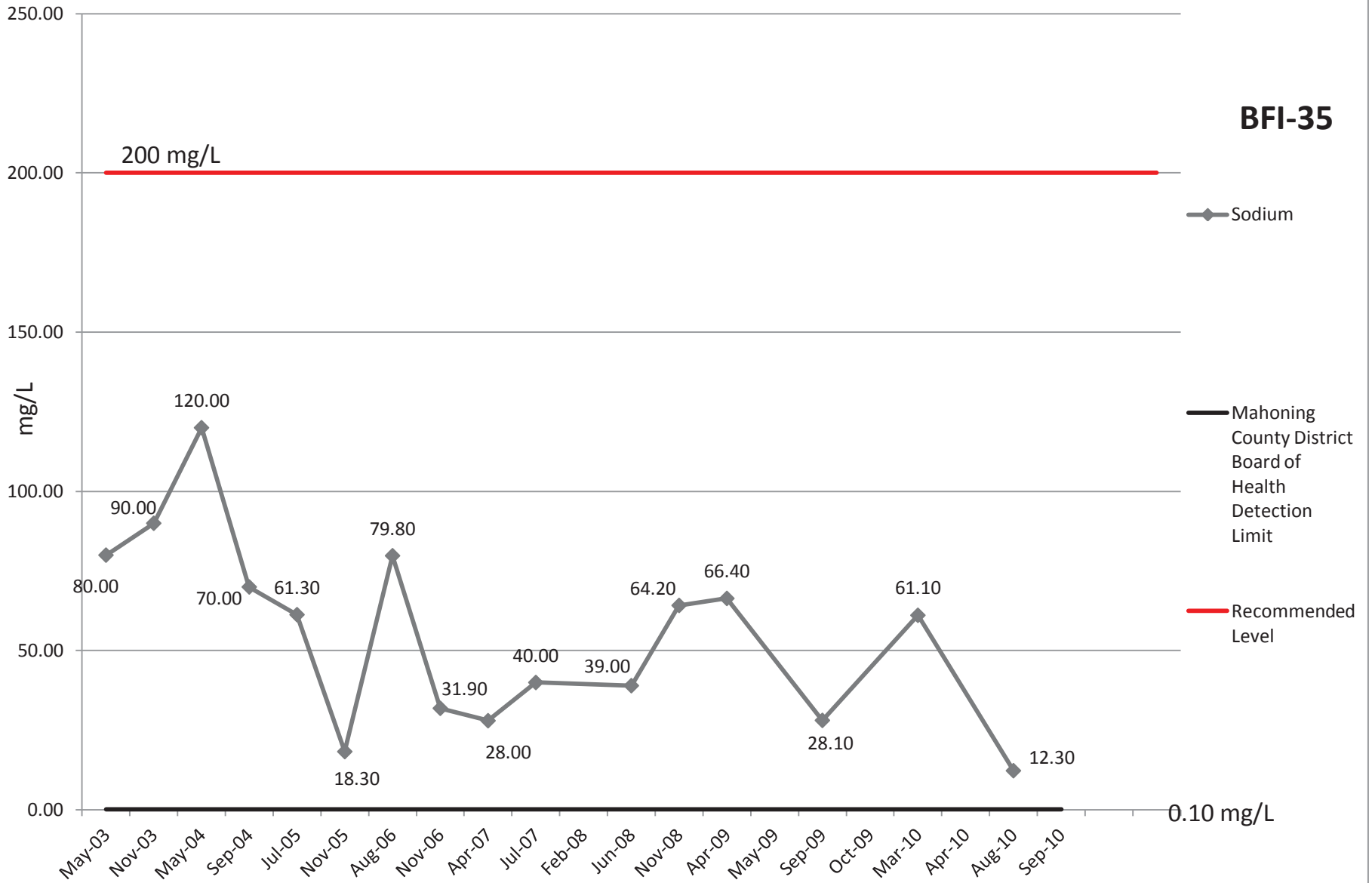


# Potassium

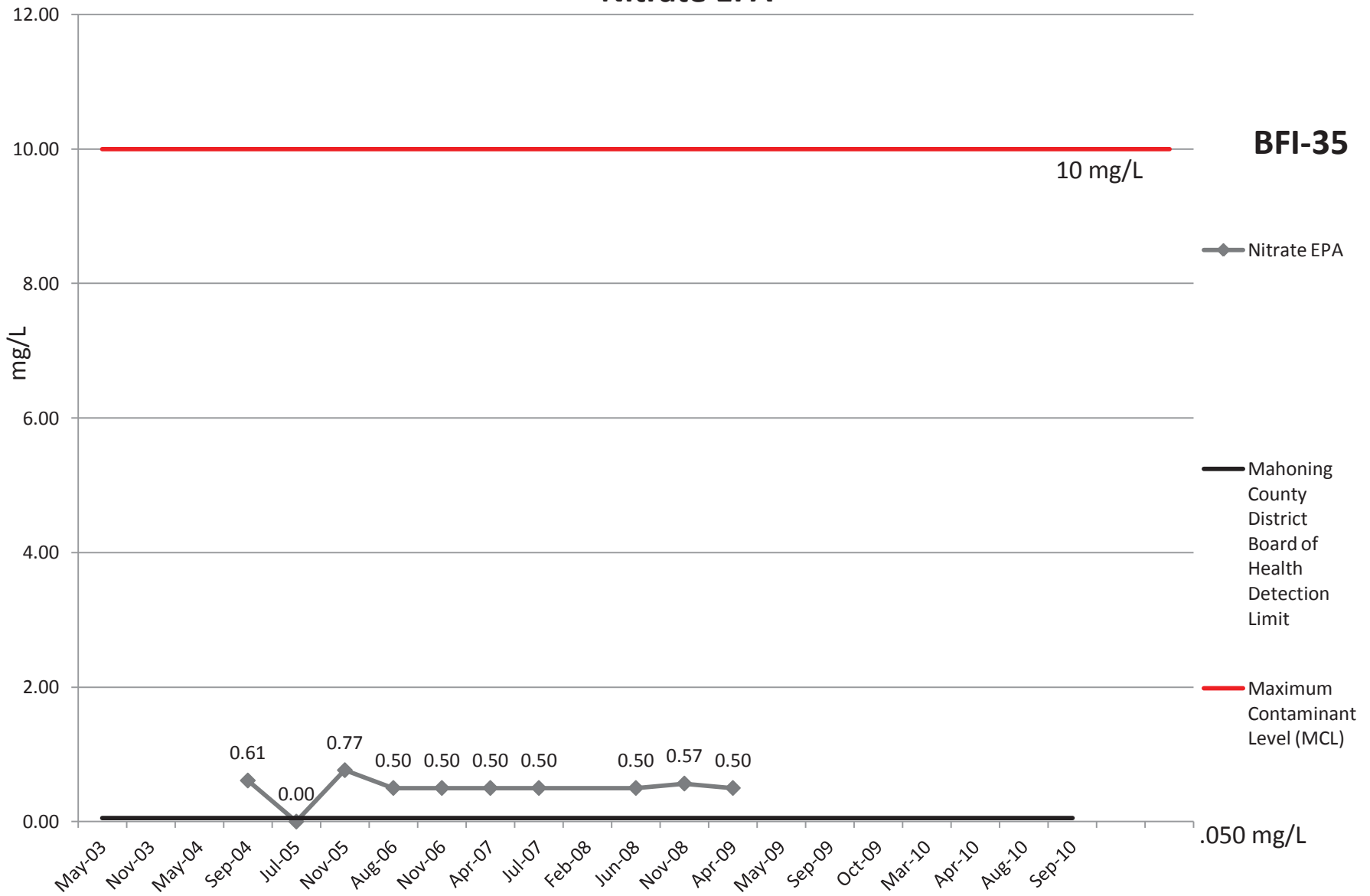


# Sodium

**BFI-35**

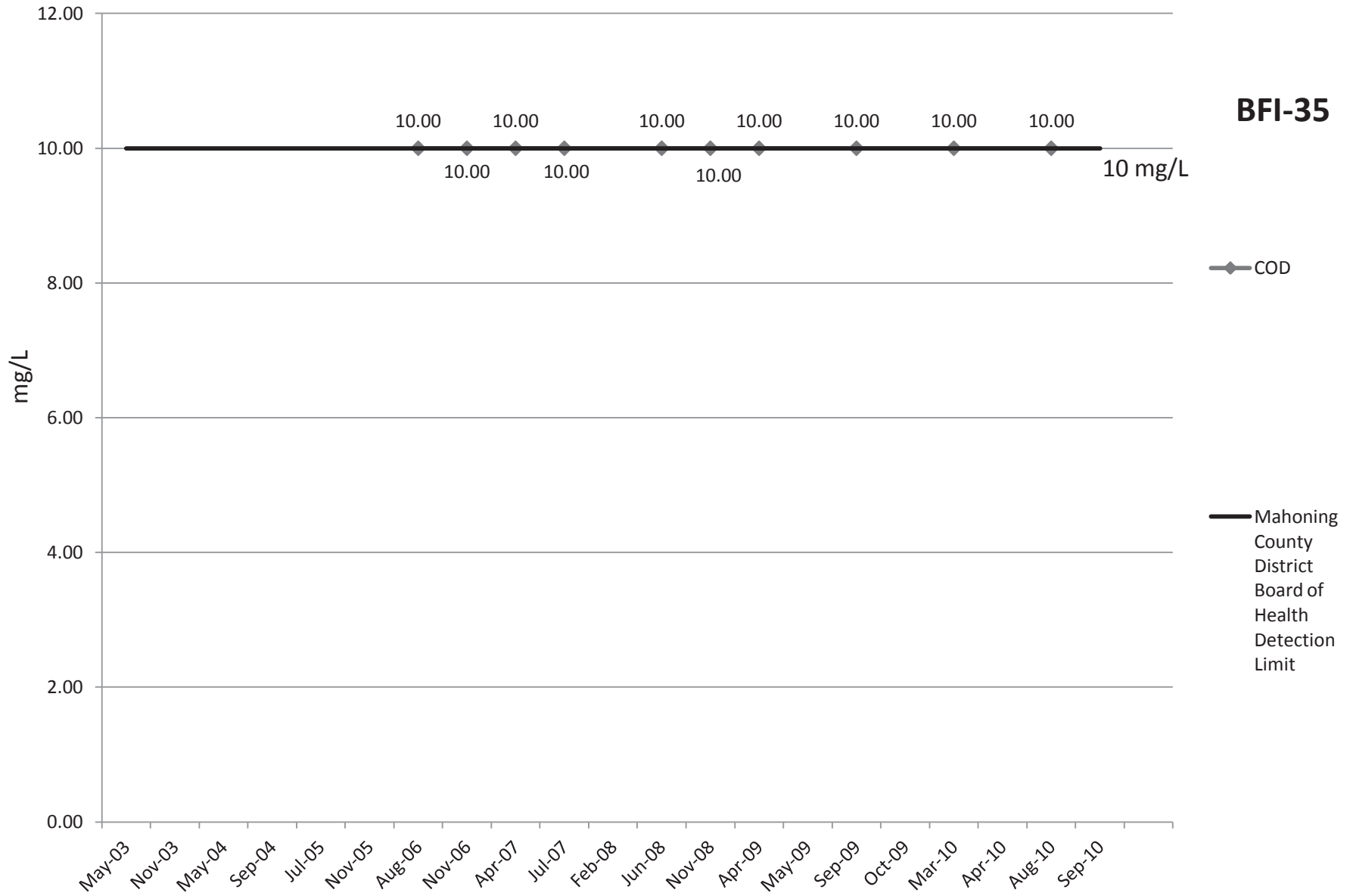


# Nitrate EPA

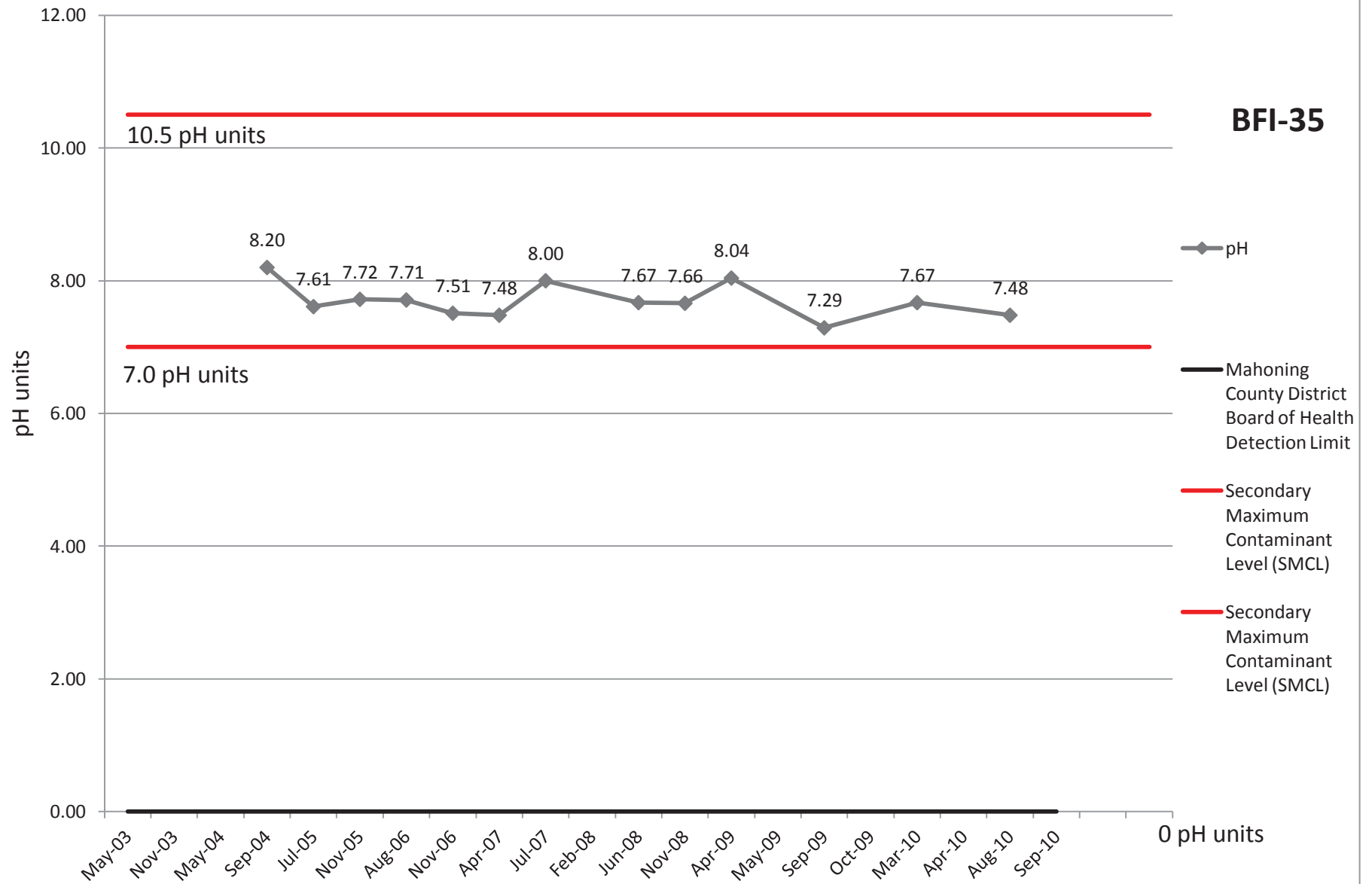


# COD

**BFI-35**

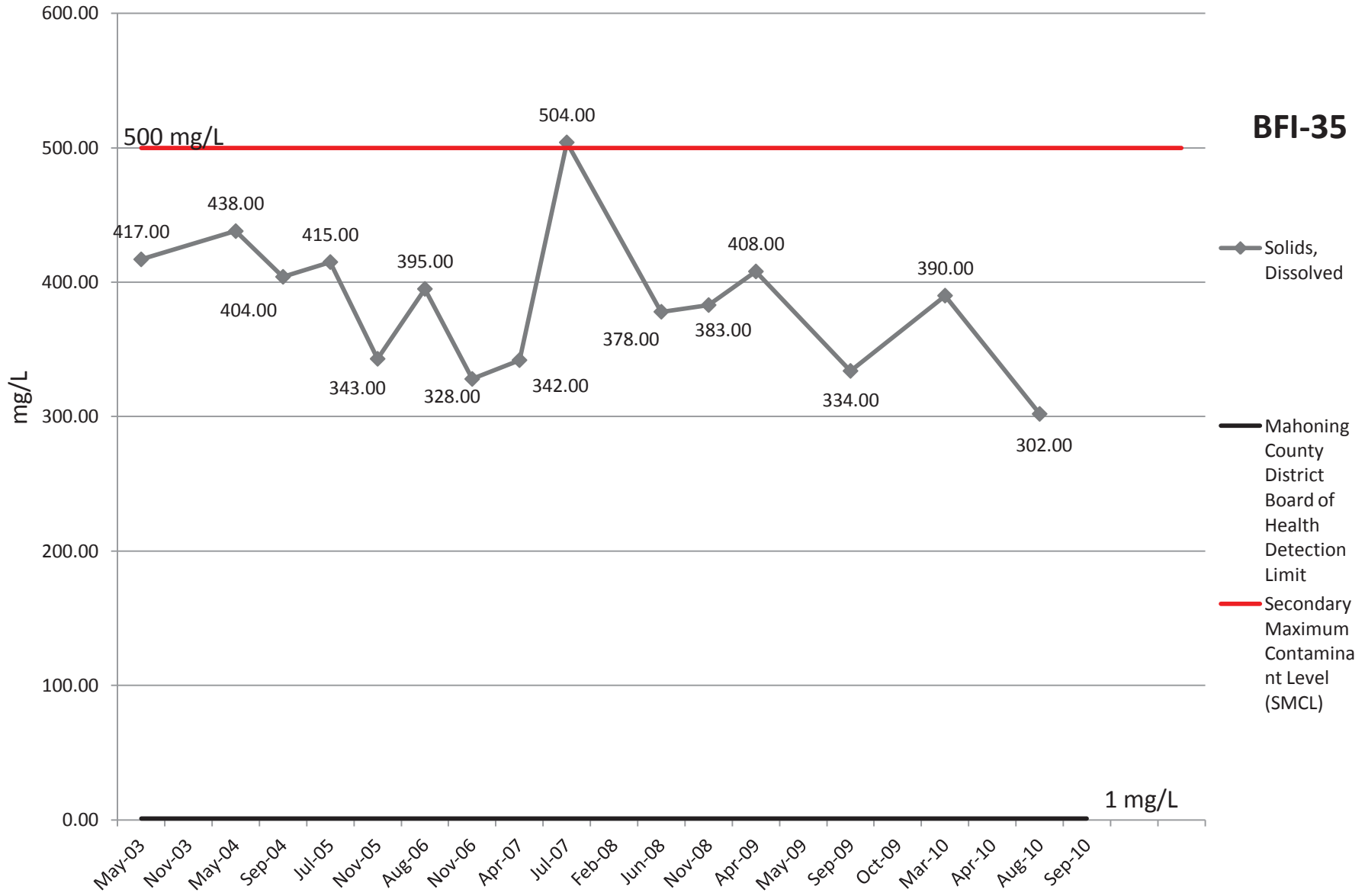


# pH

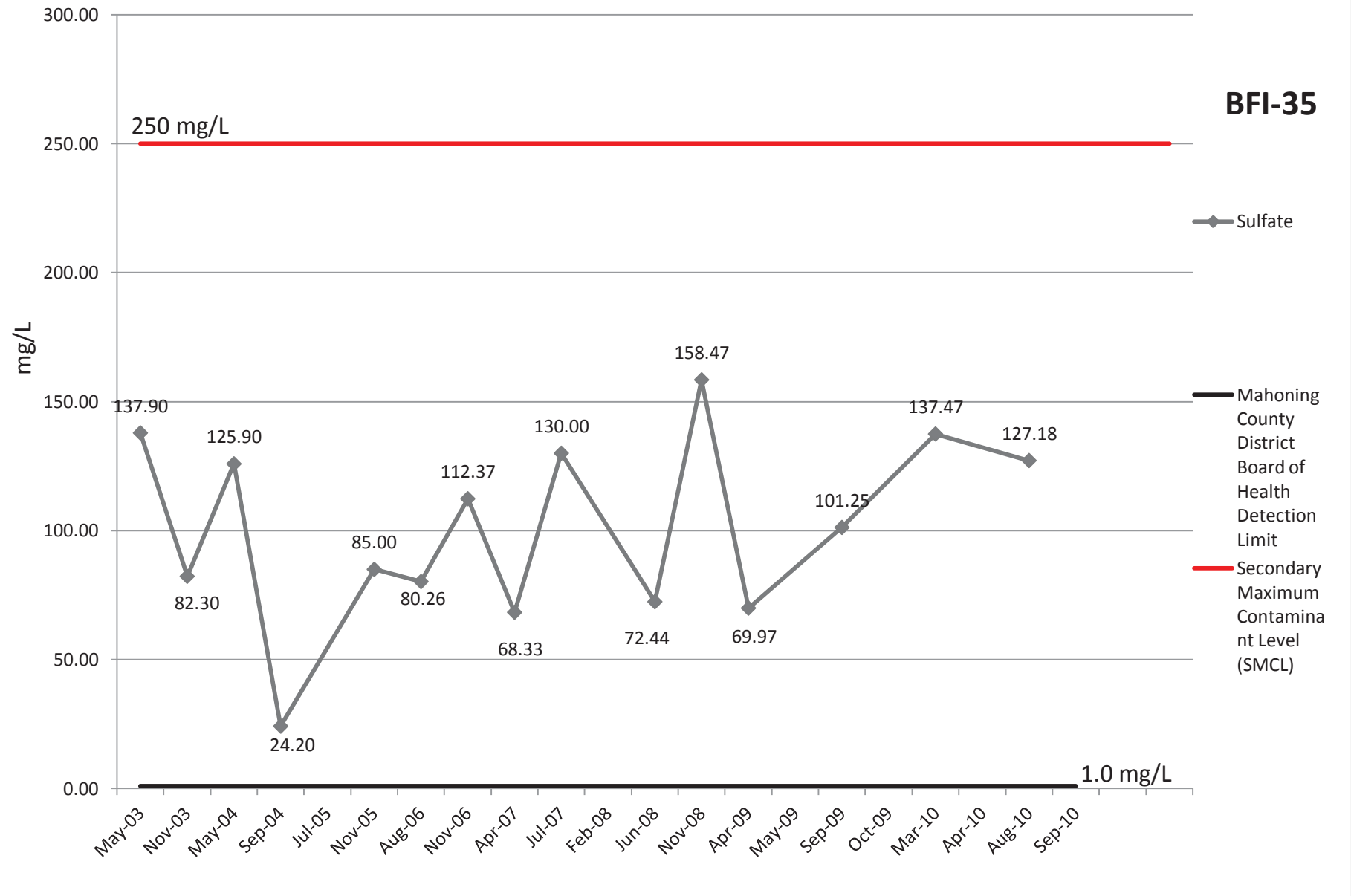




# Solids, Dissolved



# Sulfate



# Bacteria

## BFI-35

Positive/Negative

◆ Bacteria

positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

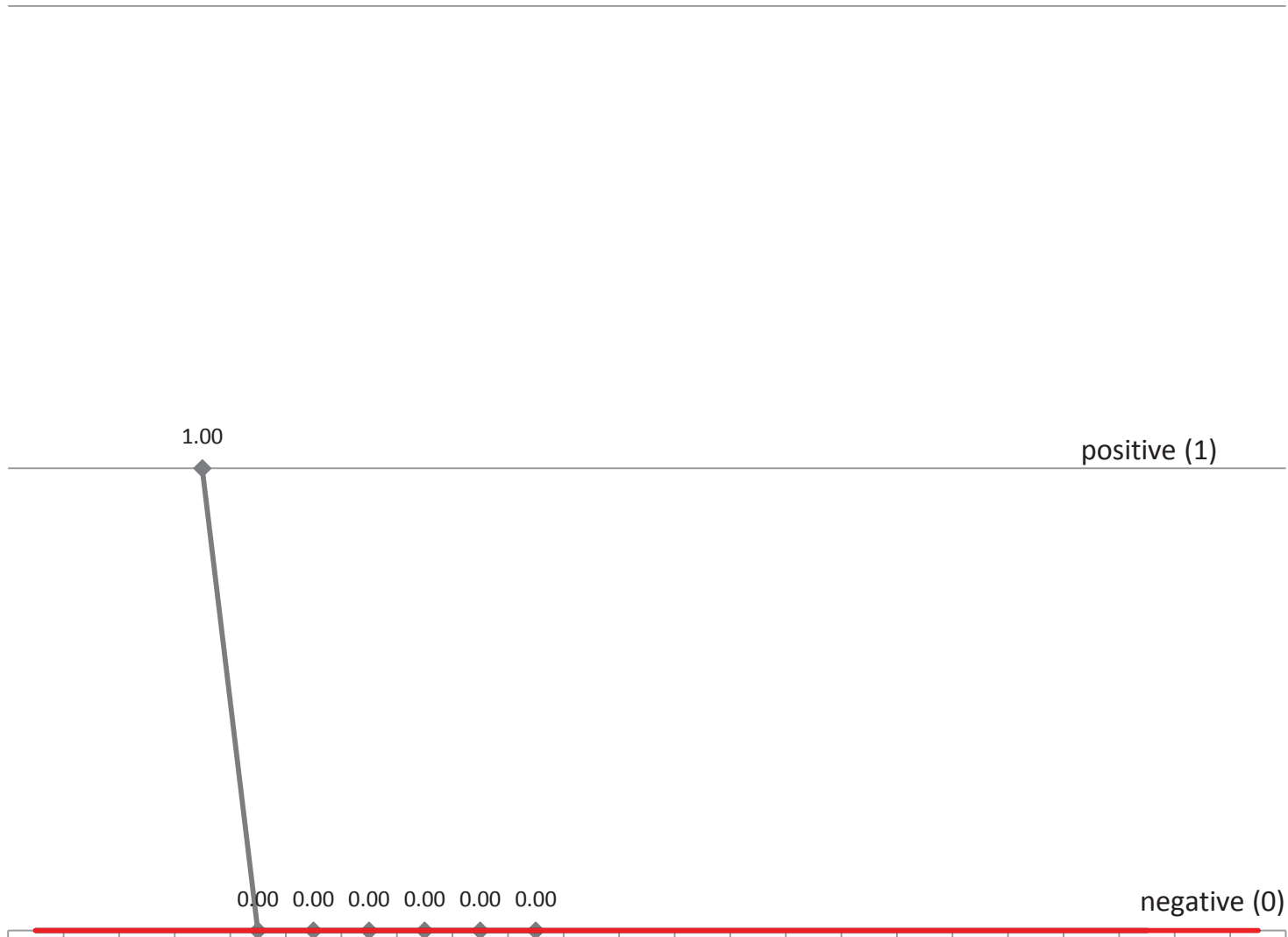
— Maximum  
Contaminant  
Level (MCL)

1.00

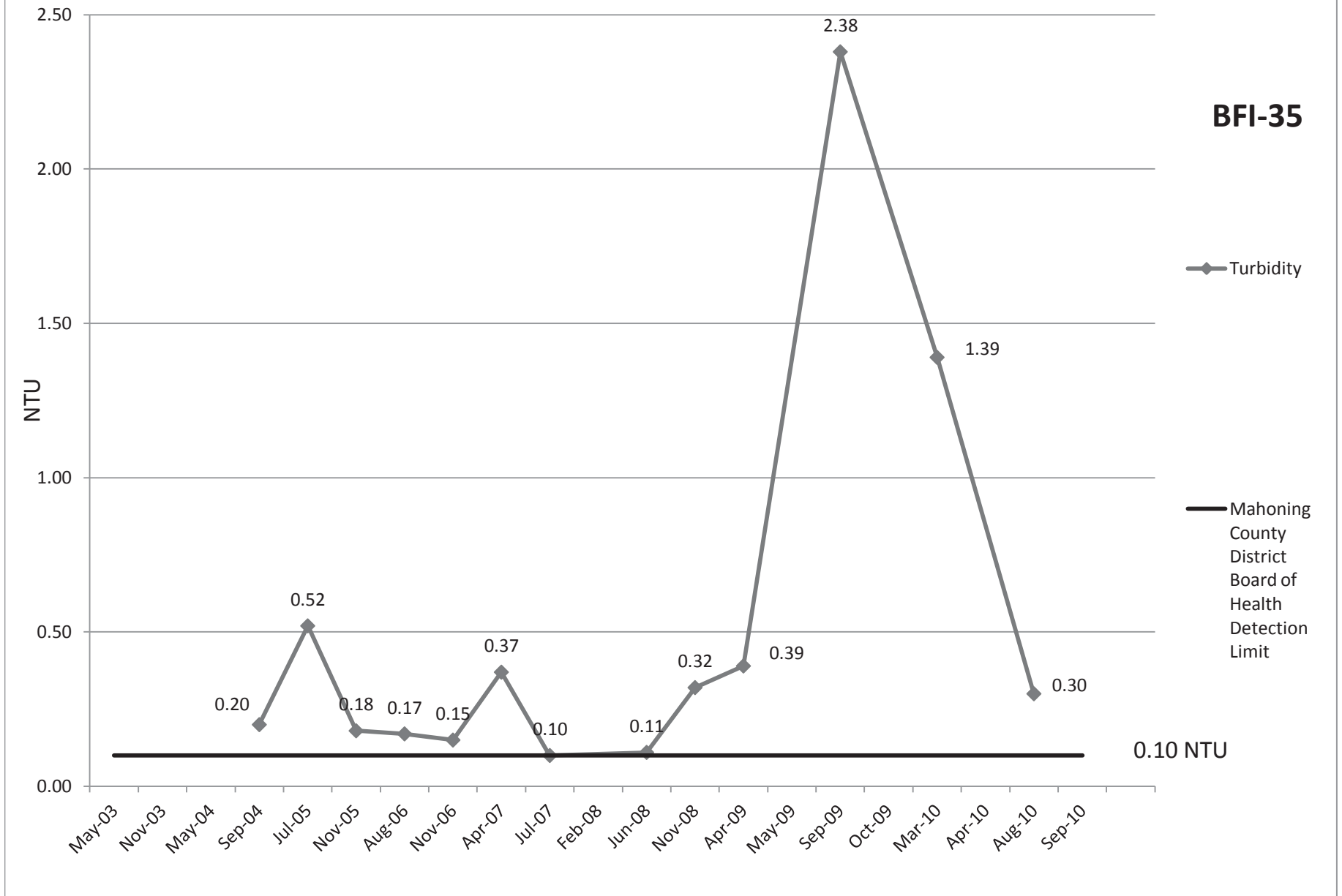
0.00 0.00 0.00 0.00 0.00 0.00

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

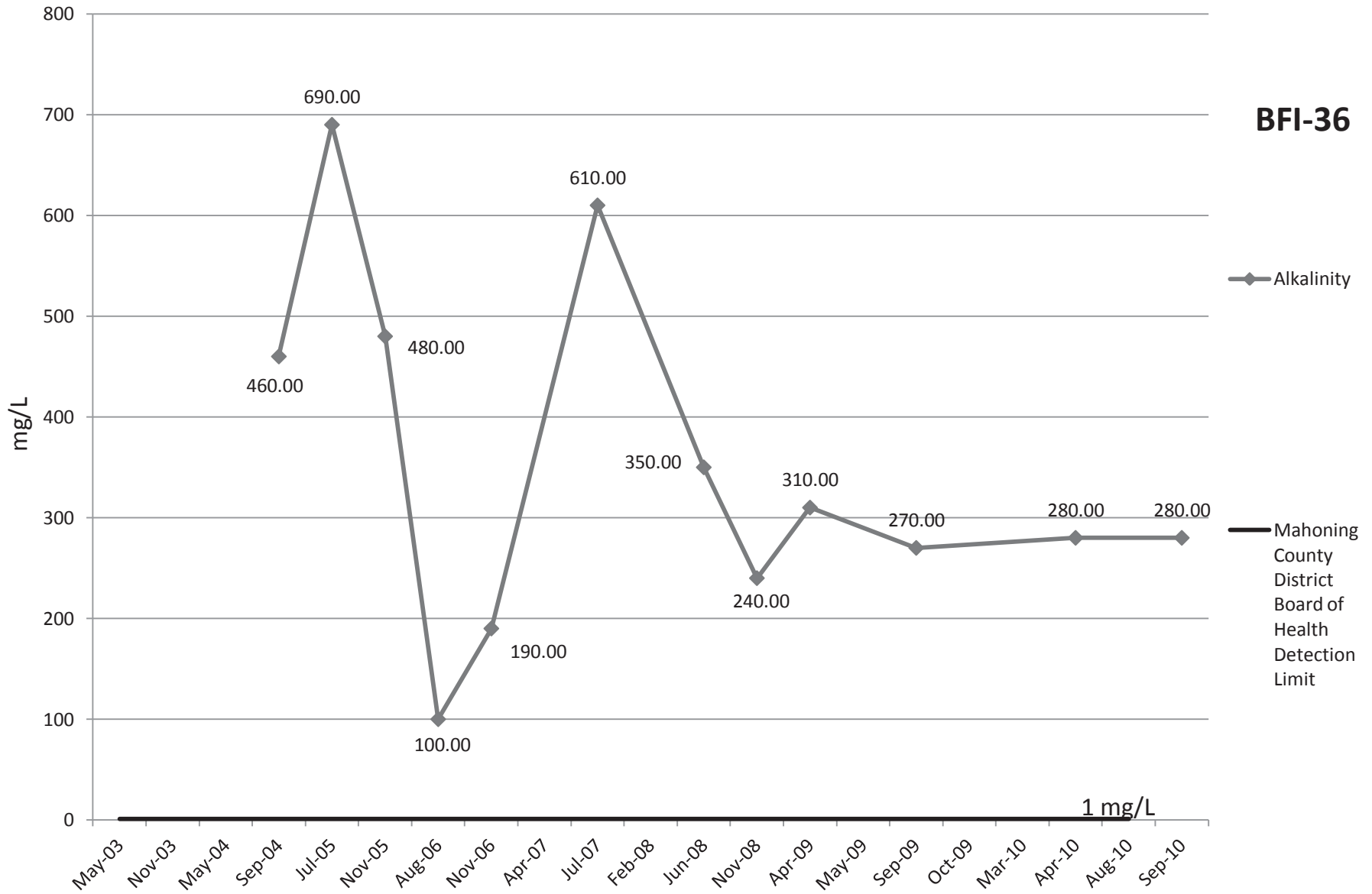


# Turbidity

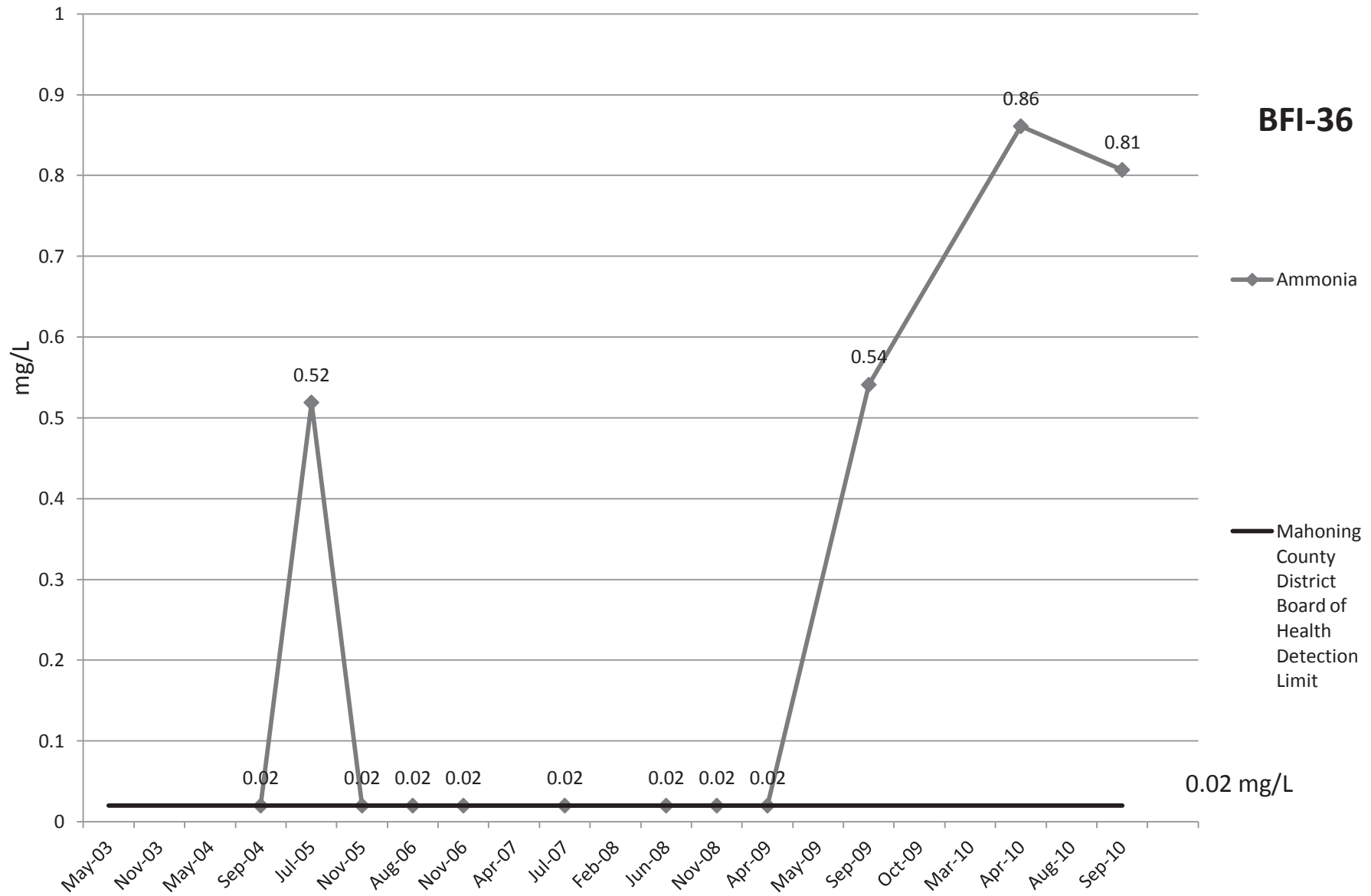


# Alkalinity

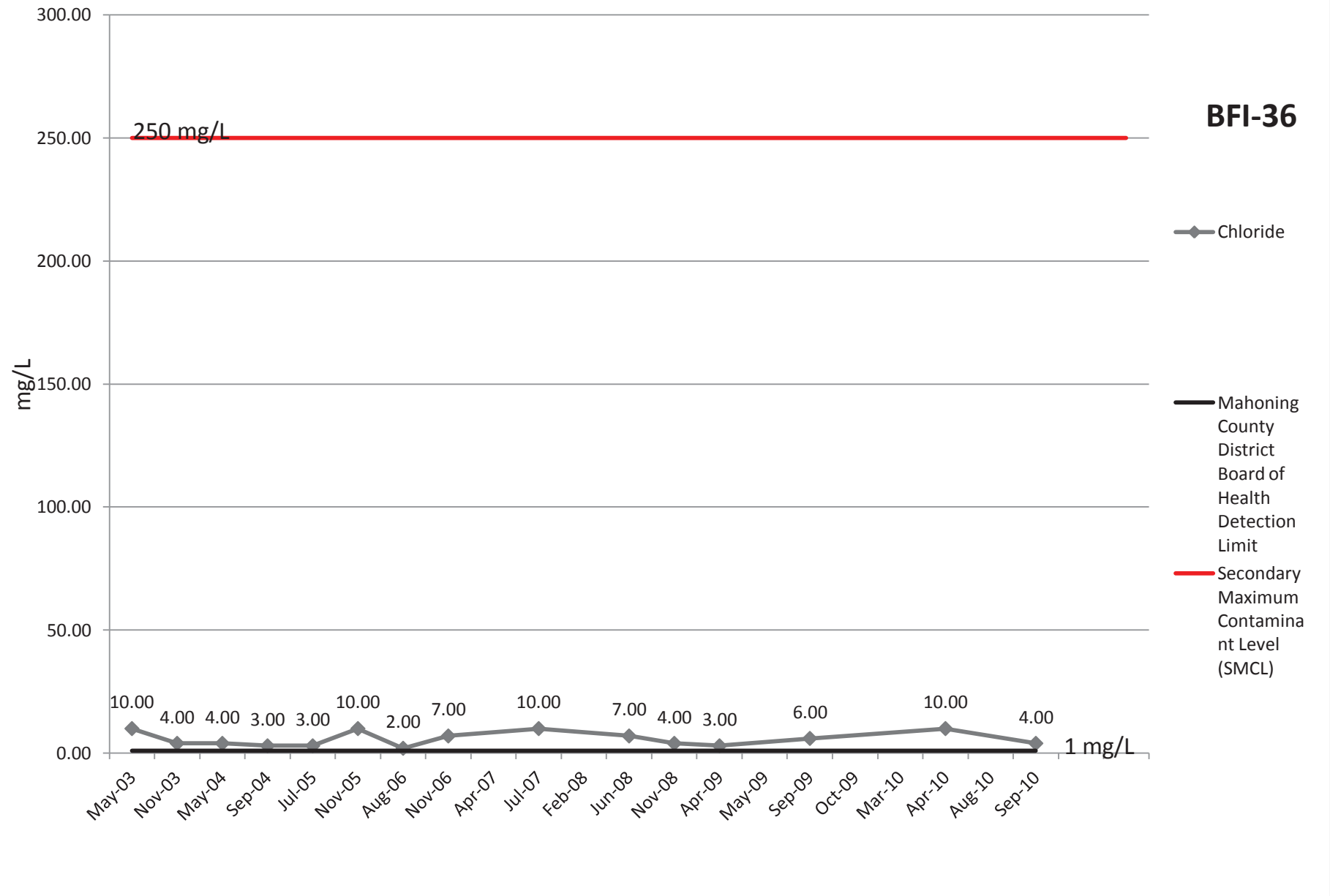
**BFI-36**



# Ammonia

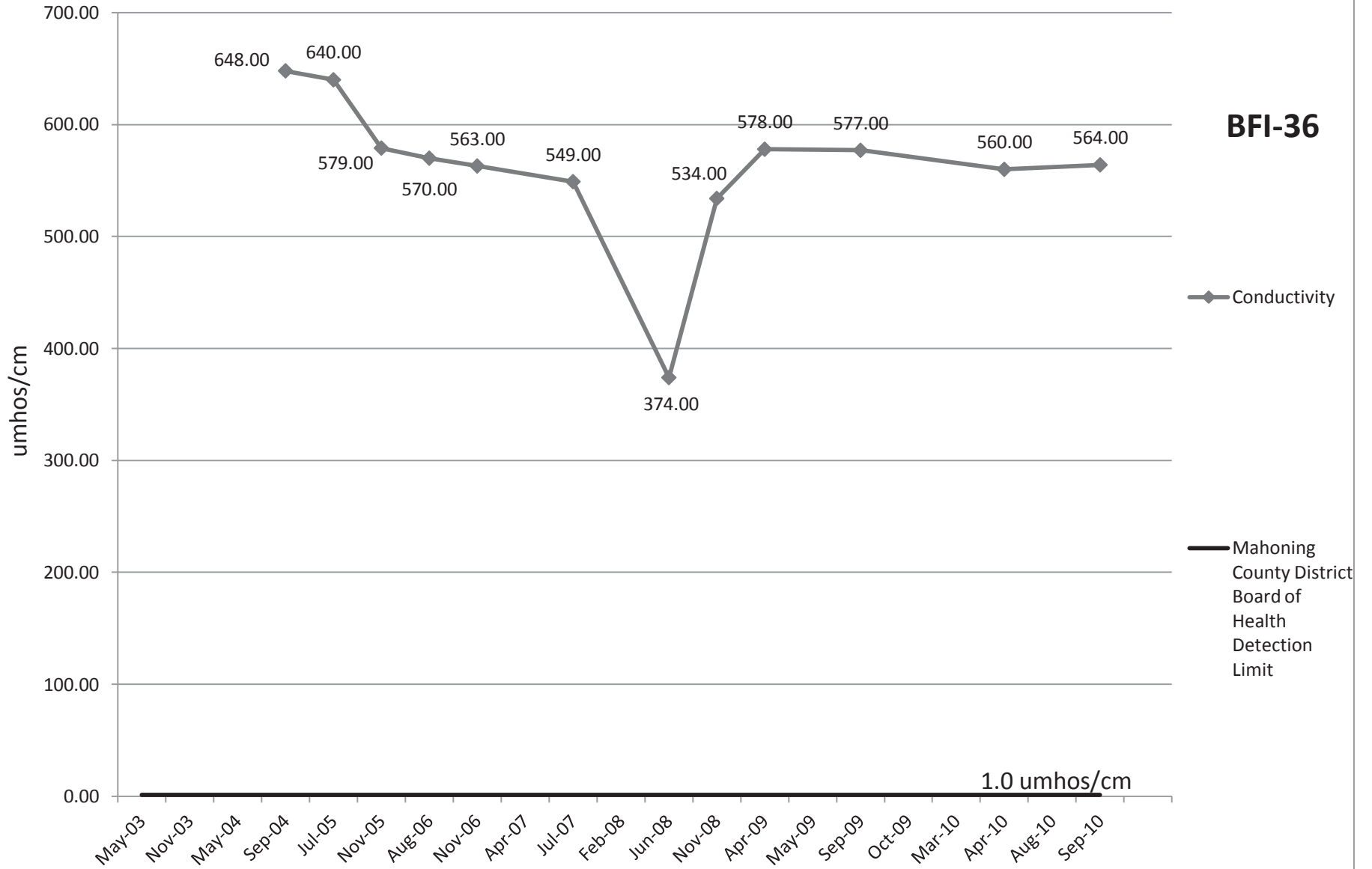


# Chloride



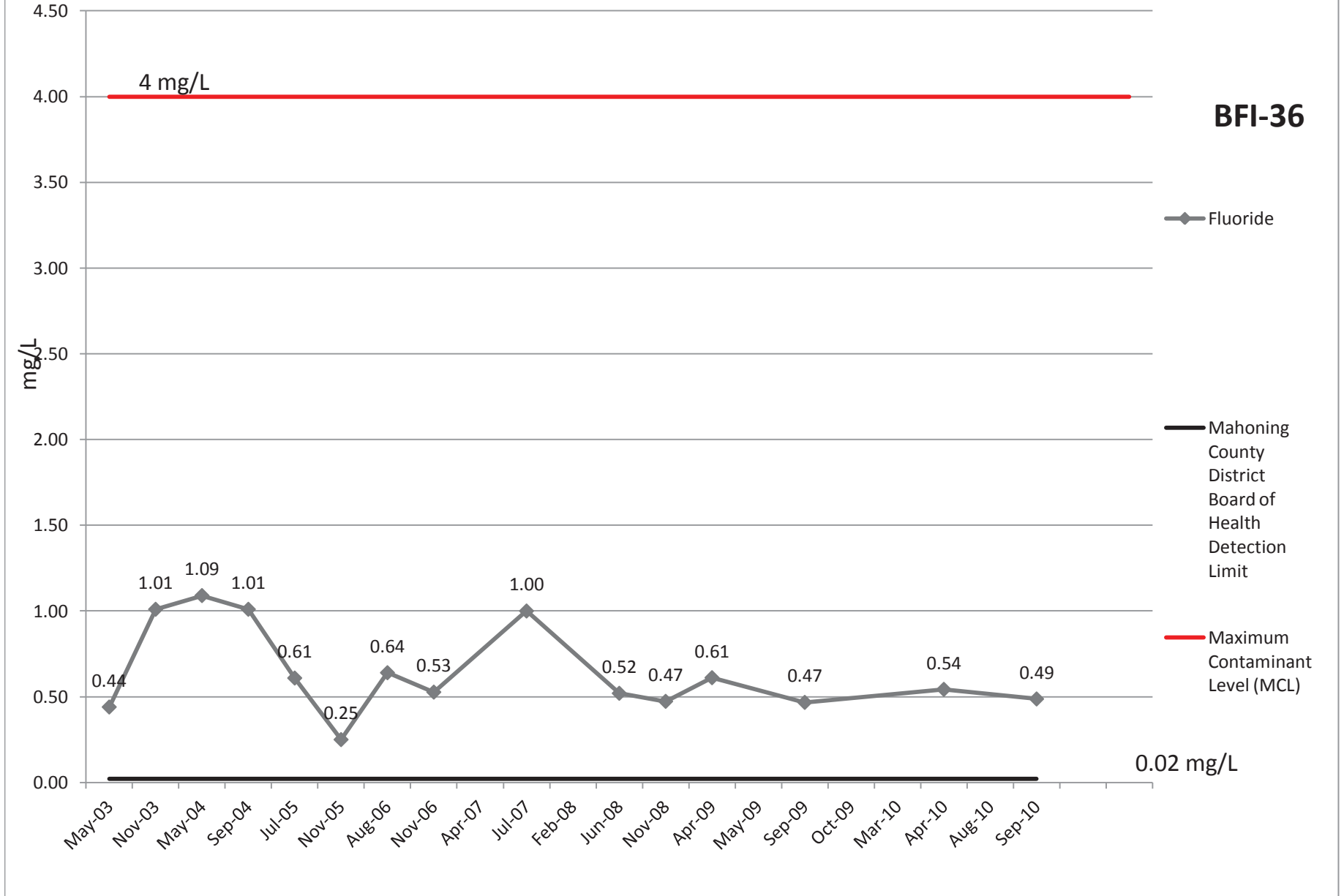
# Conductivity

**BFI-36**



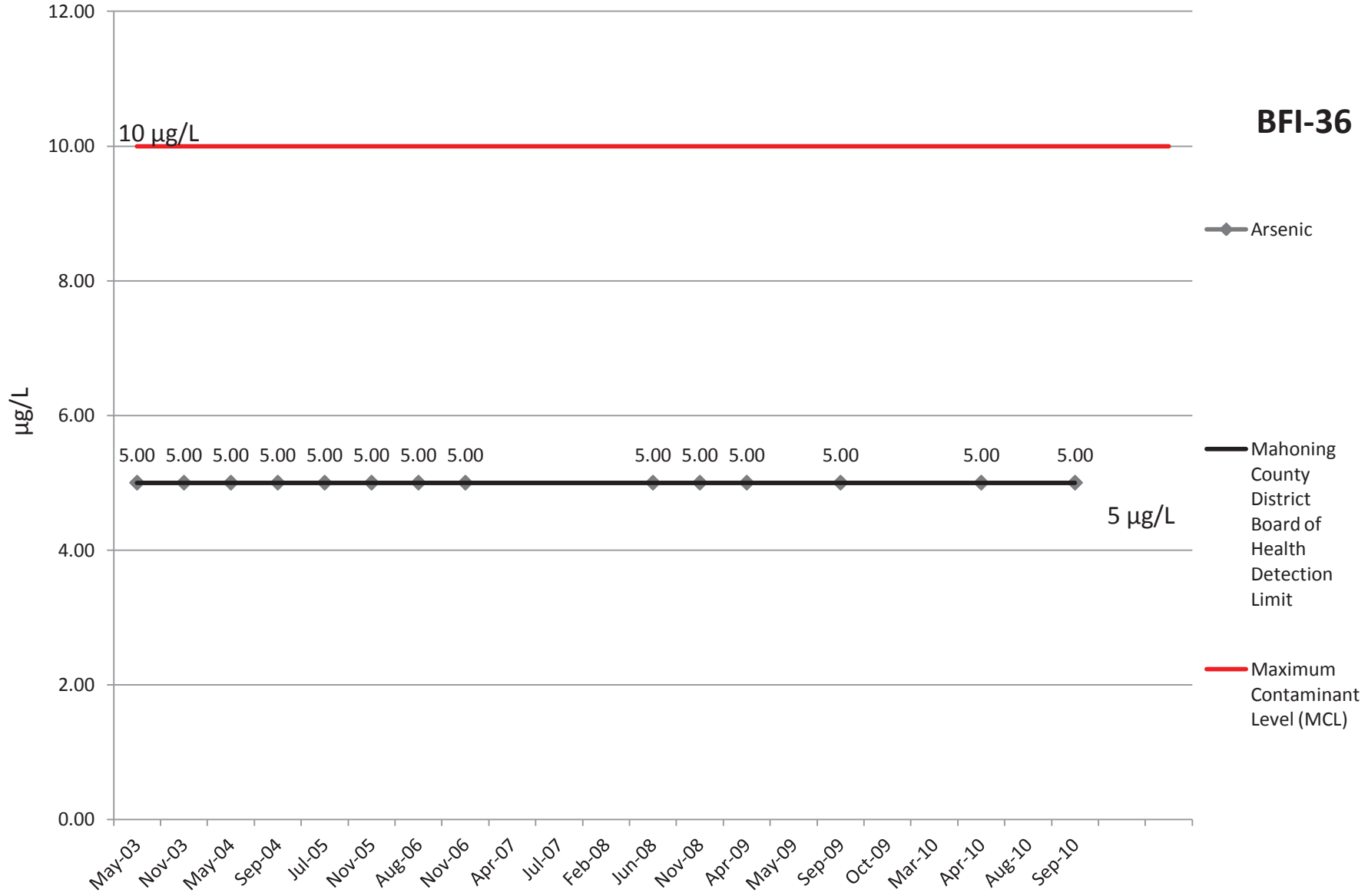


# Fluoride



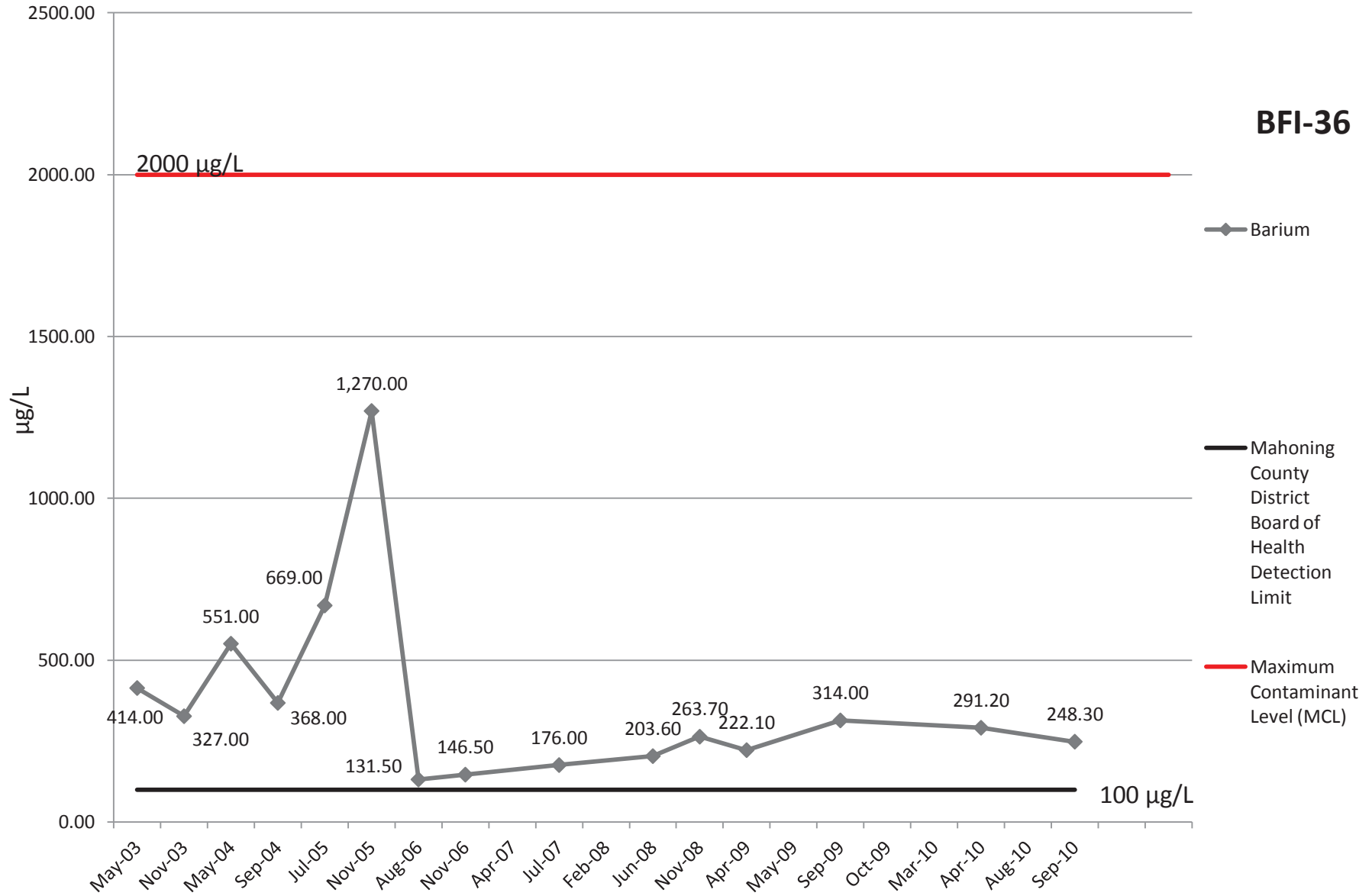
# Arsenic

**BFI-36**



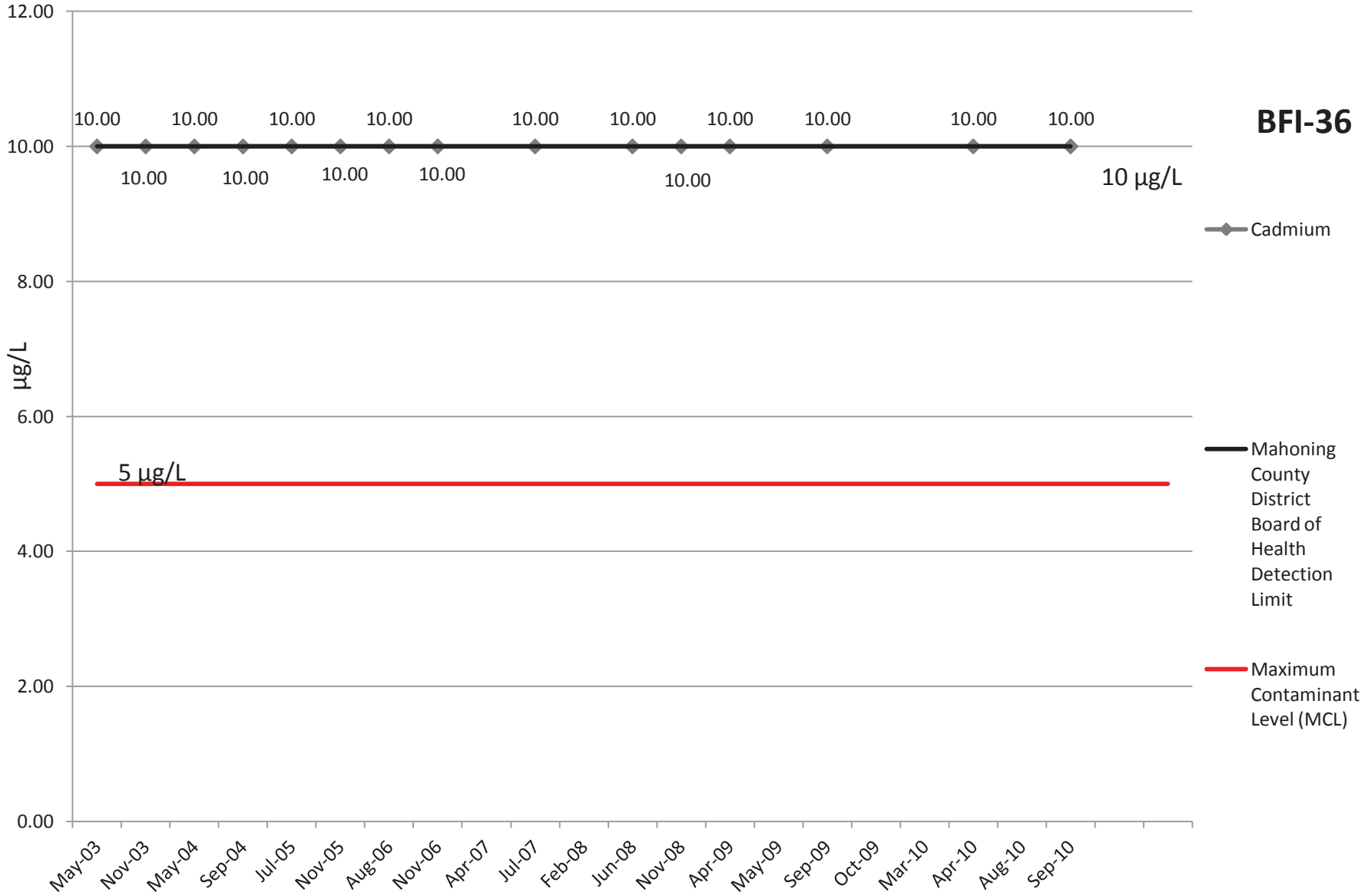
# Barium

**BFI-36**

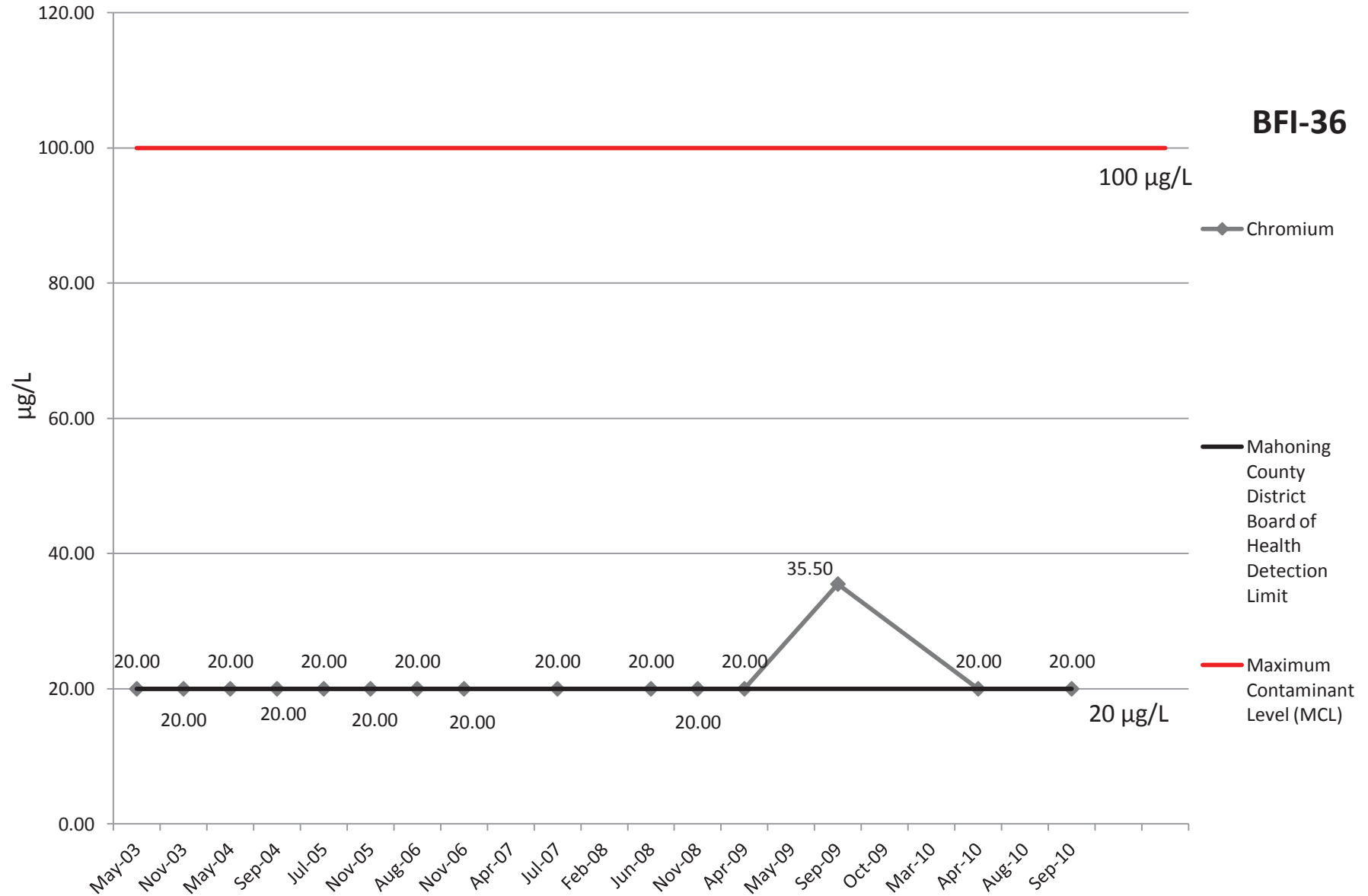


# Cadmium

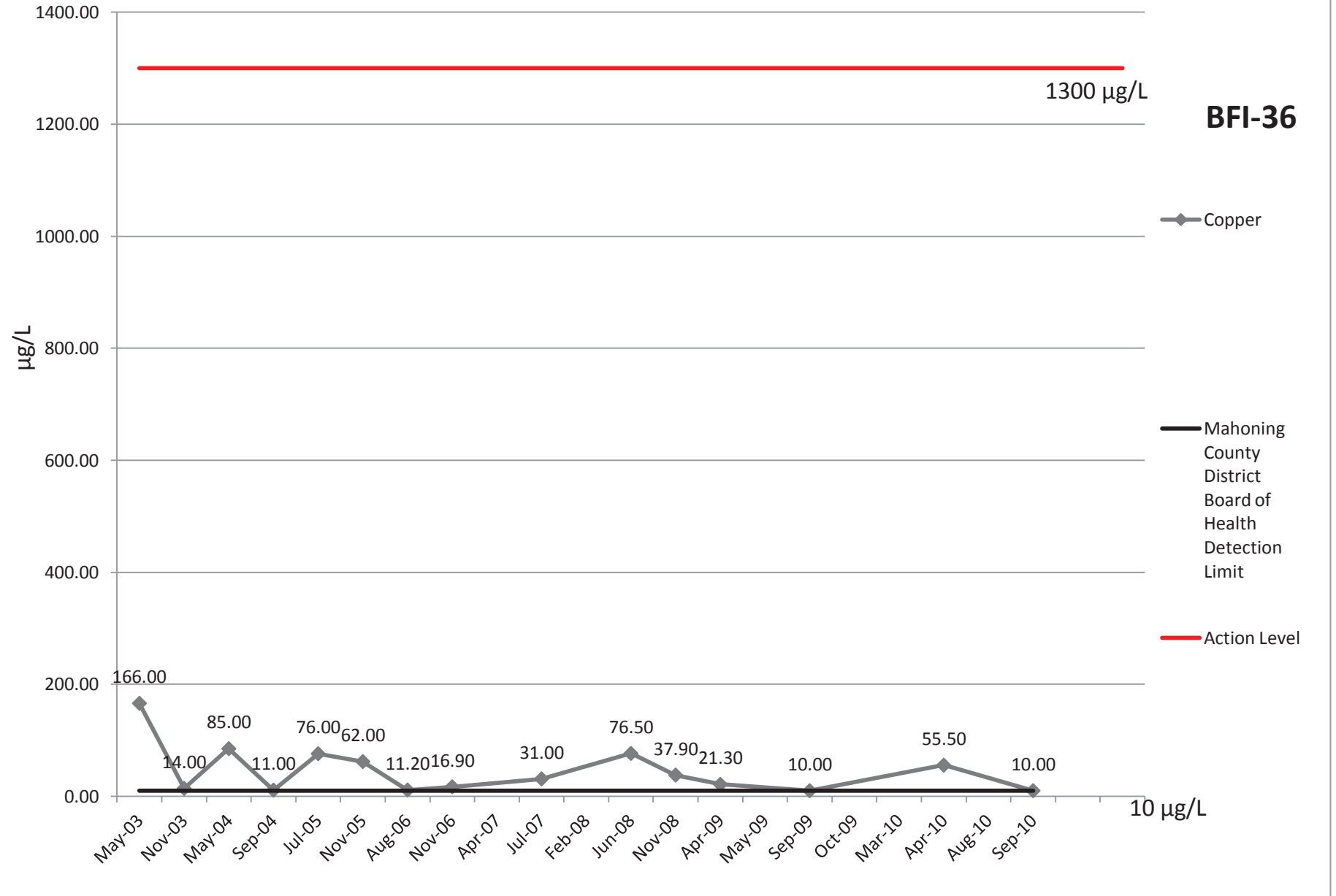
**BFI-36**



# Chromium

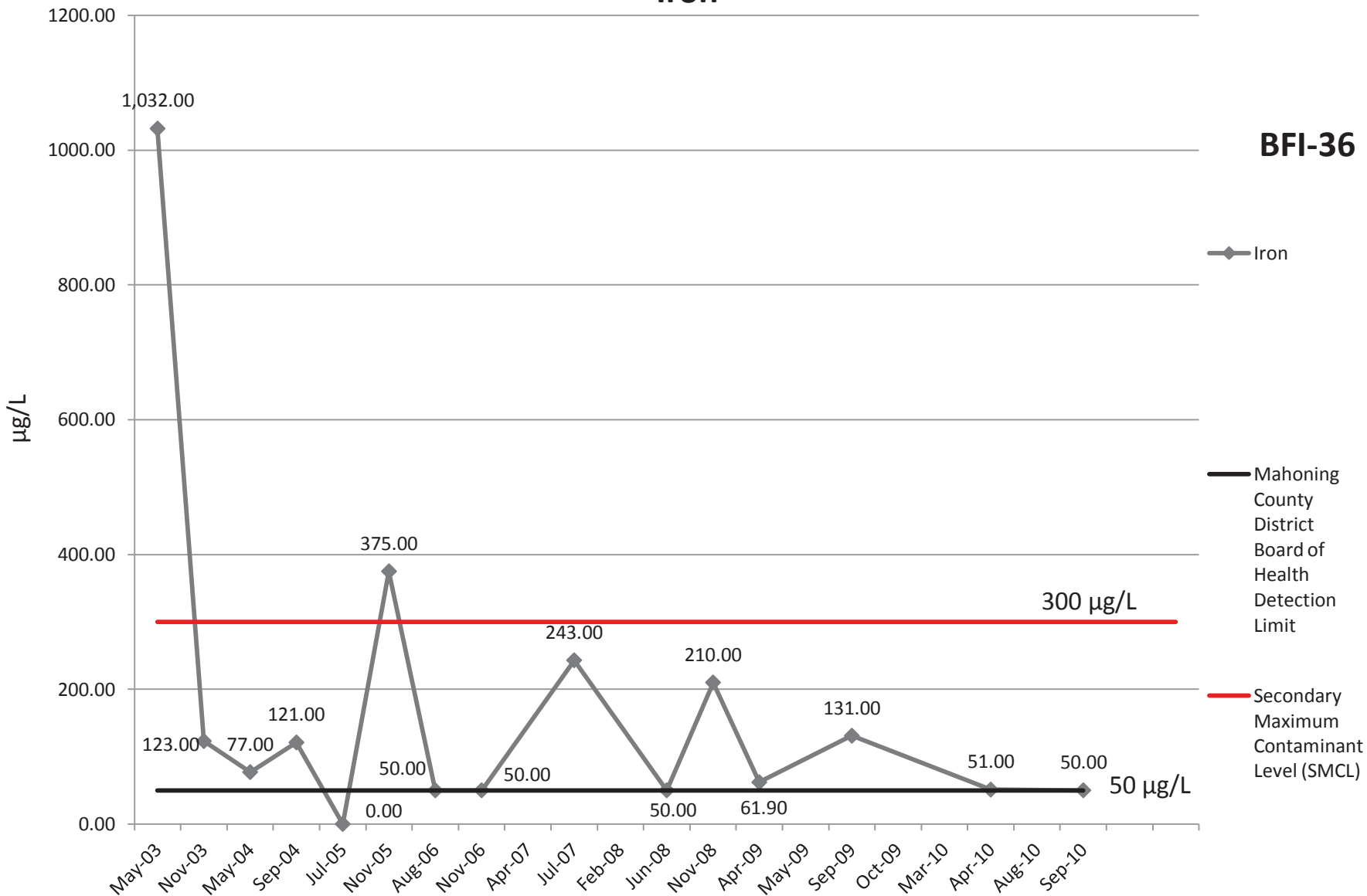


# Copper



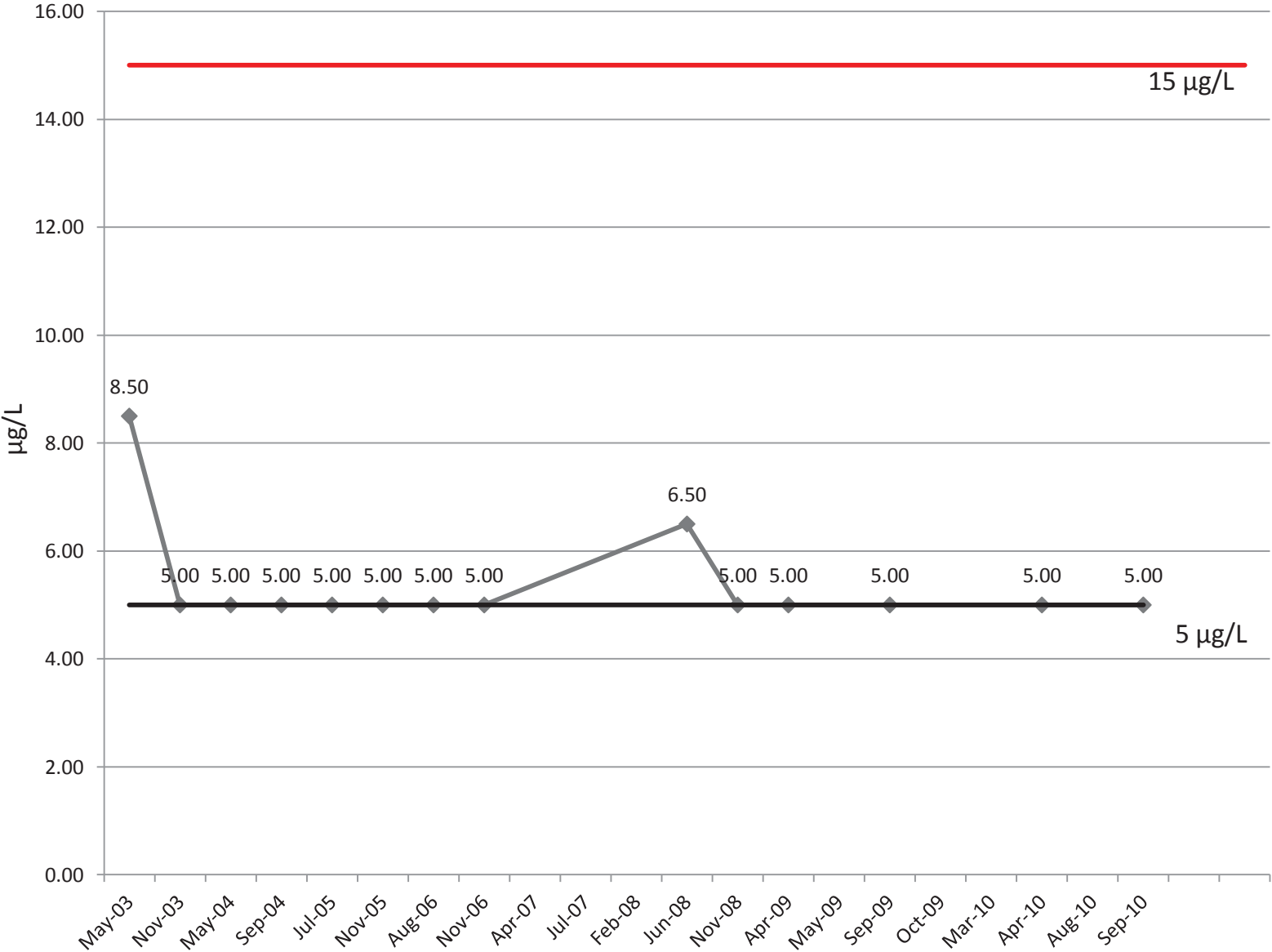
# Iron

**BFI-36**



# Lead

**BFI-36**



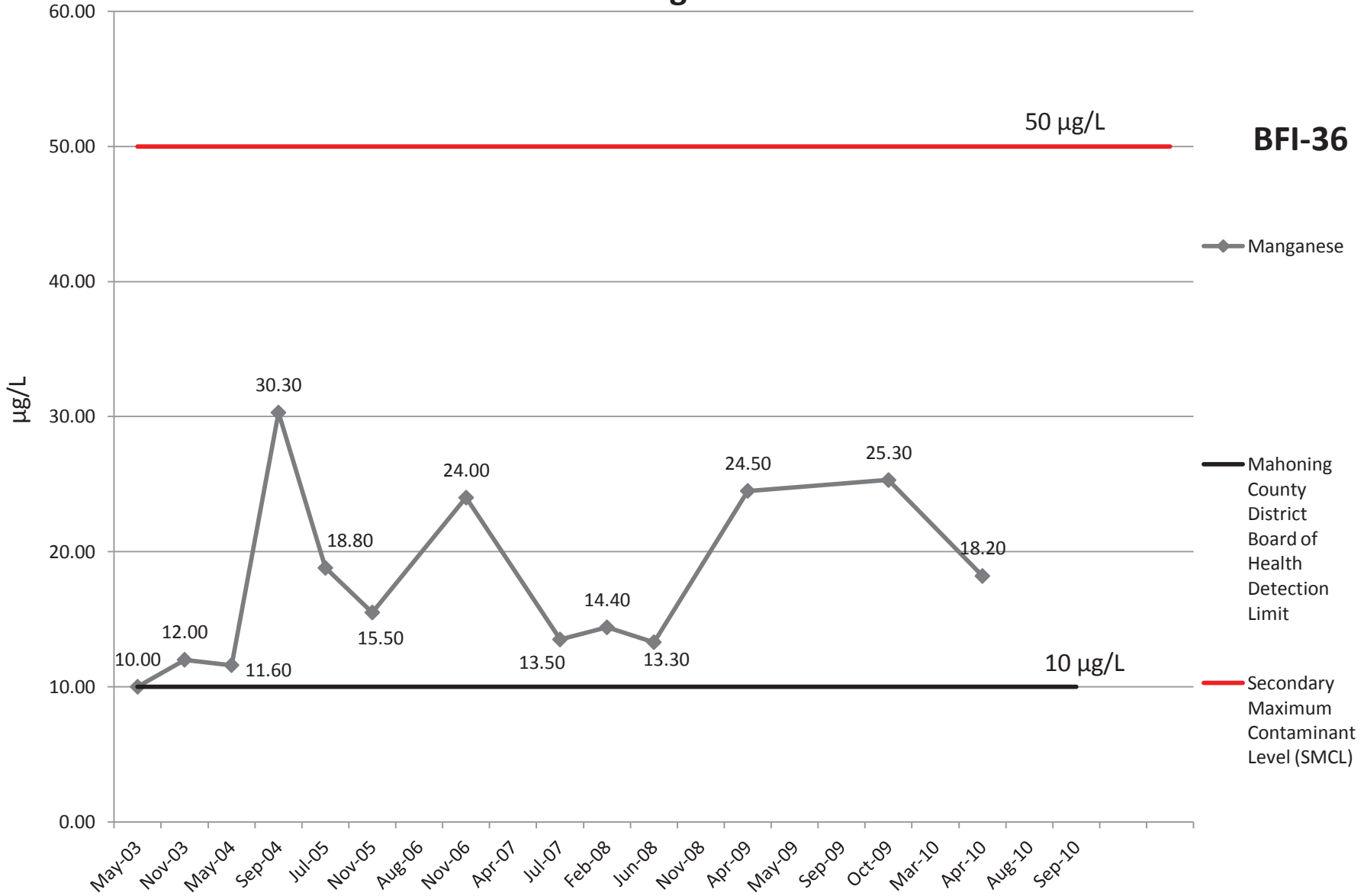
◆ Lead

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Action Level



# Manganese



**BFI-36**

◆ Manganese

— Mahoning County District Board of Health Detection Limit

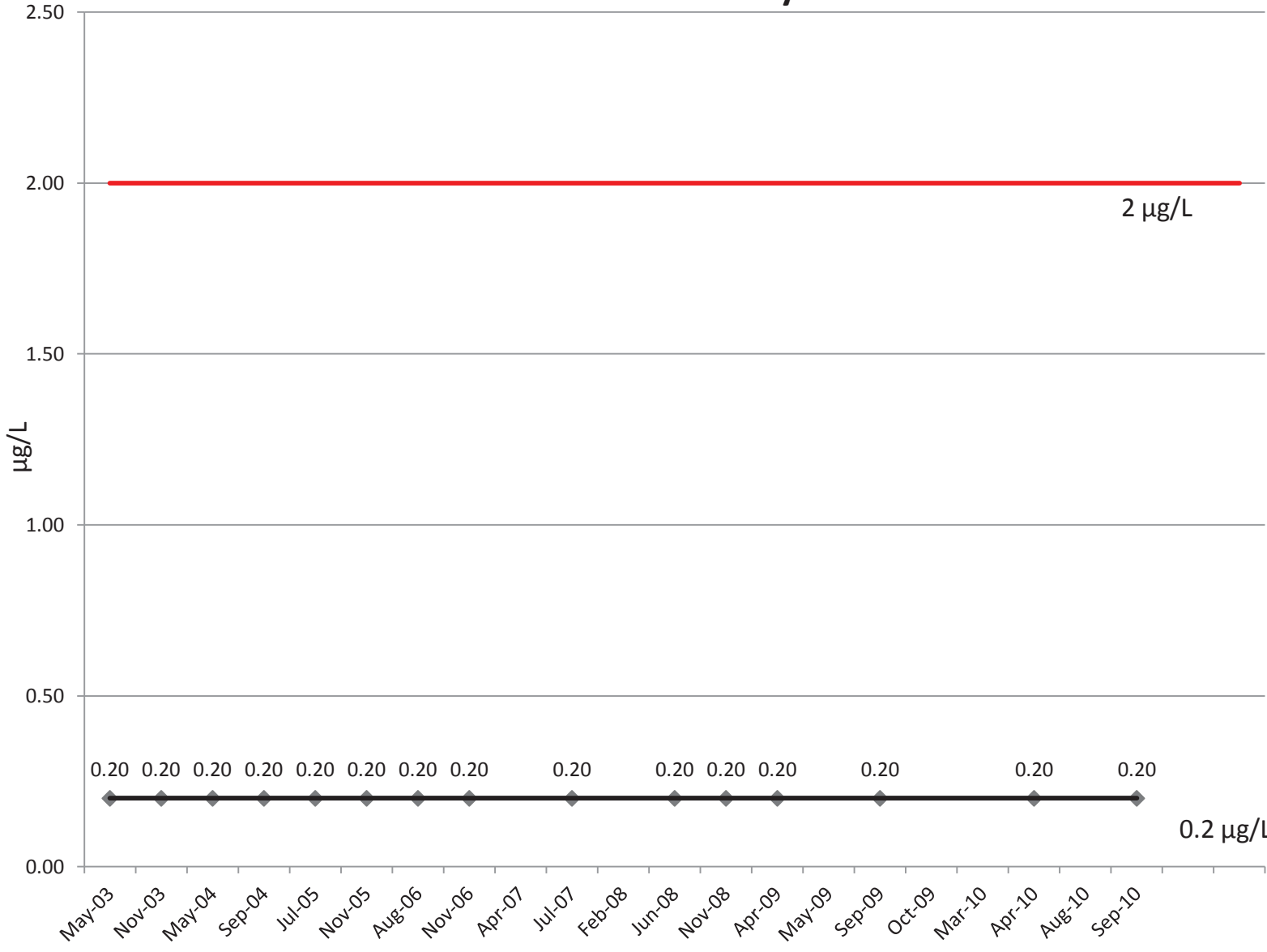
— Secondary Maximum Contaminant Level (SMCL)

# Mercury

**BFI-36**

2 µg/L

0.2 µg/L

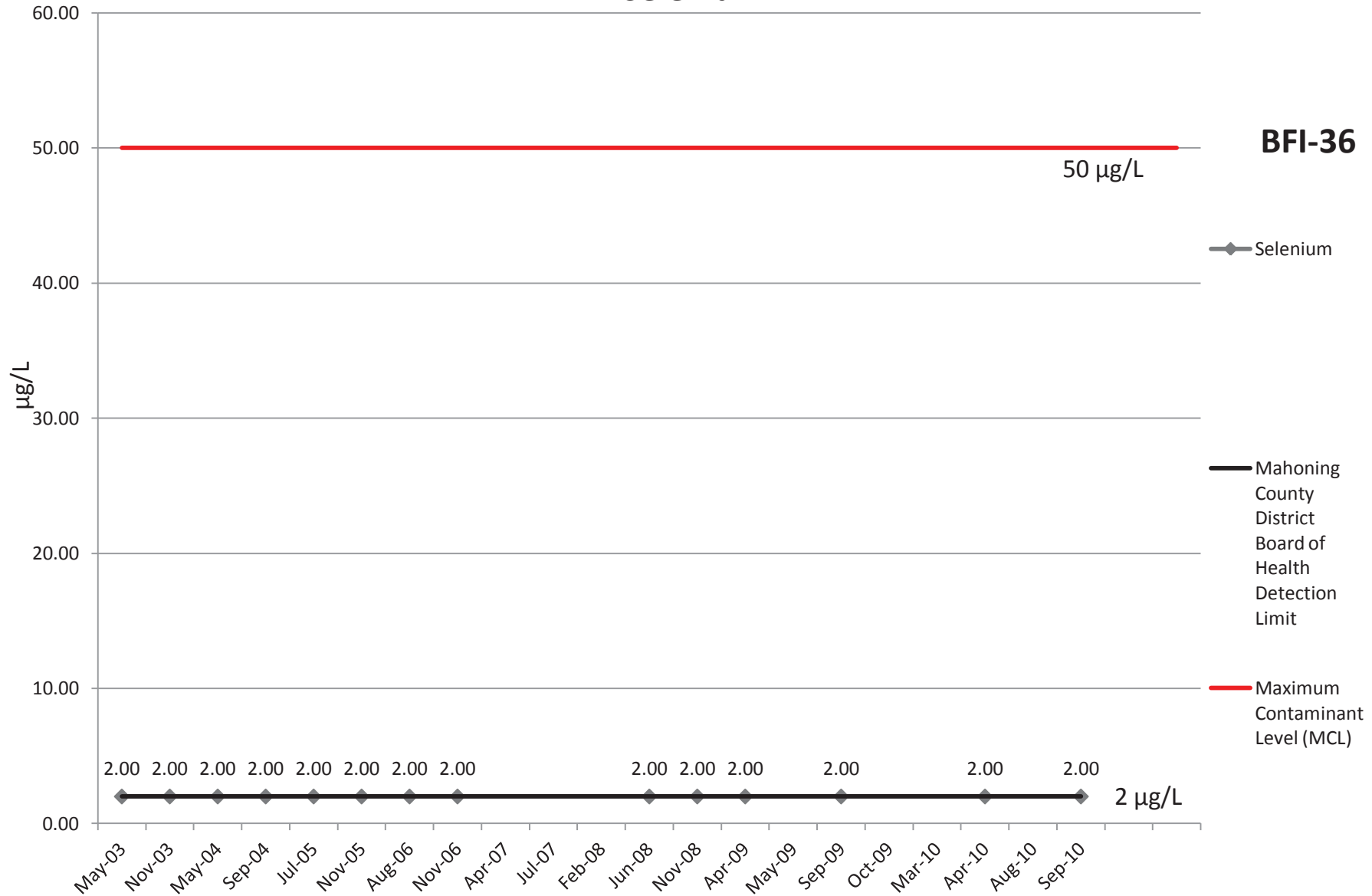


◆ Mercury

— Mahoning County District Board of Health Detection Limit

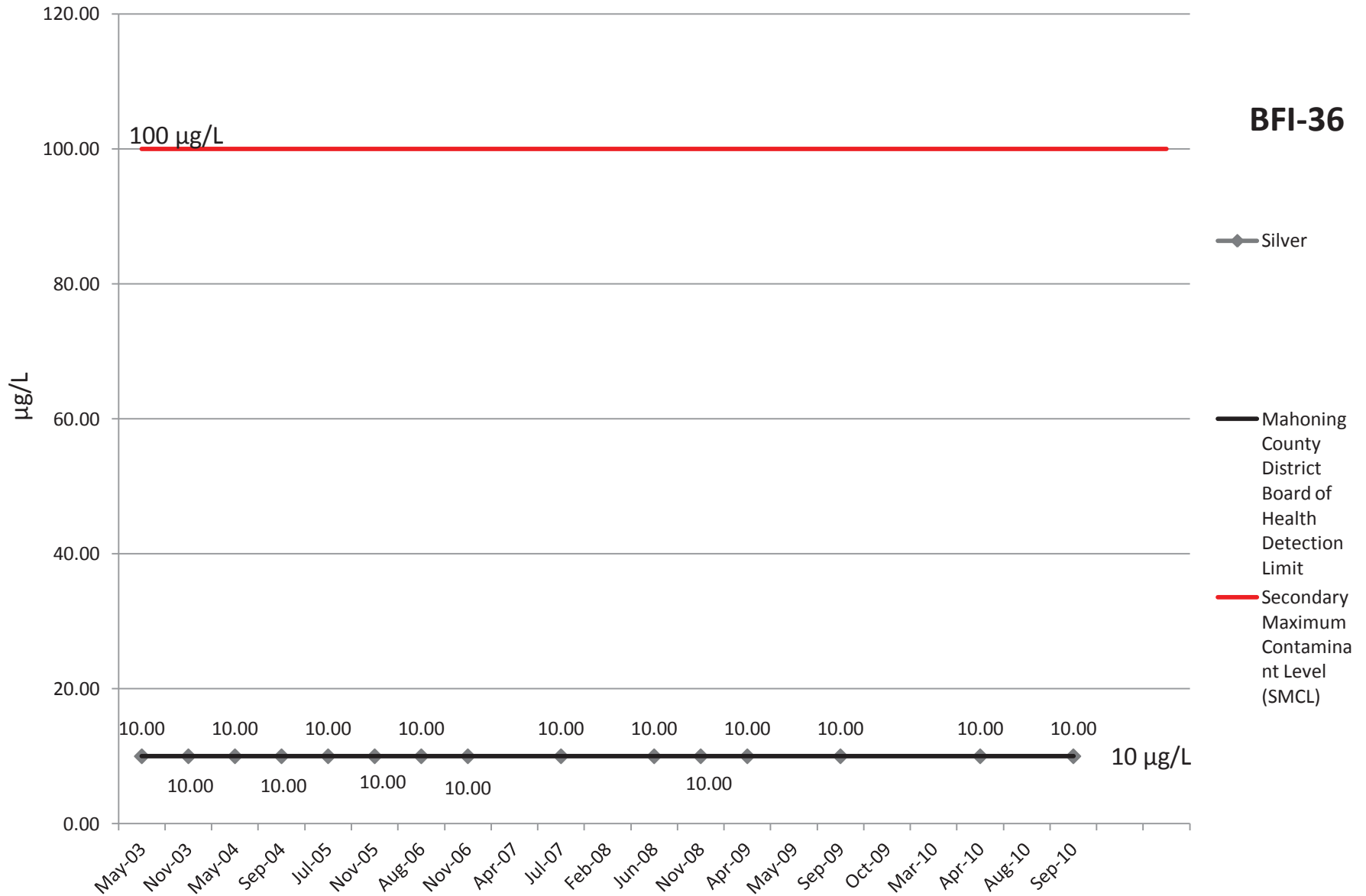
— Maximum Contaminant Level (MCL)

# Selenium

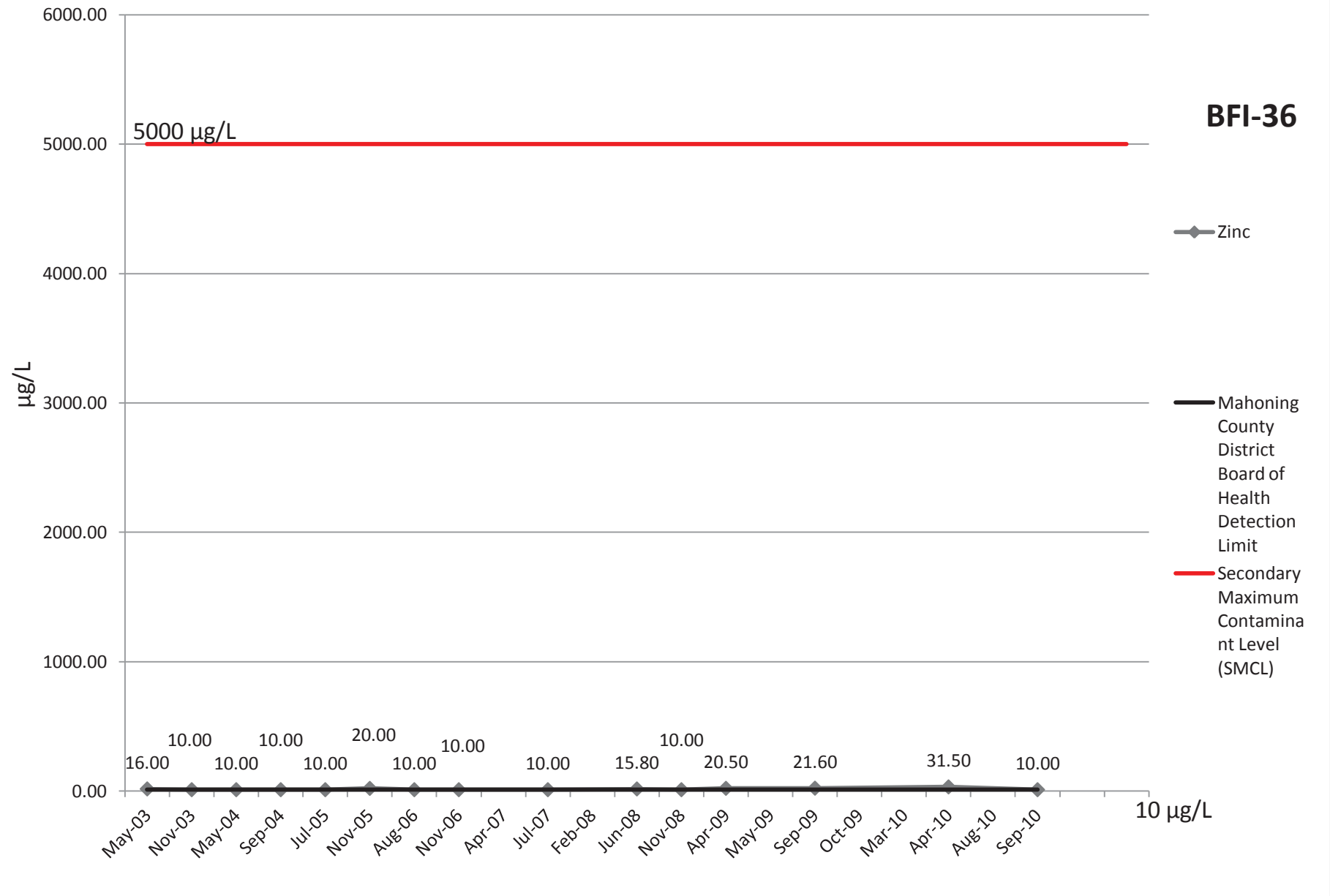


# Silver

**BFI-36**

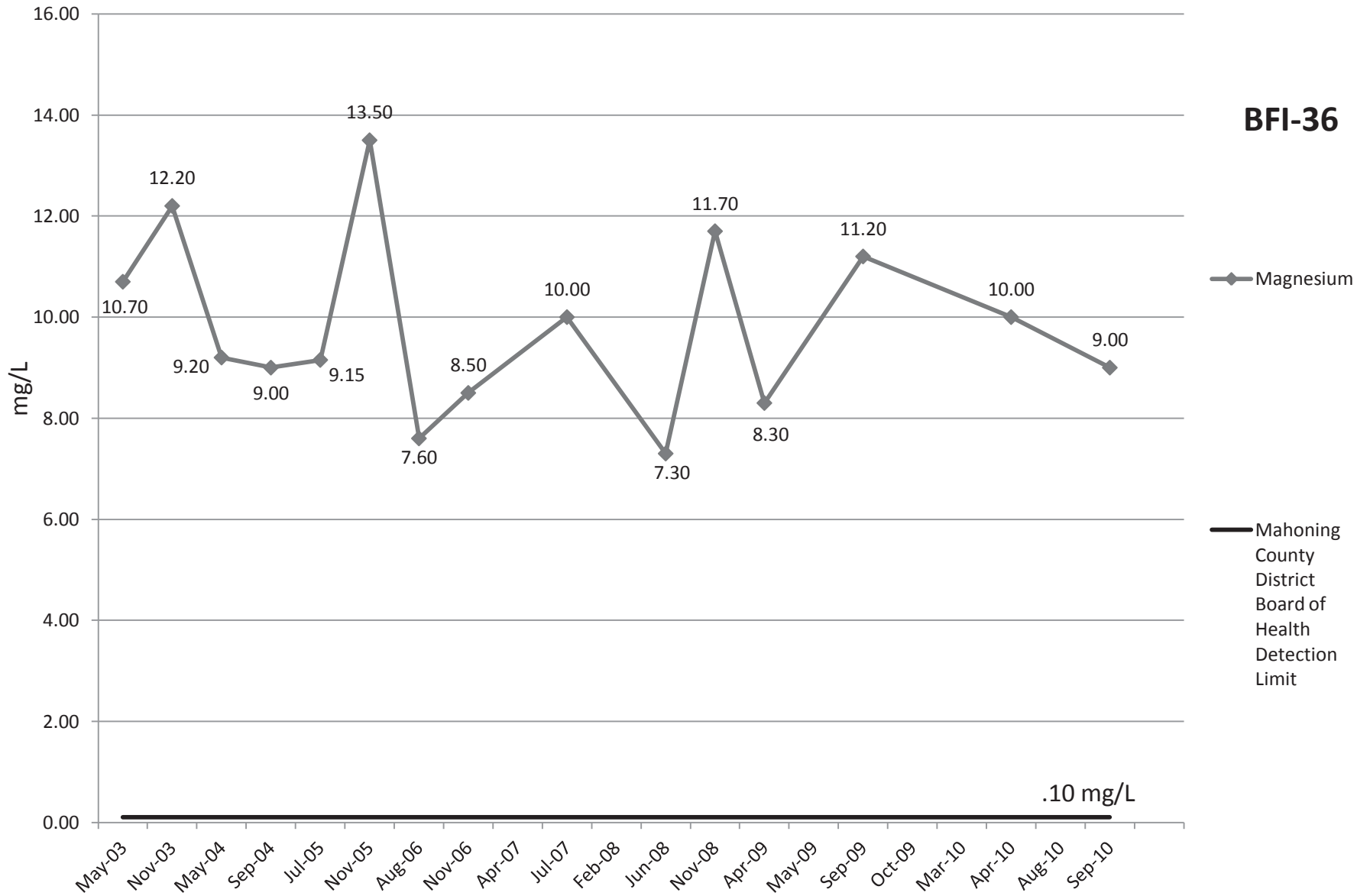


# Zinc

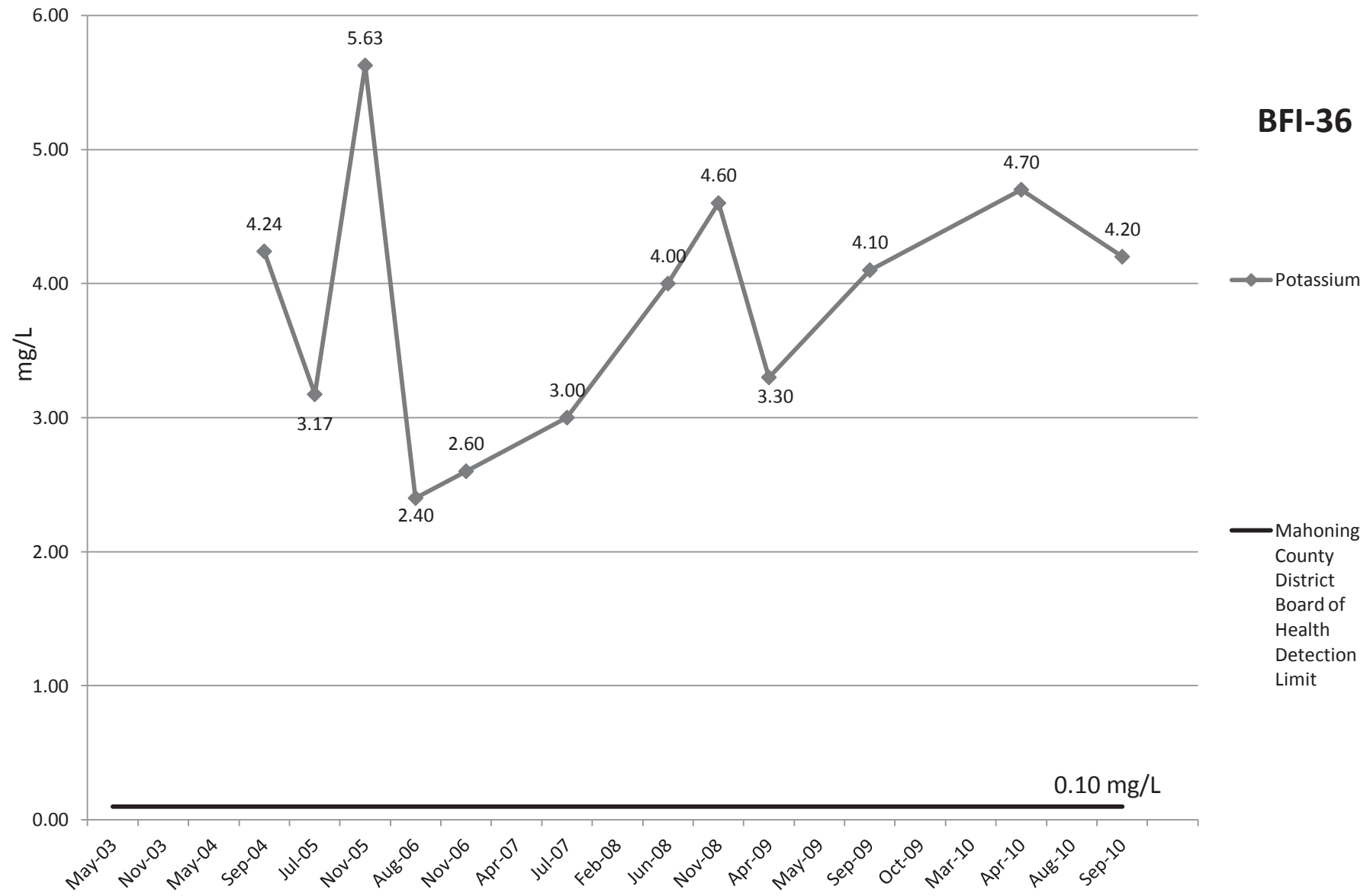


# Magnesium

**BFI-36**

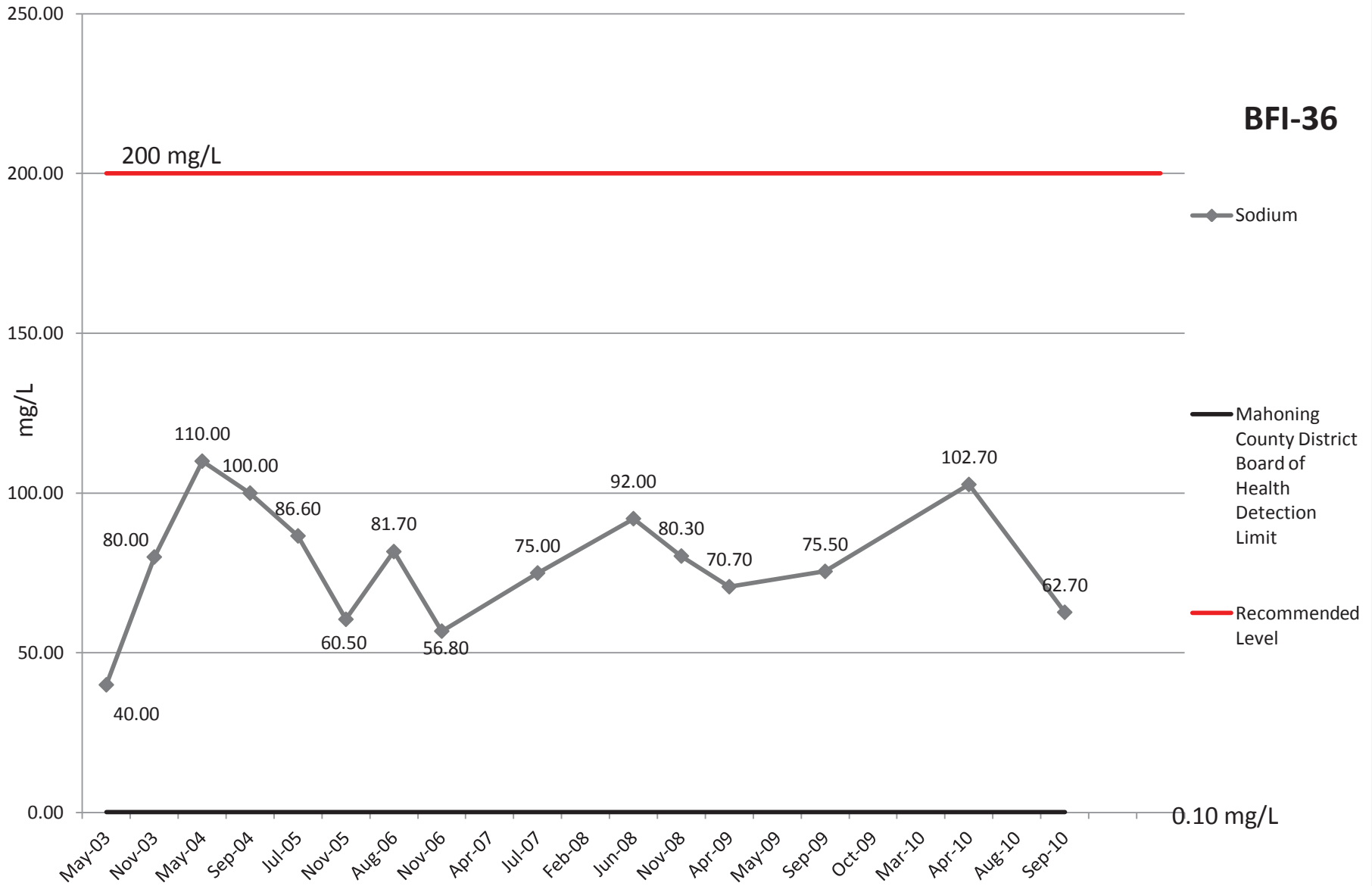


# Potassium



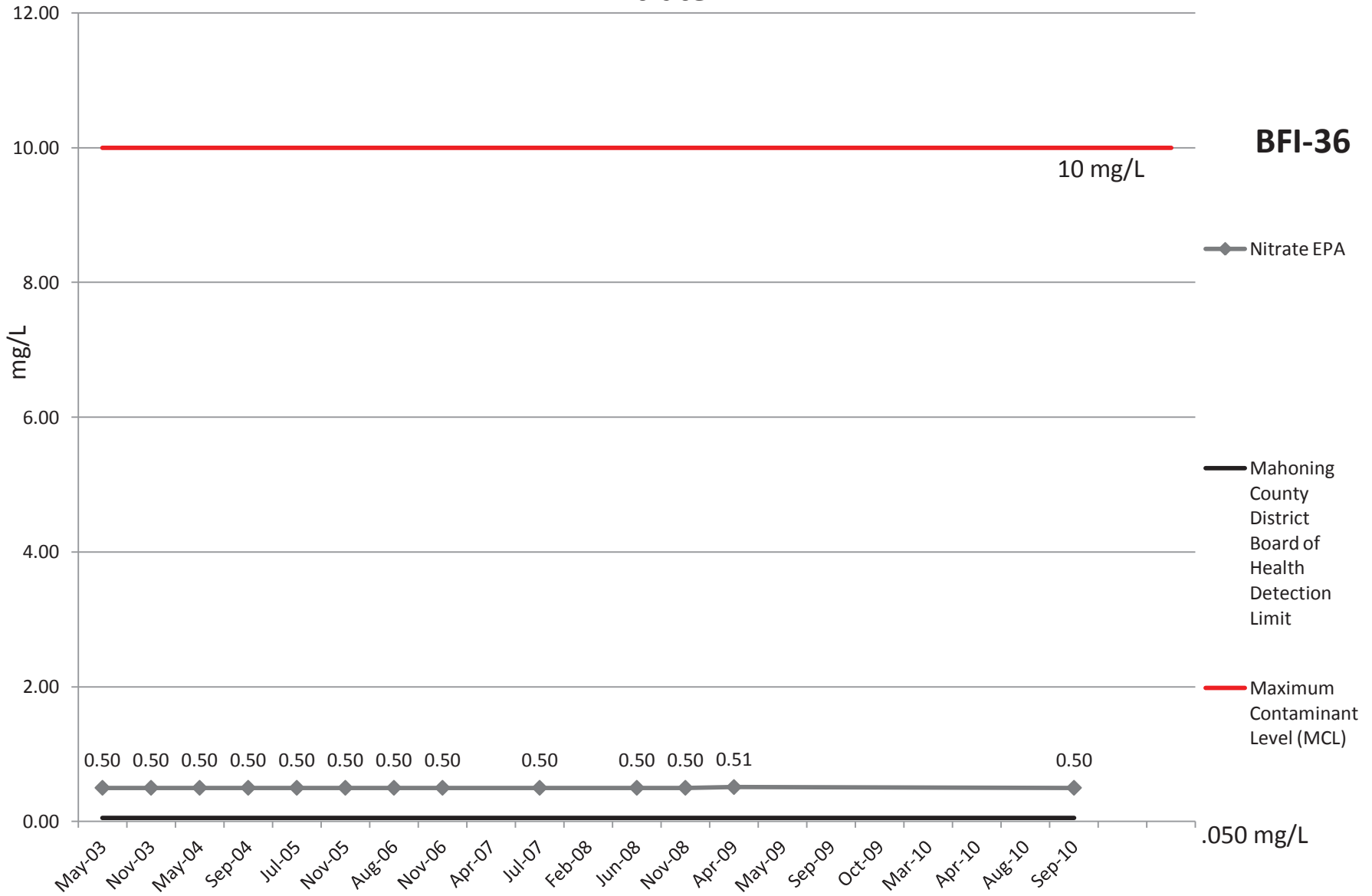
# Sodium

**BFI-36**



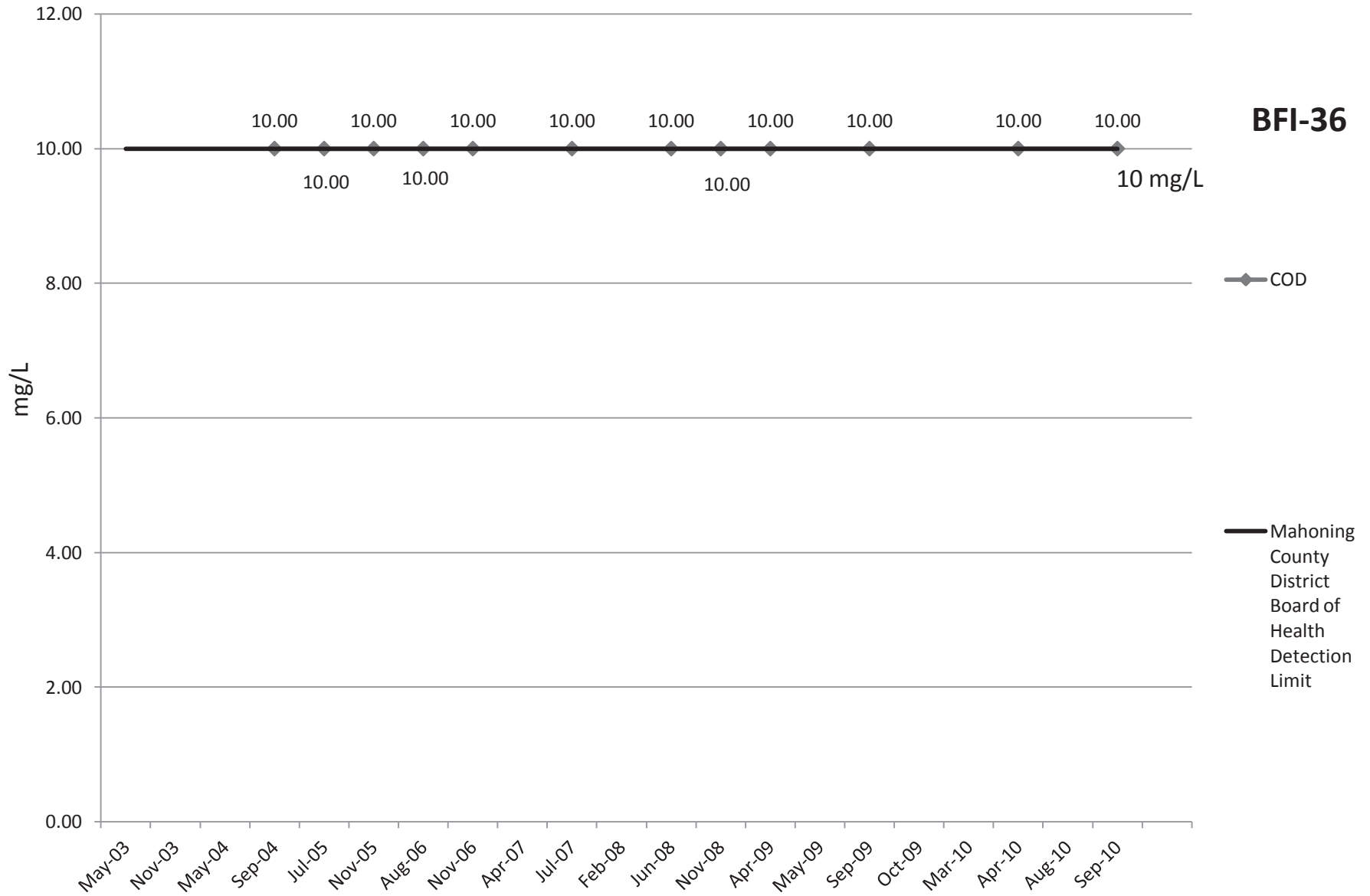


# Nitrate EPA



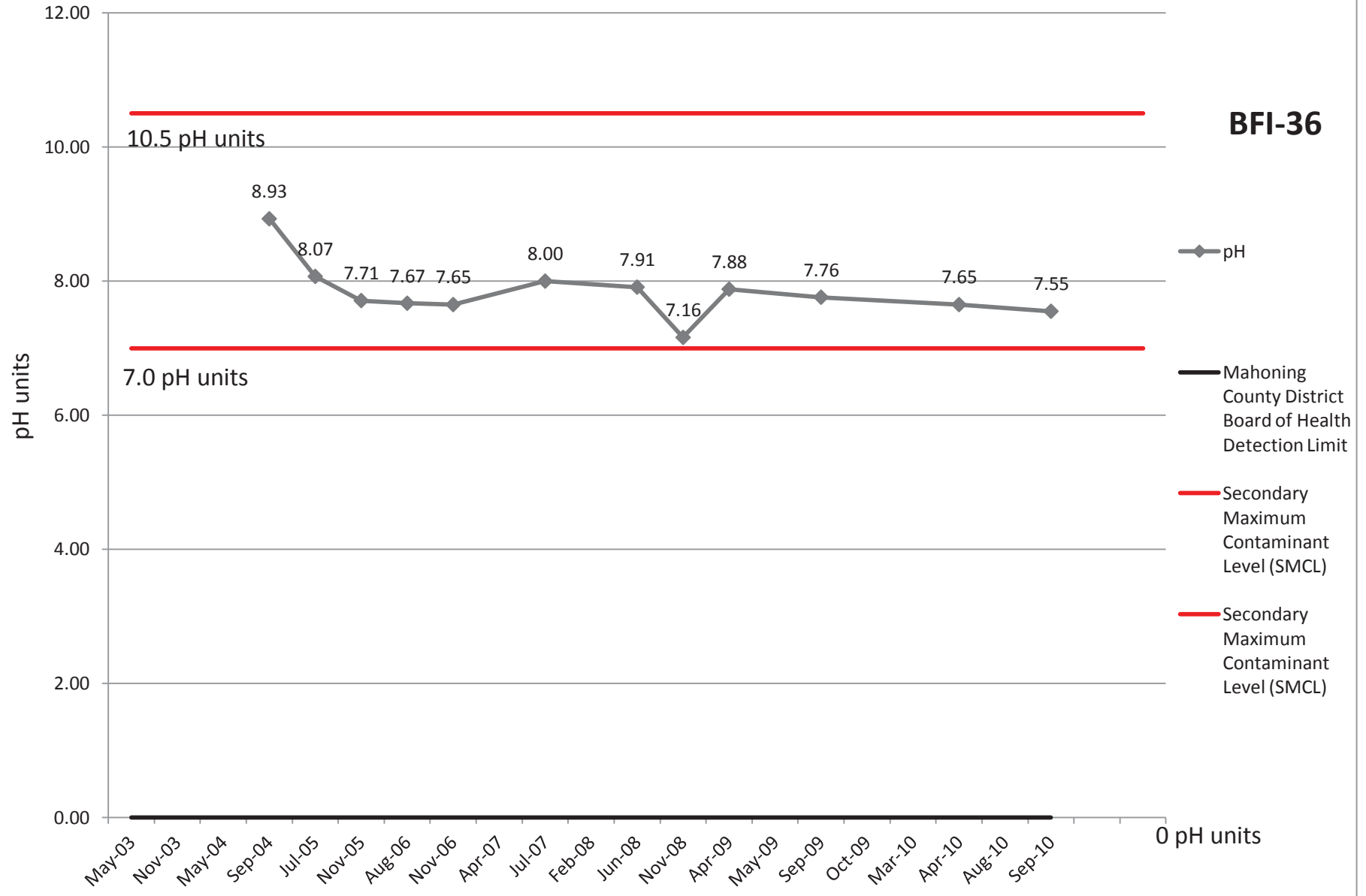
# COD

**BFI-36**



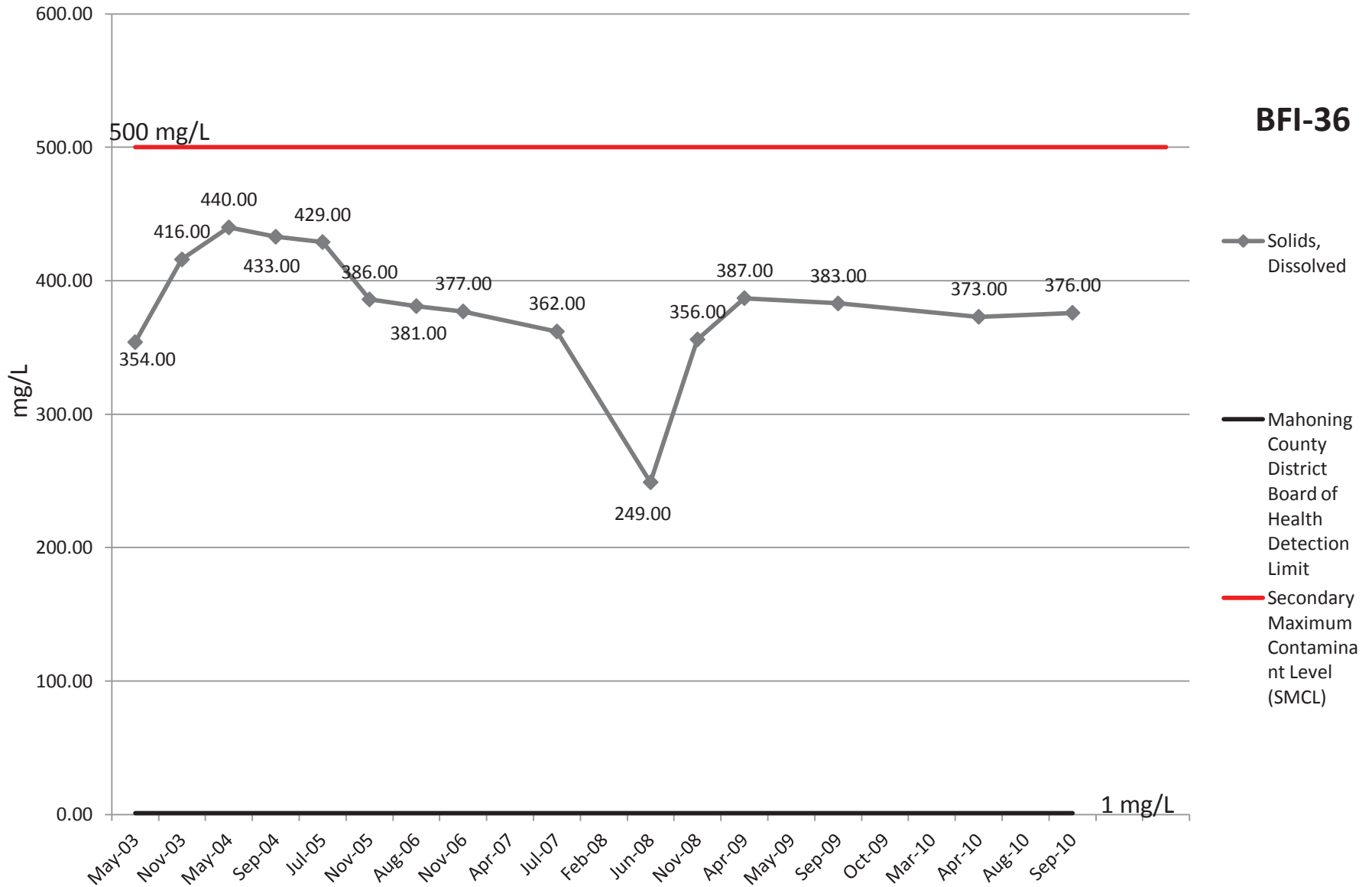
# pH

**BFI-36**



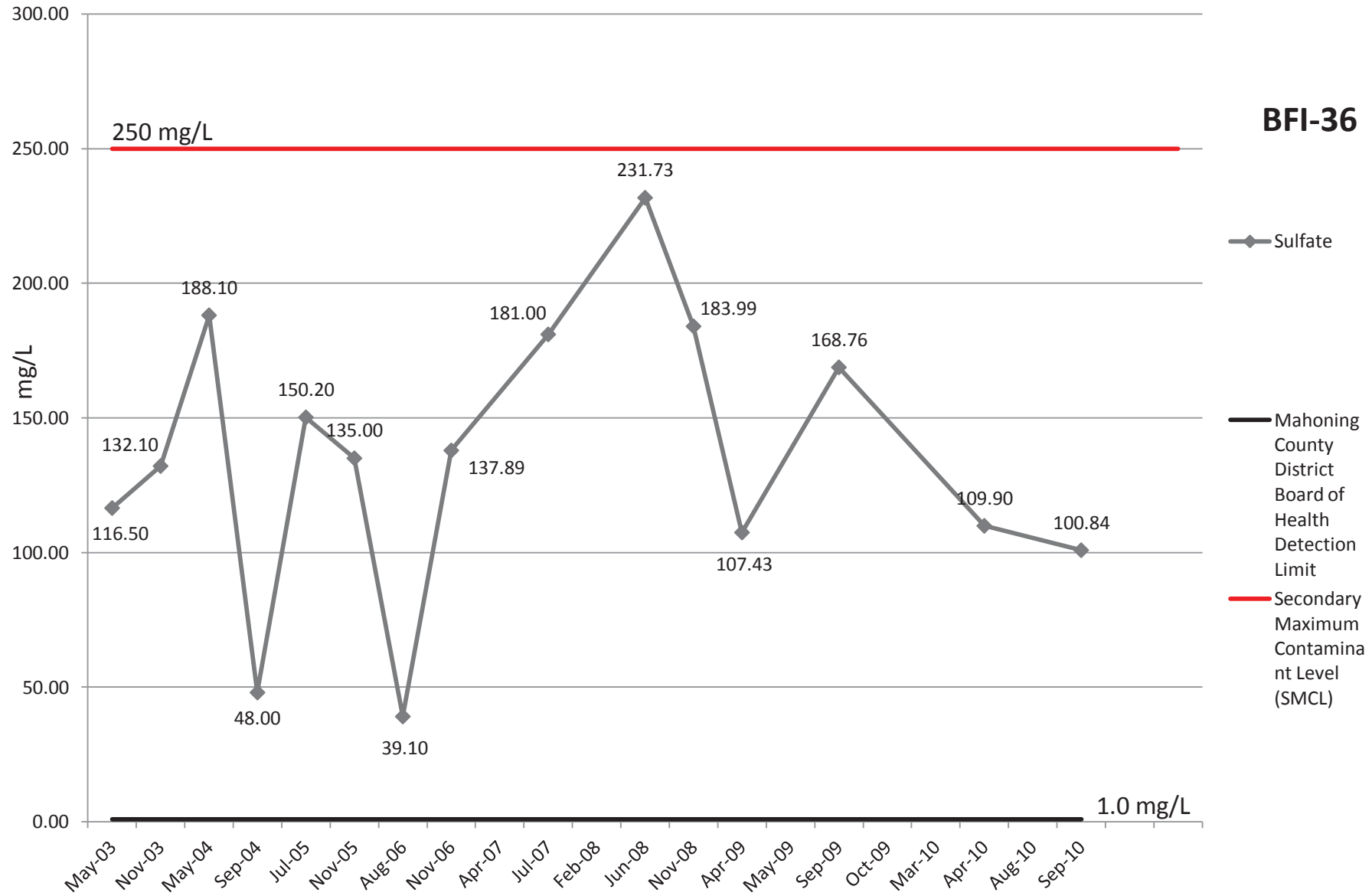
# Solids, Dissolved

**BFI-36**



# Sulfate

**BFI-36**



# Bacteria

## BFI-36

Positive/Negative

◆ Bacteria

positive (1)

1.00

1.00

1.00

1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

0.00

0.00

0.00

0.00

0.00

negative (0)

May-03

Nov-03

May-04

Sep-04

Jul-05

Nov-05

Aug-06

Nov-06

Apr-07

Jul-07

Feb-08

Jun-08

Nov-08

Apr-09

May-09

Sep-09

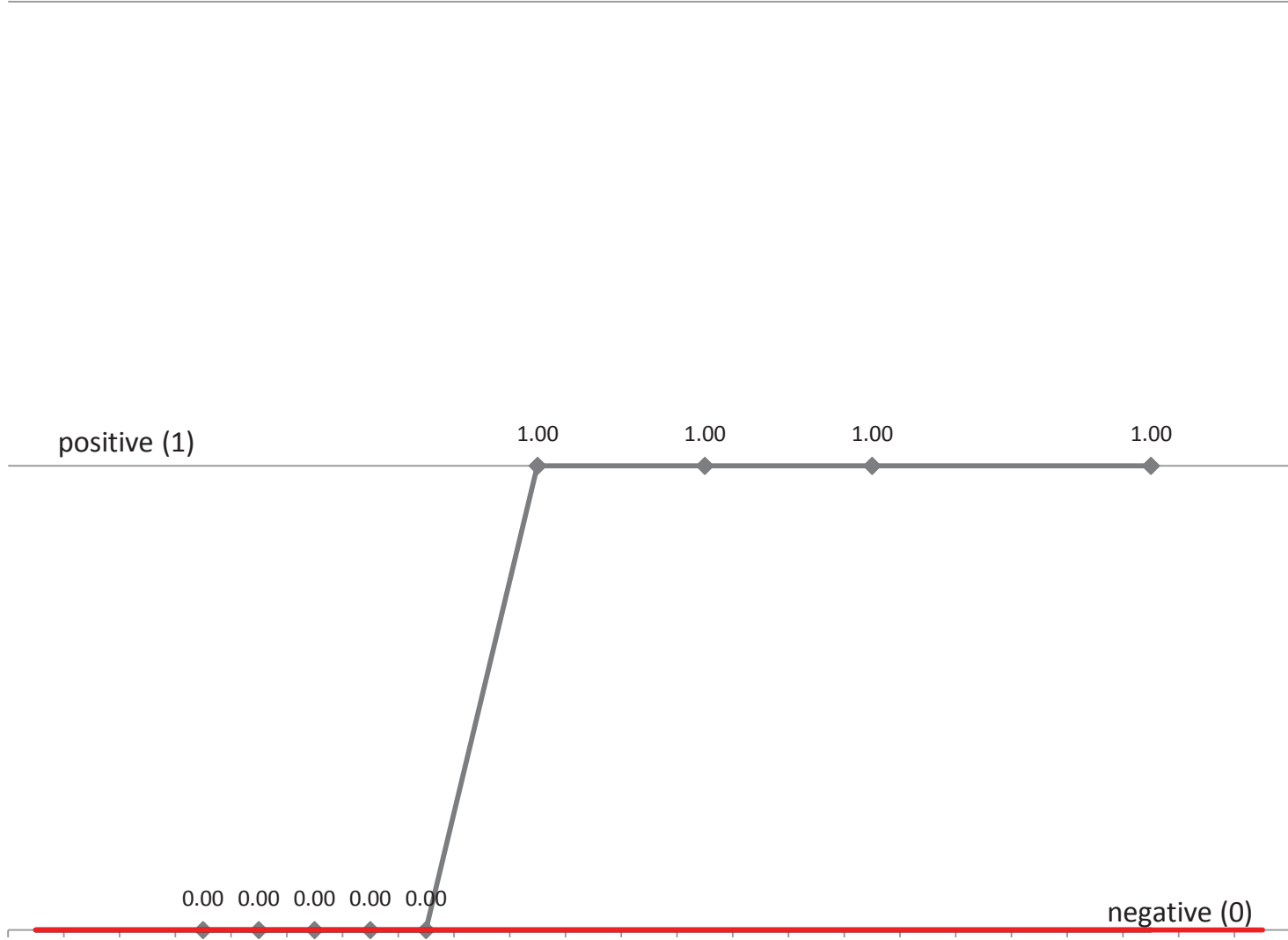
Oct-09

Mar-10

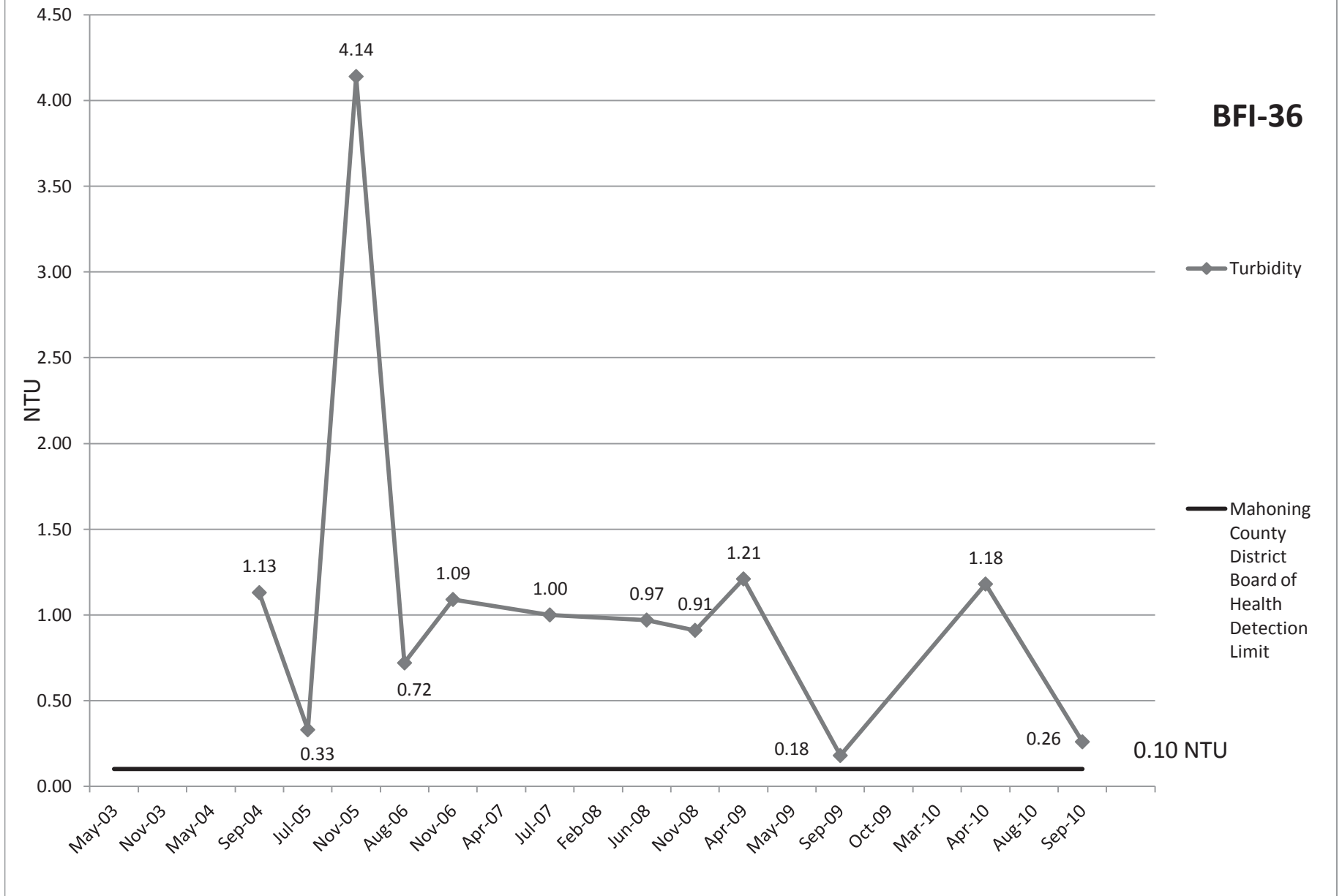
Apr-10

Aug-10

Sep-10

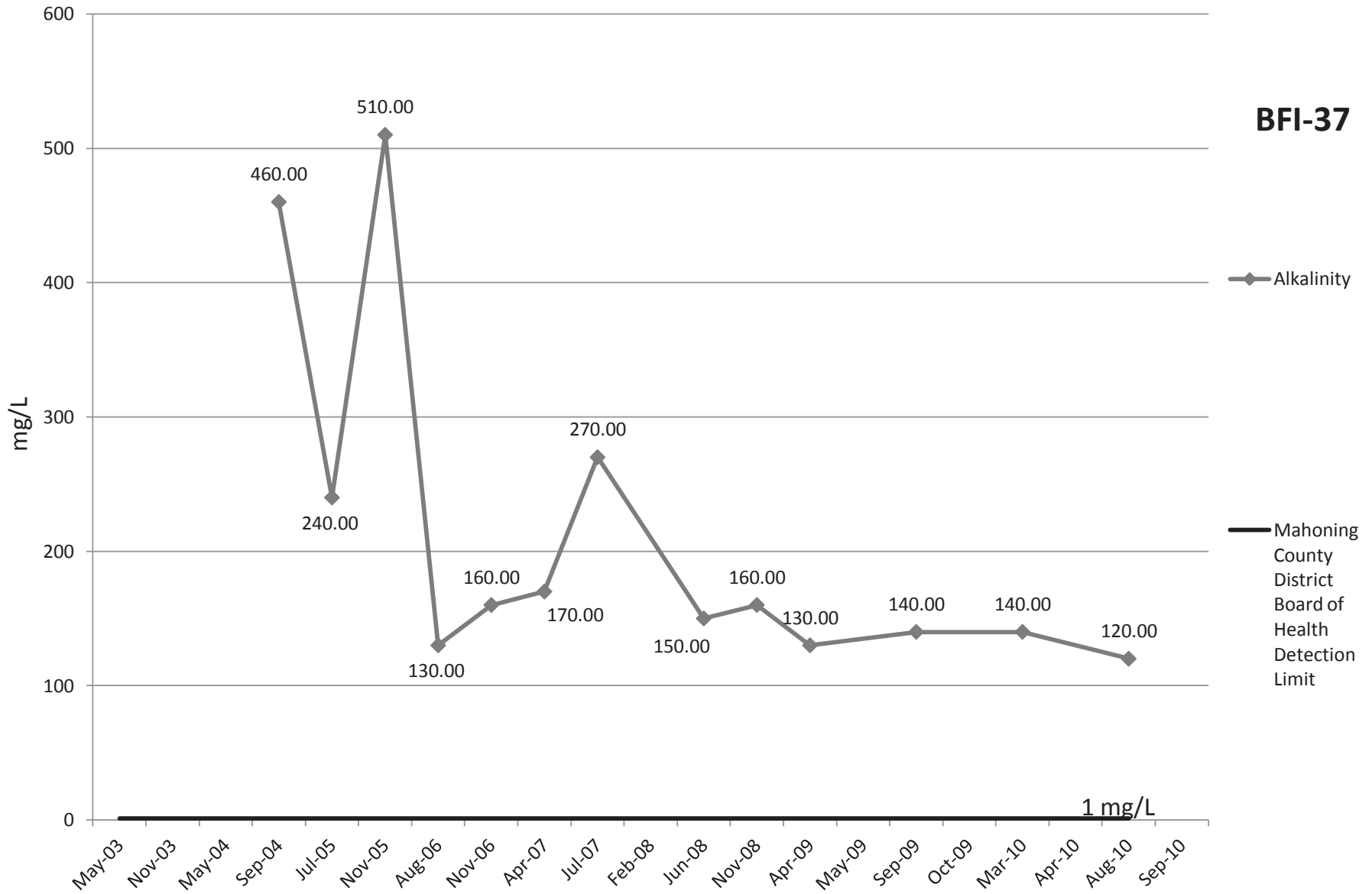


# Turbidity



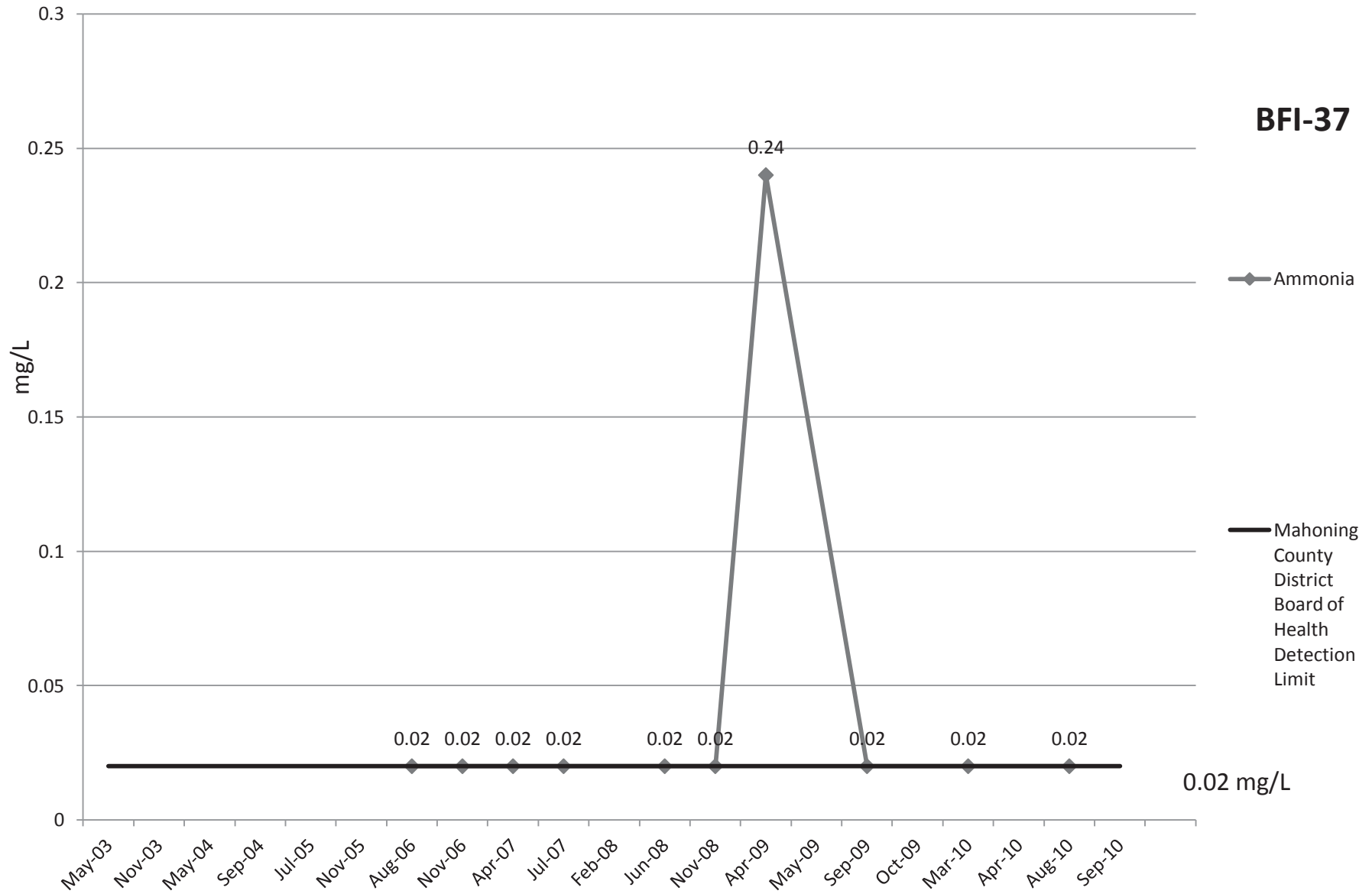
# Alkalinity

**BFI-37**



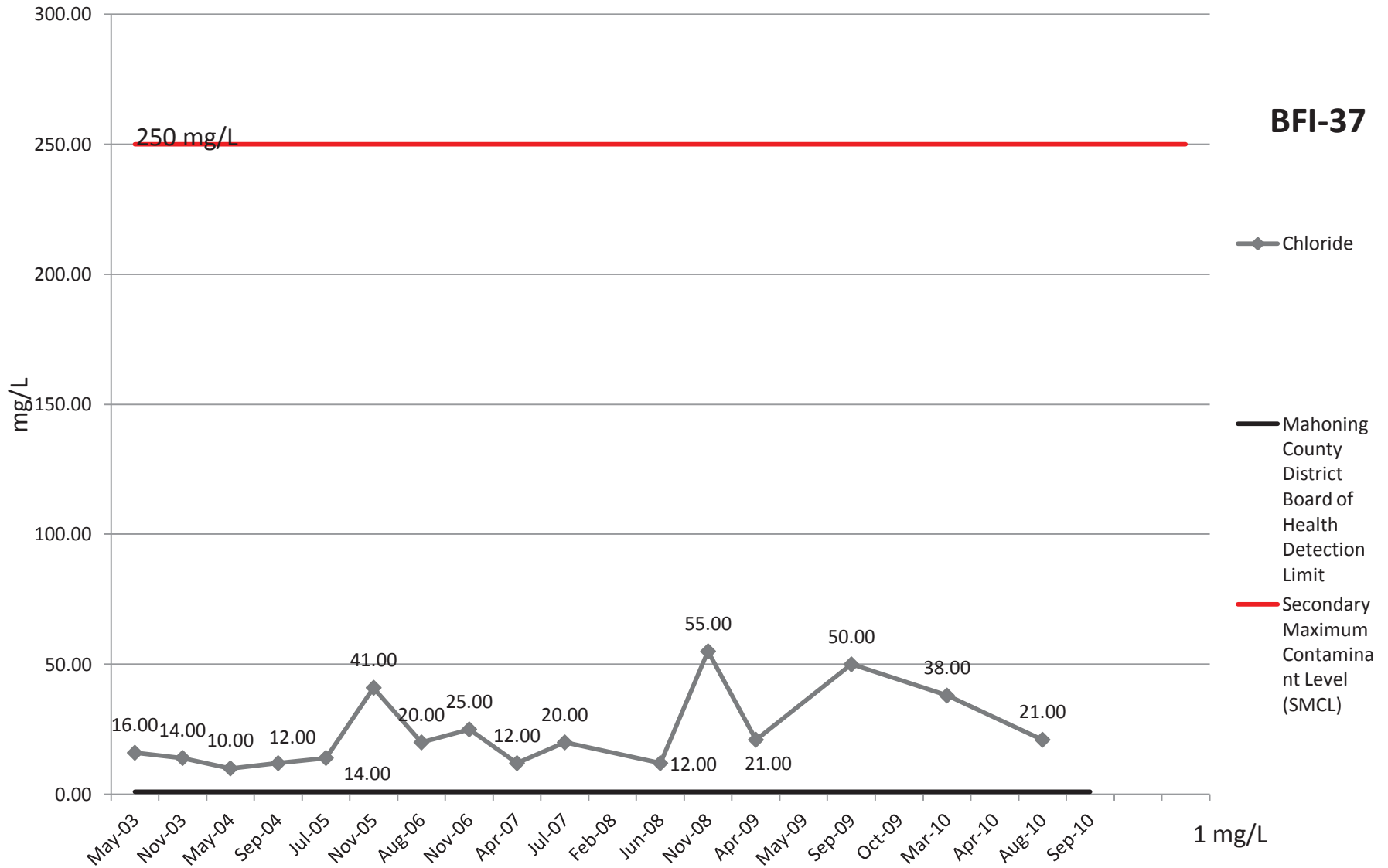


# Ammonia



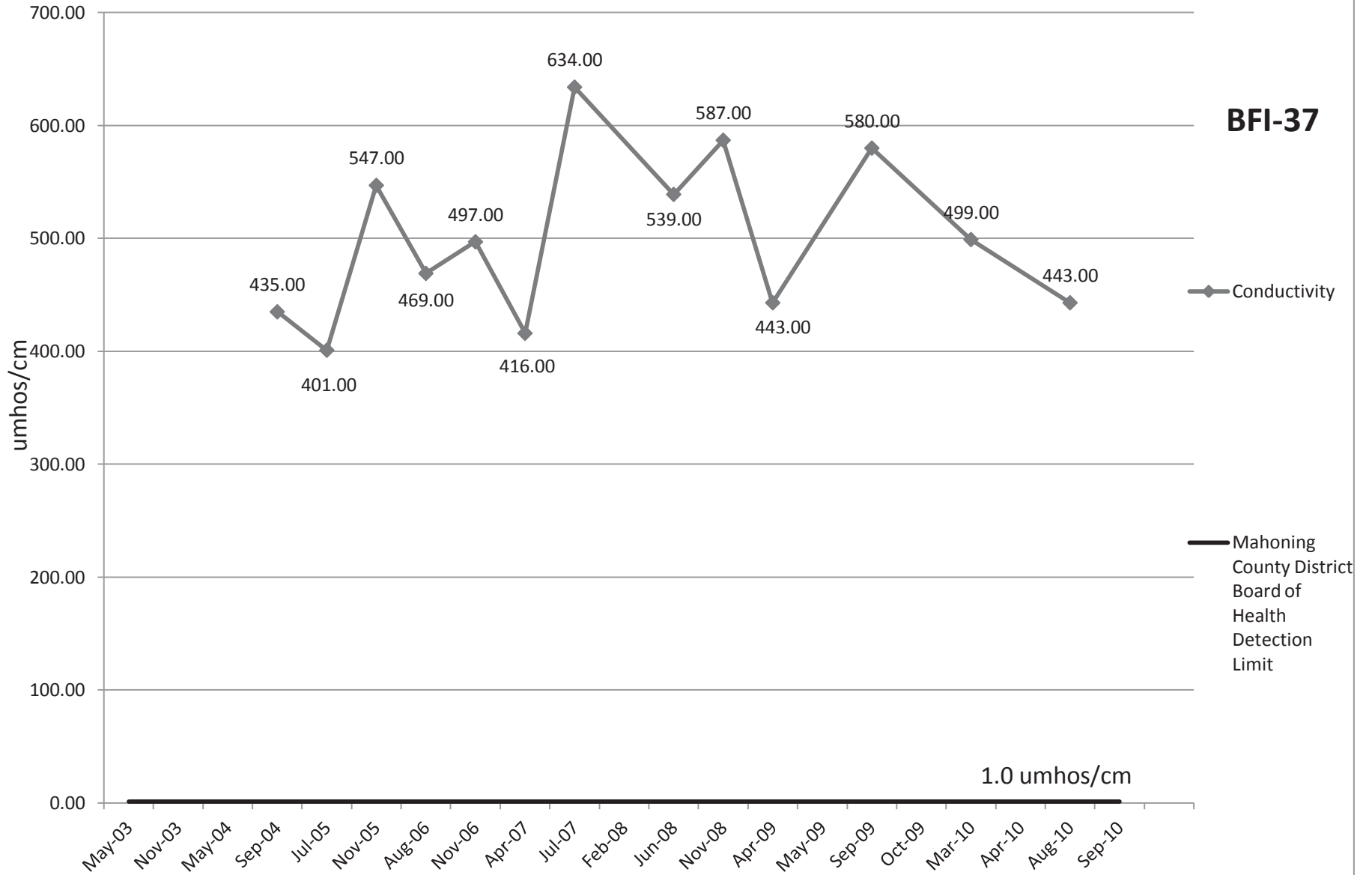
# Chloride

**BFI-37**

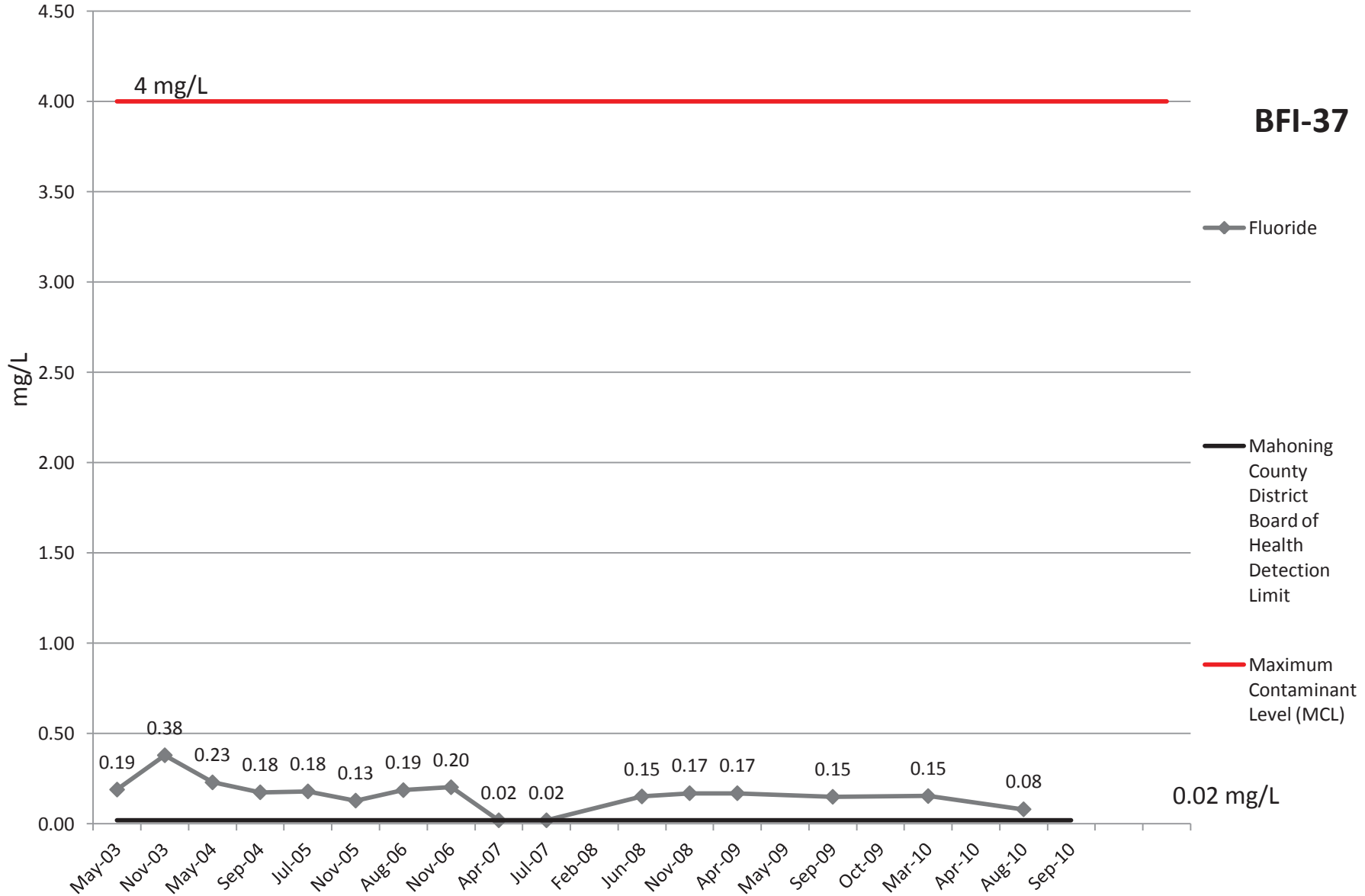


# Conductivity

**BFI-37**

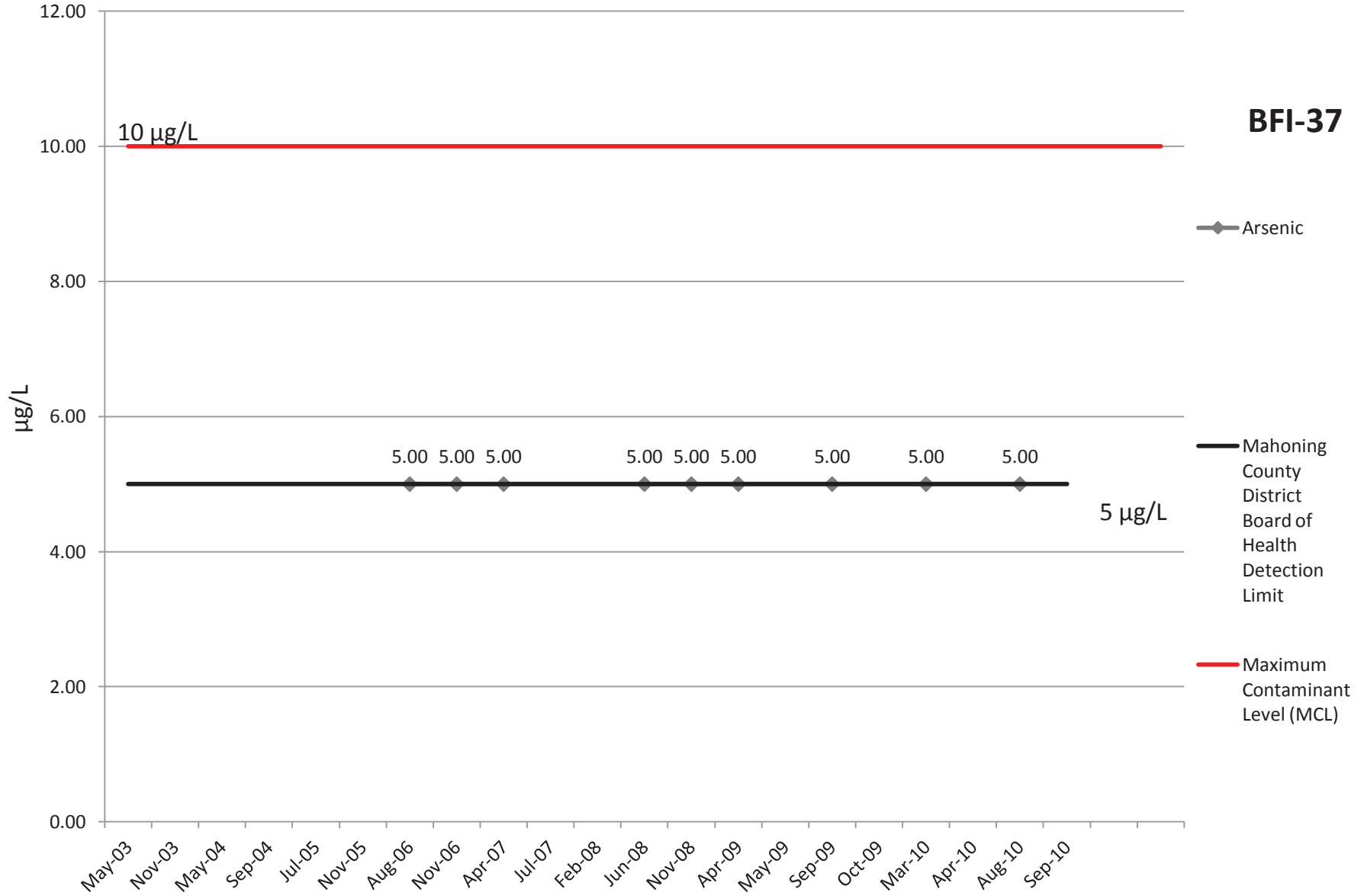


# Fluoride



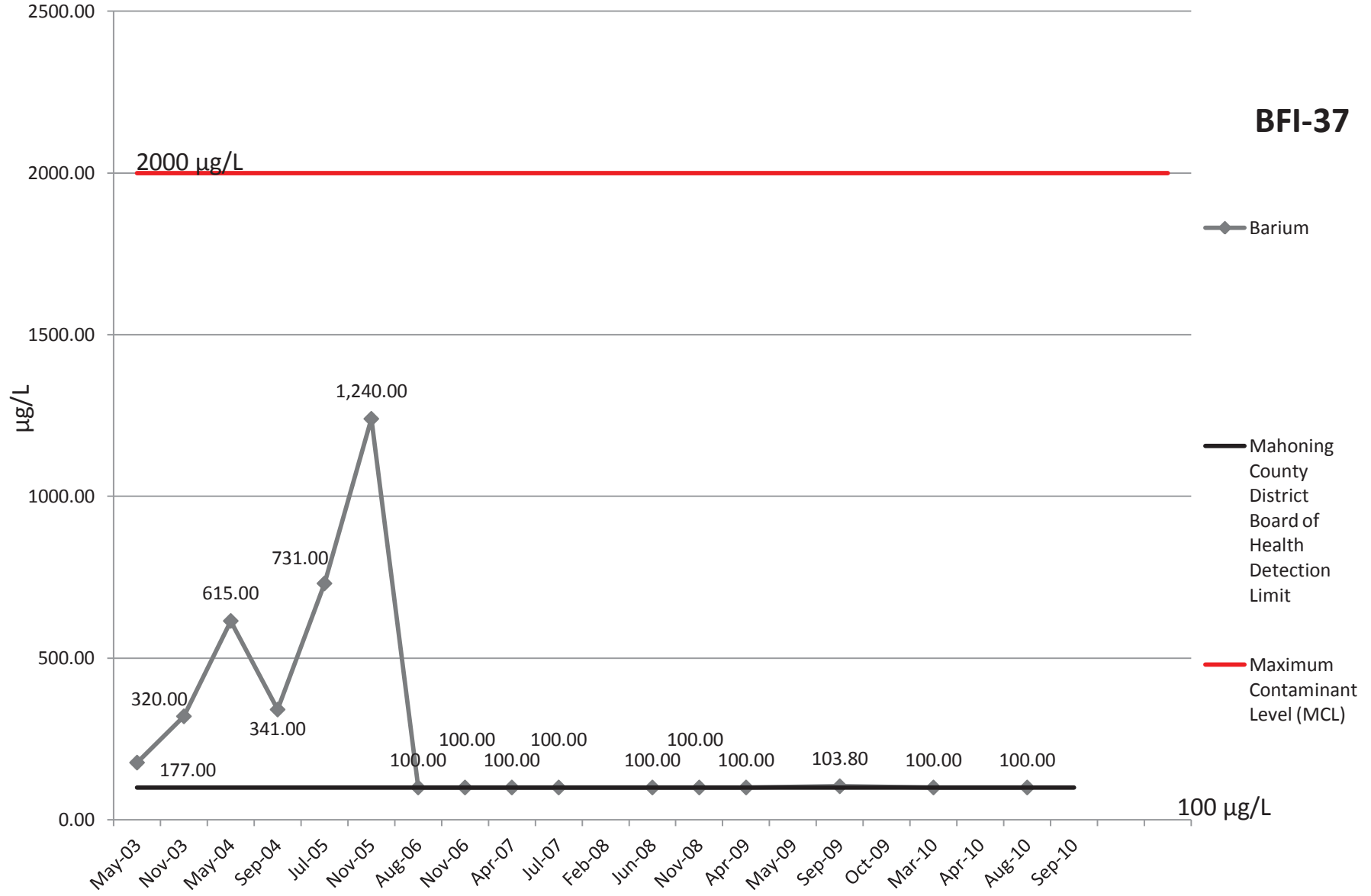
# Arsenic

**BFI-37**



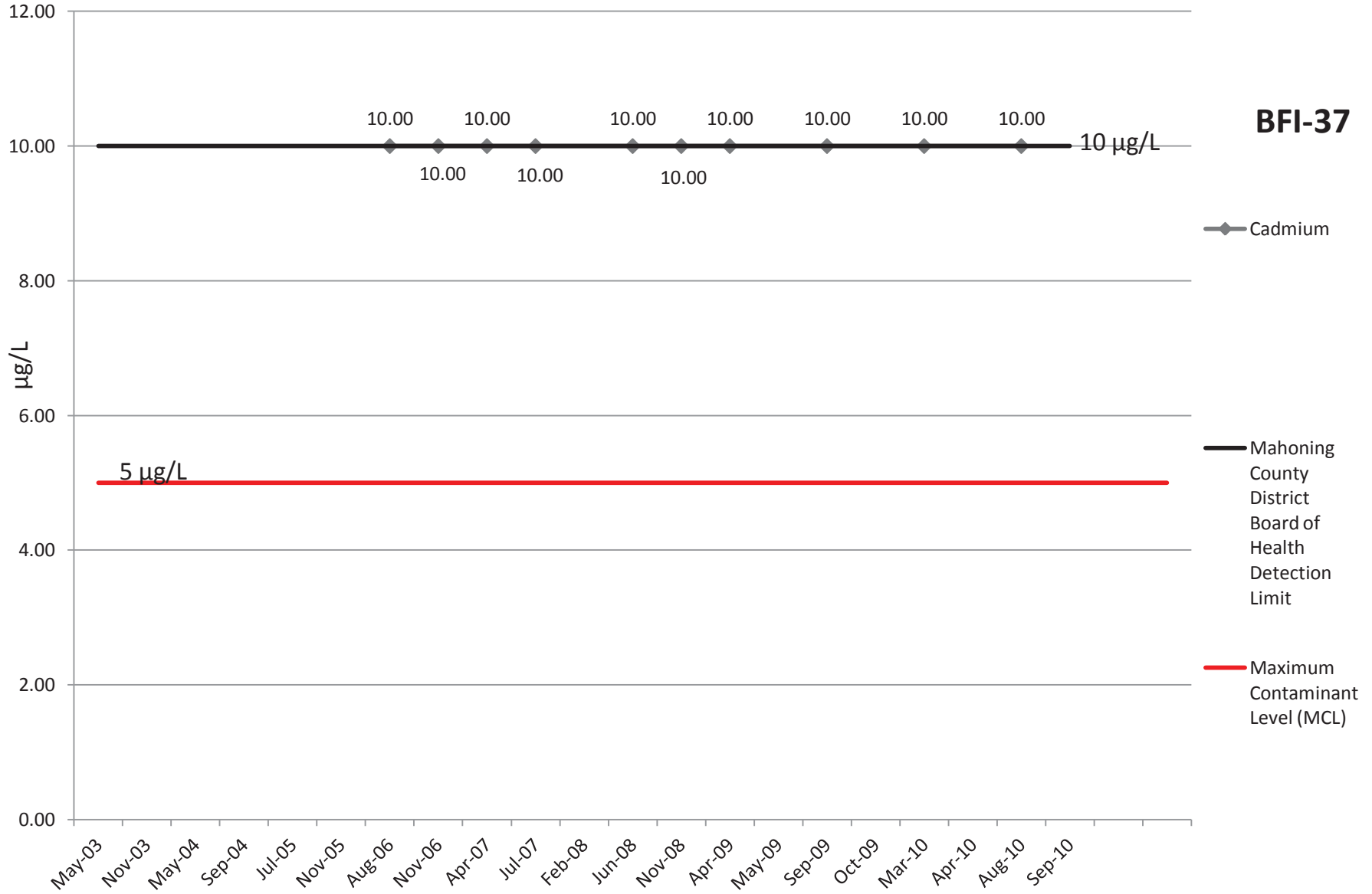
# Barium

**BFI-37**



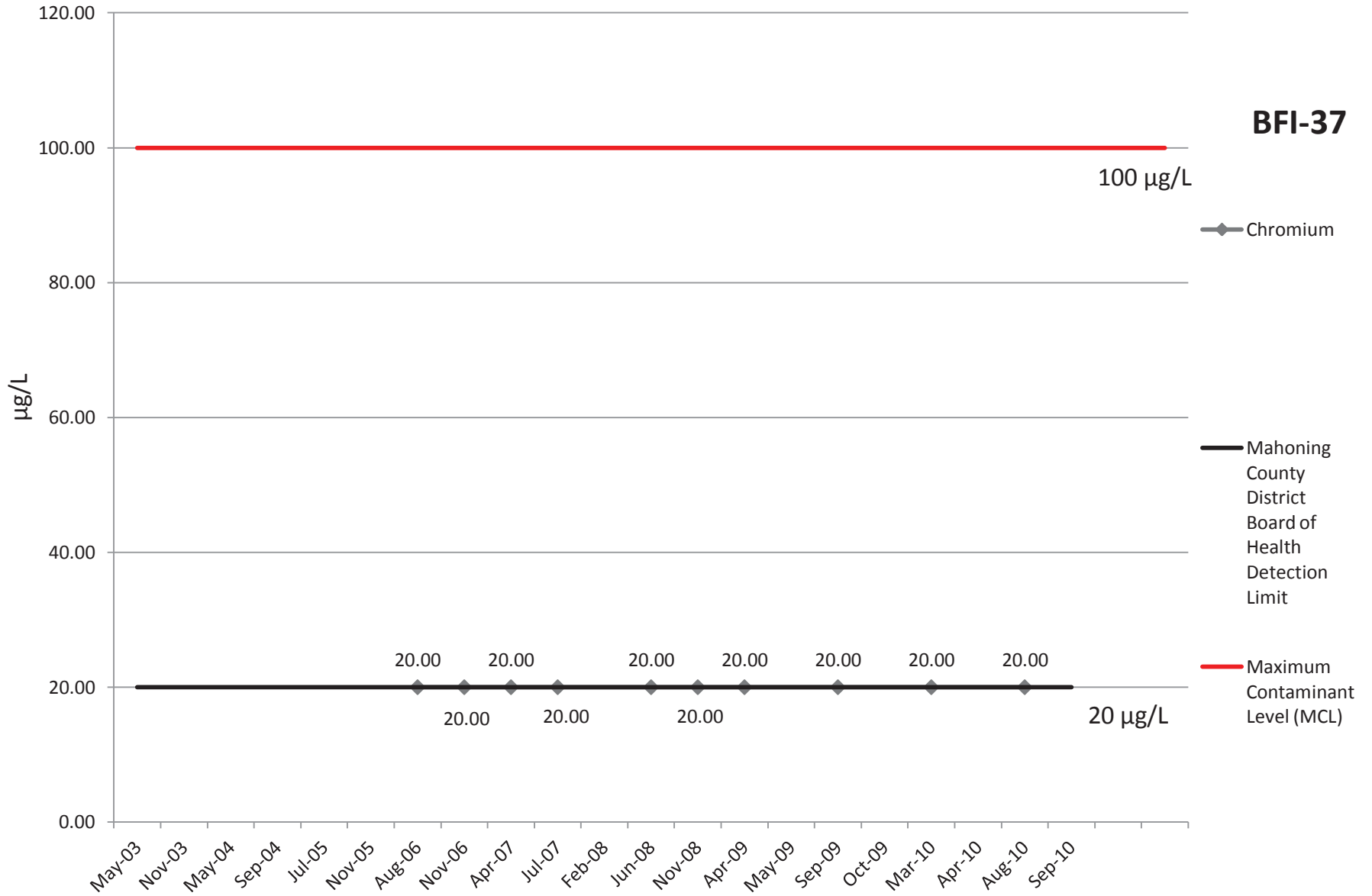
# Cadmium

**BFI-37**



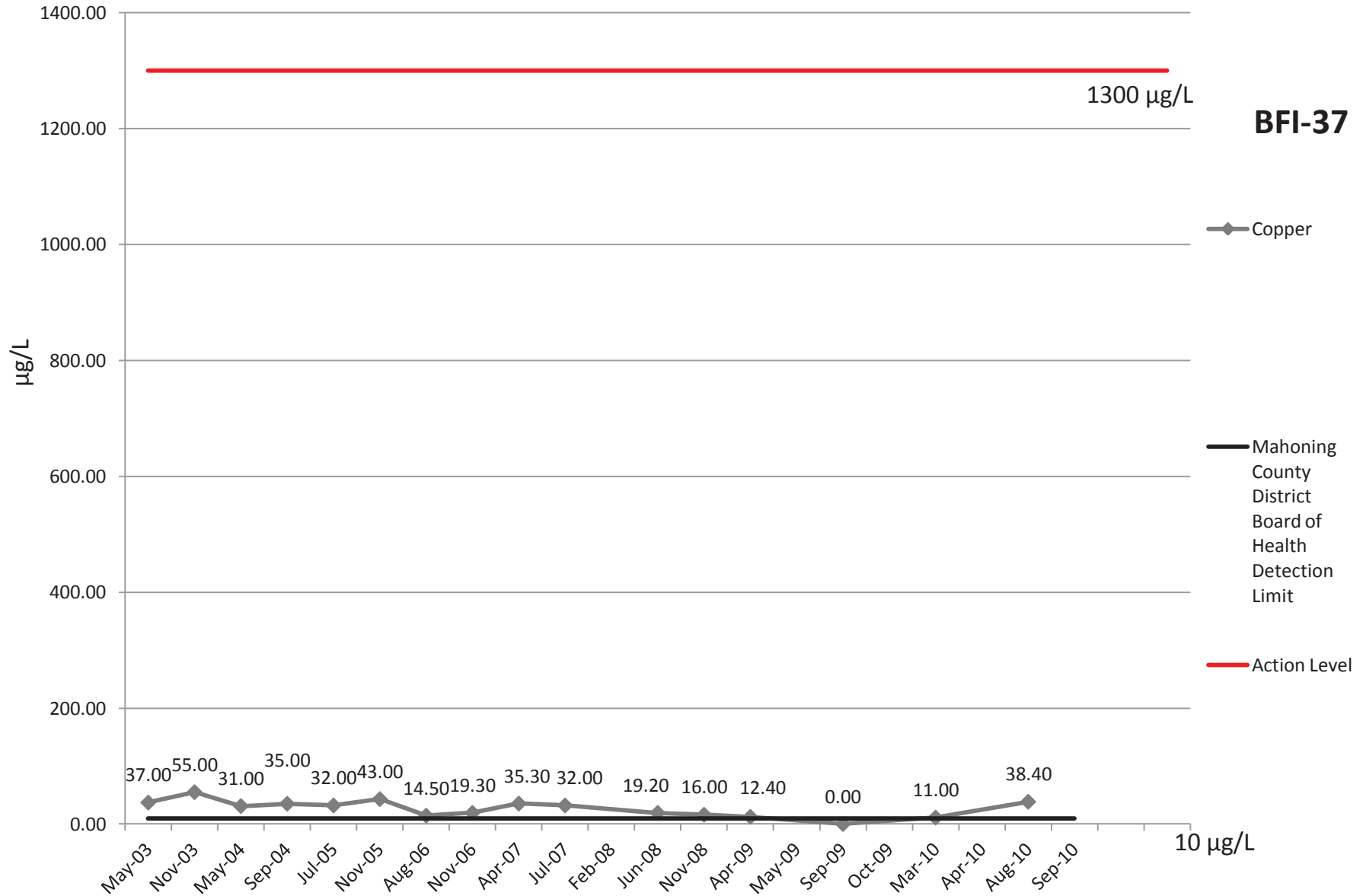
# Chromium

**BFI-37**

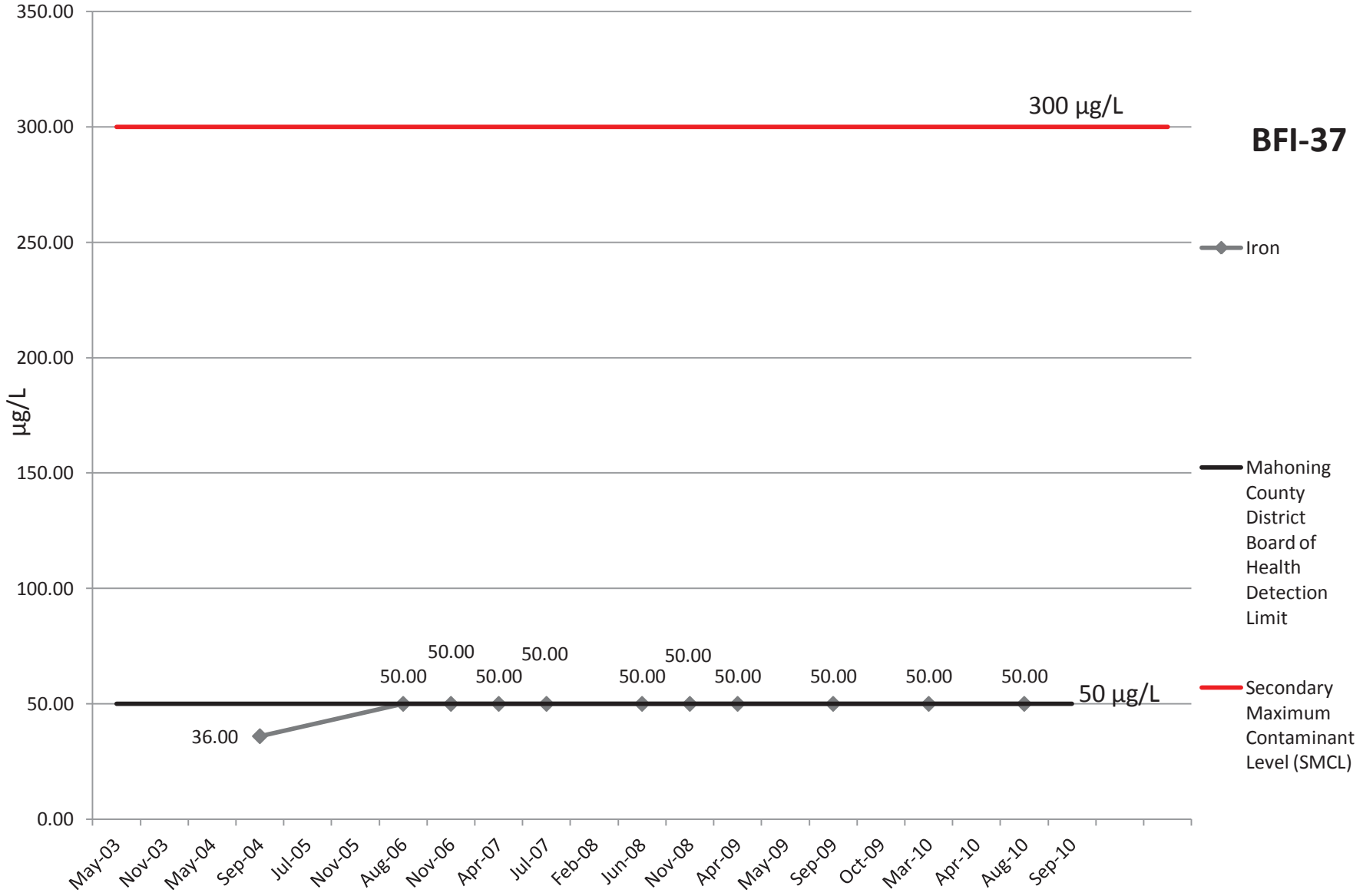




# Copper

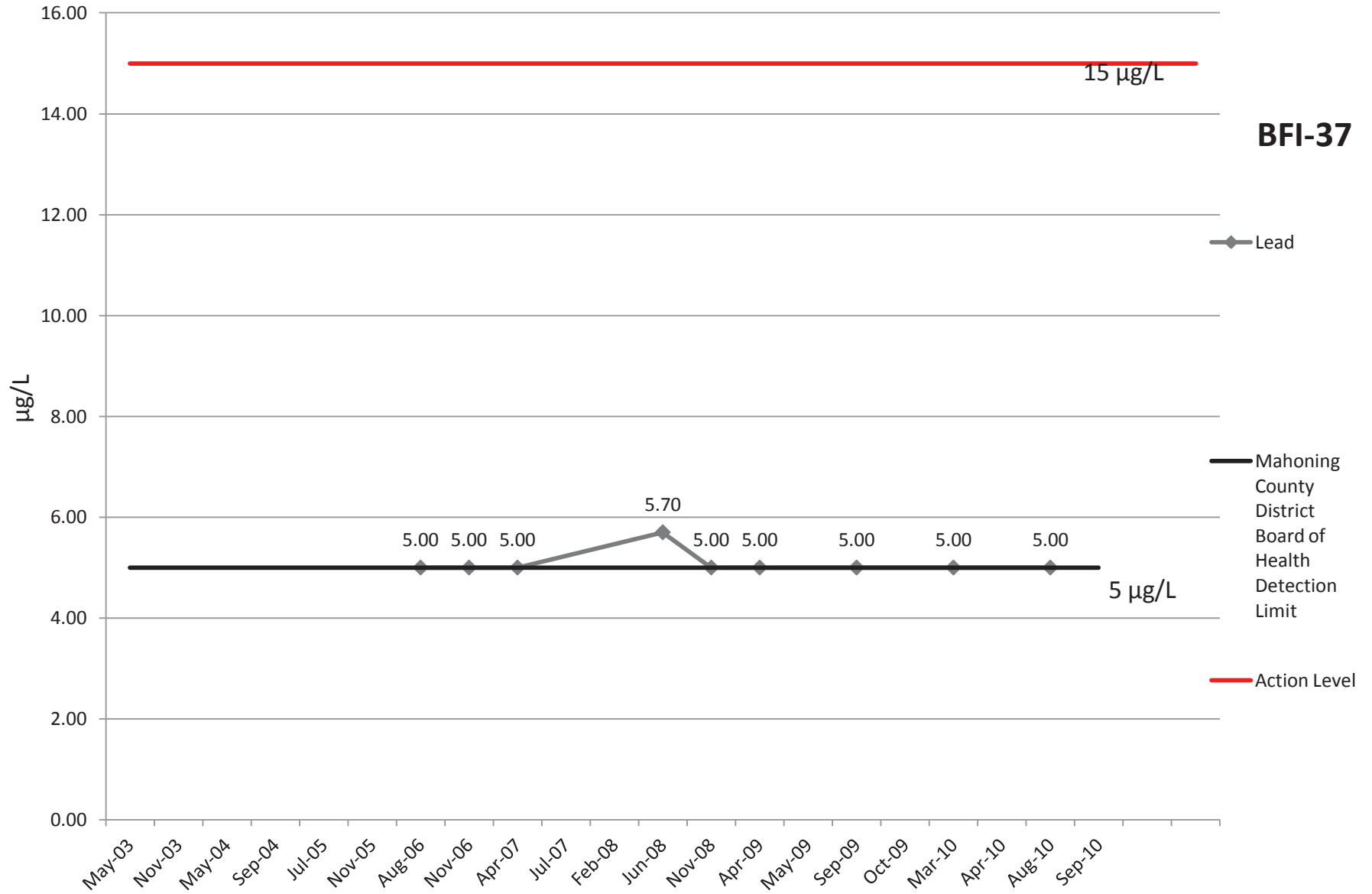


# Iron



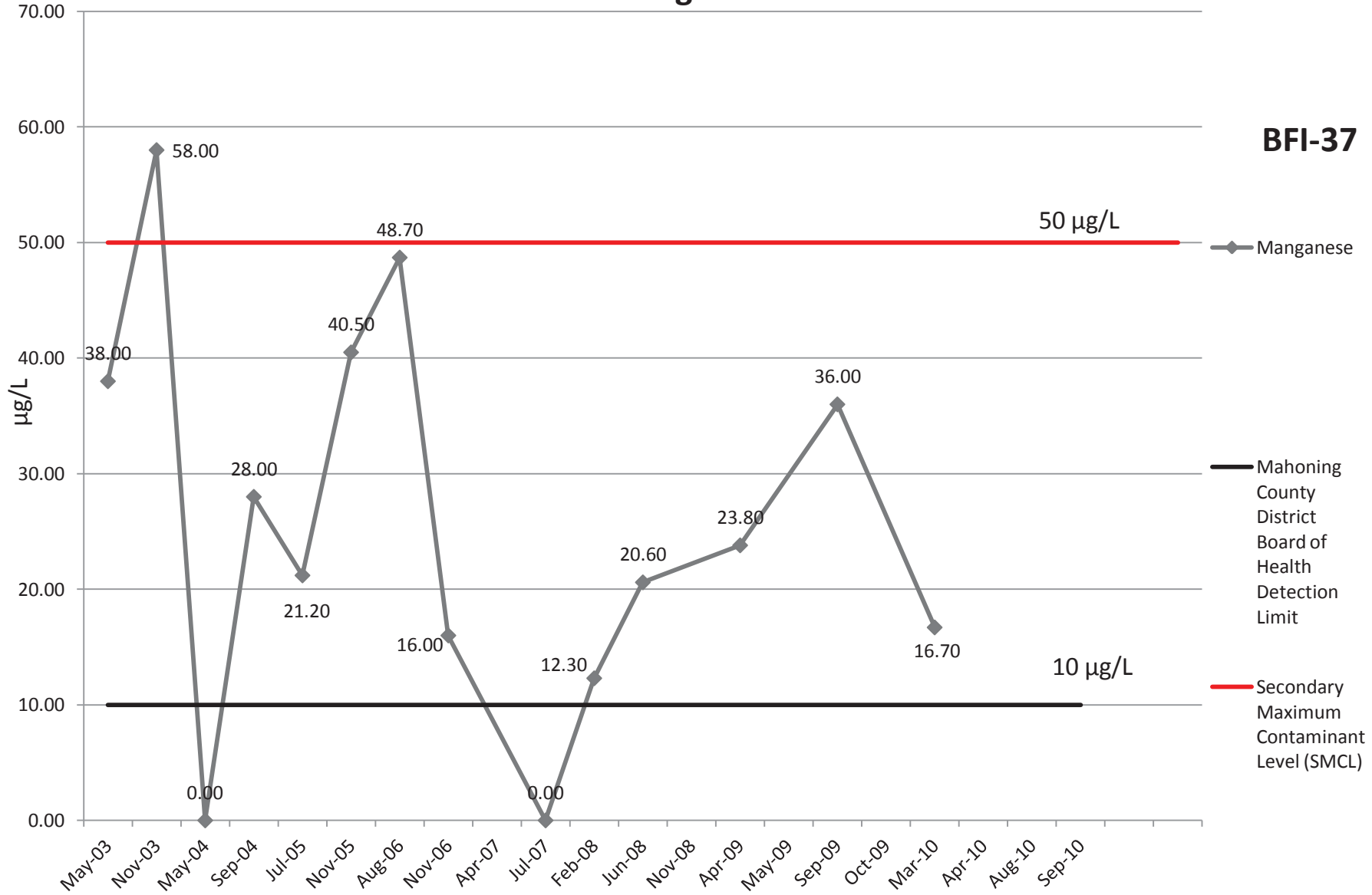
# Lead

**BFI-37**



# Manganese

**BFI-37**

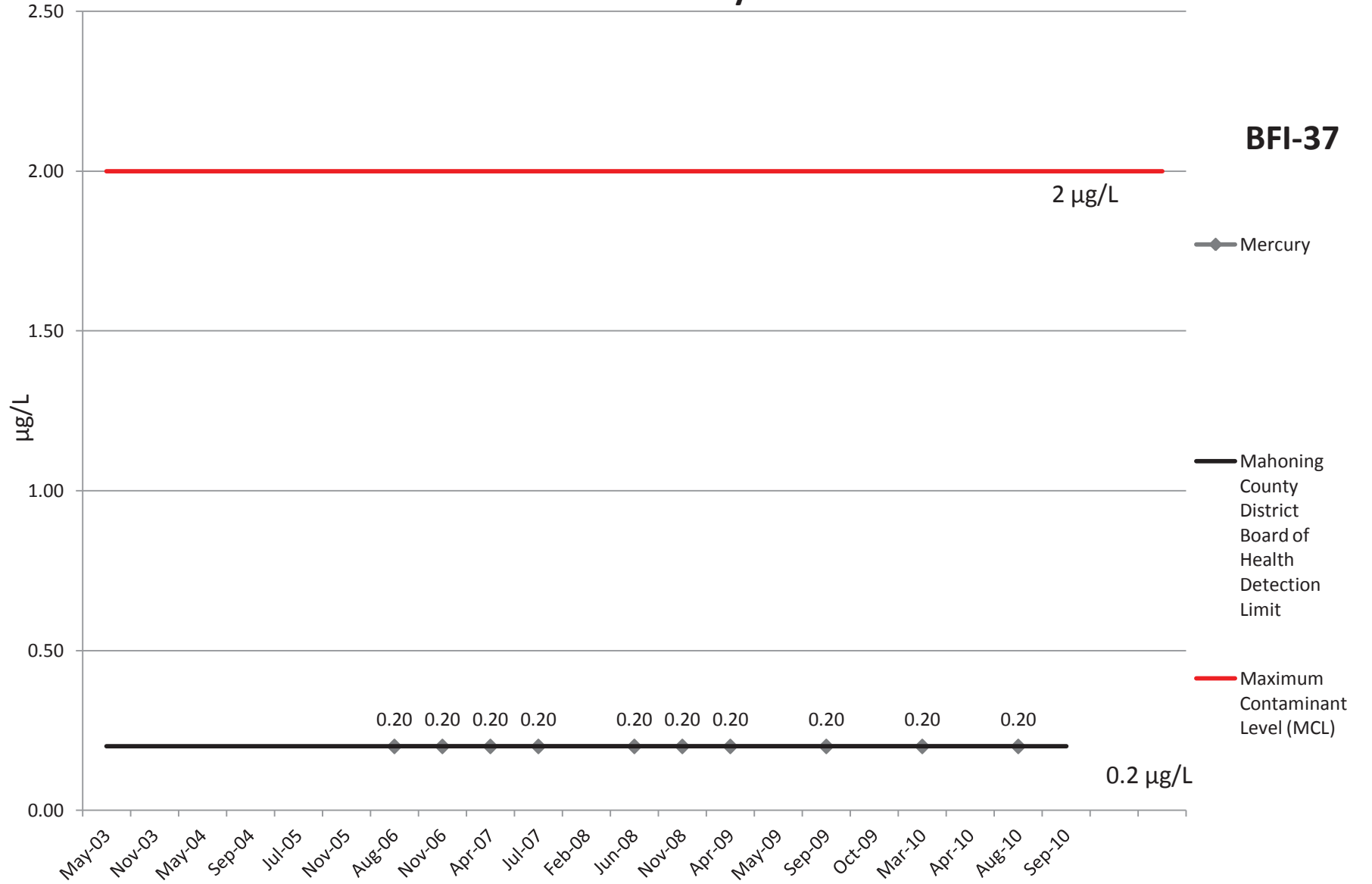


# Mercury

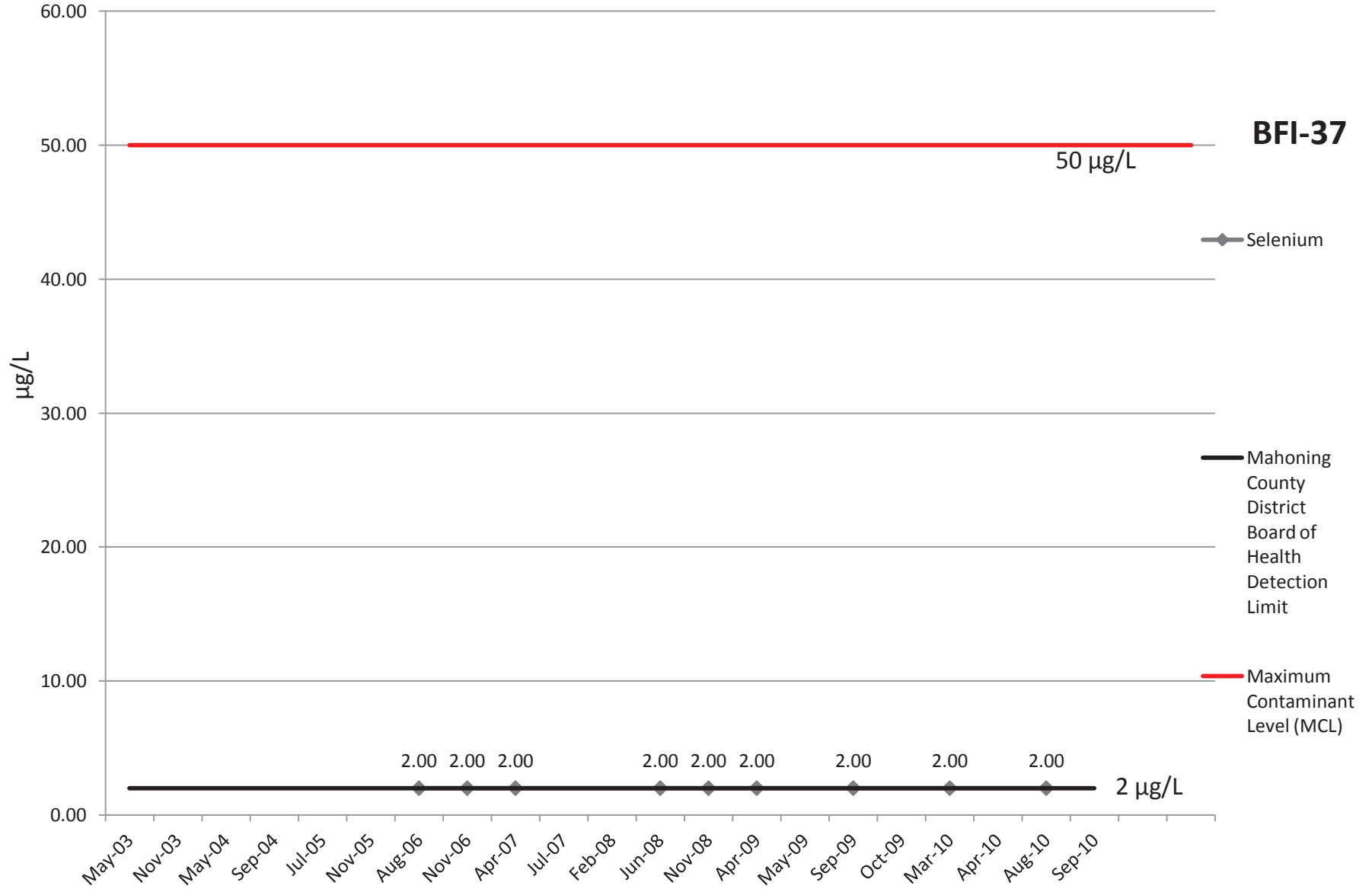
**BFI-37**

2 µg/L

0.2 µg/L

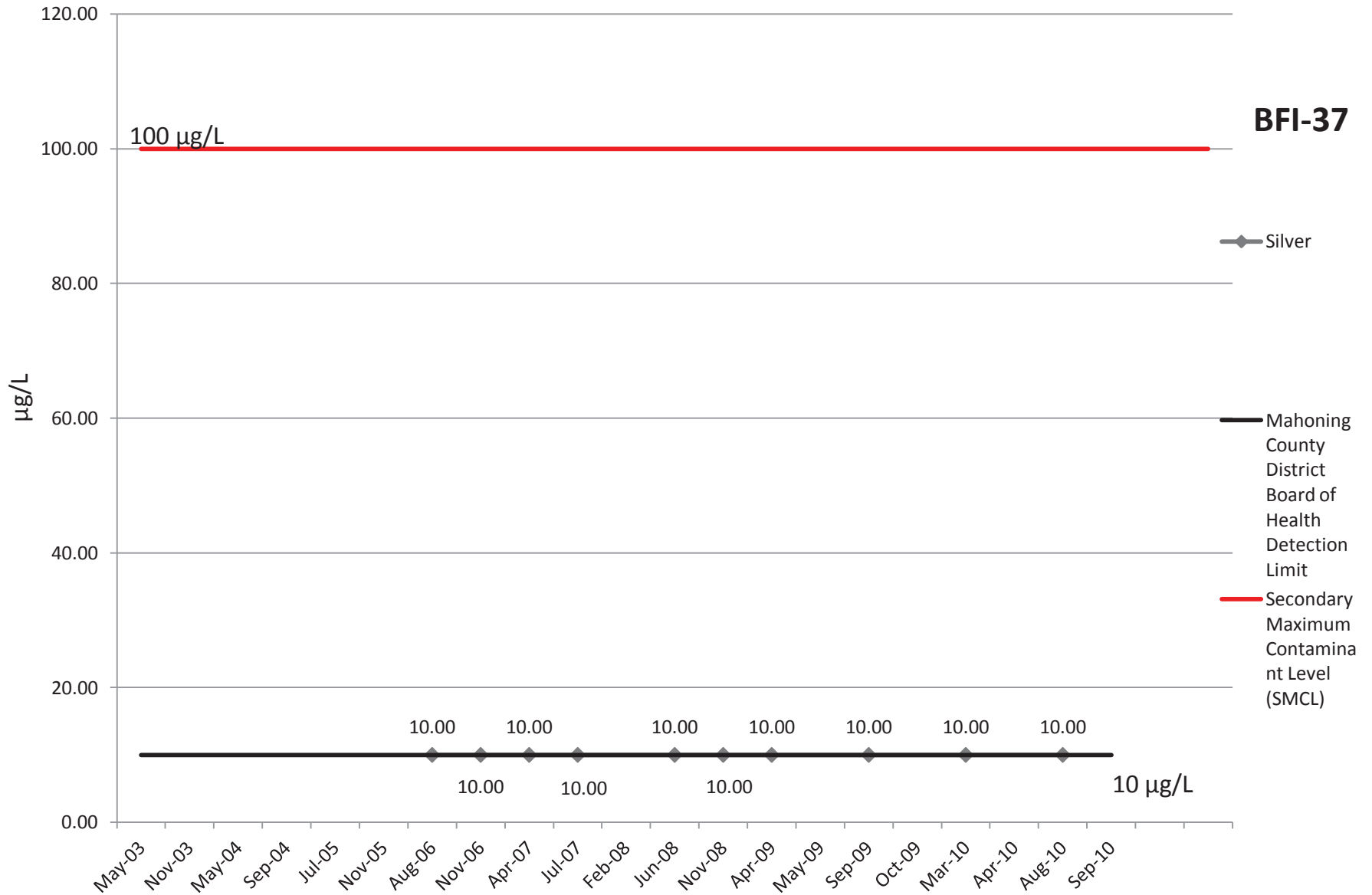


# Selenium

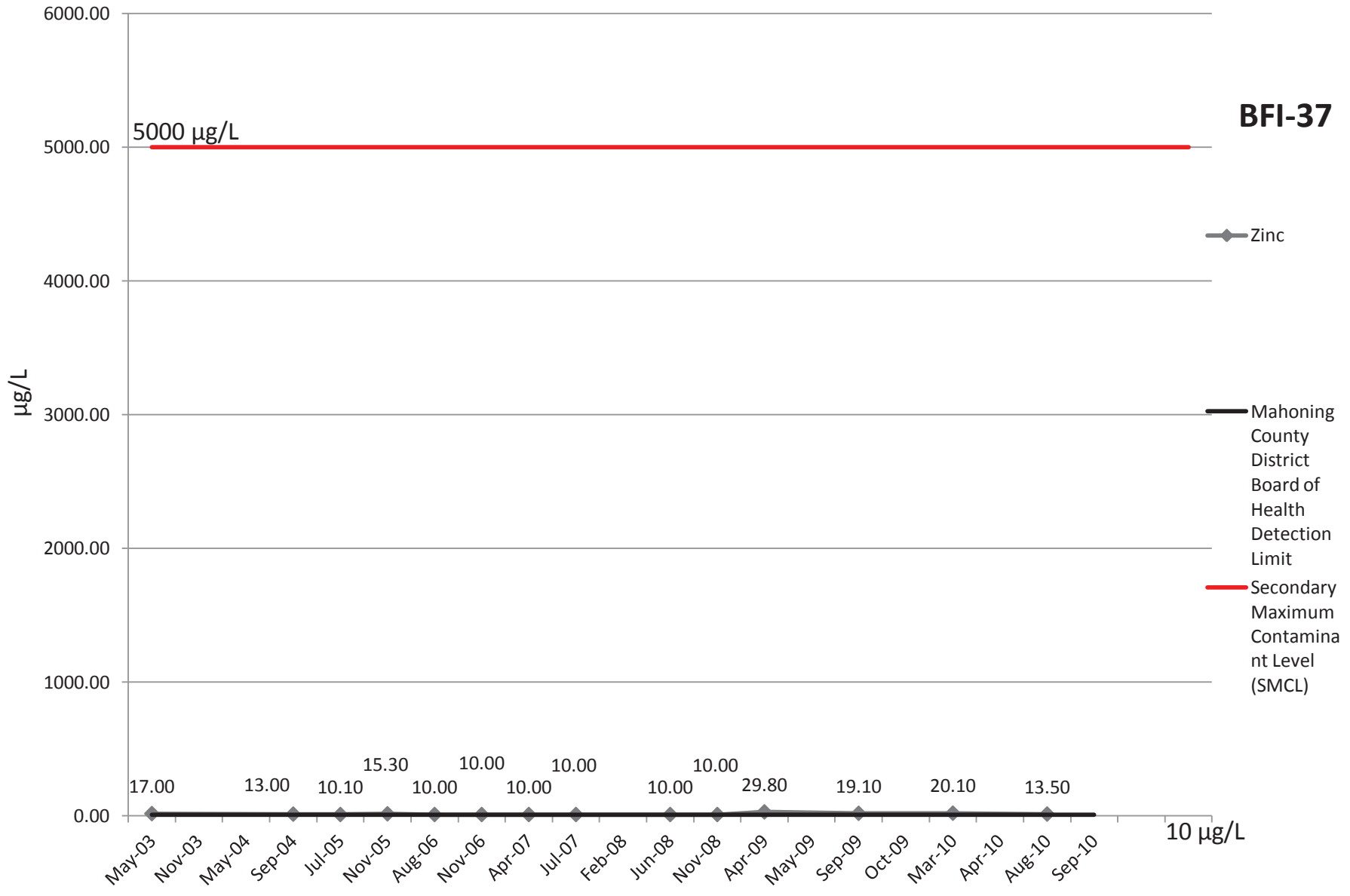


# Silver

**BFI-37**

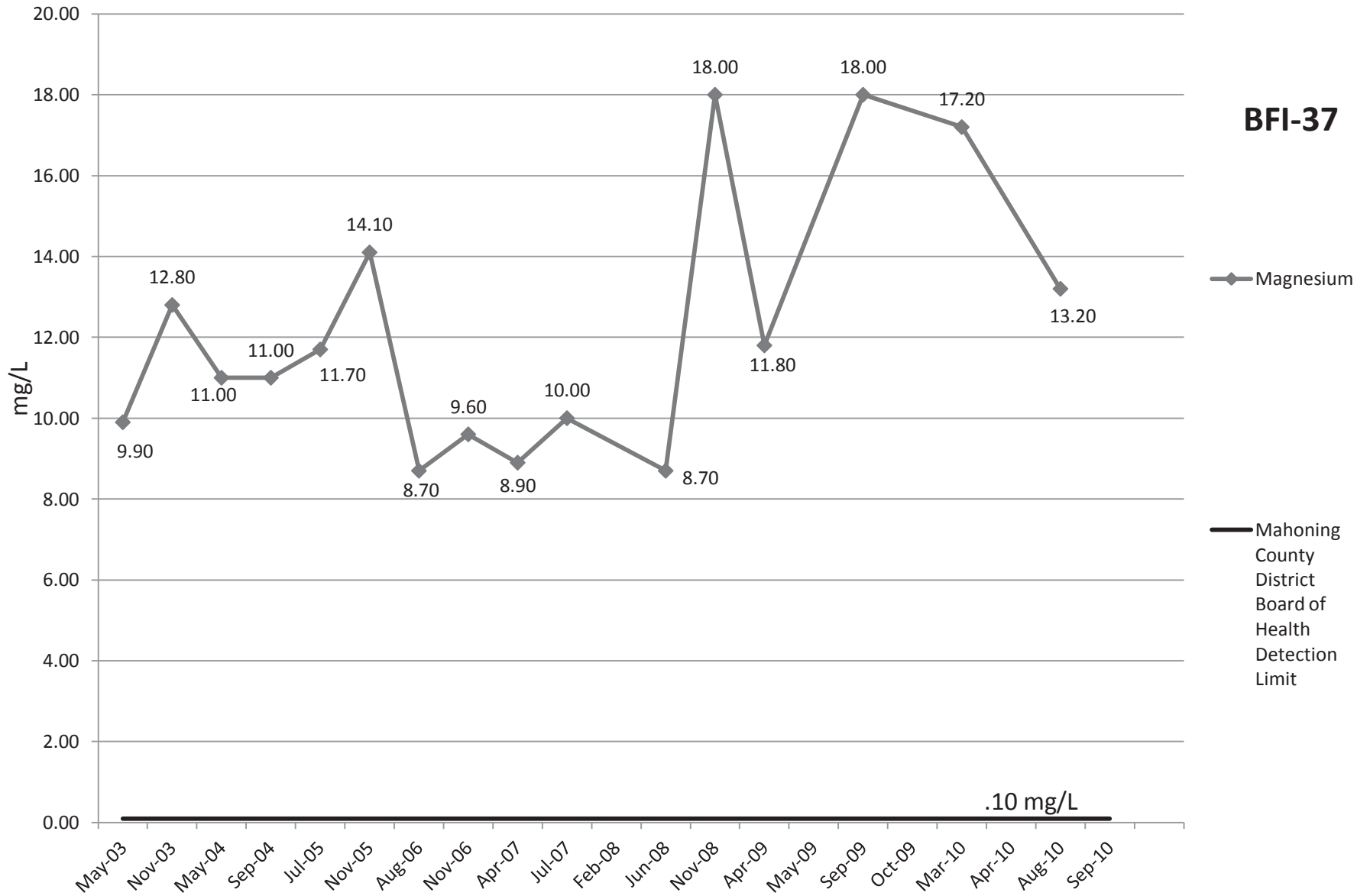


# Zinc



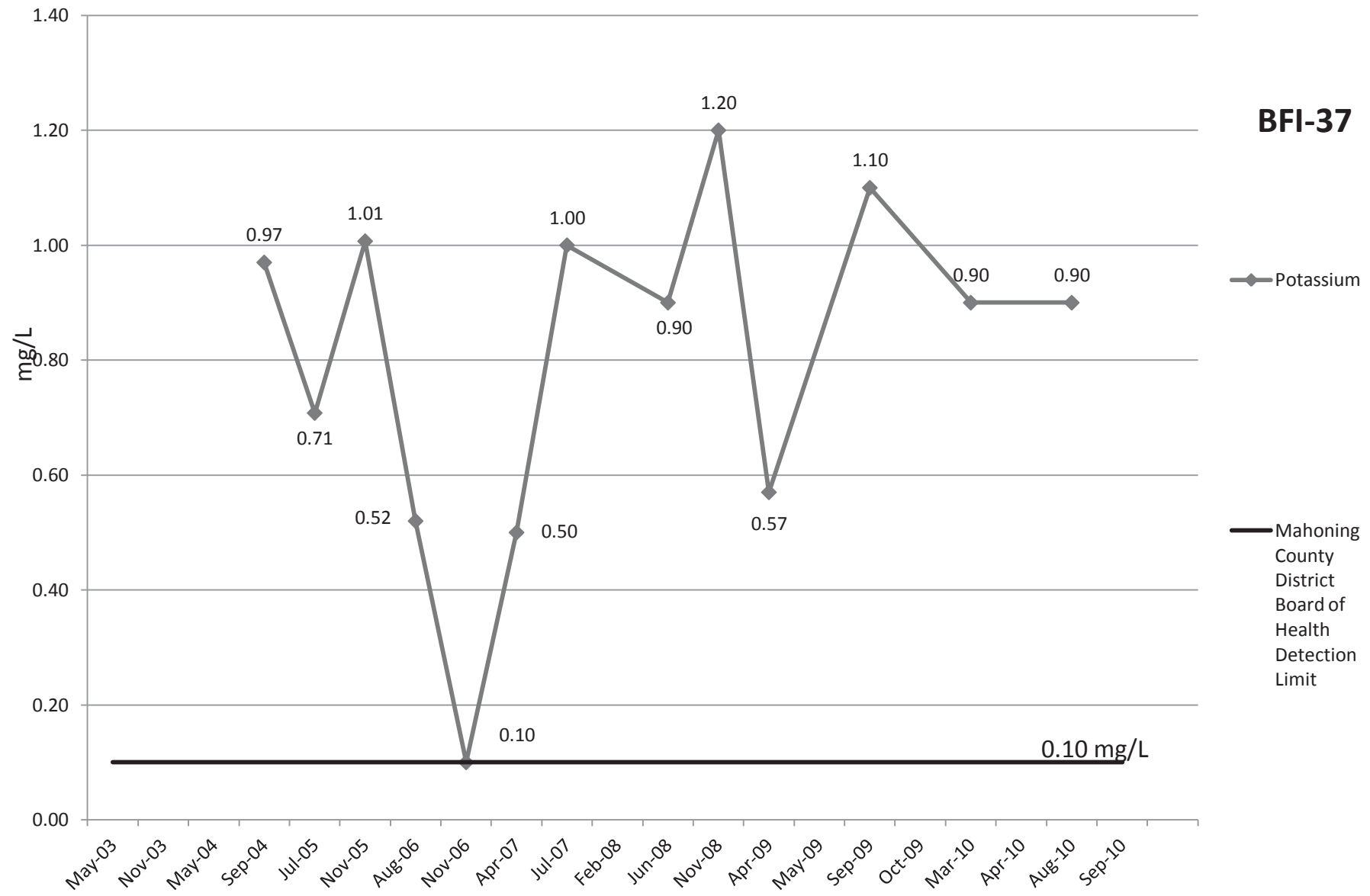


# Magnesium



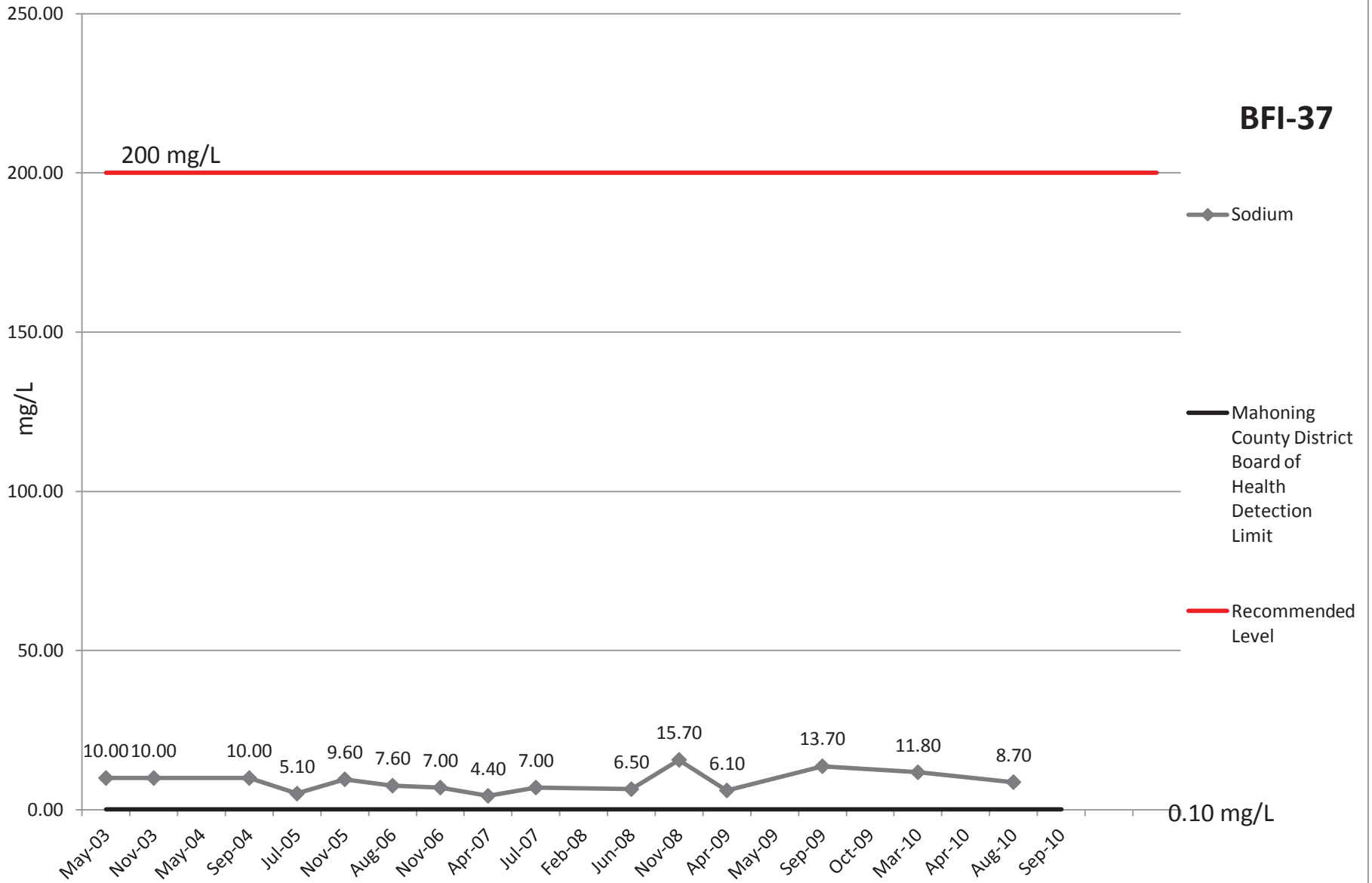
# Potassium

**BFI-37**



# Sodium

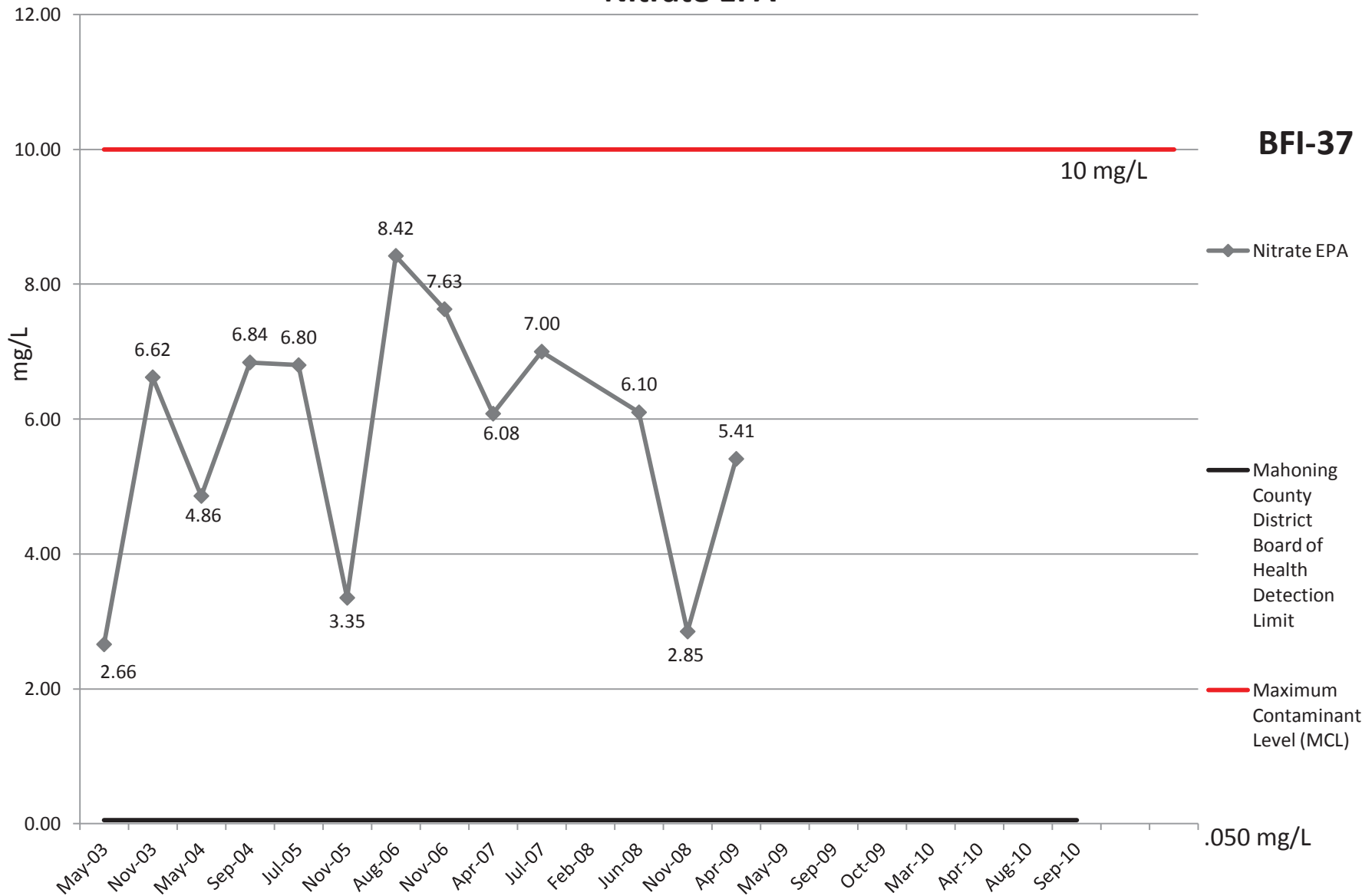
**BFI-37**



# Nitrate EPA

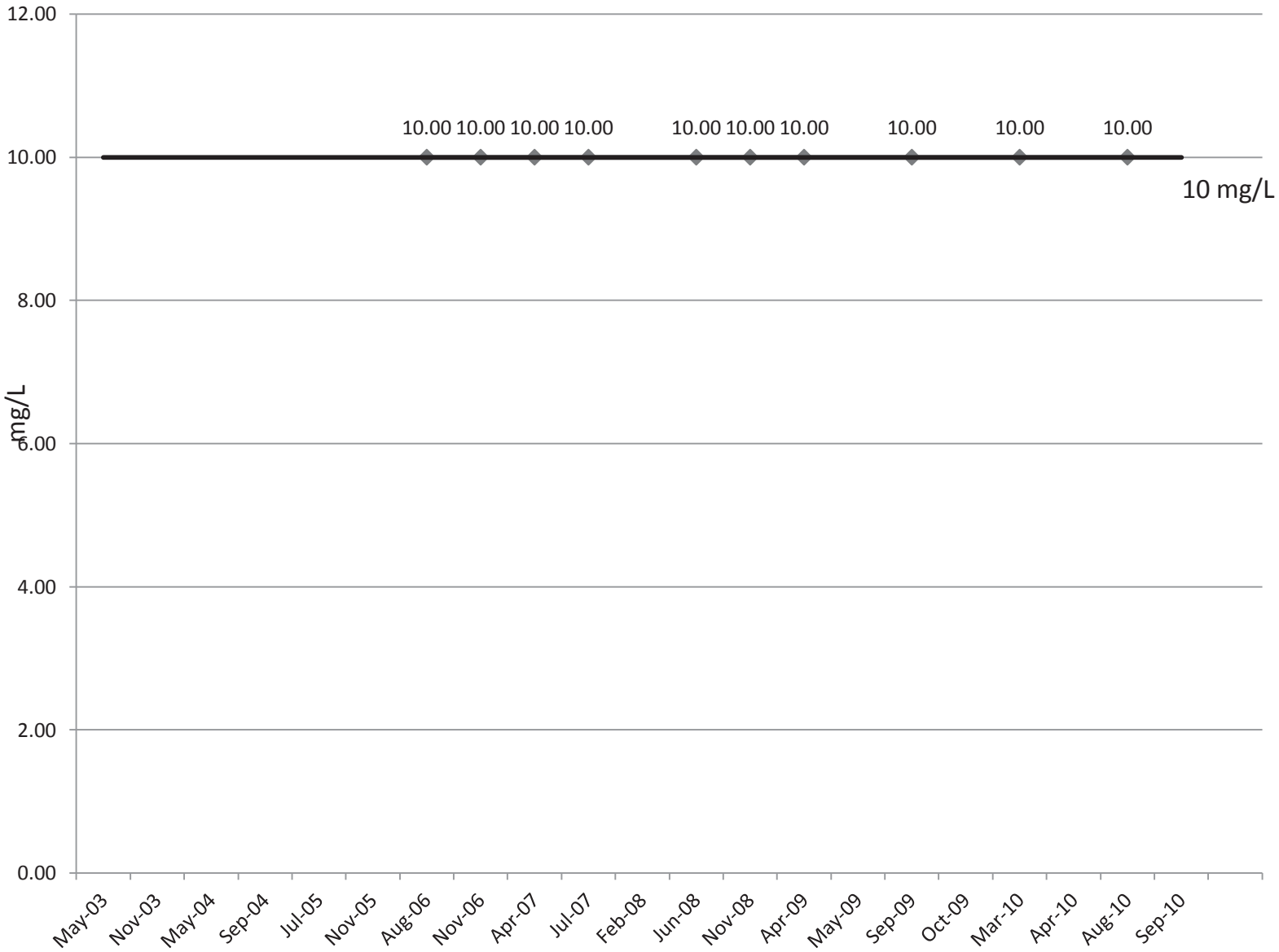
**BFI-37**

10 mg/L



# COD

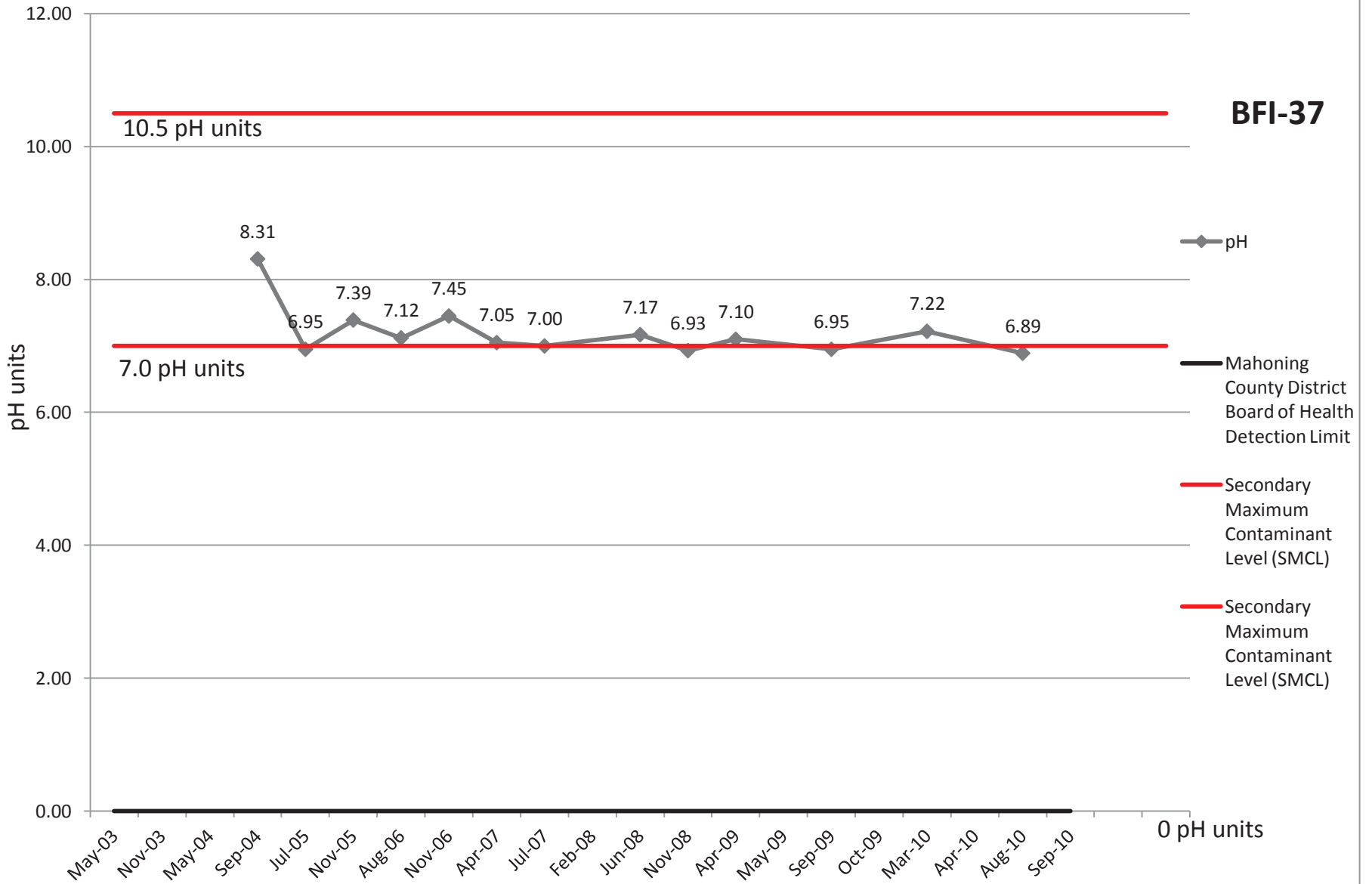
**BFI-37**



◆ COD

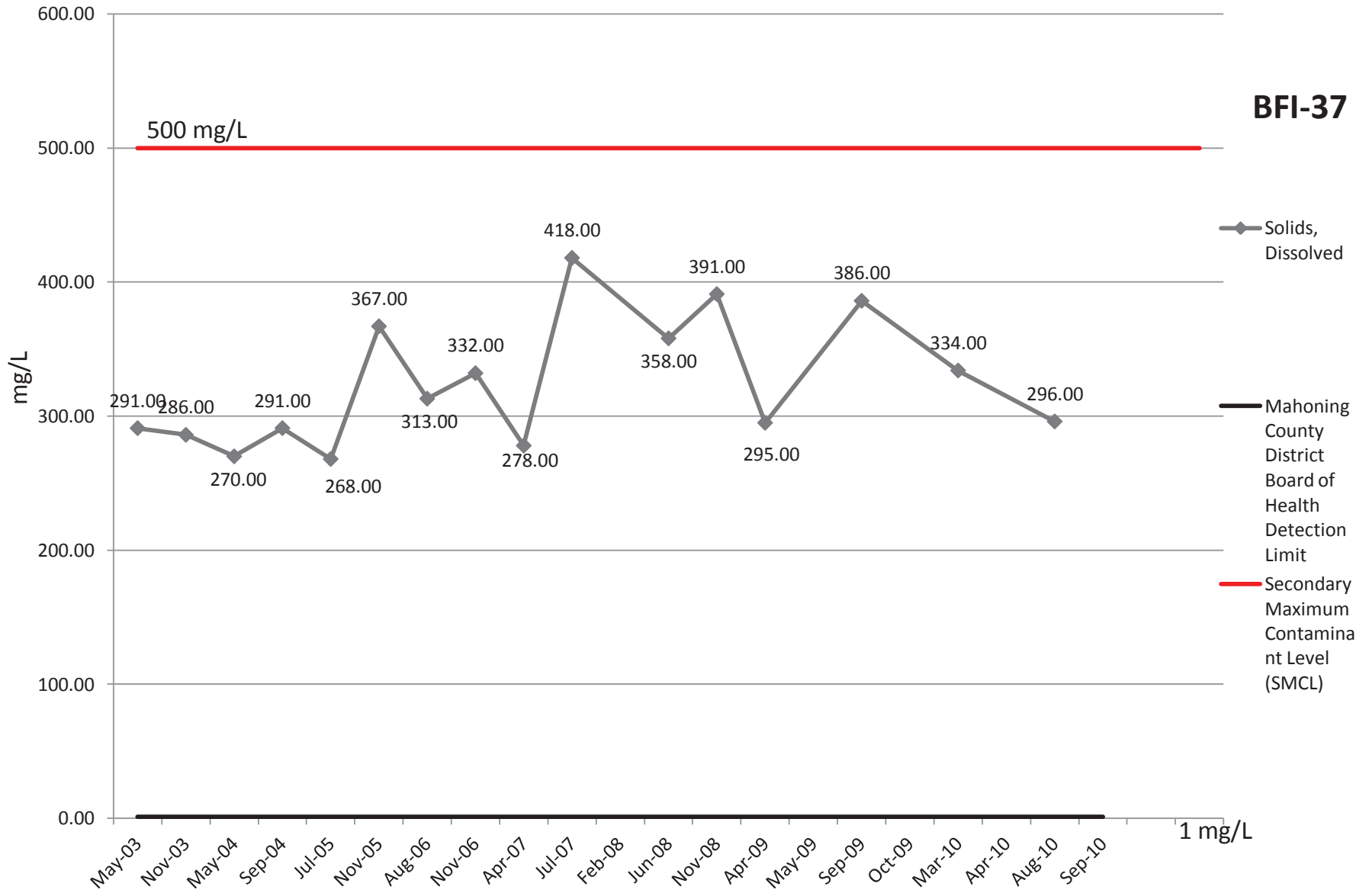
— Mahoning County District Board of Health Detection Limit

# pH



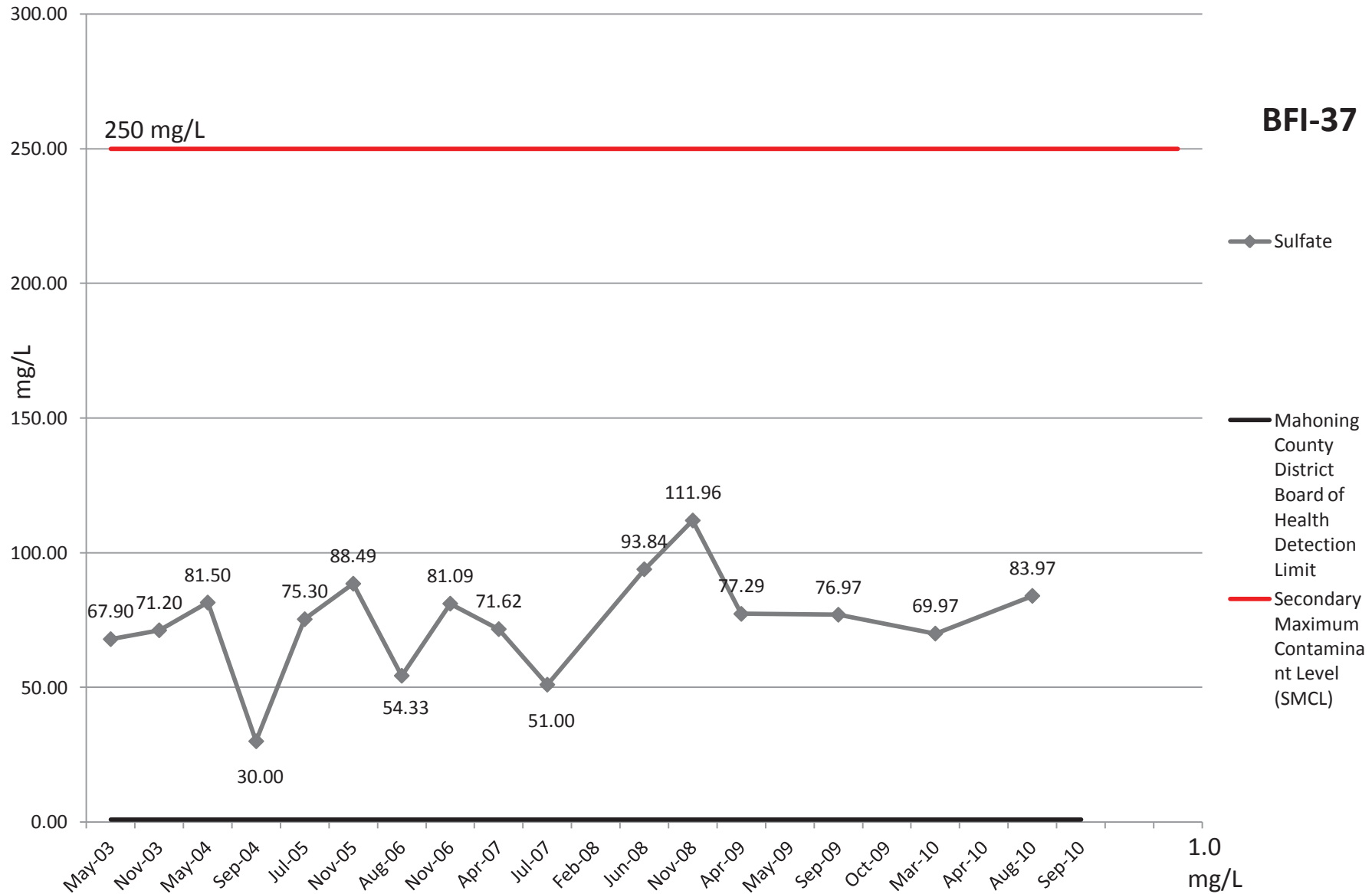
# Solids, Dissolved

**BFI-37**



# Sulfate

**BFI-37**





# Bacteria

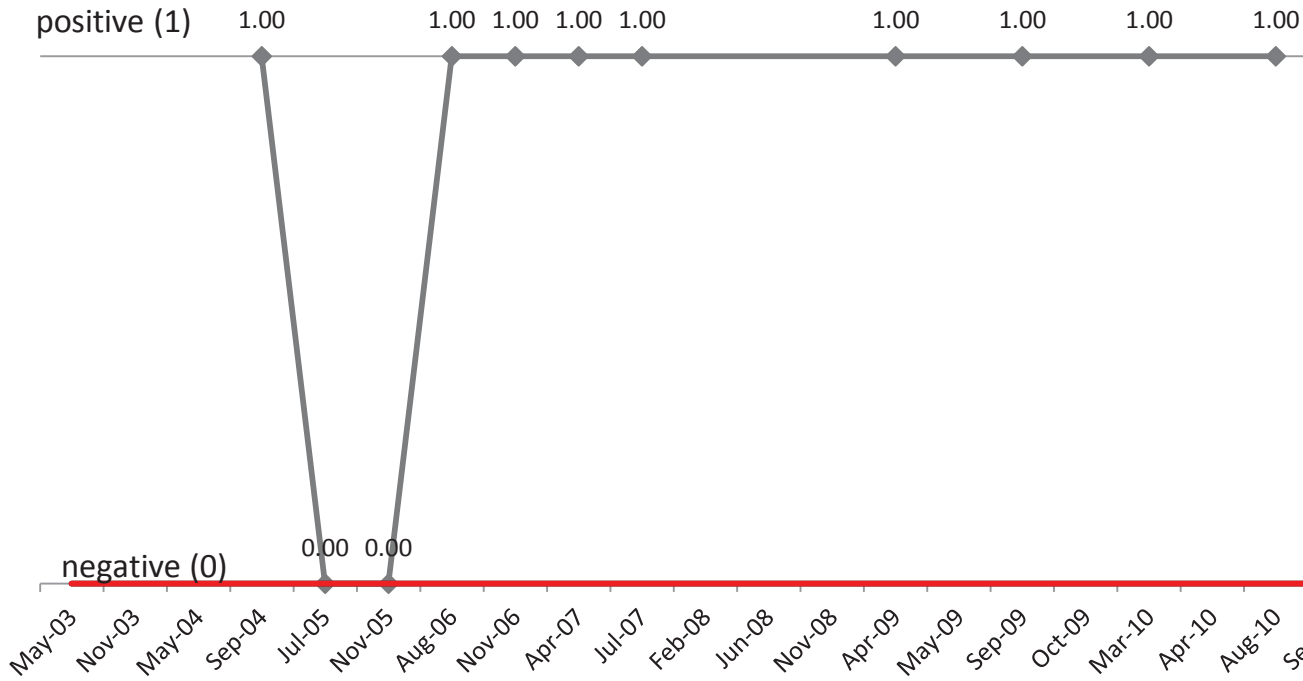
**BFI-37**

Positive/Negative

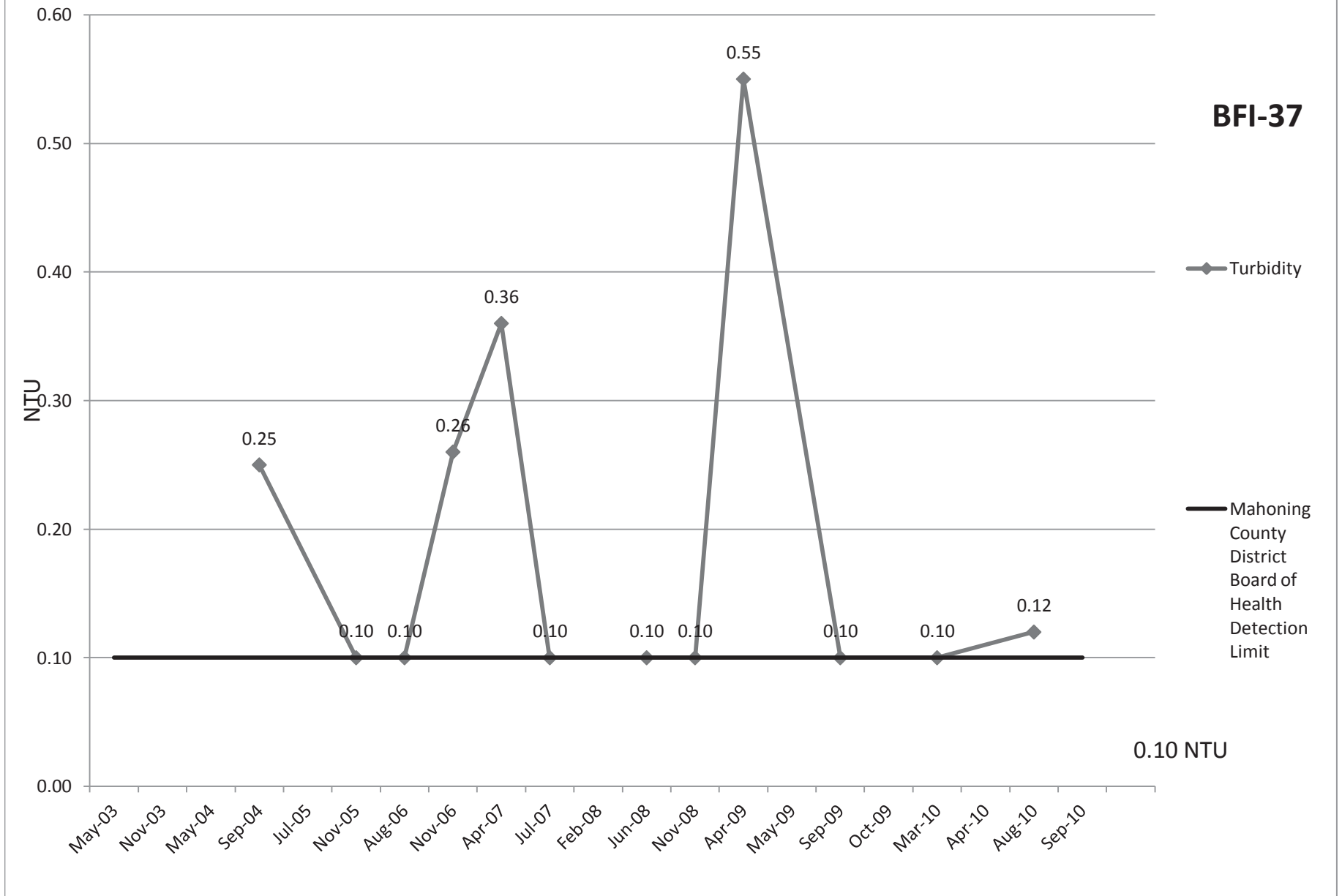
◆ Bacteria

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

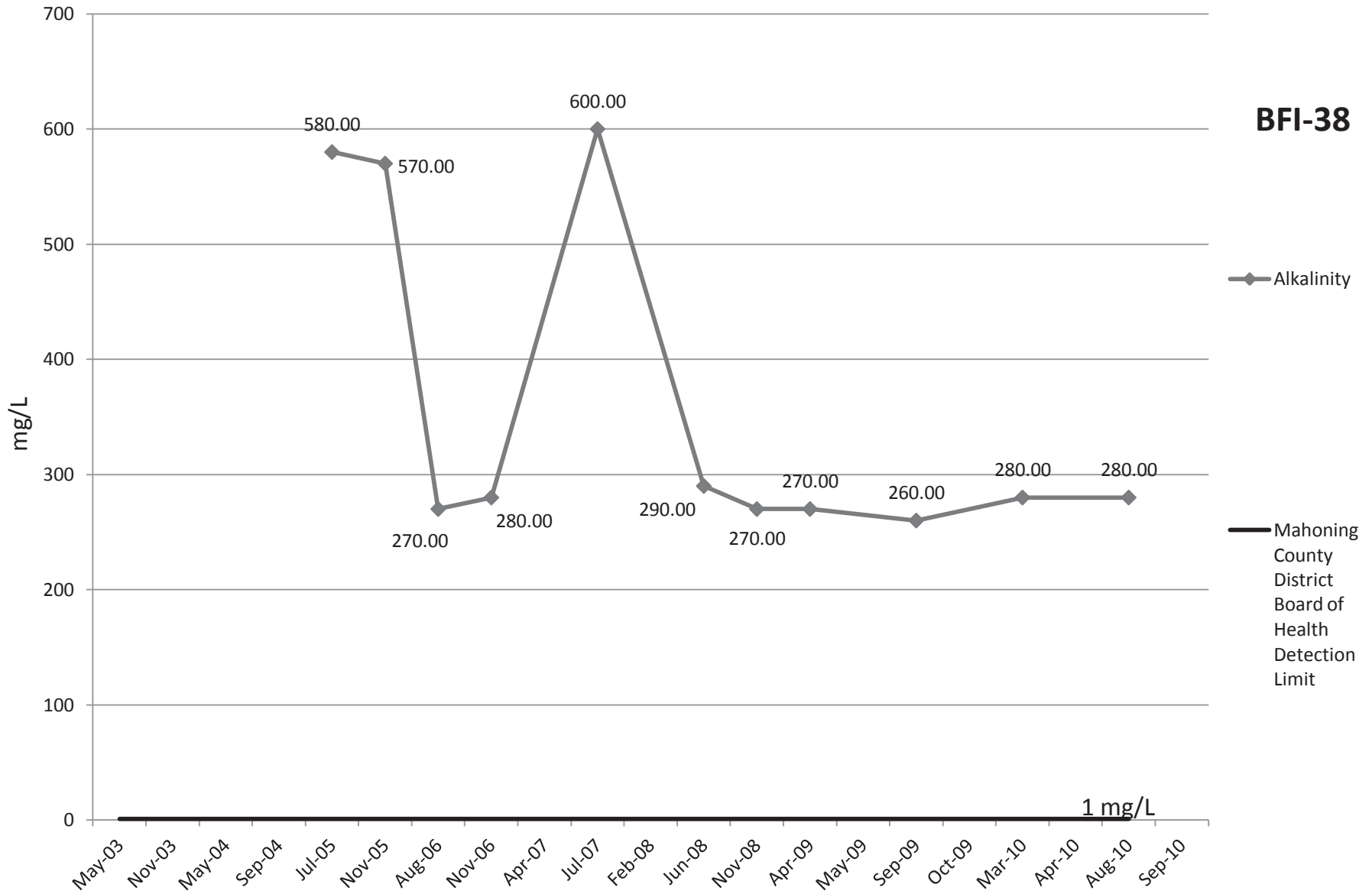


# Turbidity

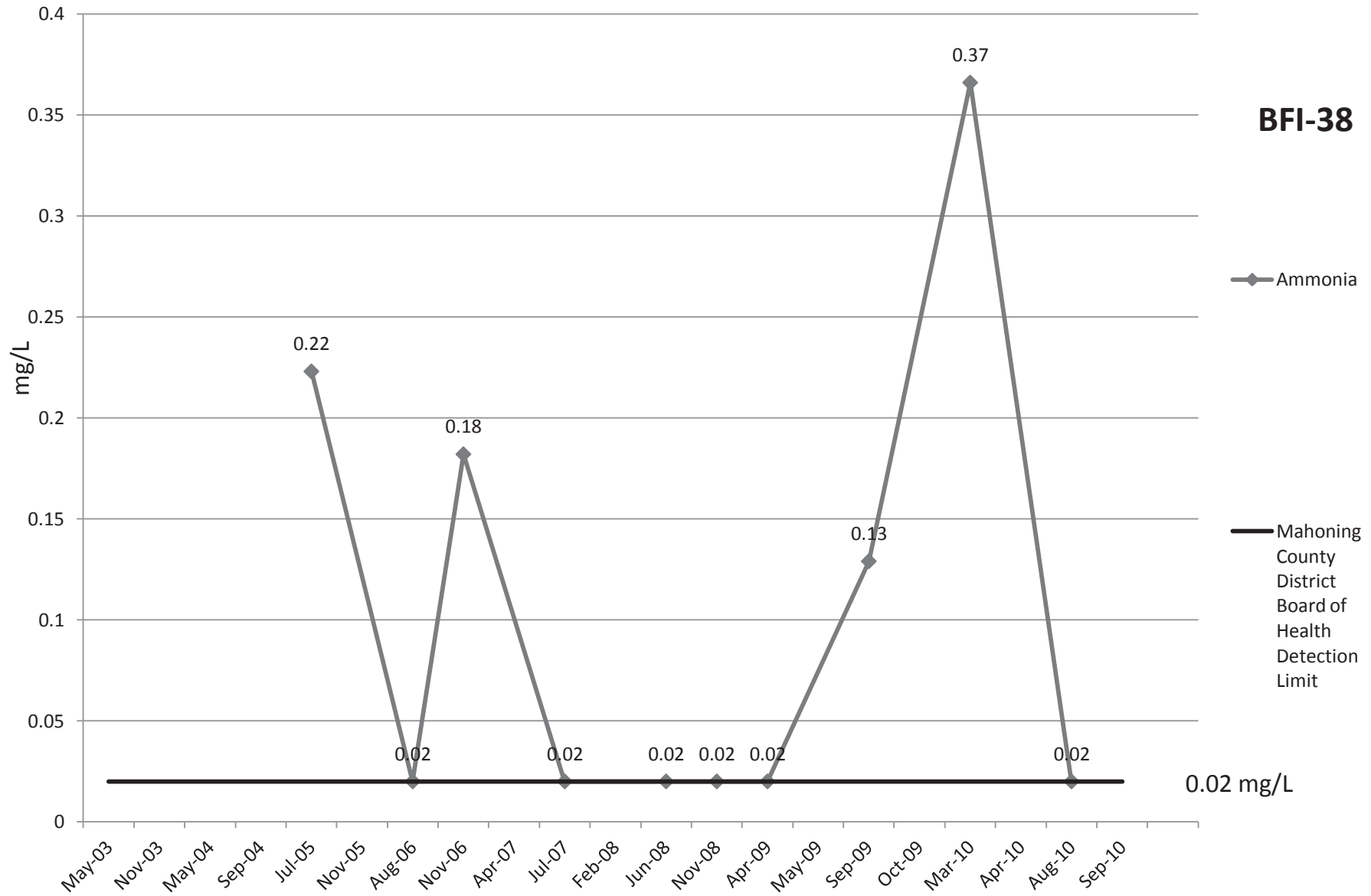


# Alkalinity

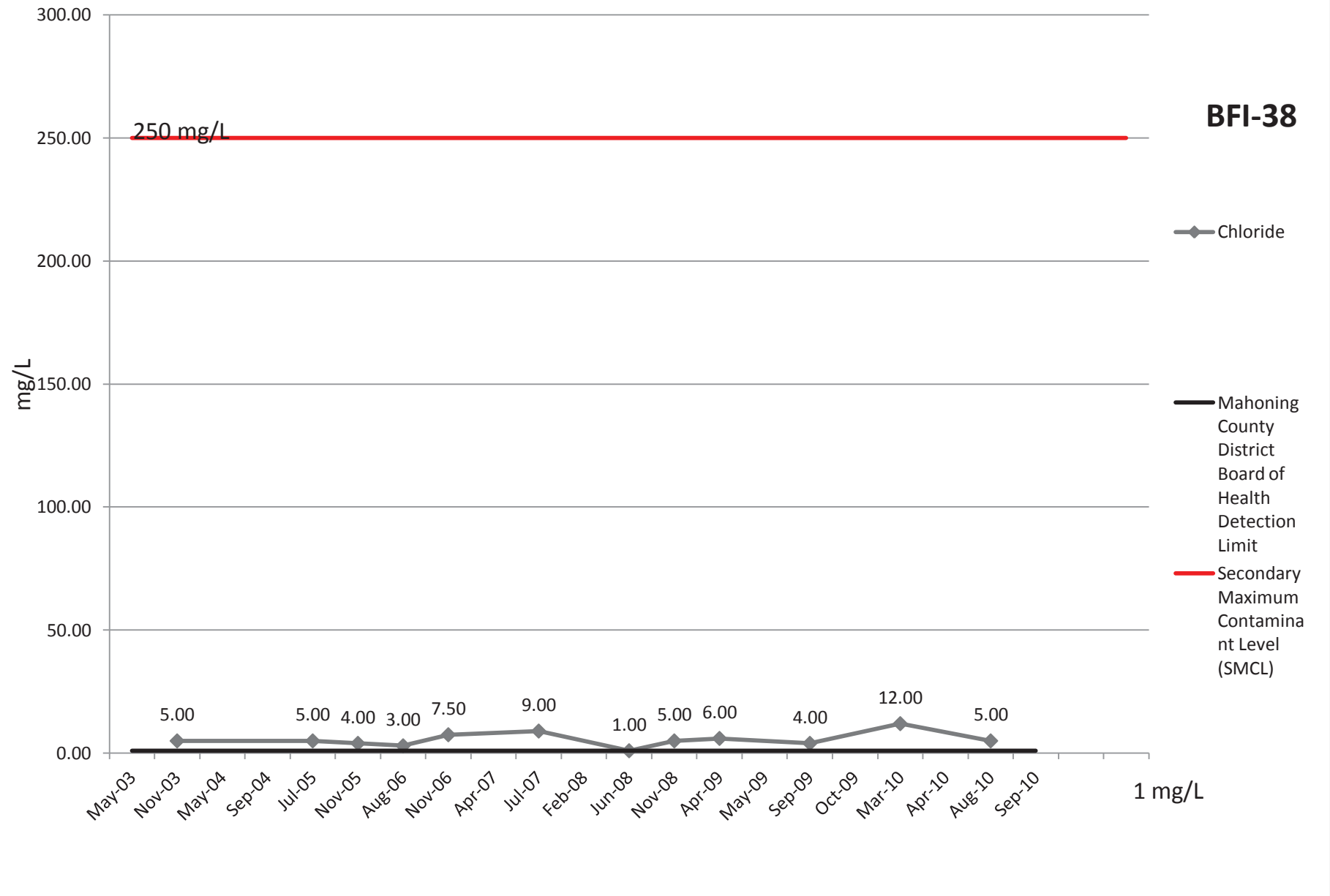
**BFI-38**



# Ammonia

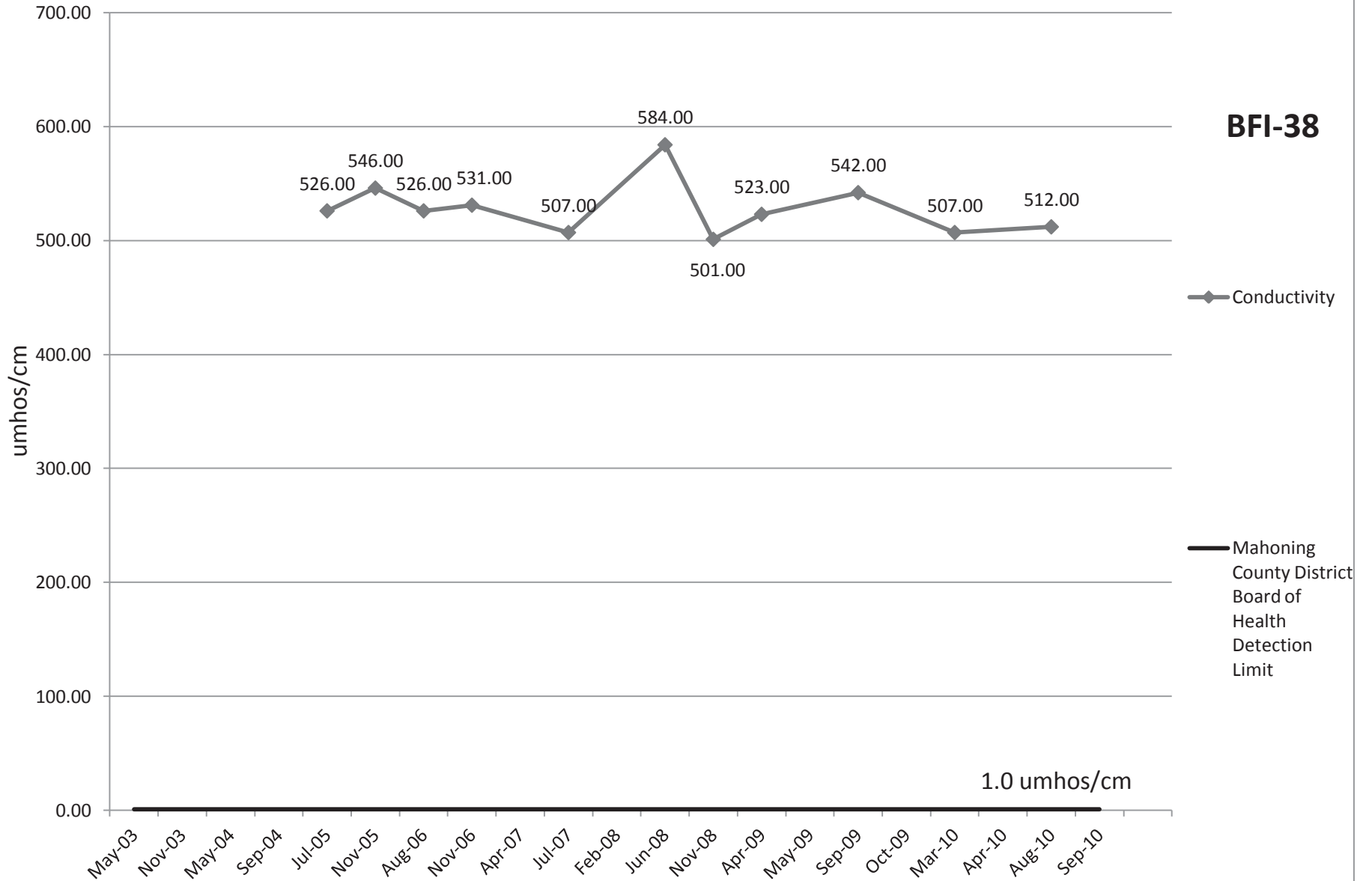


# Chloride

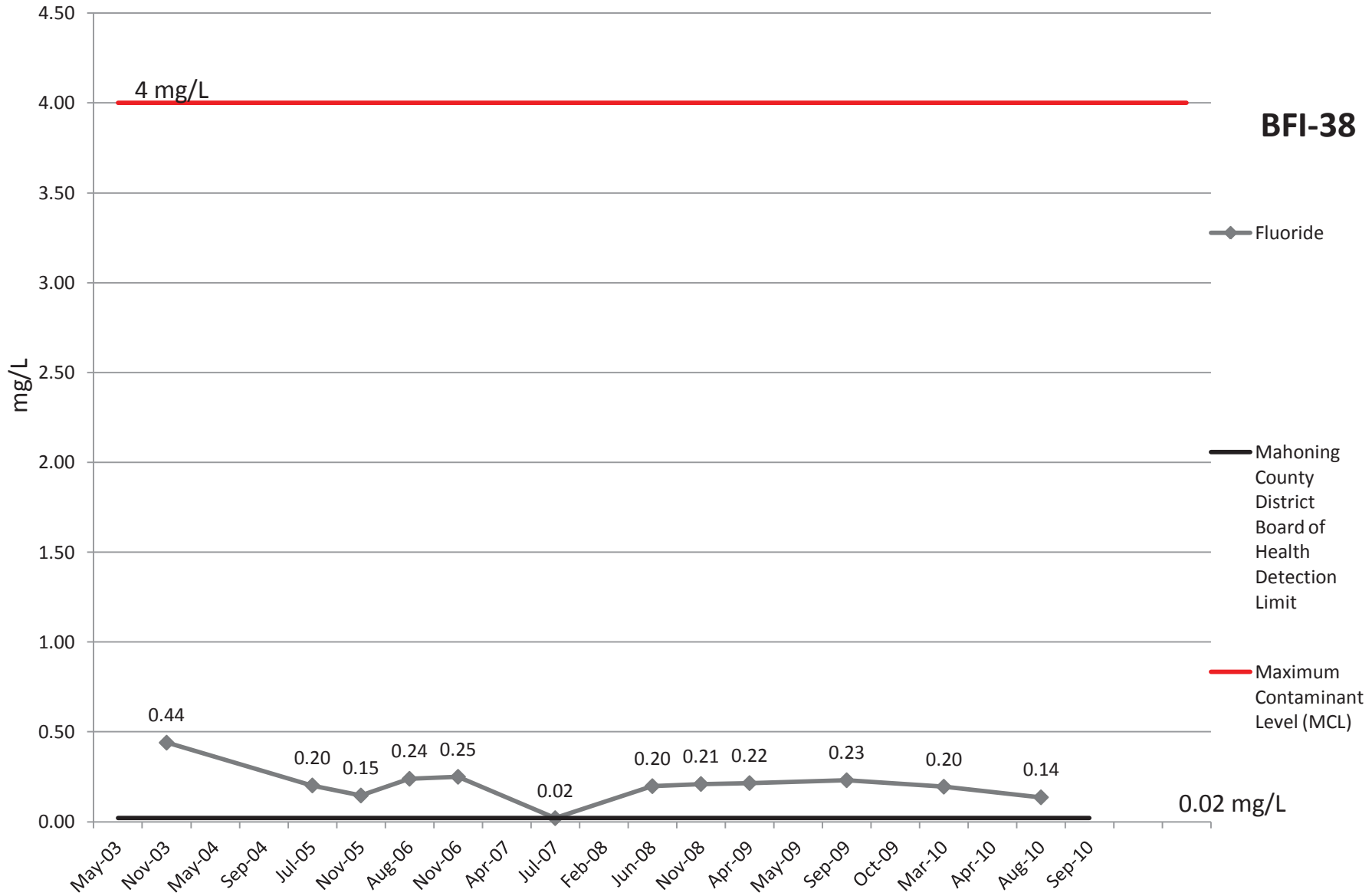


# Conductivity

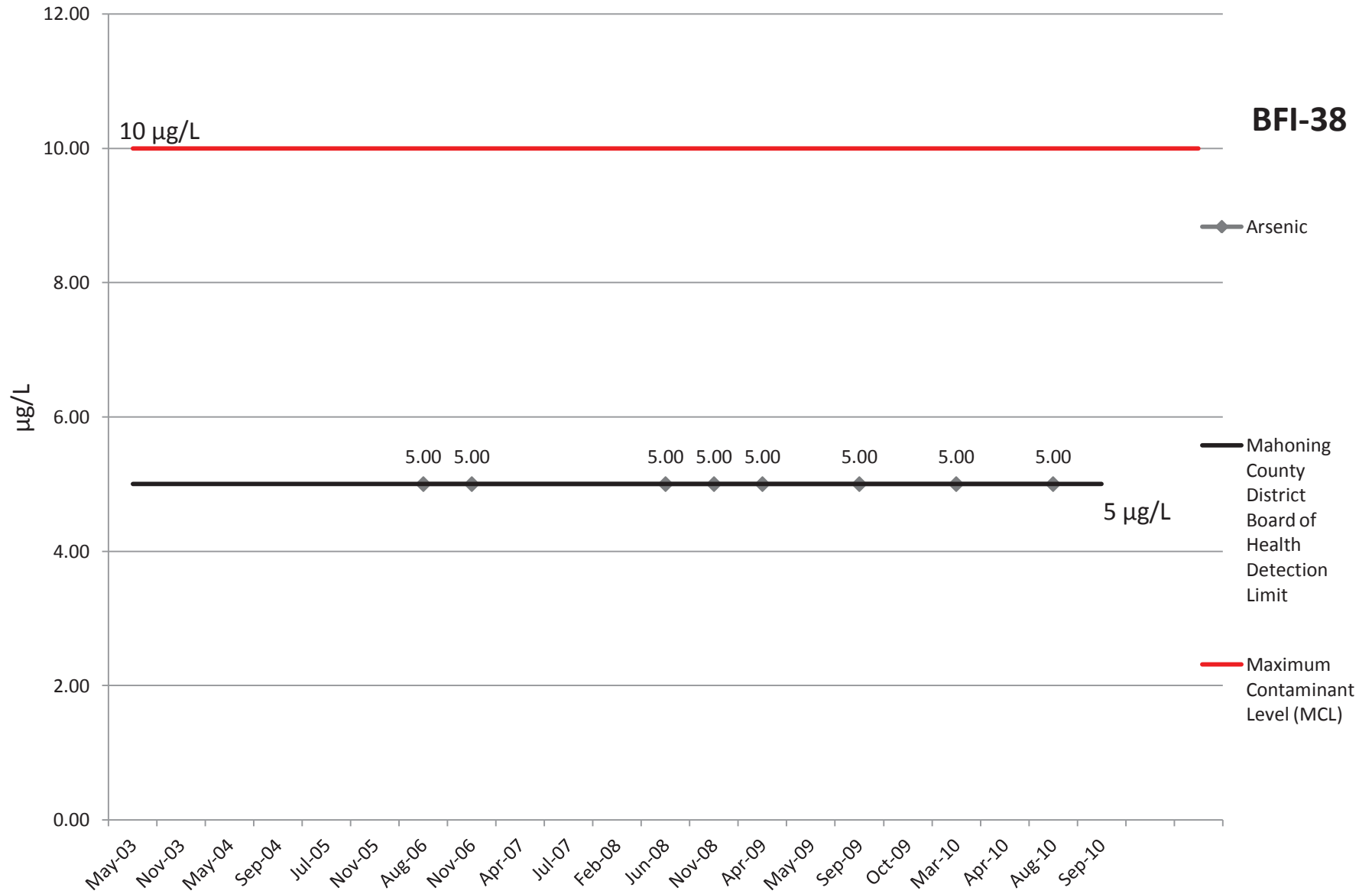
**BFI-38**



# Fluoride



# Arsenic



**BFI-38**

◆ Arsenic

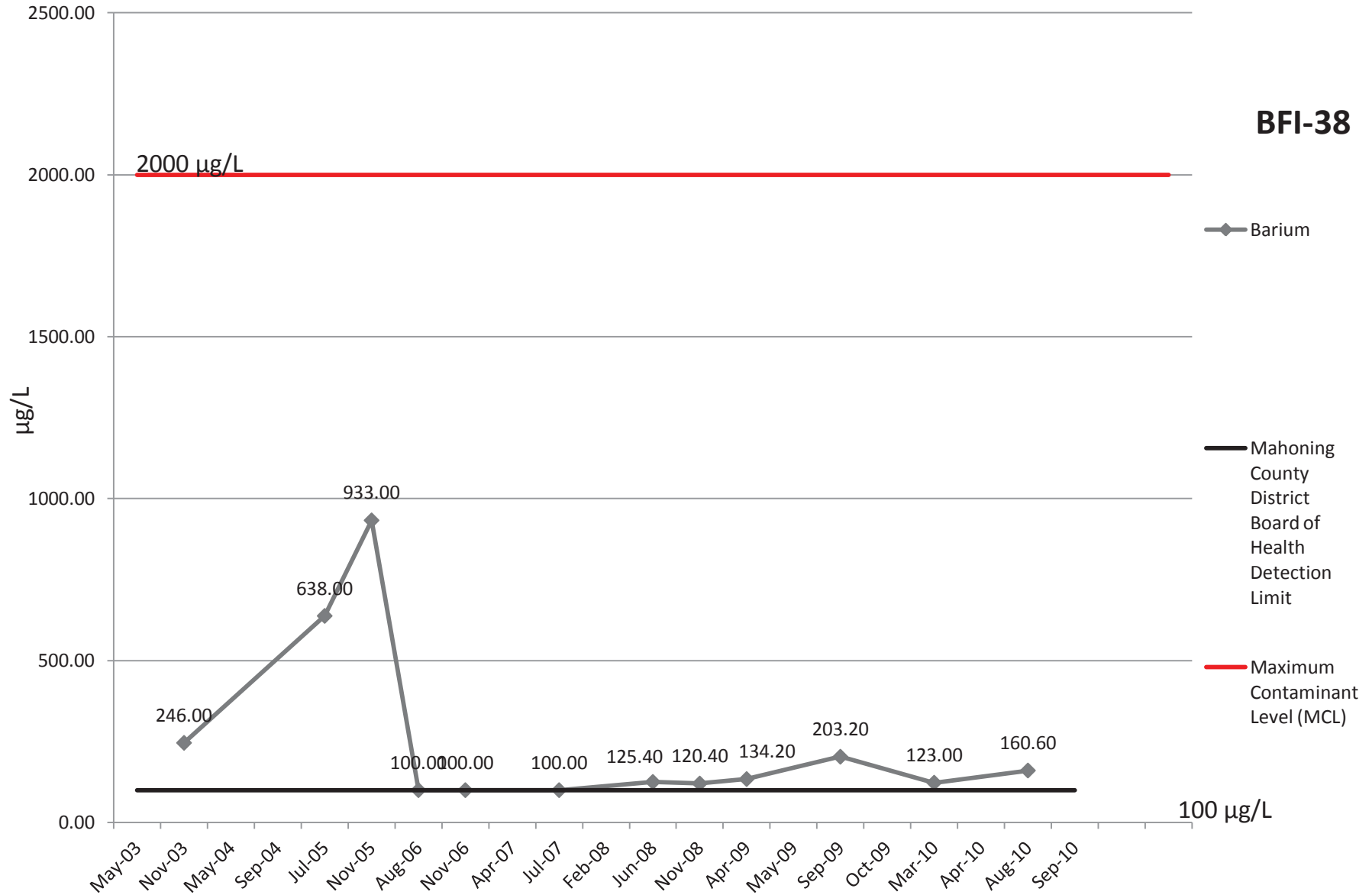
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)



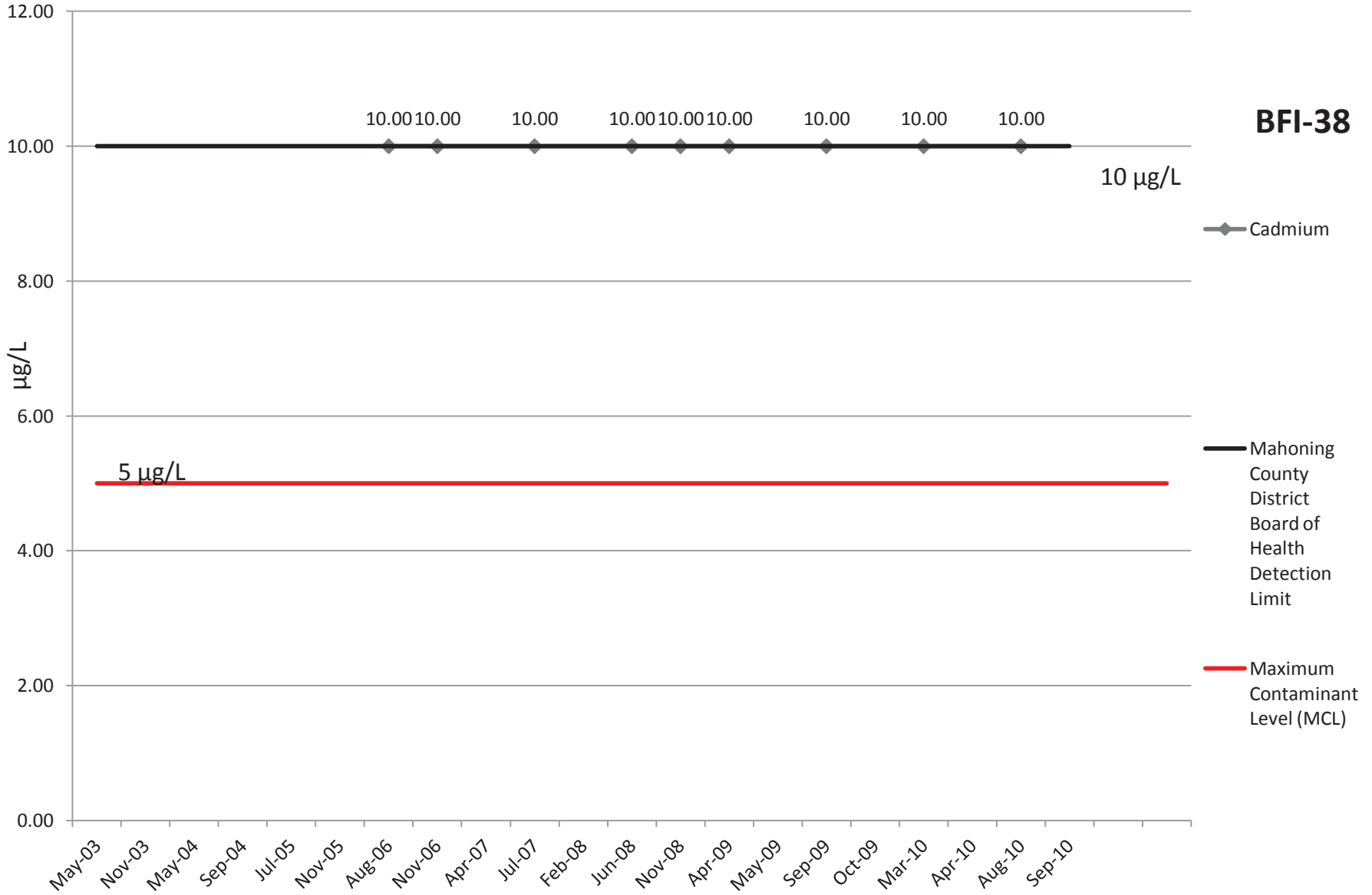
# Barium

**BFI-38**



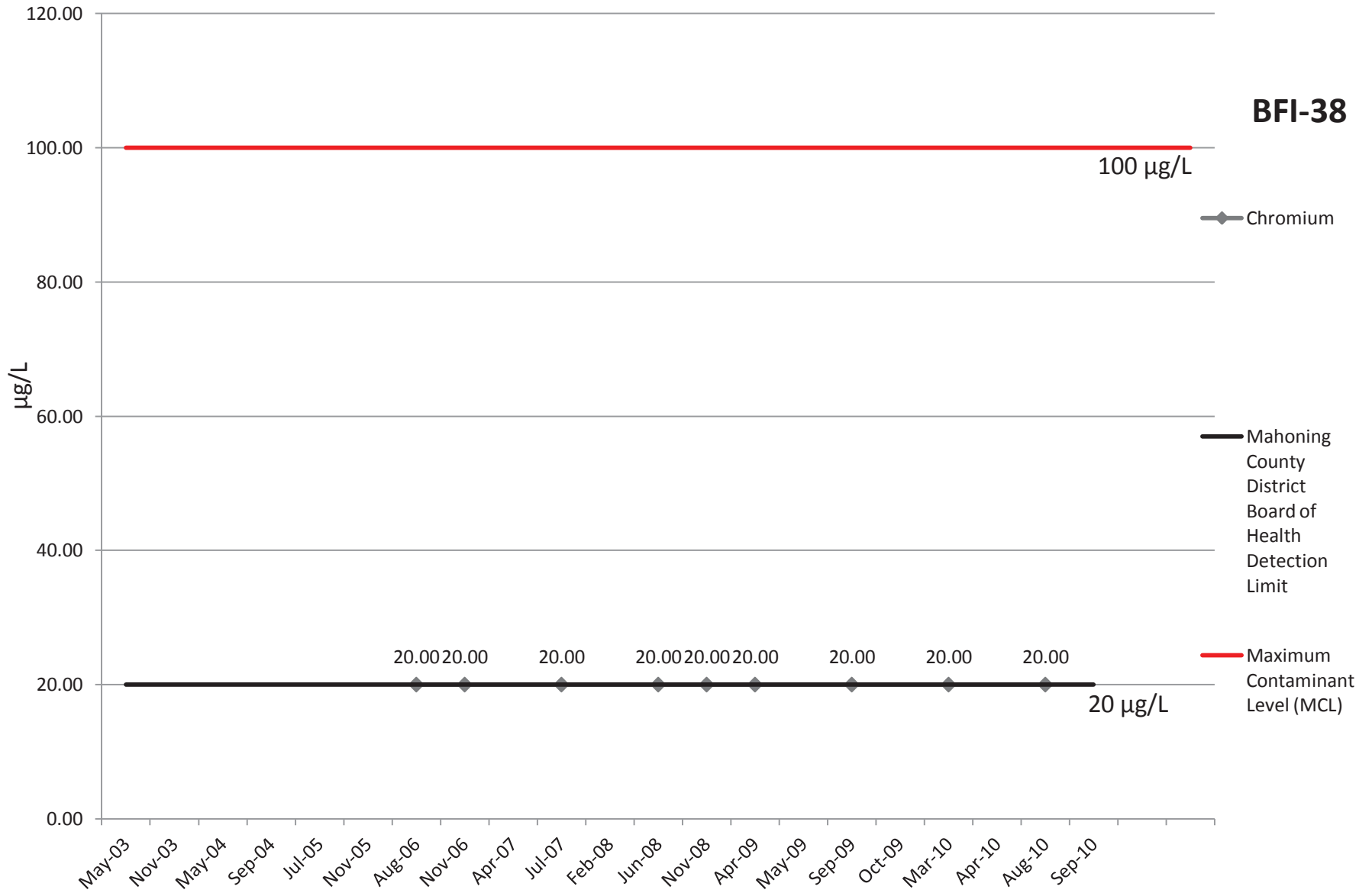
# Cadmium

**BFI-38**

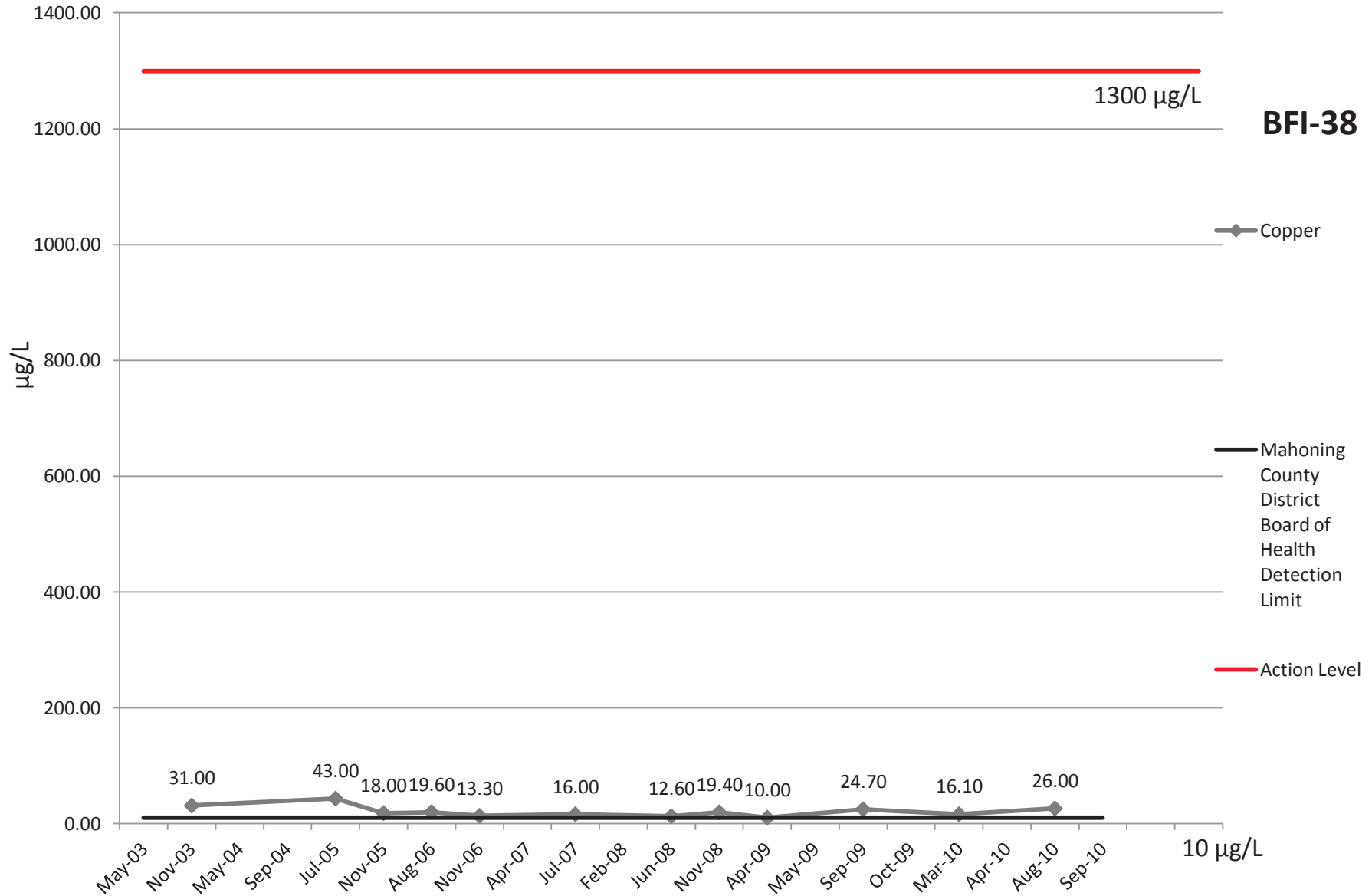


# Chromium

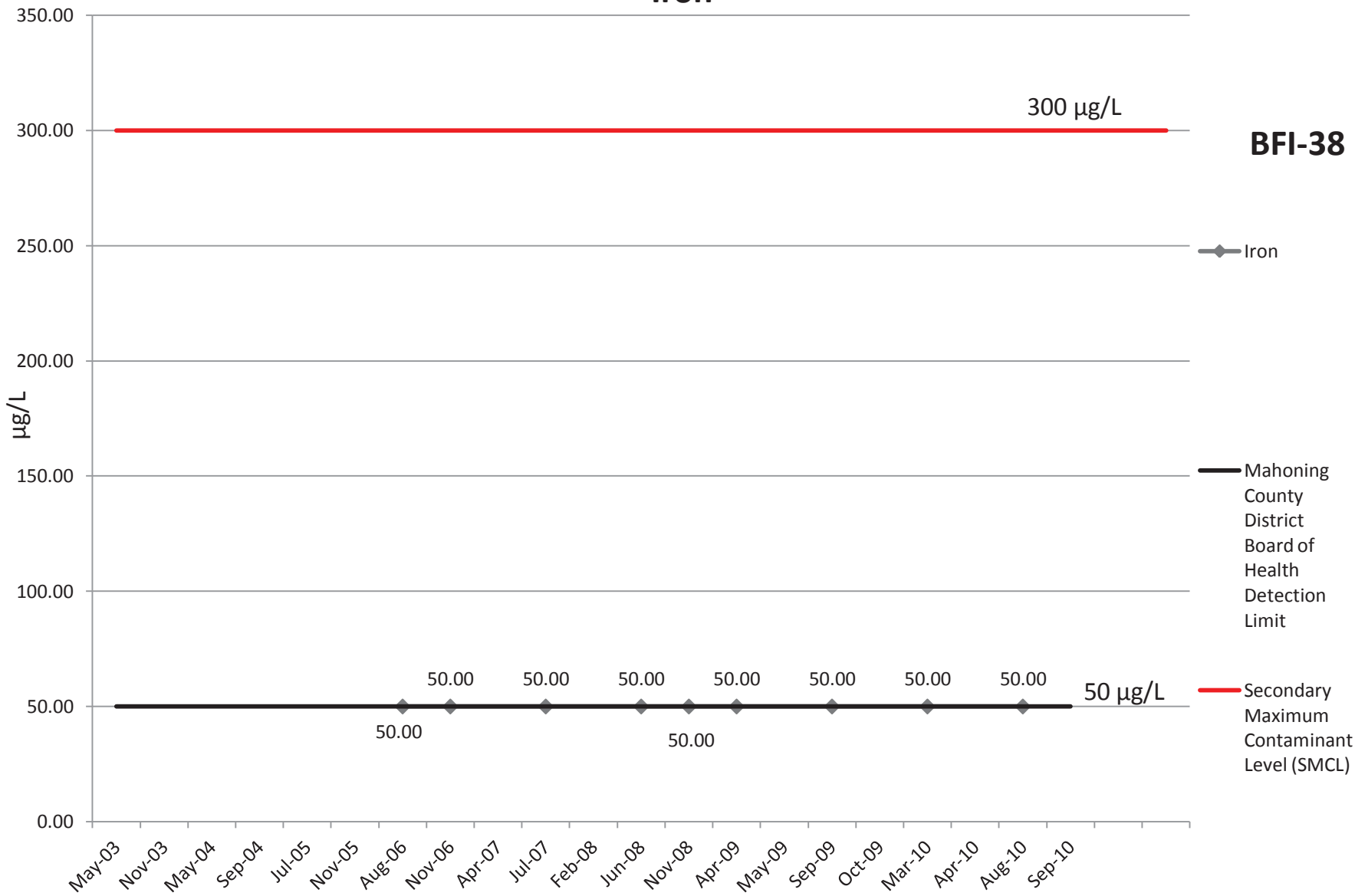
**BFI-38**



# Copper

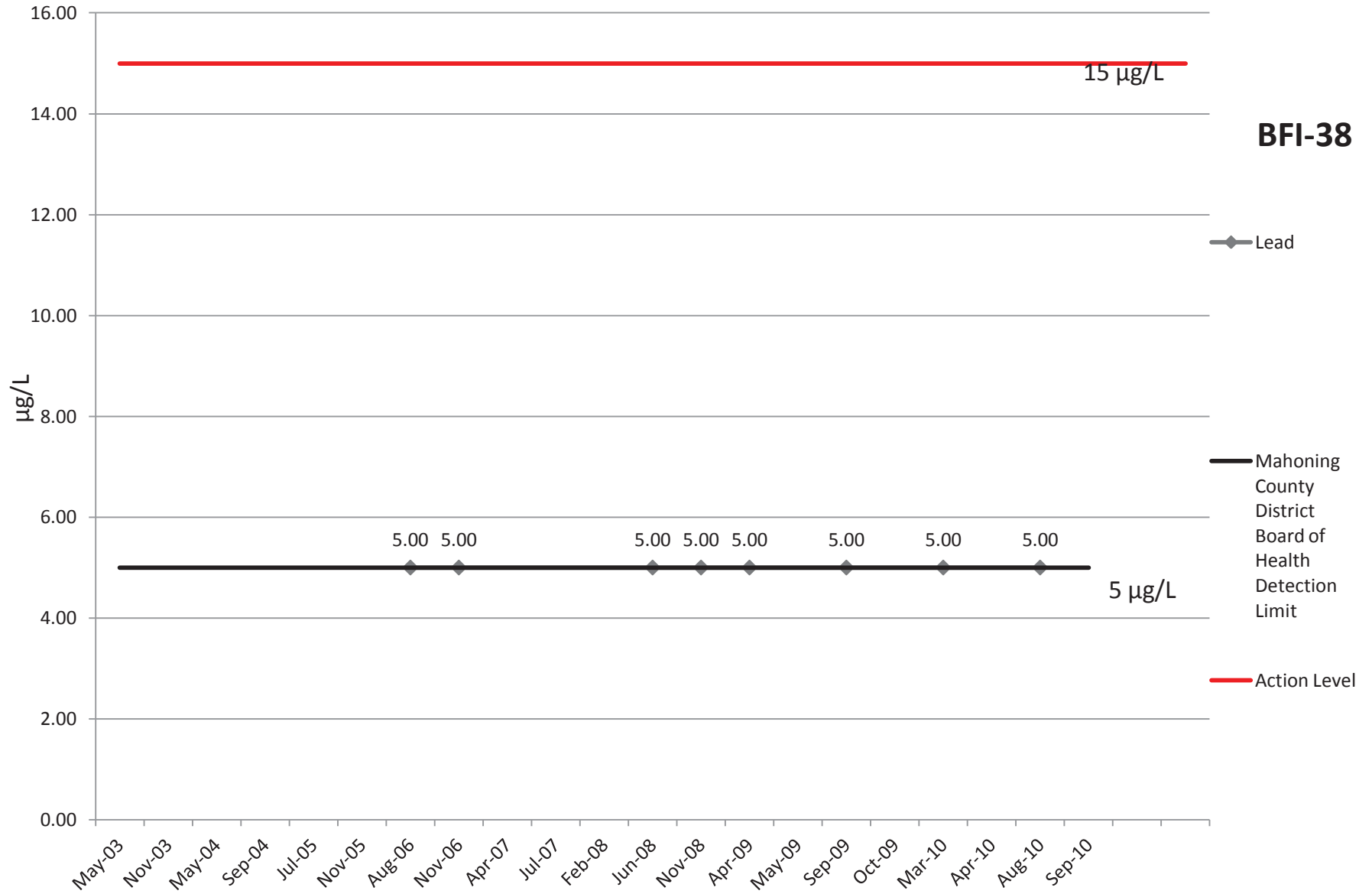


# Iron

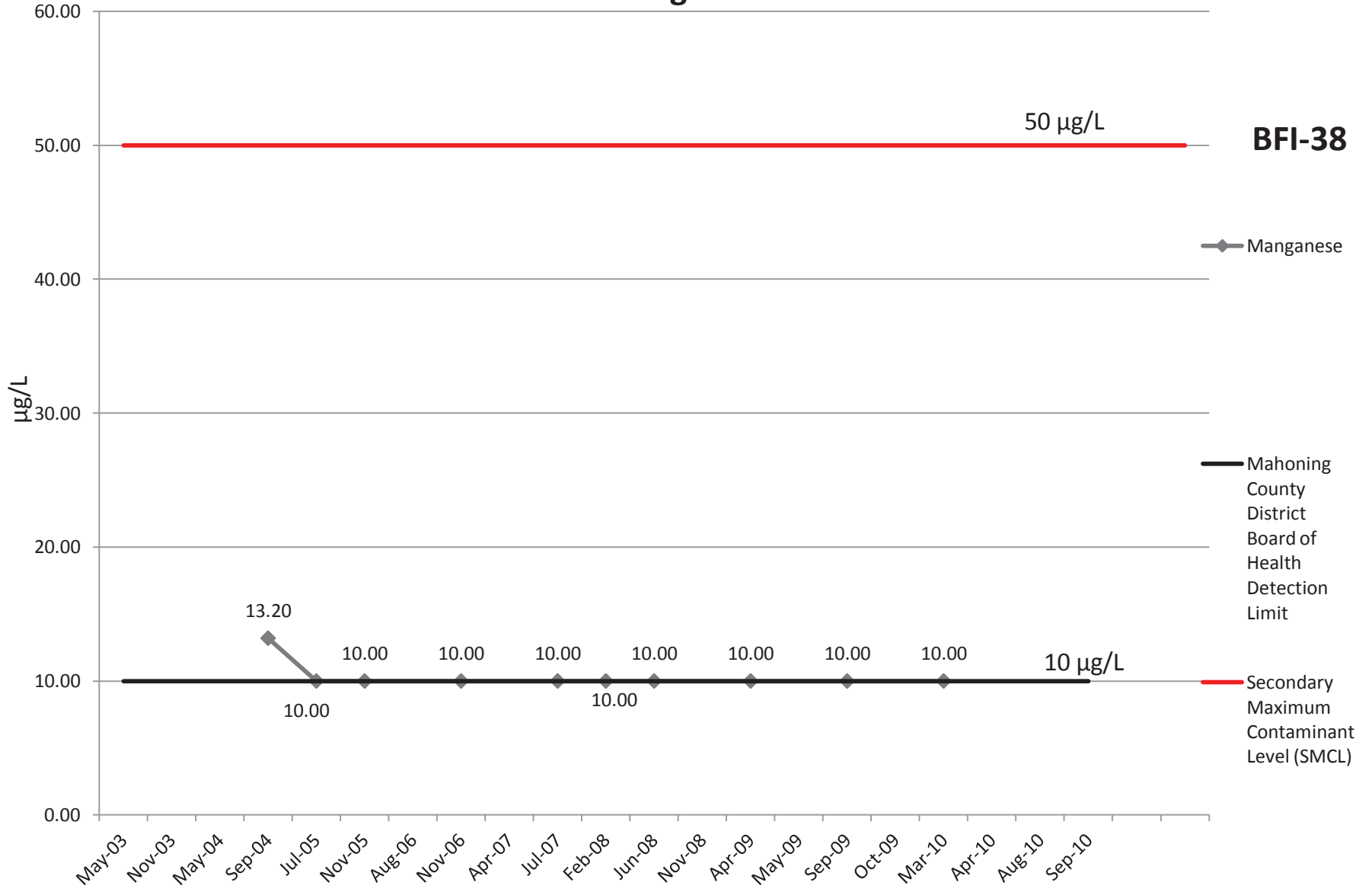


# Lead

**BFI-38**

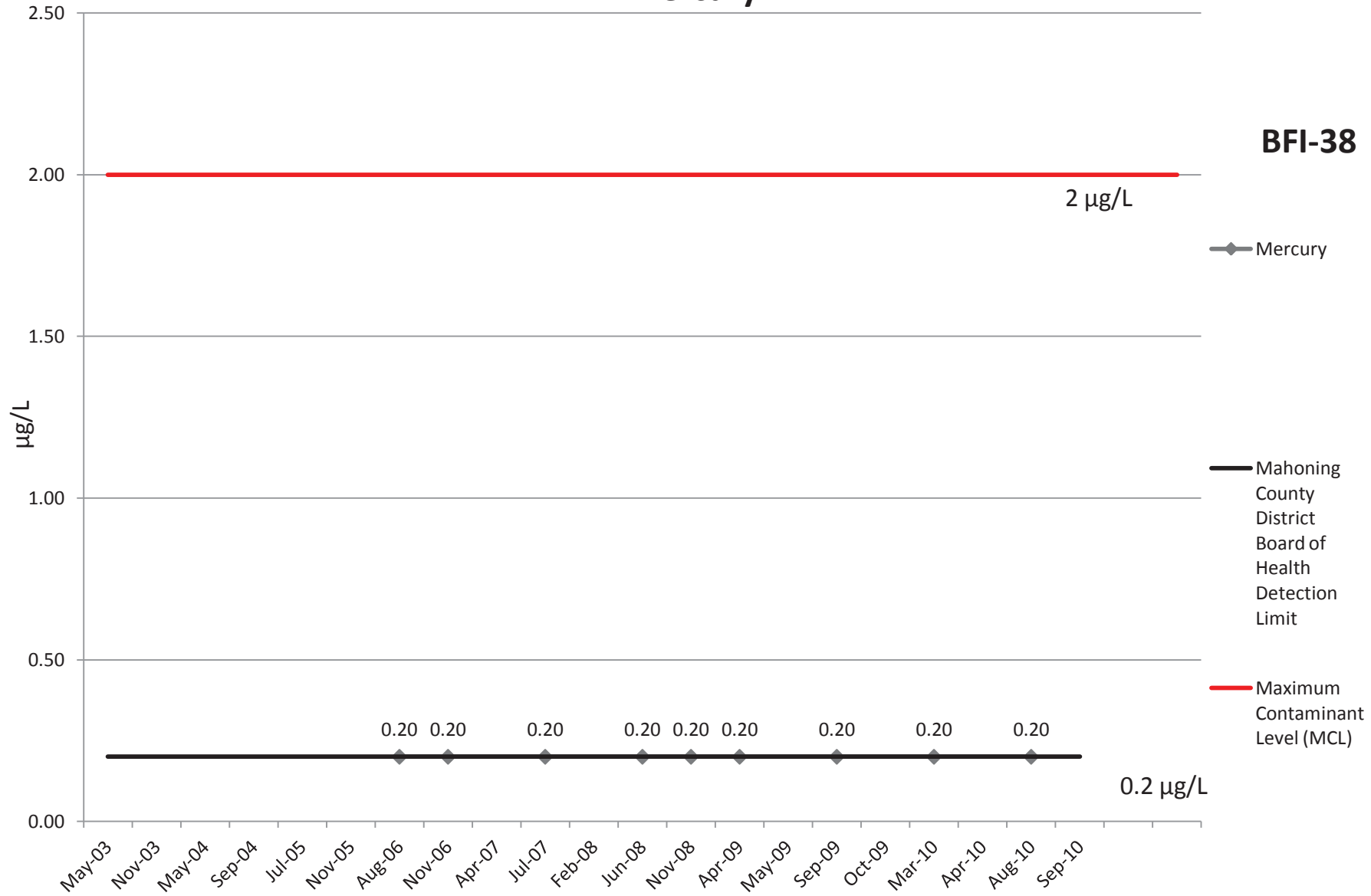


# Manganese



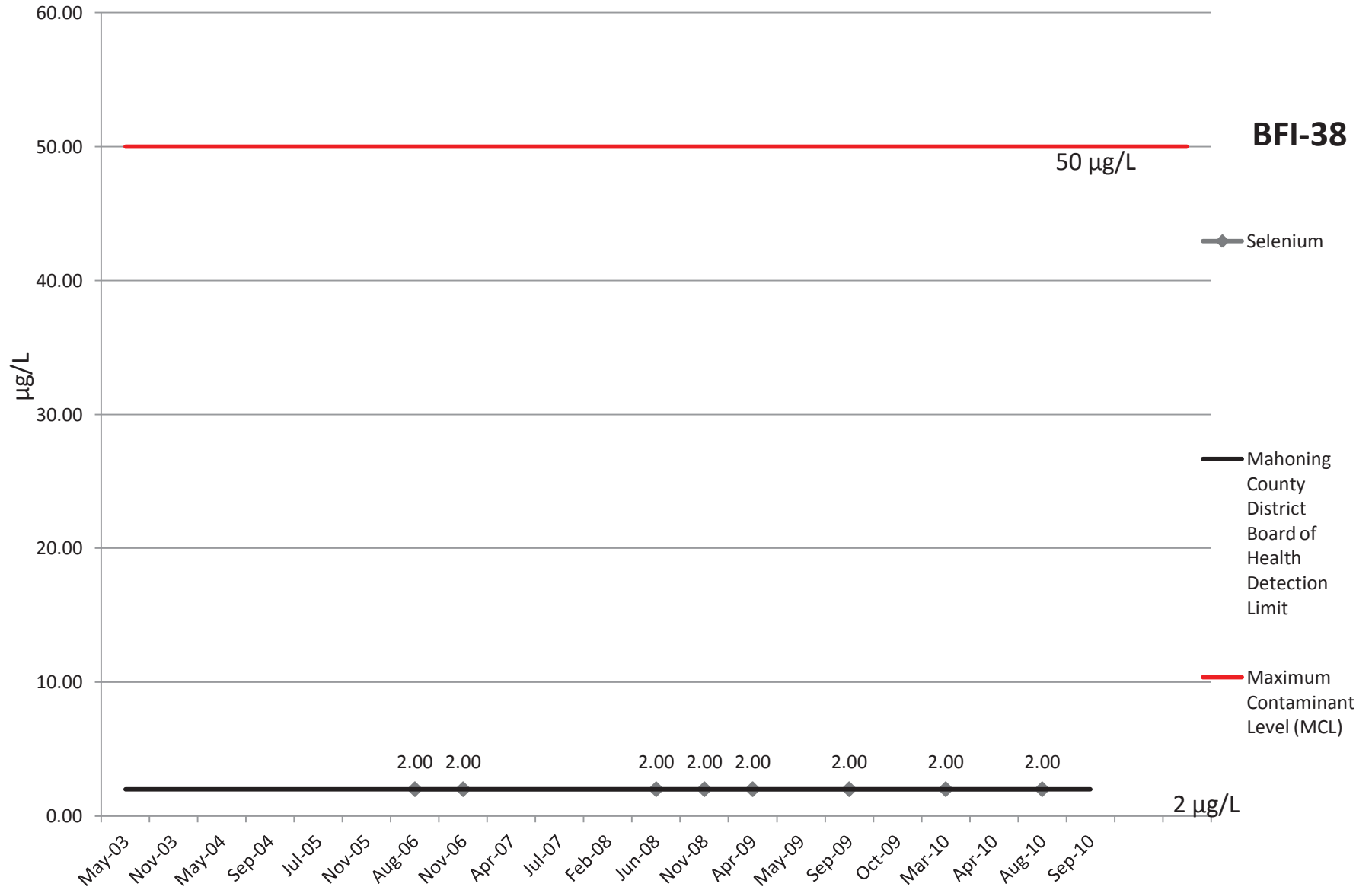
# Mercury

**BFI-38**



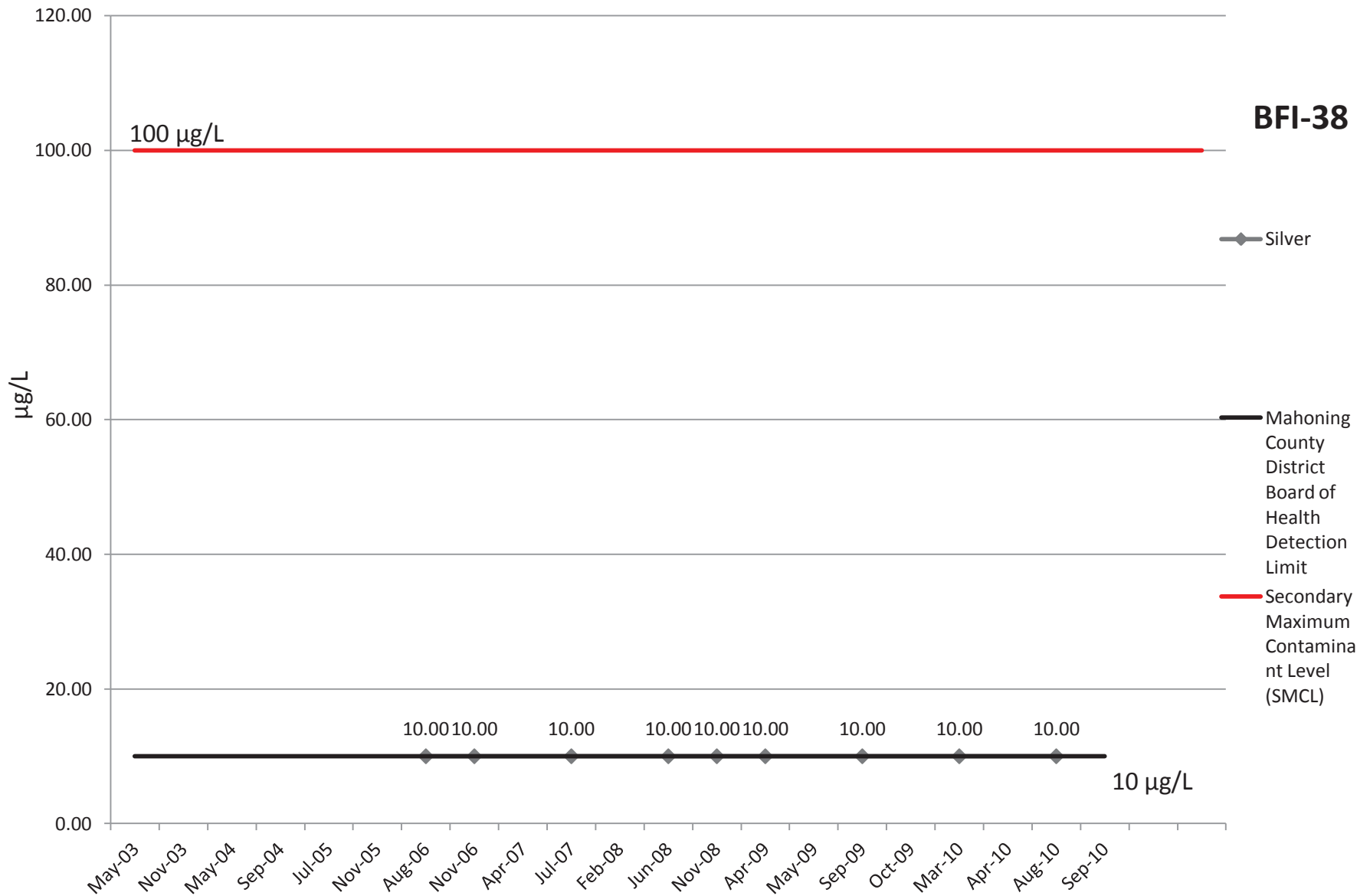


# Selenium

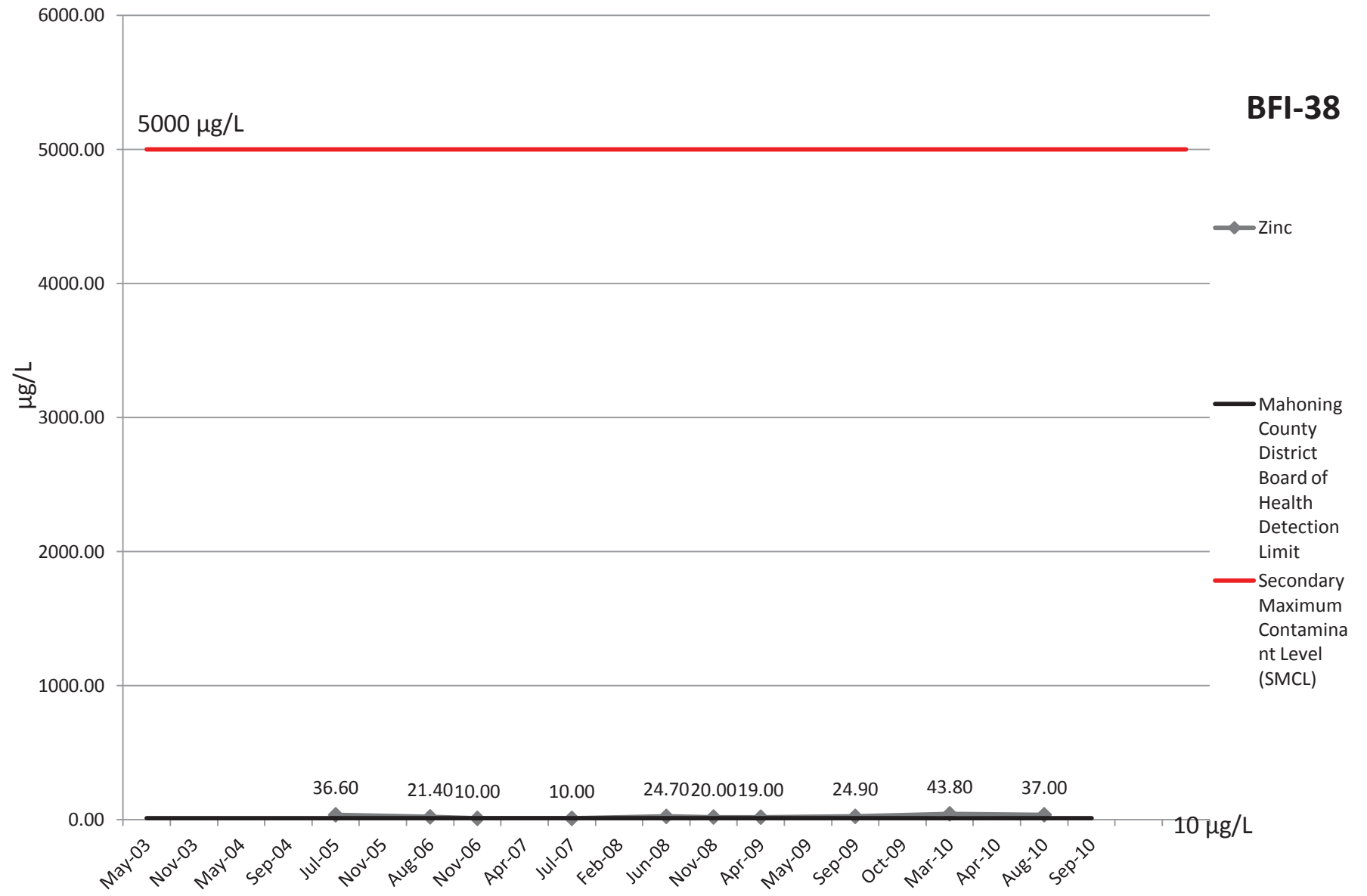


# Silver

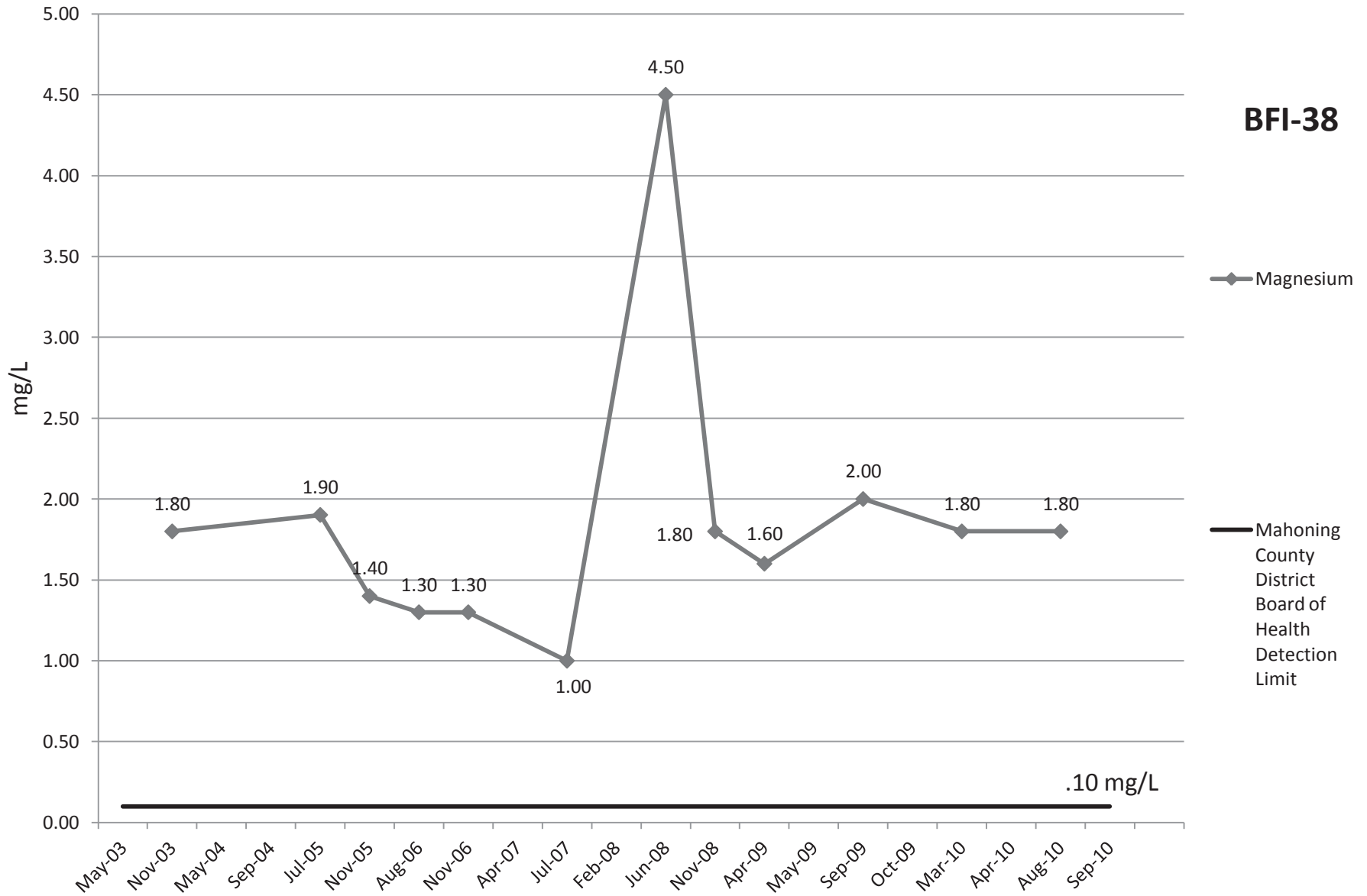
**BFI-38**



# Zinc

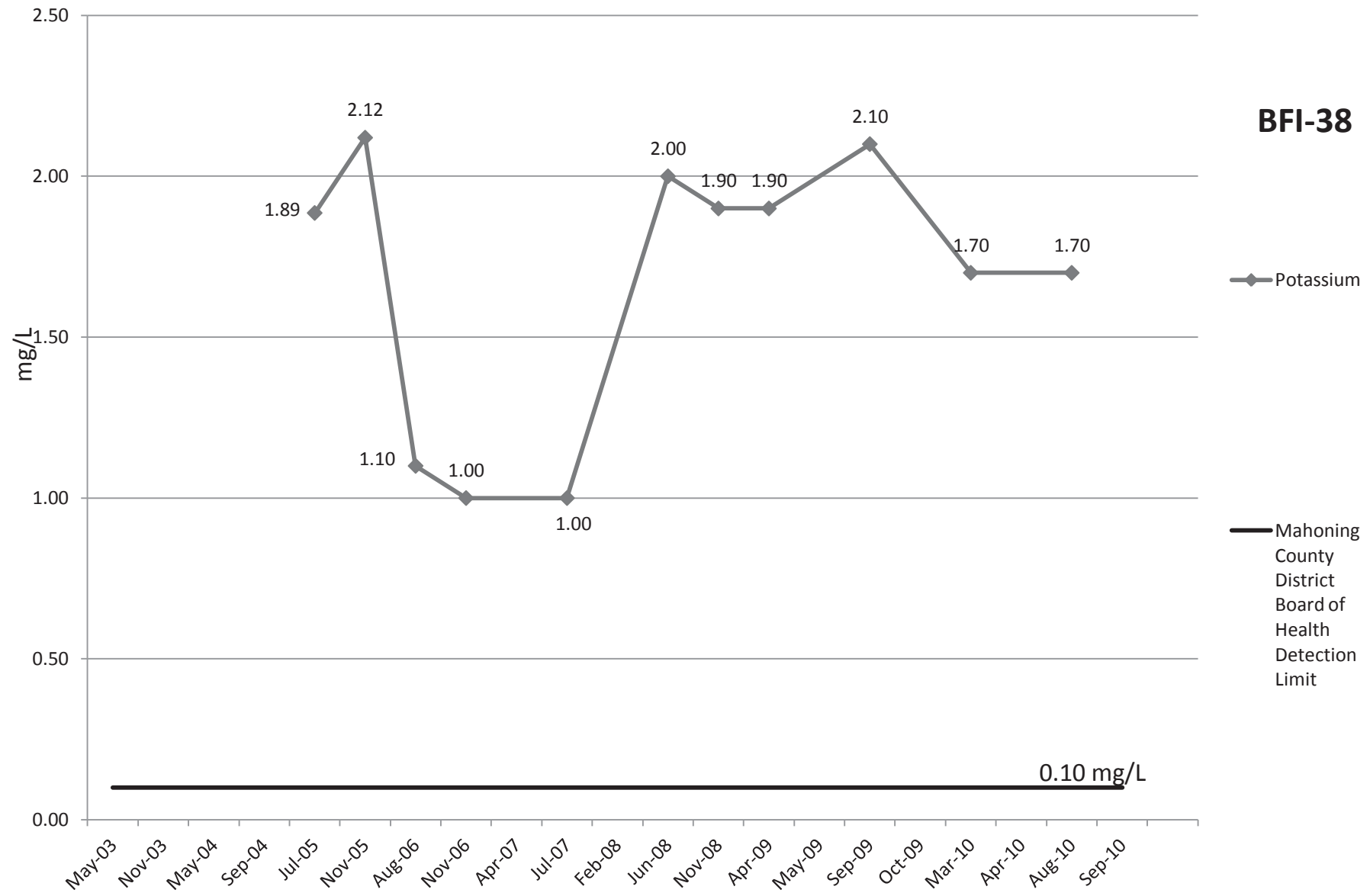


# Magnesium



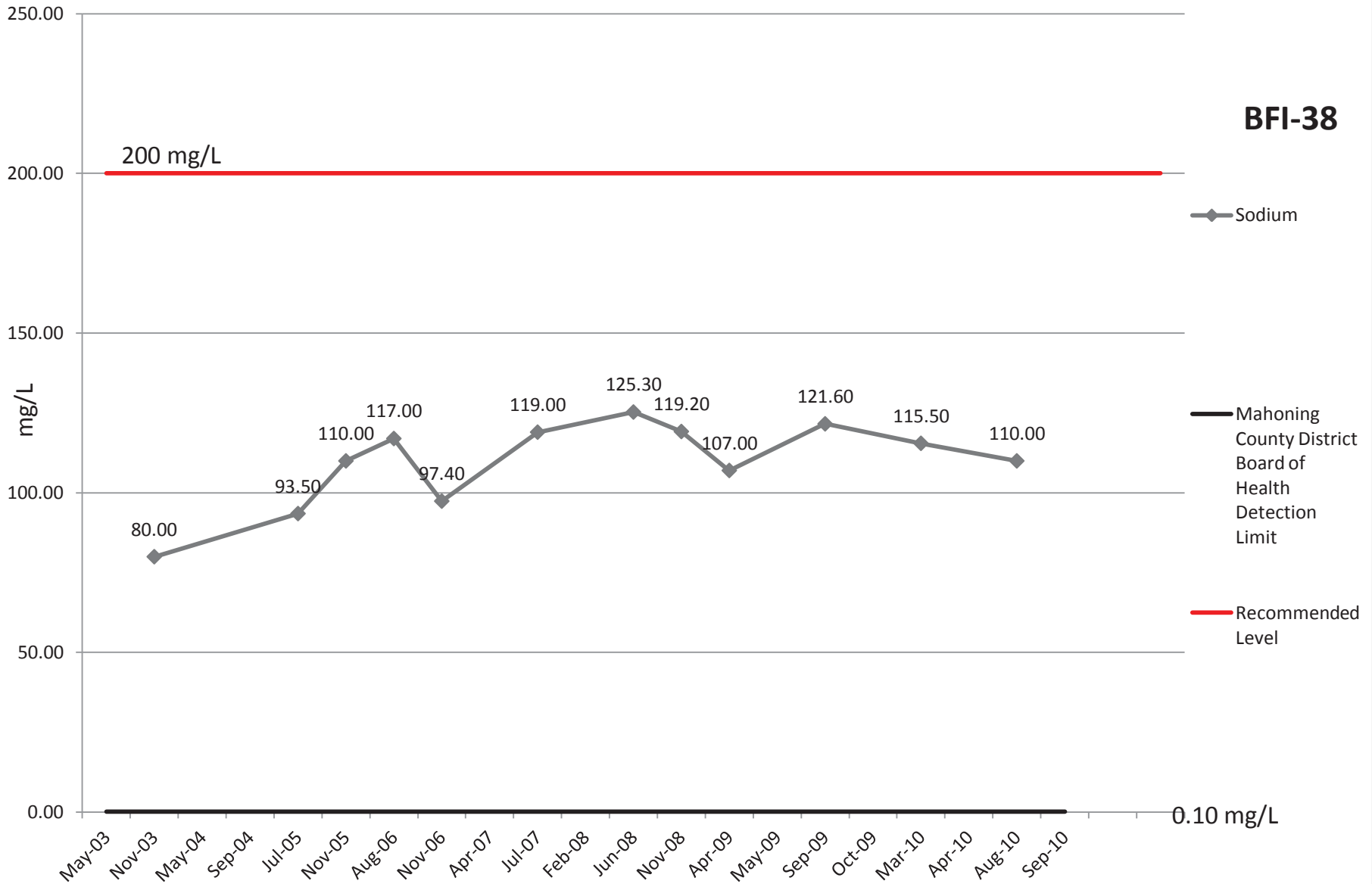
# Potassium

**BFI-38**

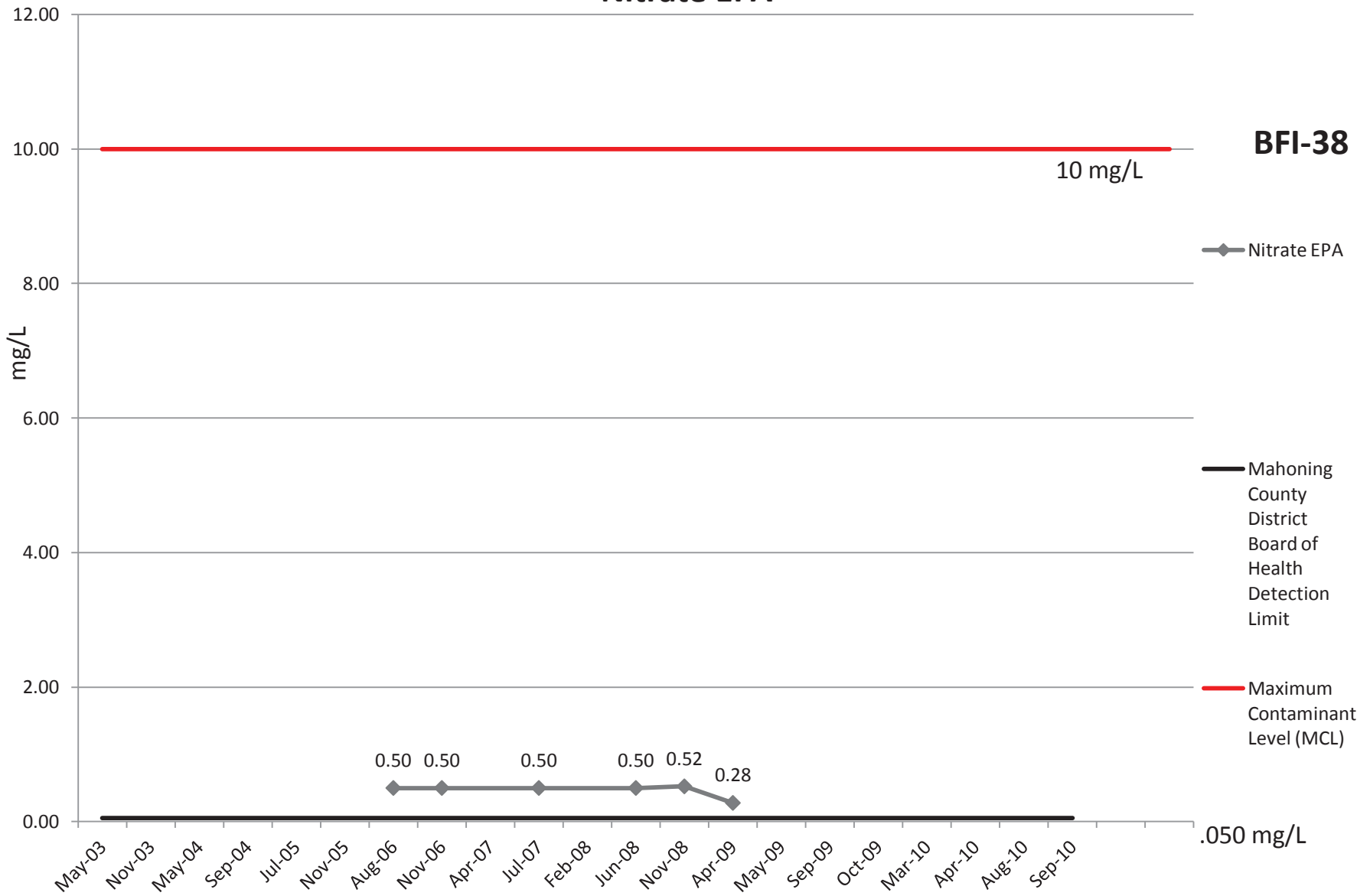


# Sodium

**BFI-38**

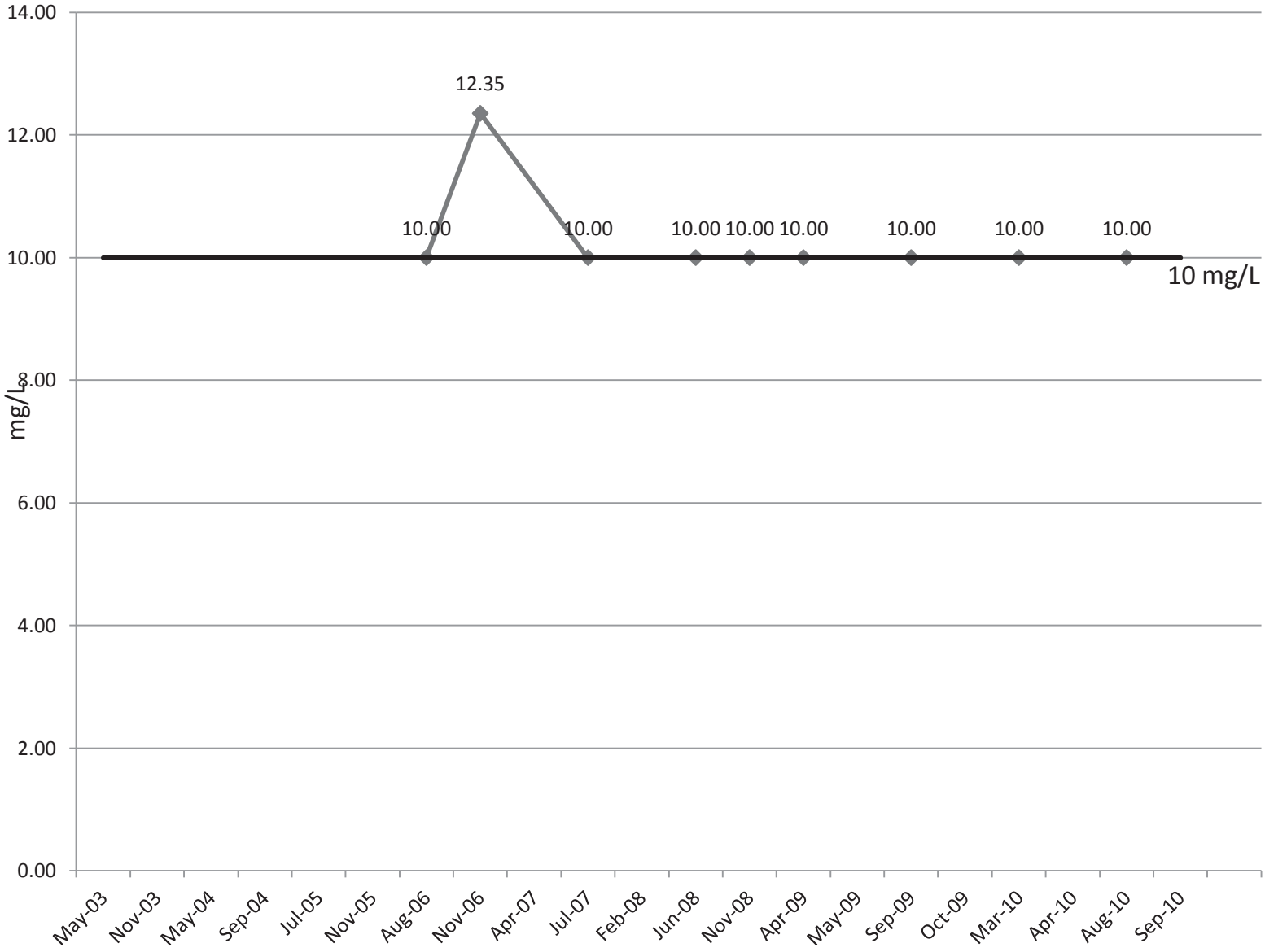


# Nitrate EPA



# COD

**BFI-38**

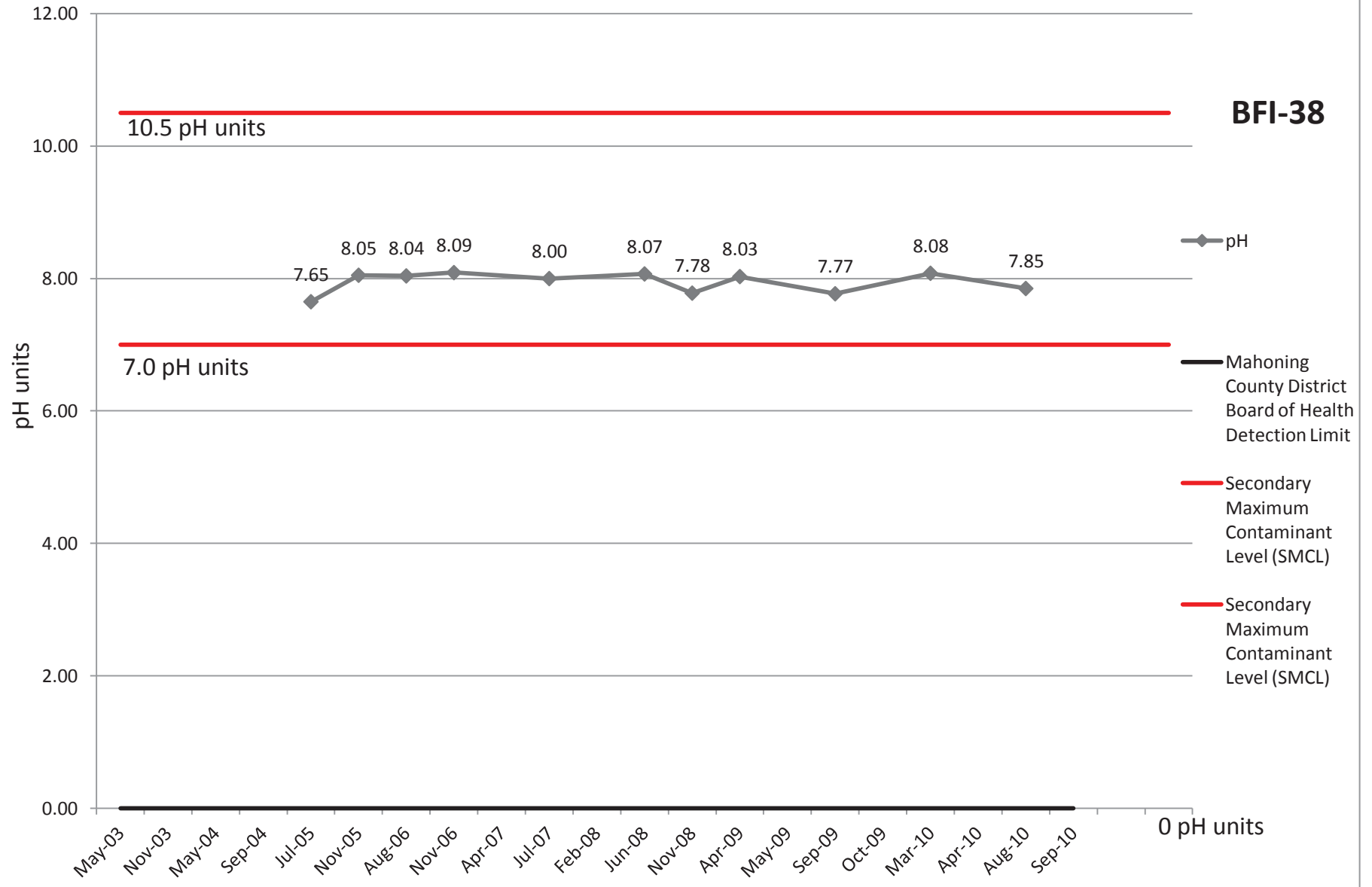


◆ COD

— Mahoning County District Board of Health Detection Limit

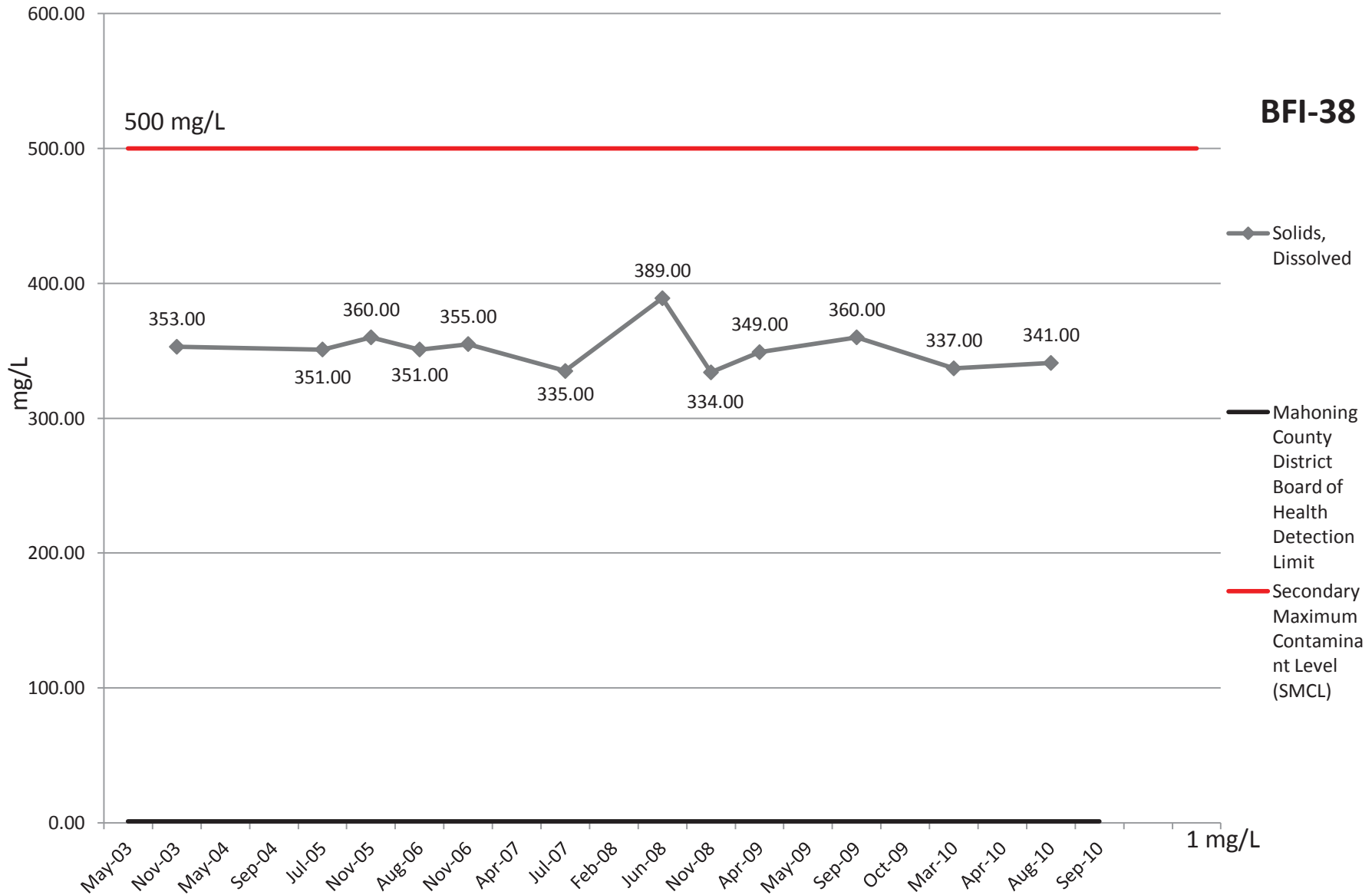


# pH



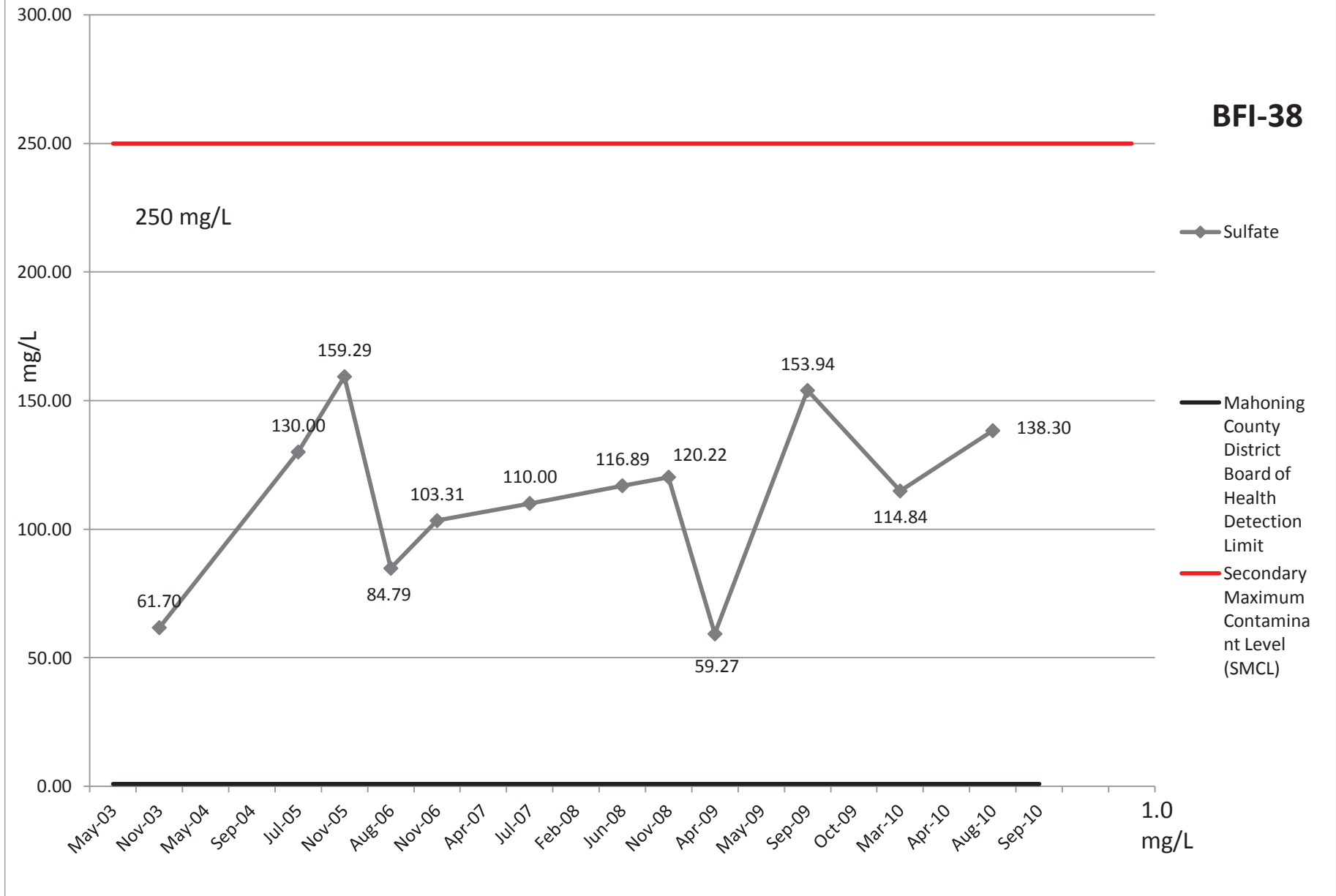
# Solids, Dissolved

**BFI-38**



# Sulfate

**BFI-38**



# Bacteria

positive (1)

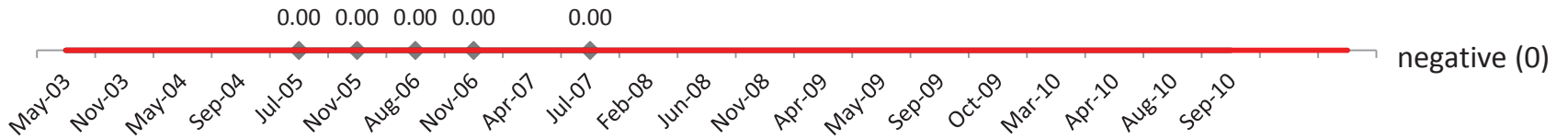
**BFI-38**

Positive/Negative

◆ Bacteria

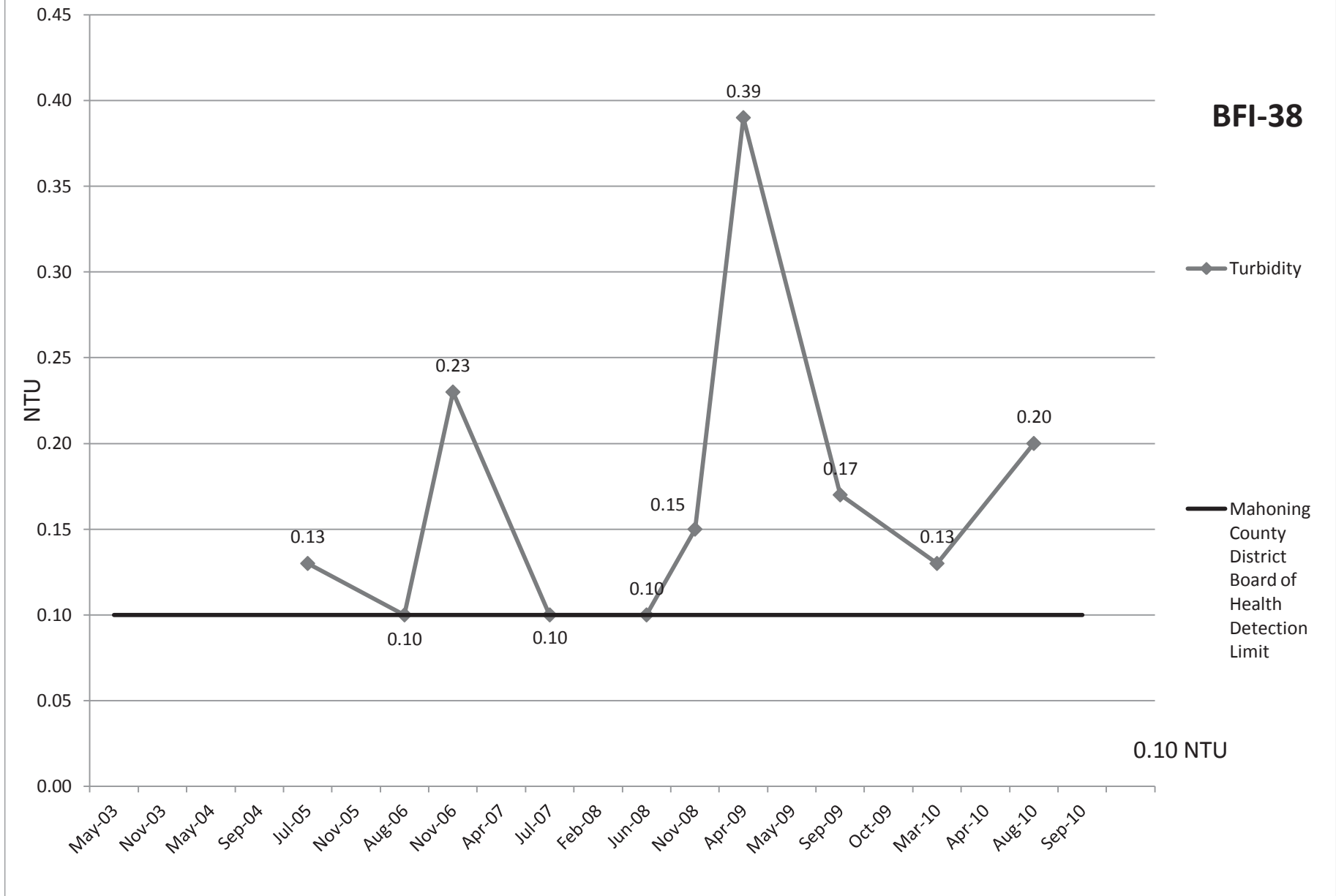
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)



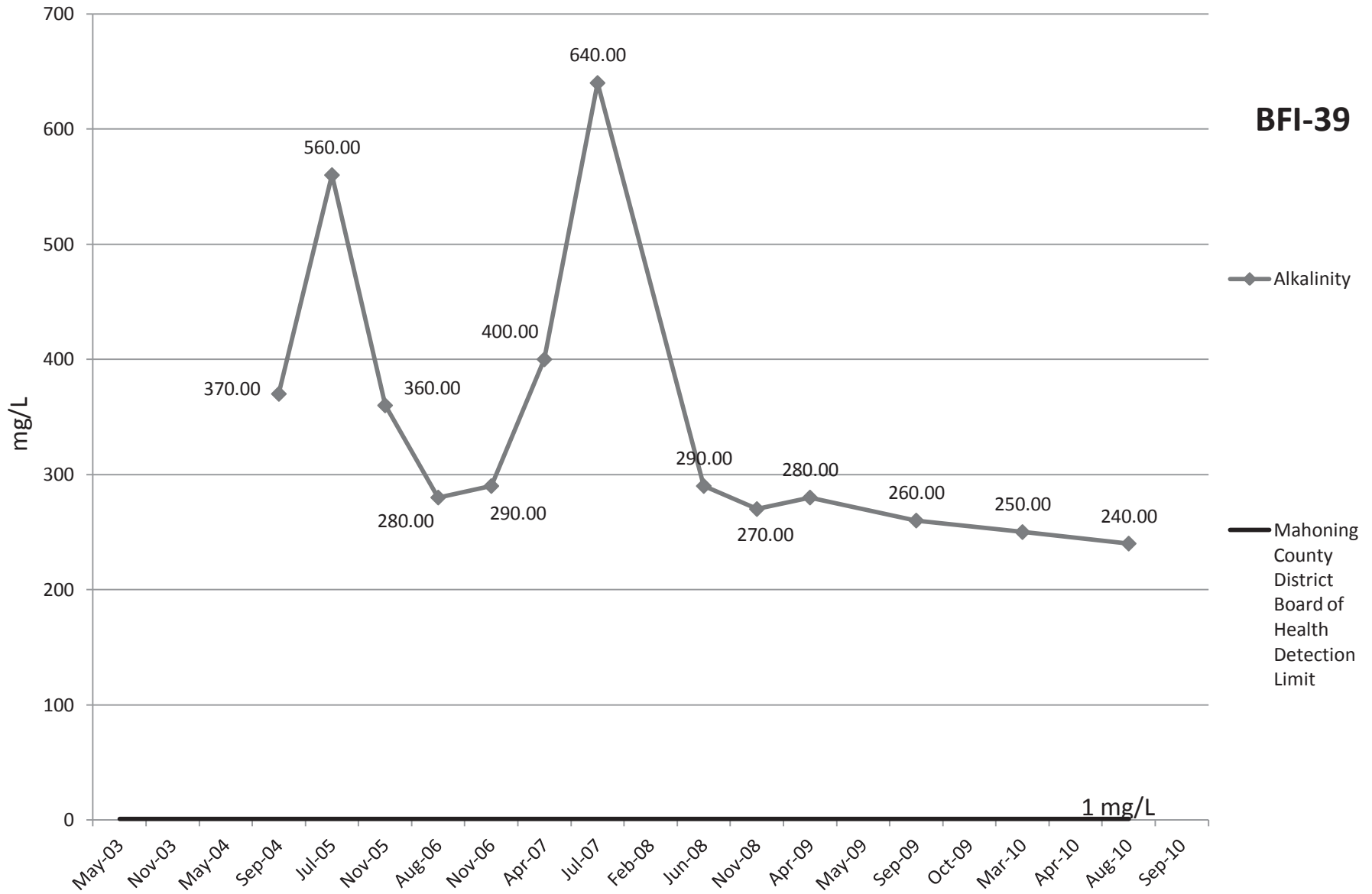
negative (0)

# Turbidity

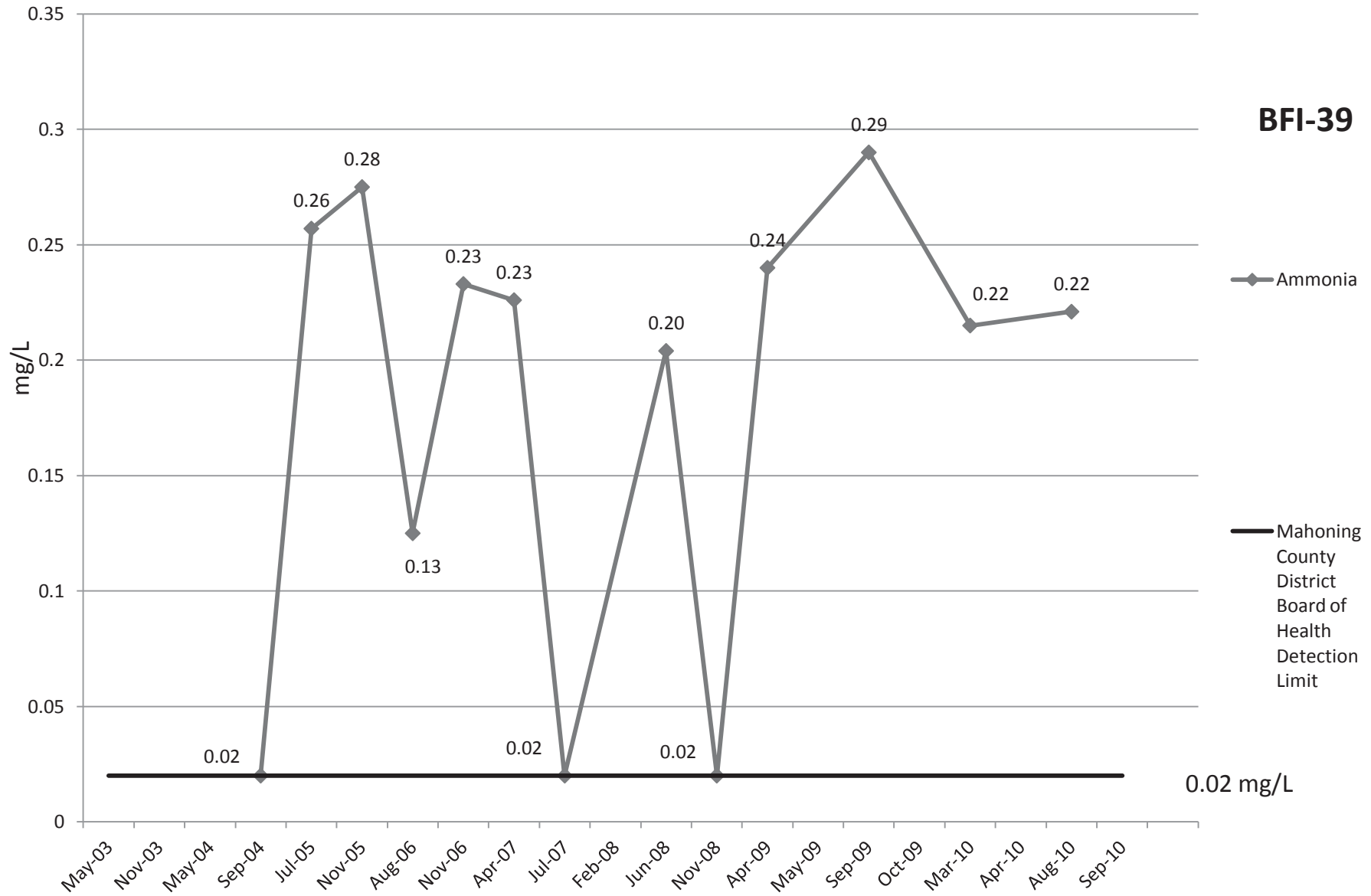


# Alkalinity

**BFI-39**

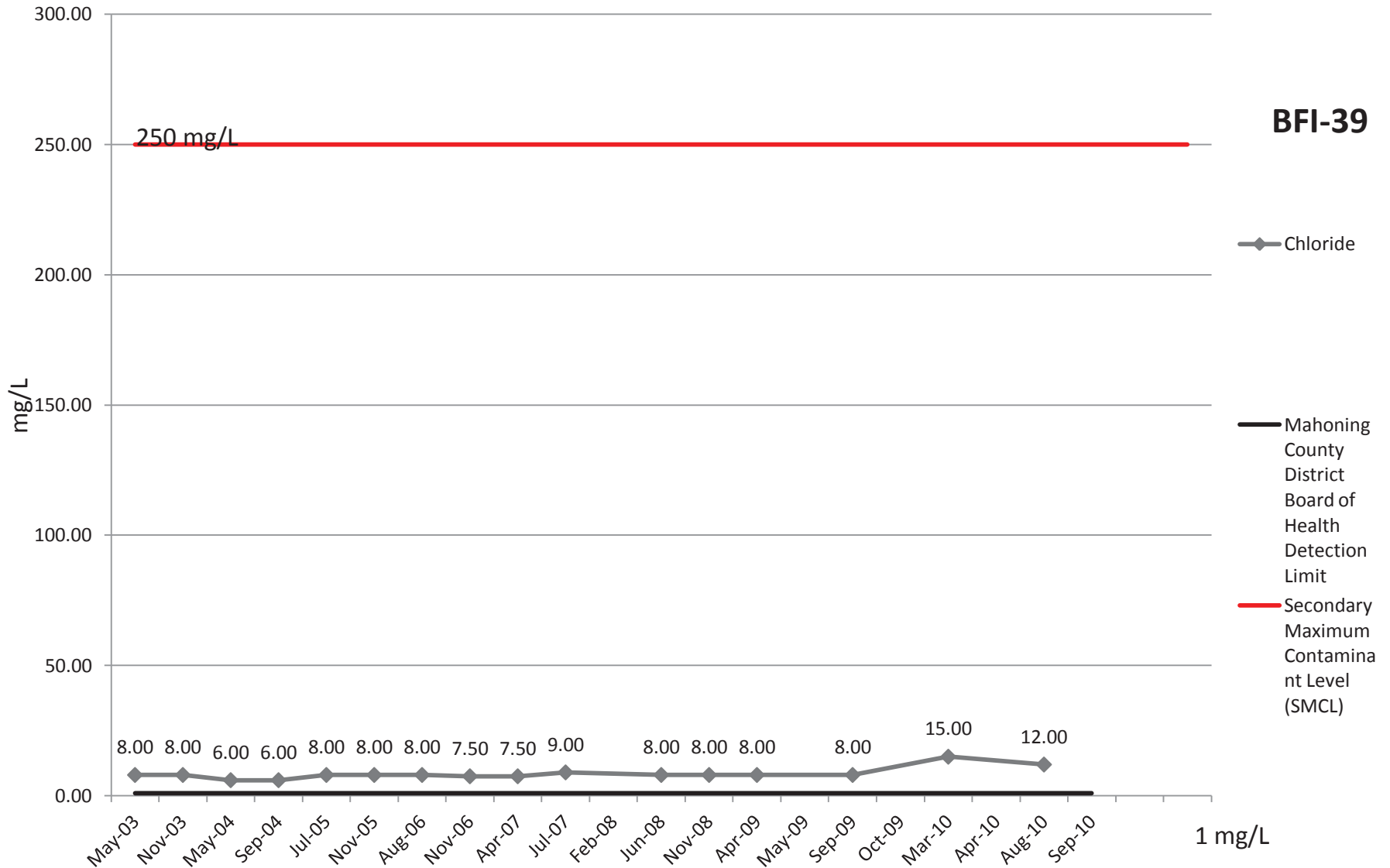


# Ammonia



# Chloride

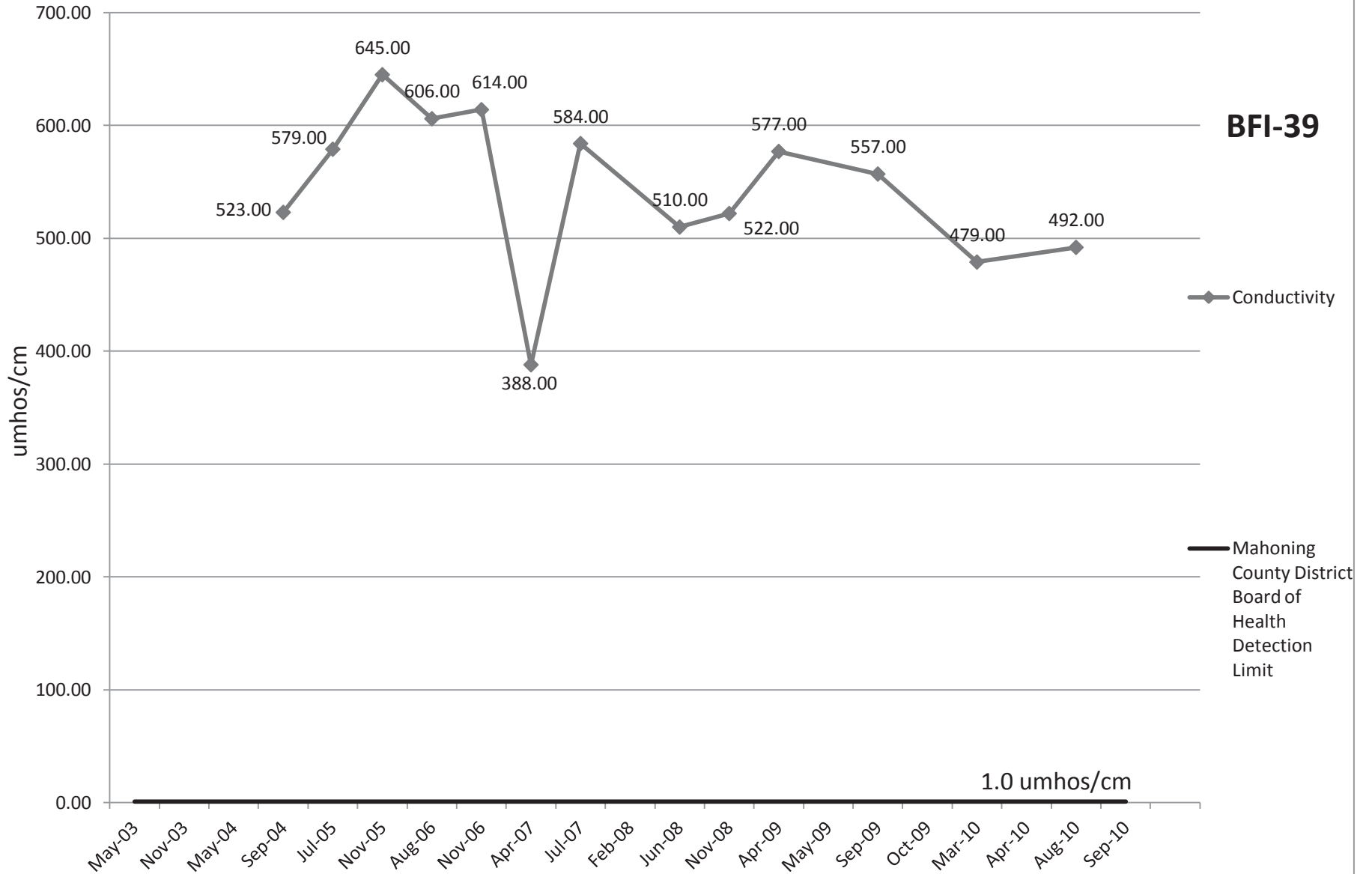
**BFI-39**



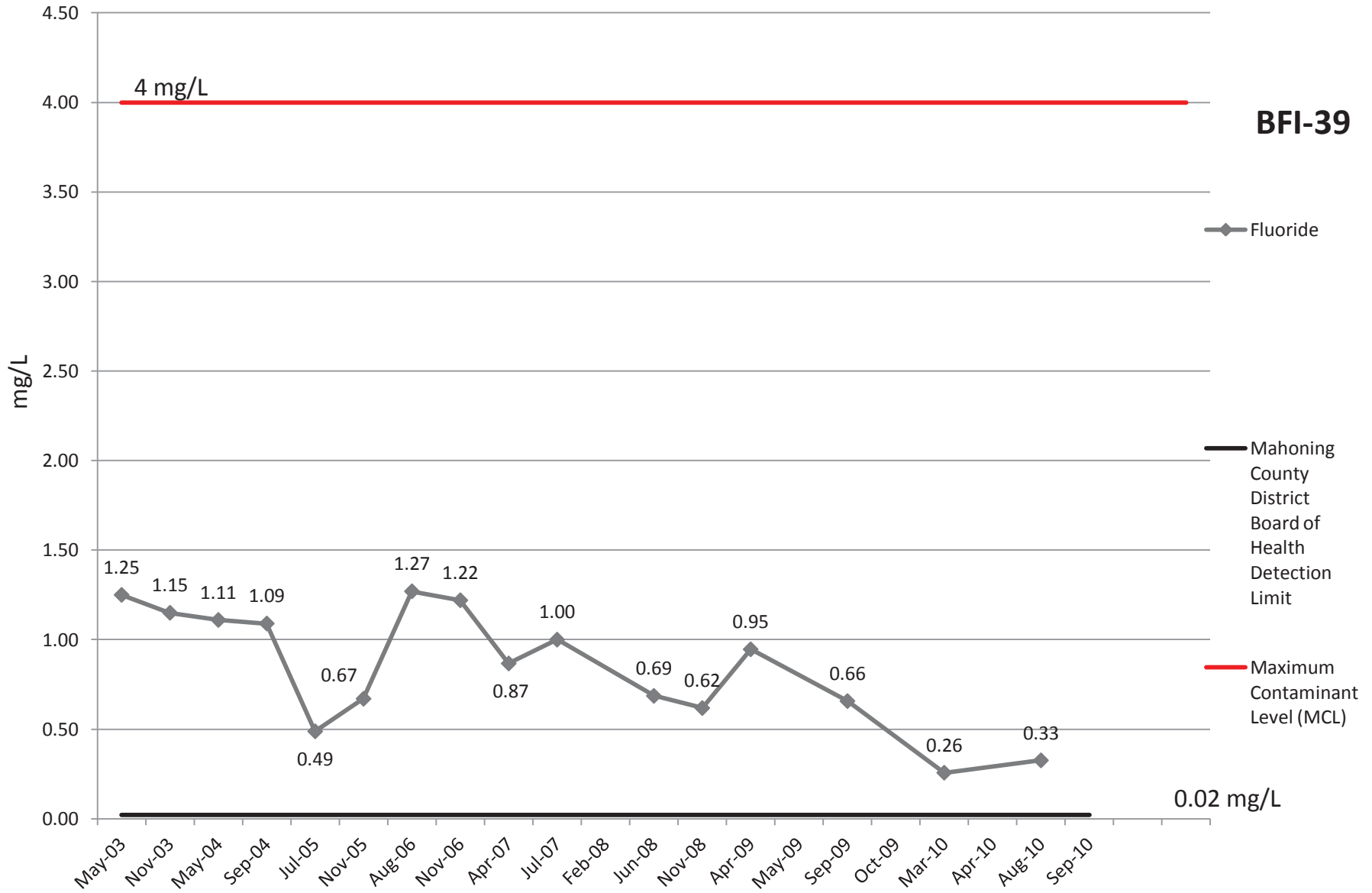


# Conductivity

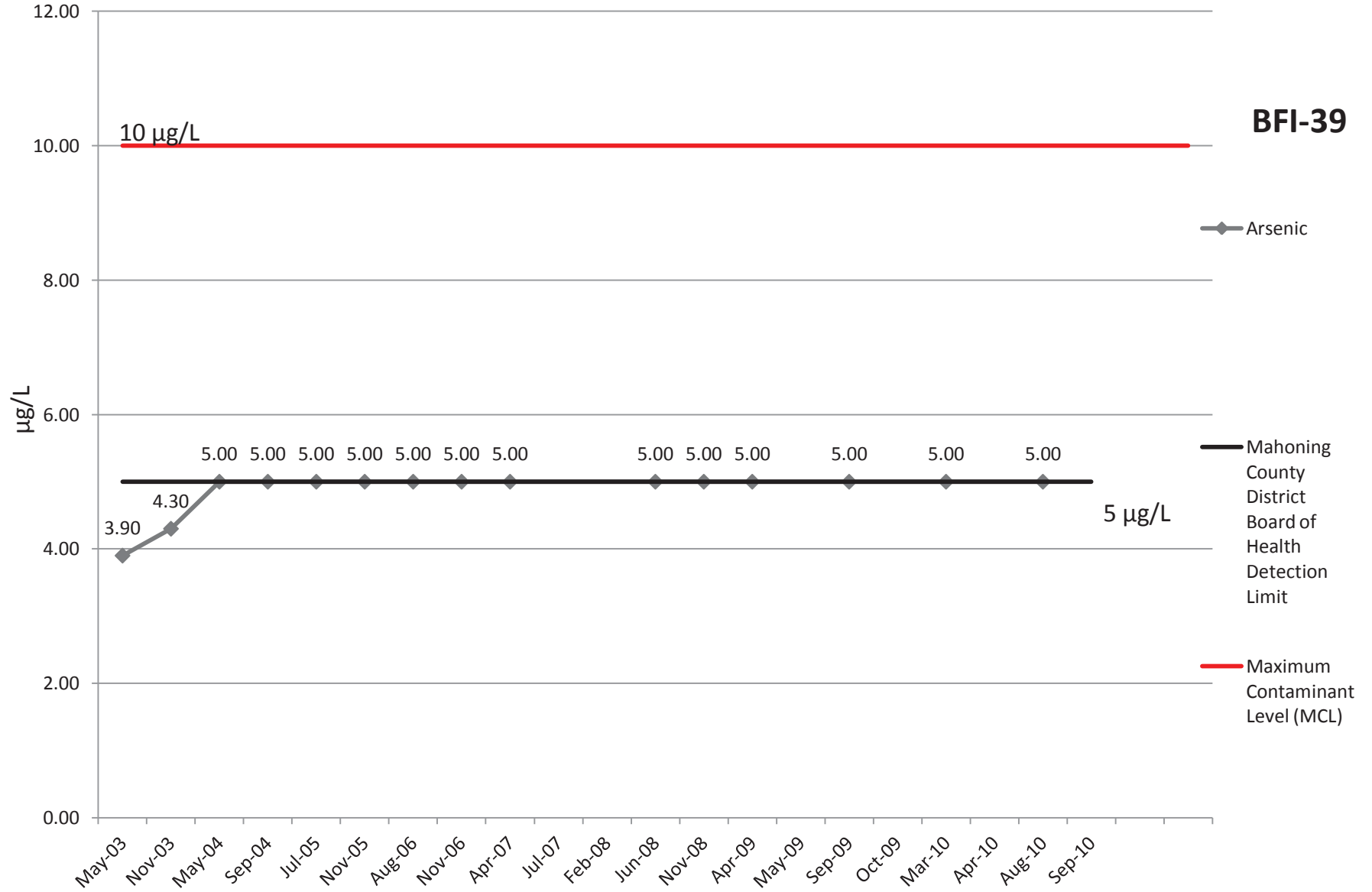
**BFI-39**



# Fluoride

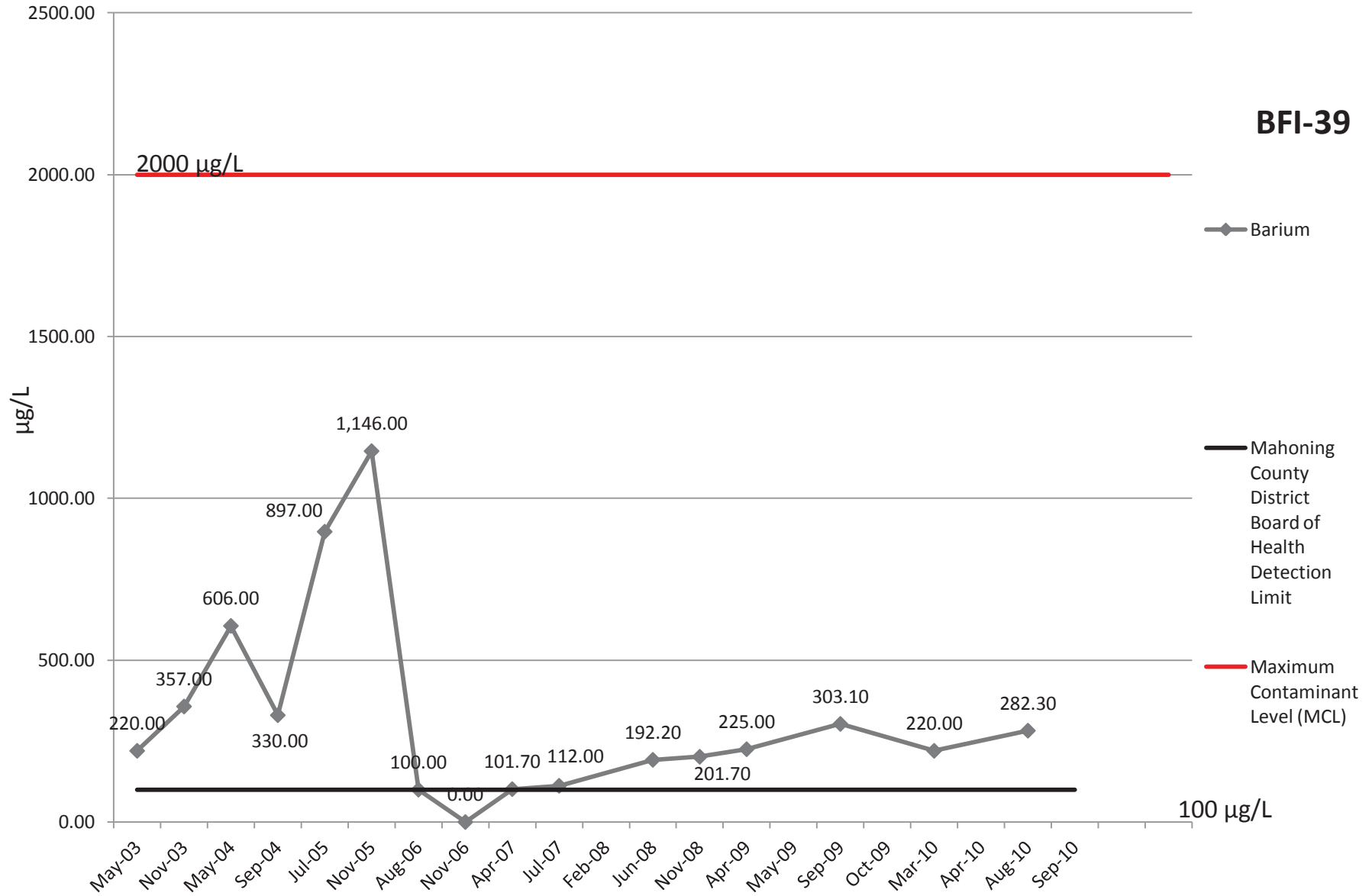


# Arsenic



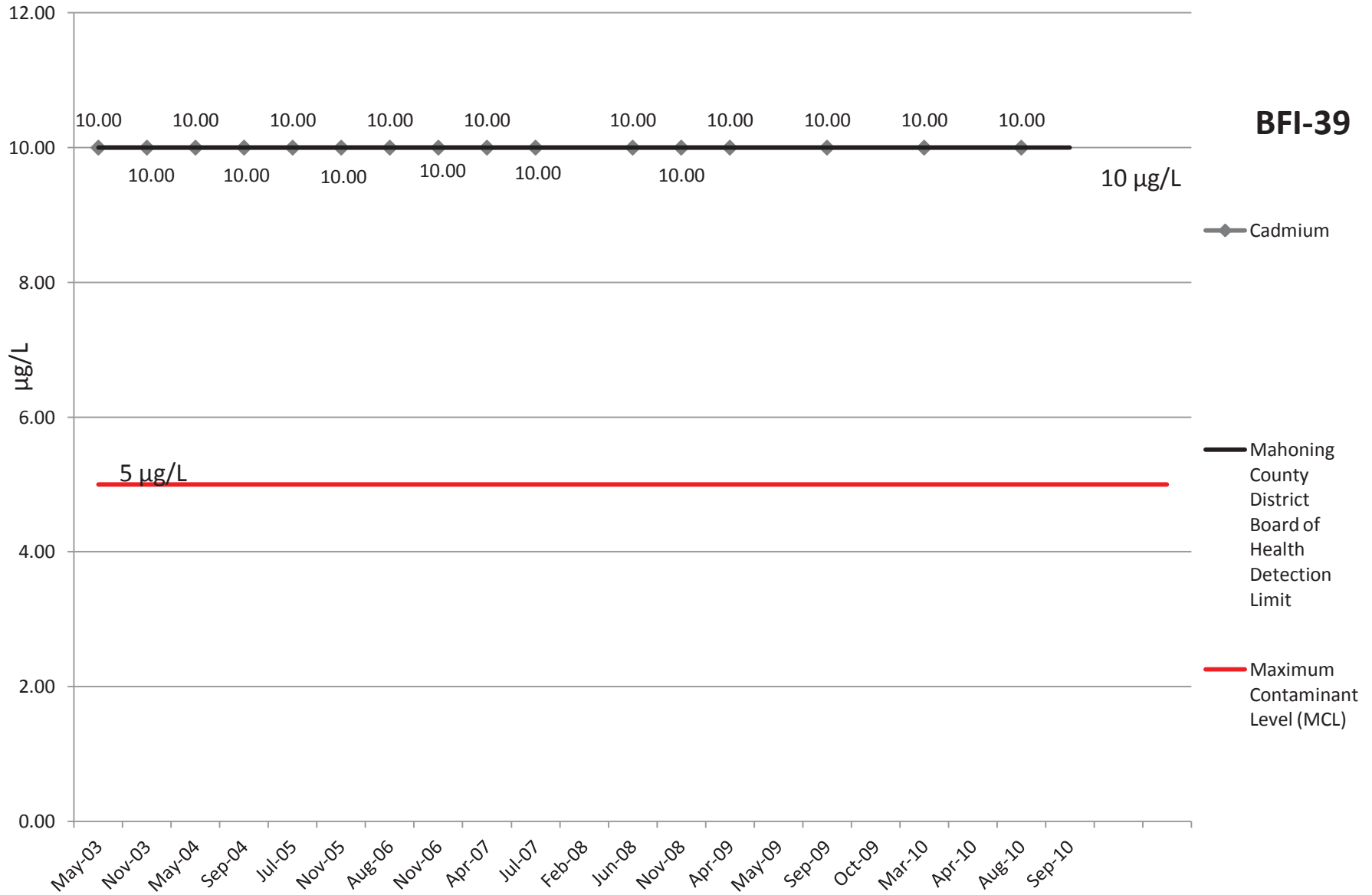
# Barium

**BFI-39**

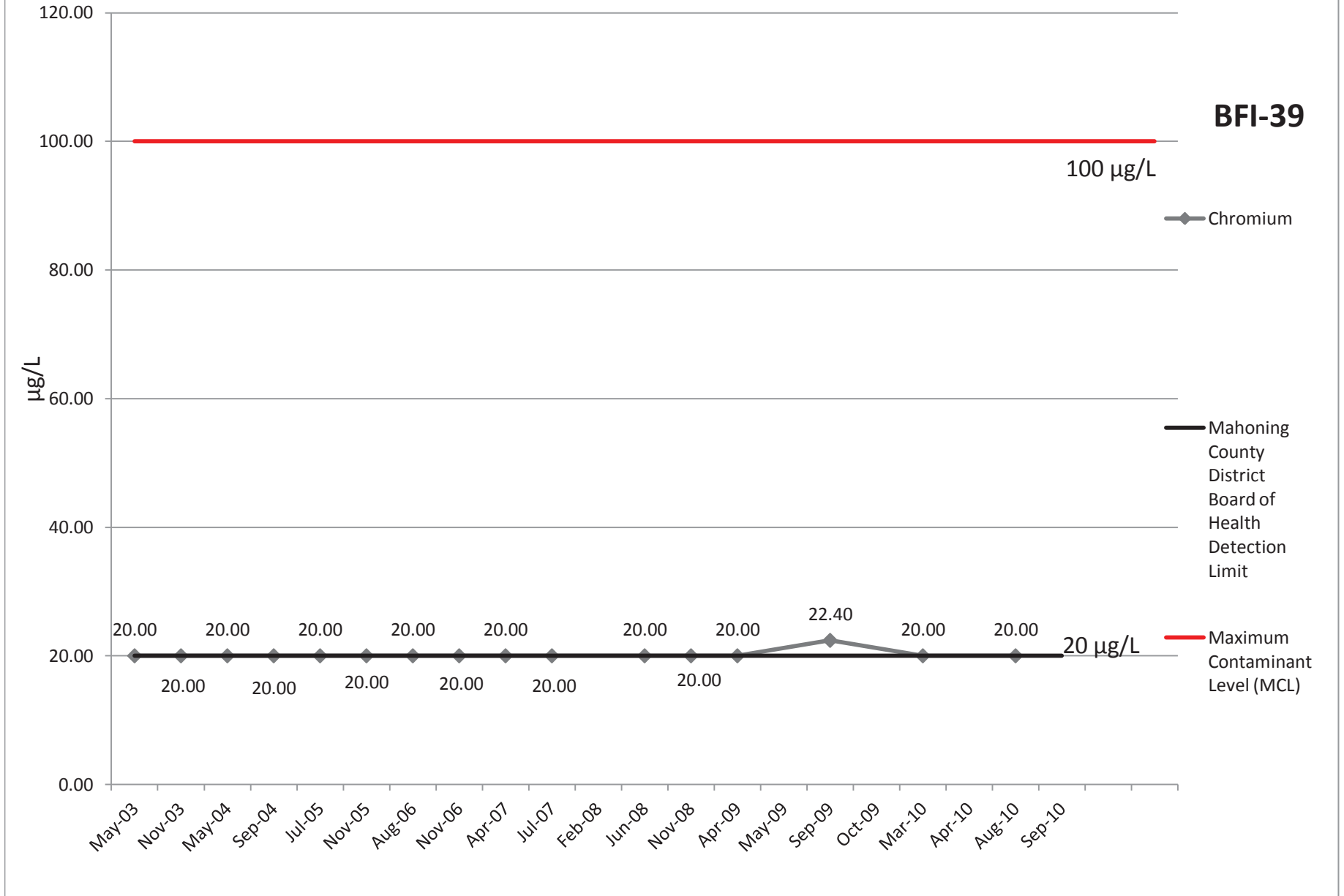


# Cadmium

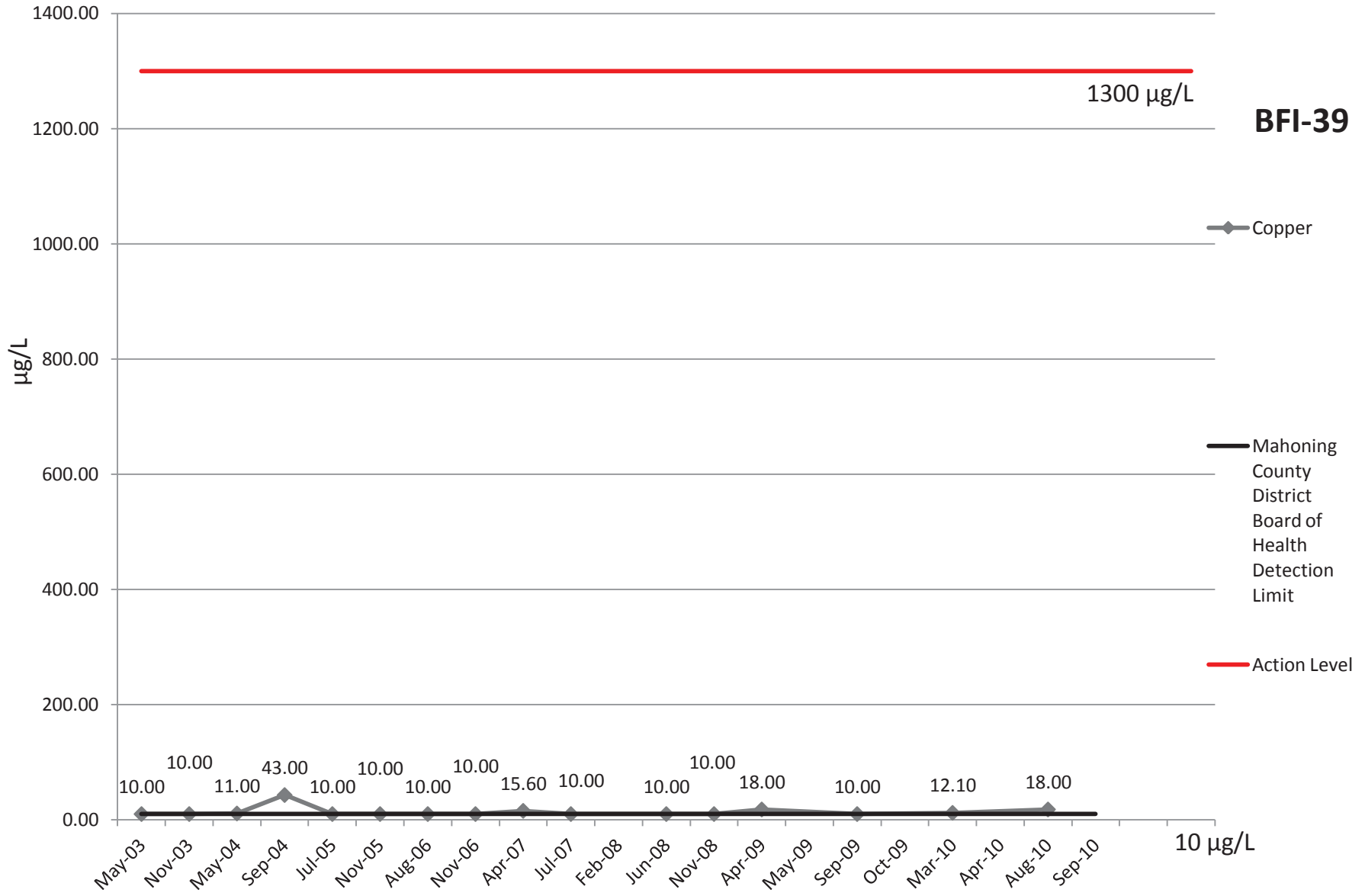
**BFI-39**



# Chromium

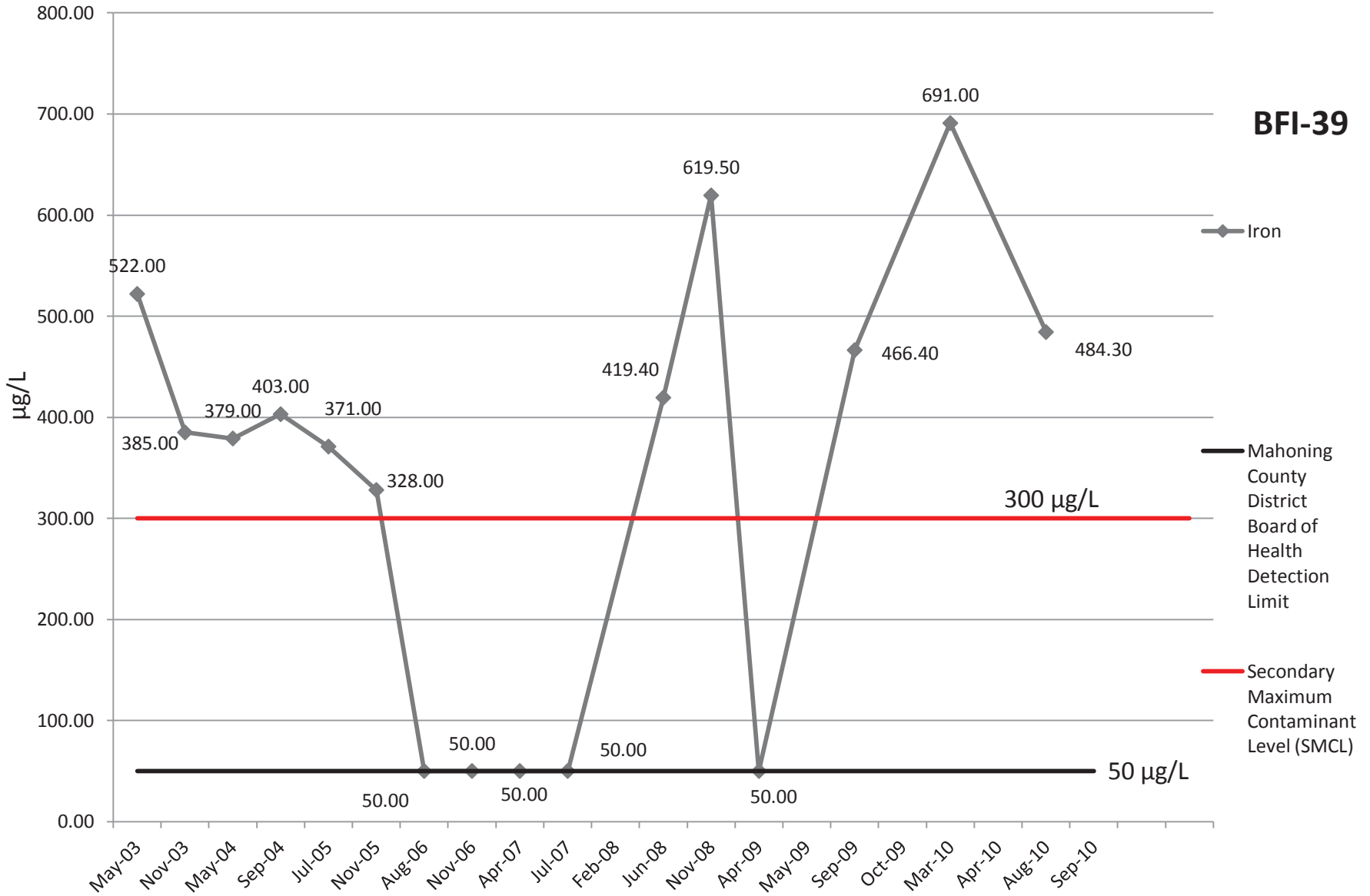


# Copper



# Iron

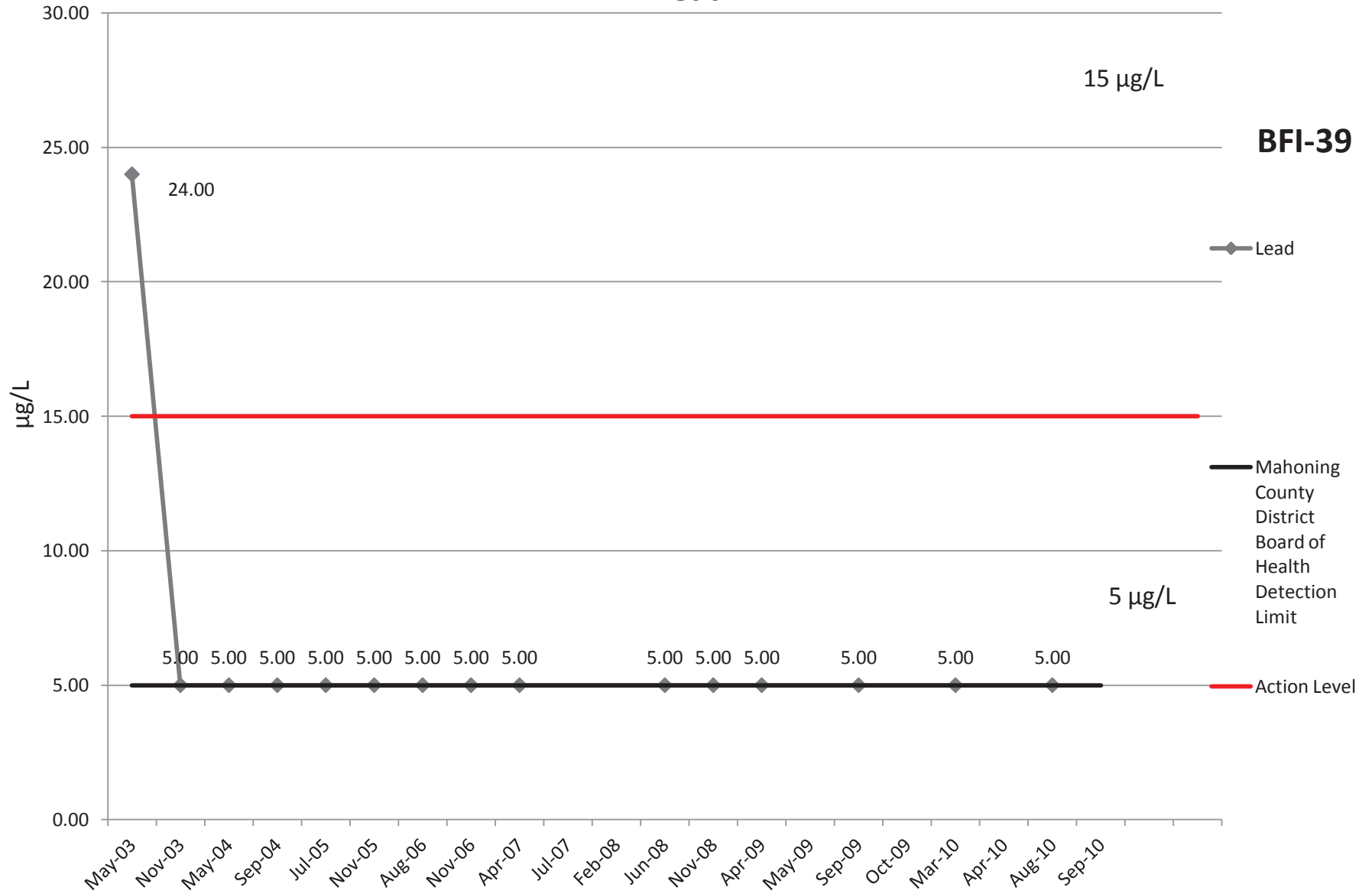
**BFI-39**





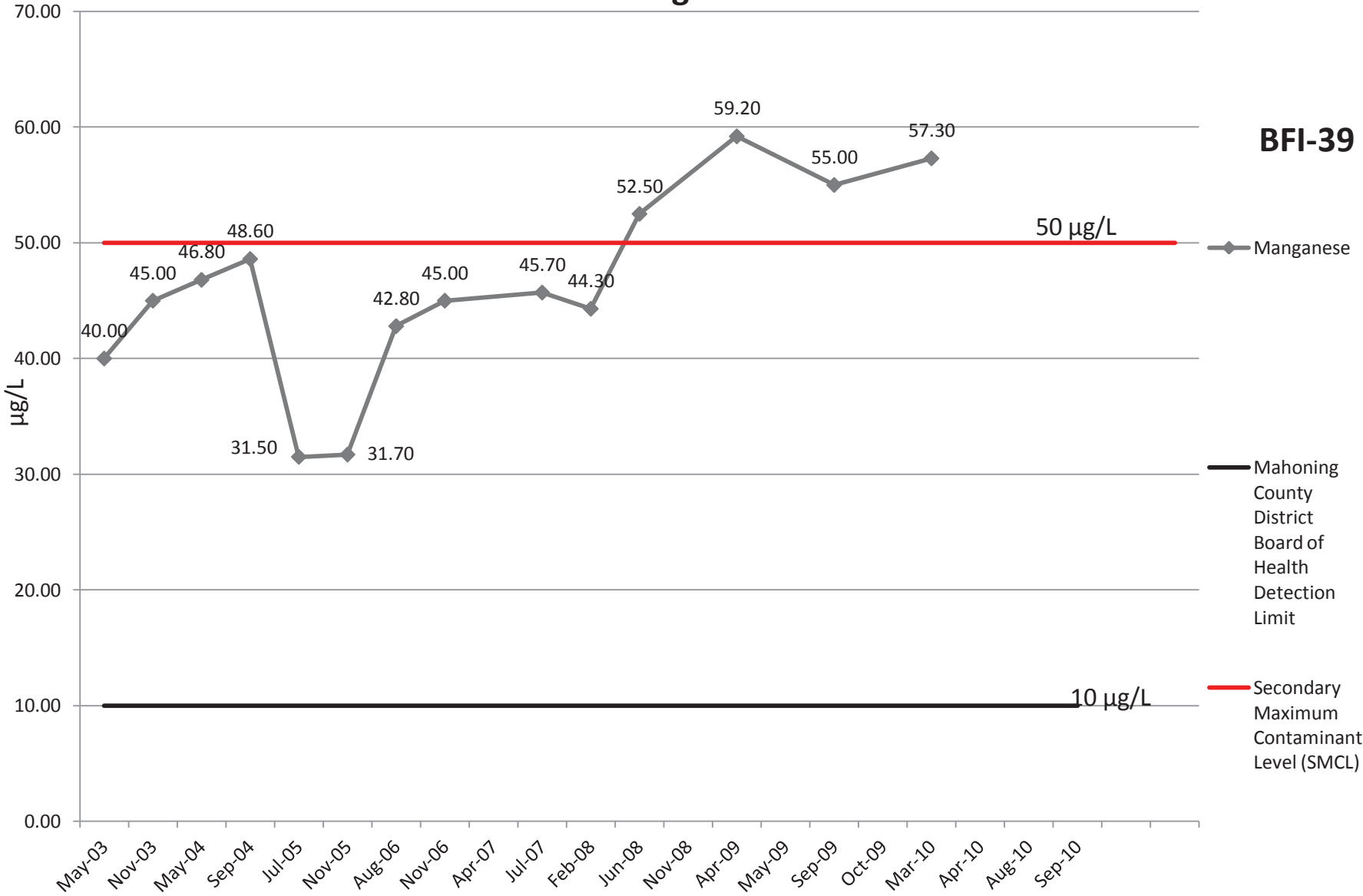
# Lead

**BFI-39**



# Manganese

**BFI-39**



# Mercury

**BFI-39**

2 µg/L

2.50  
2.00  
1.50  
1.00  
0.50  
0.00

µg/L

Mercury

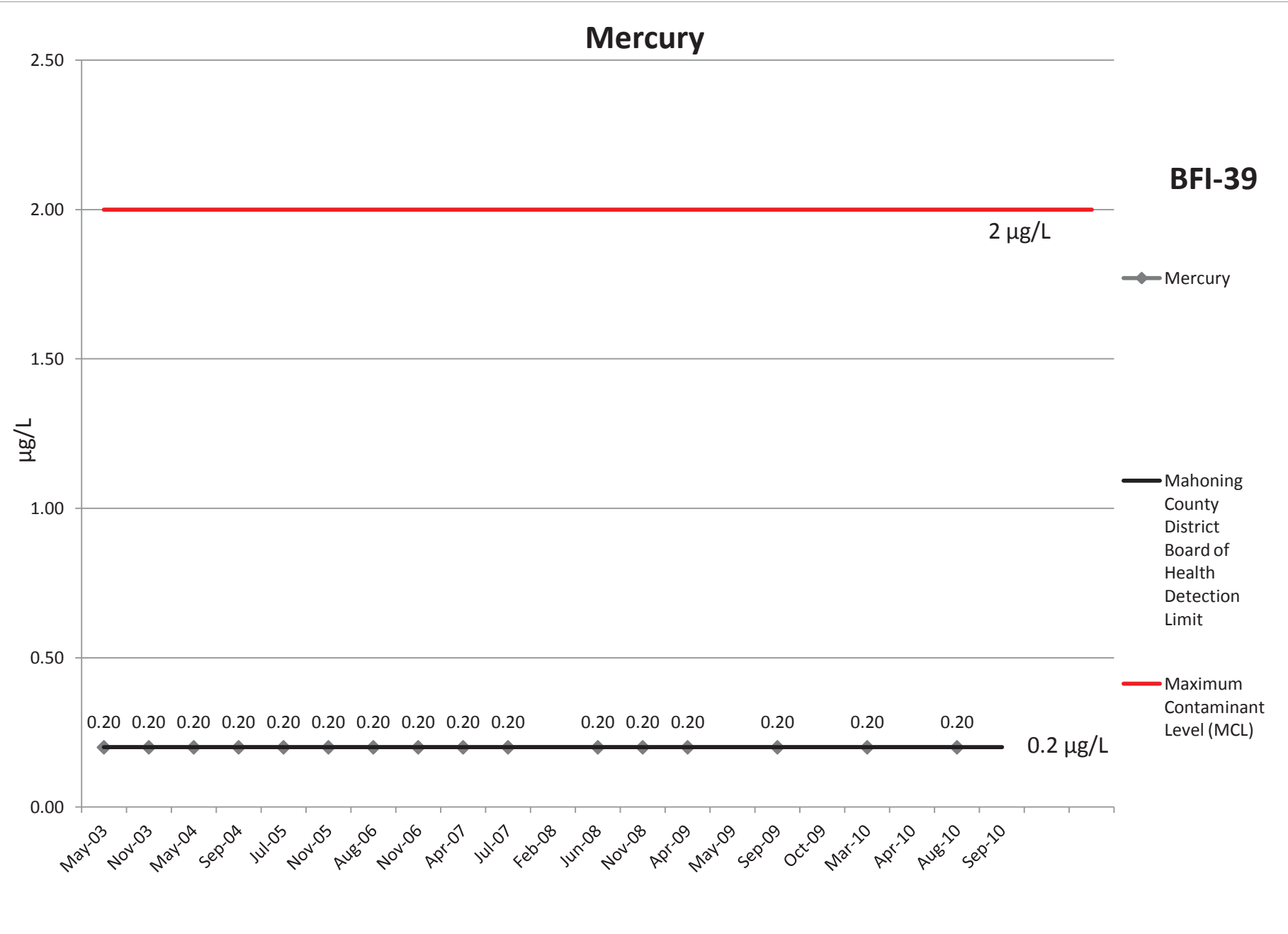
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

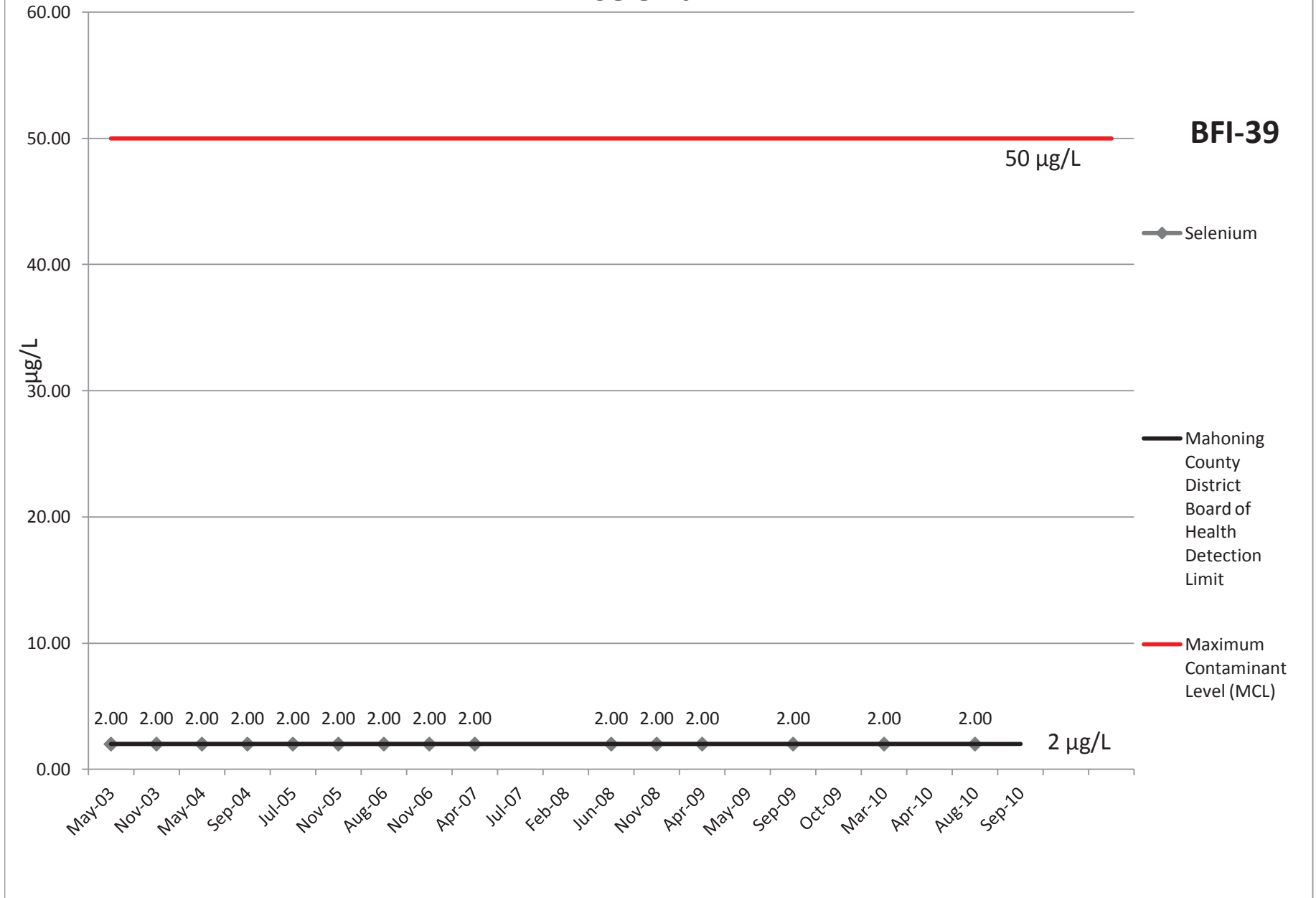
0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20 0.20

0.2 µg/L

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

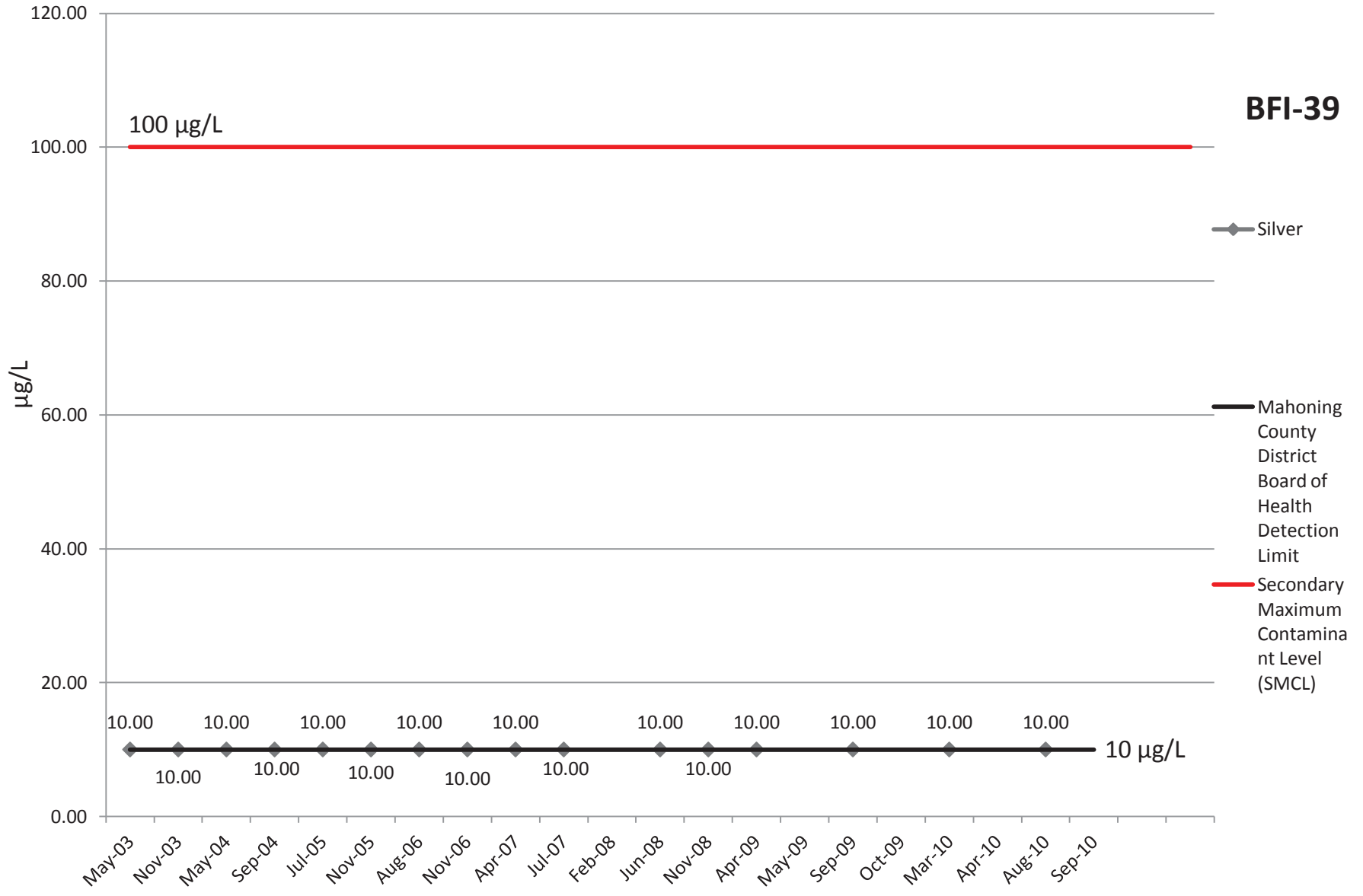


# Selenium



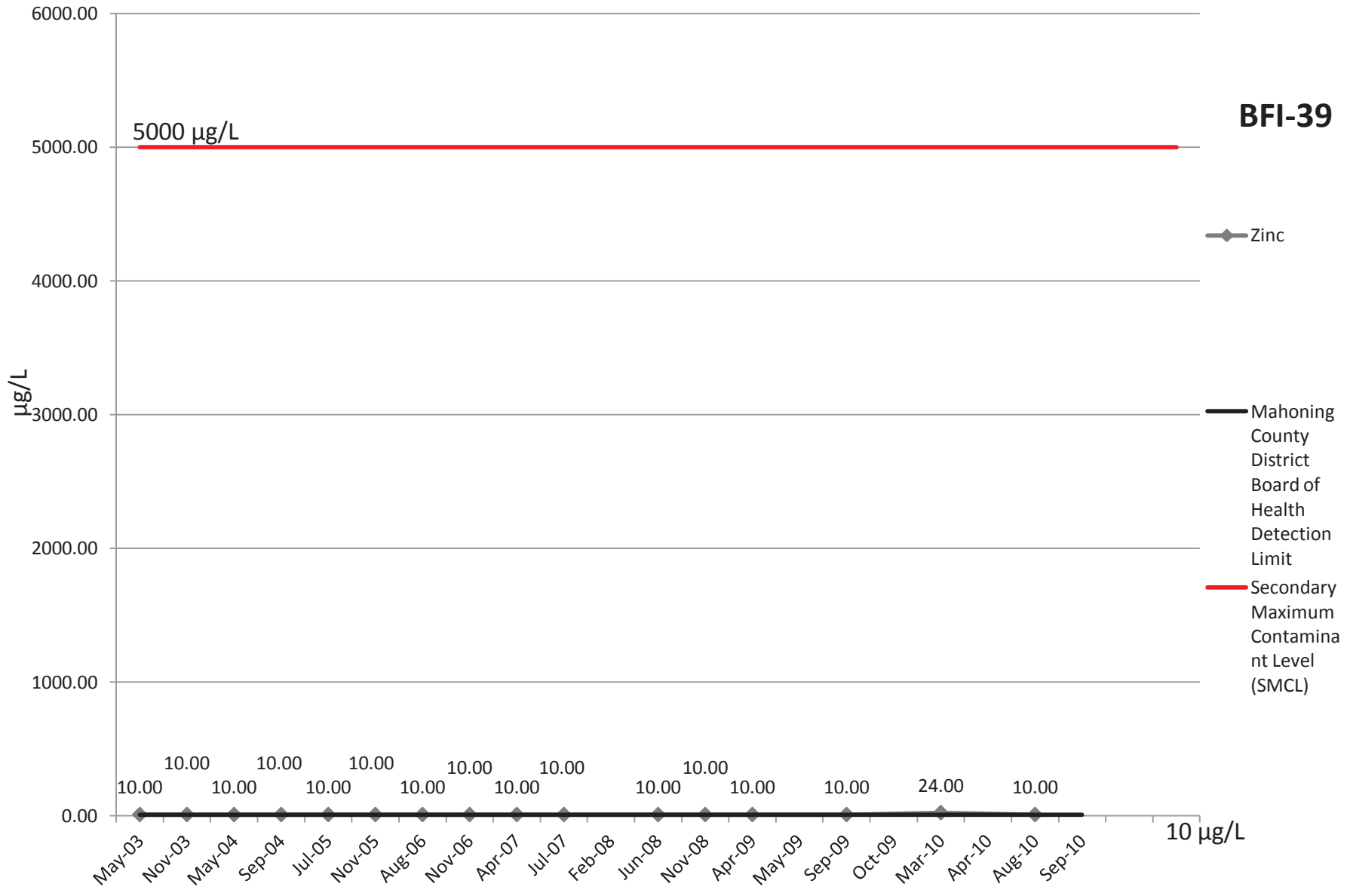
# Silver

**BFI-39**

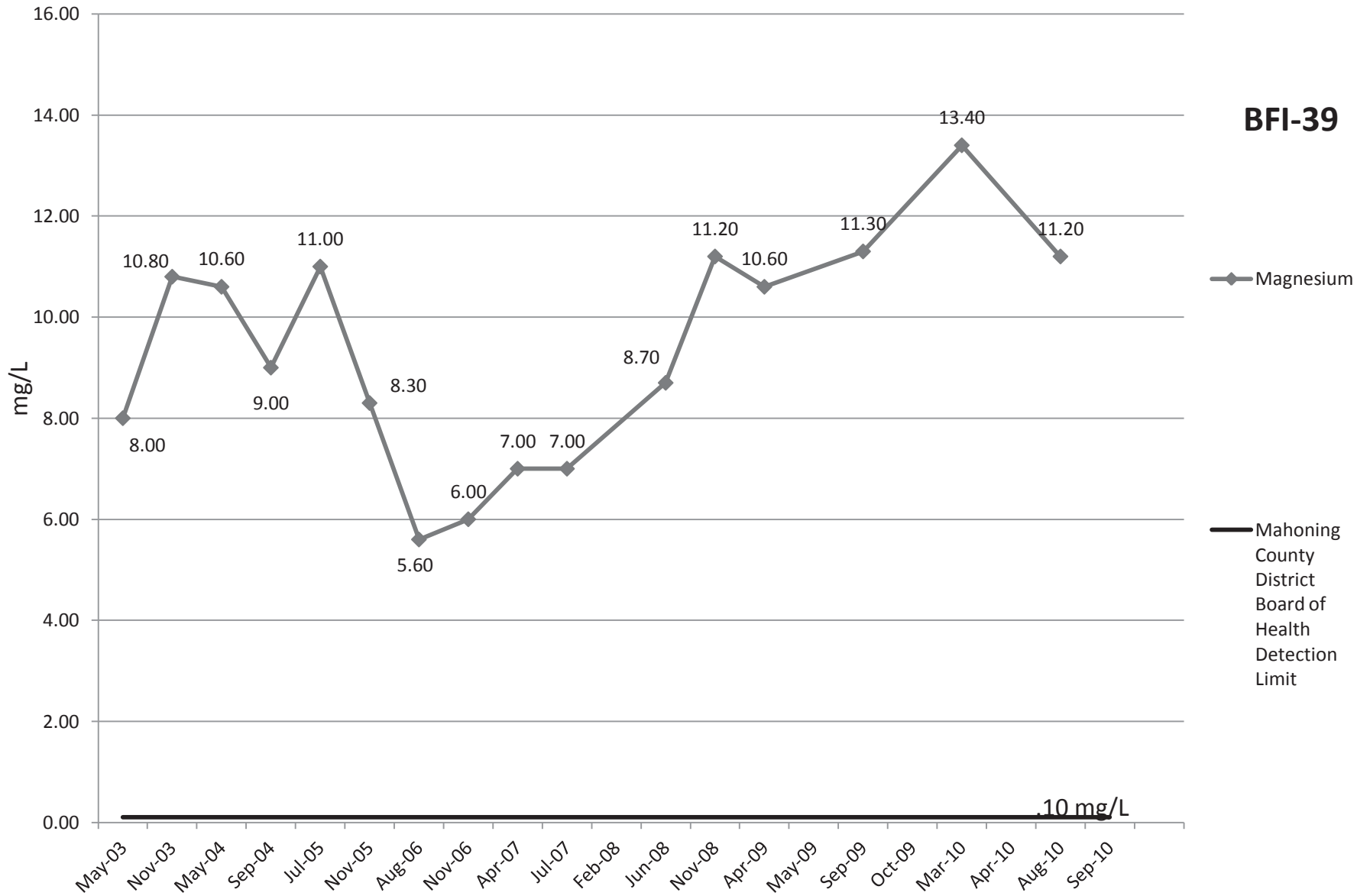


# Zinc

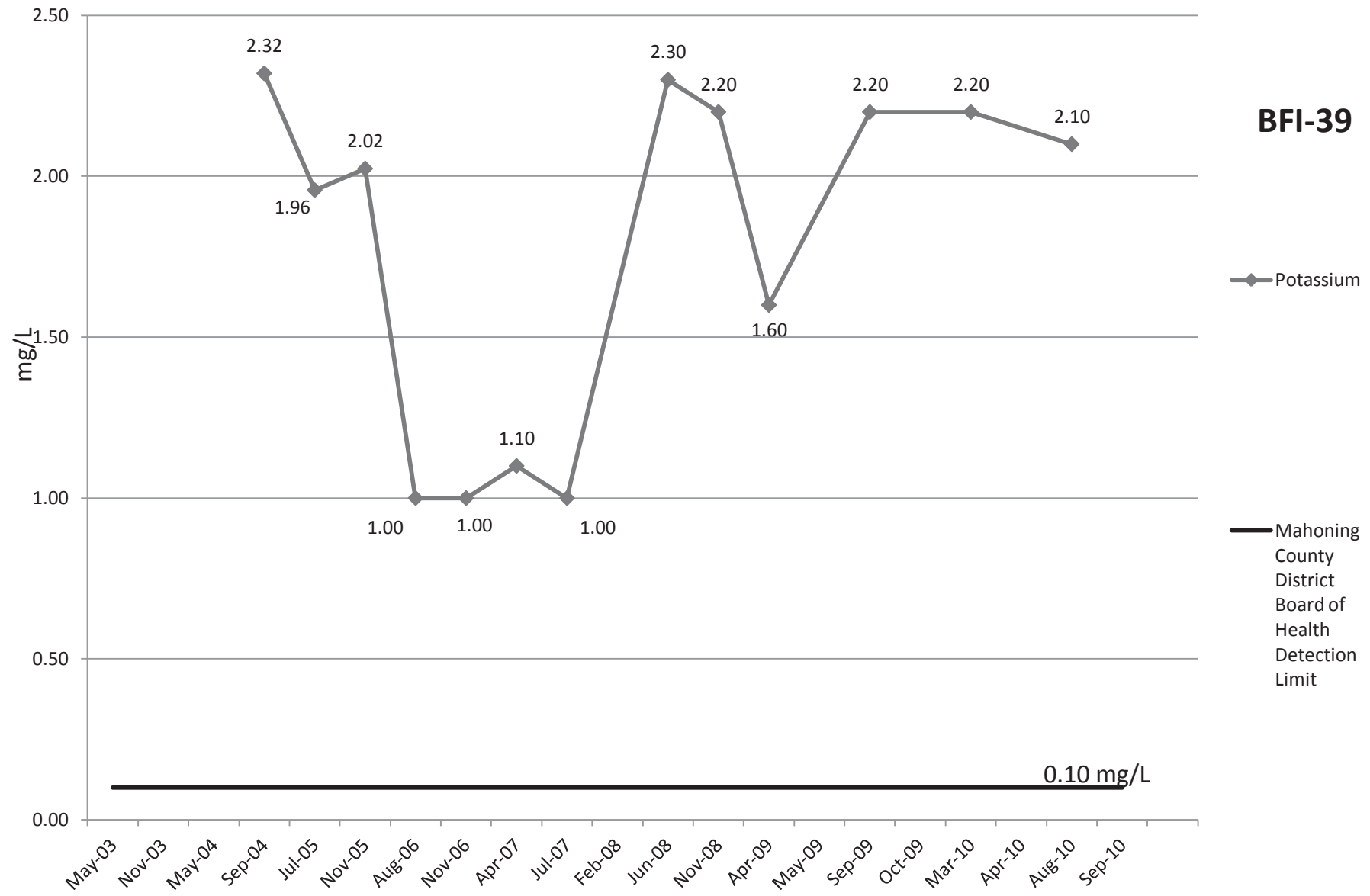
**BFI-39**



# Magnesium



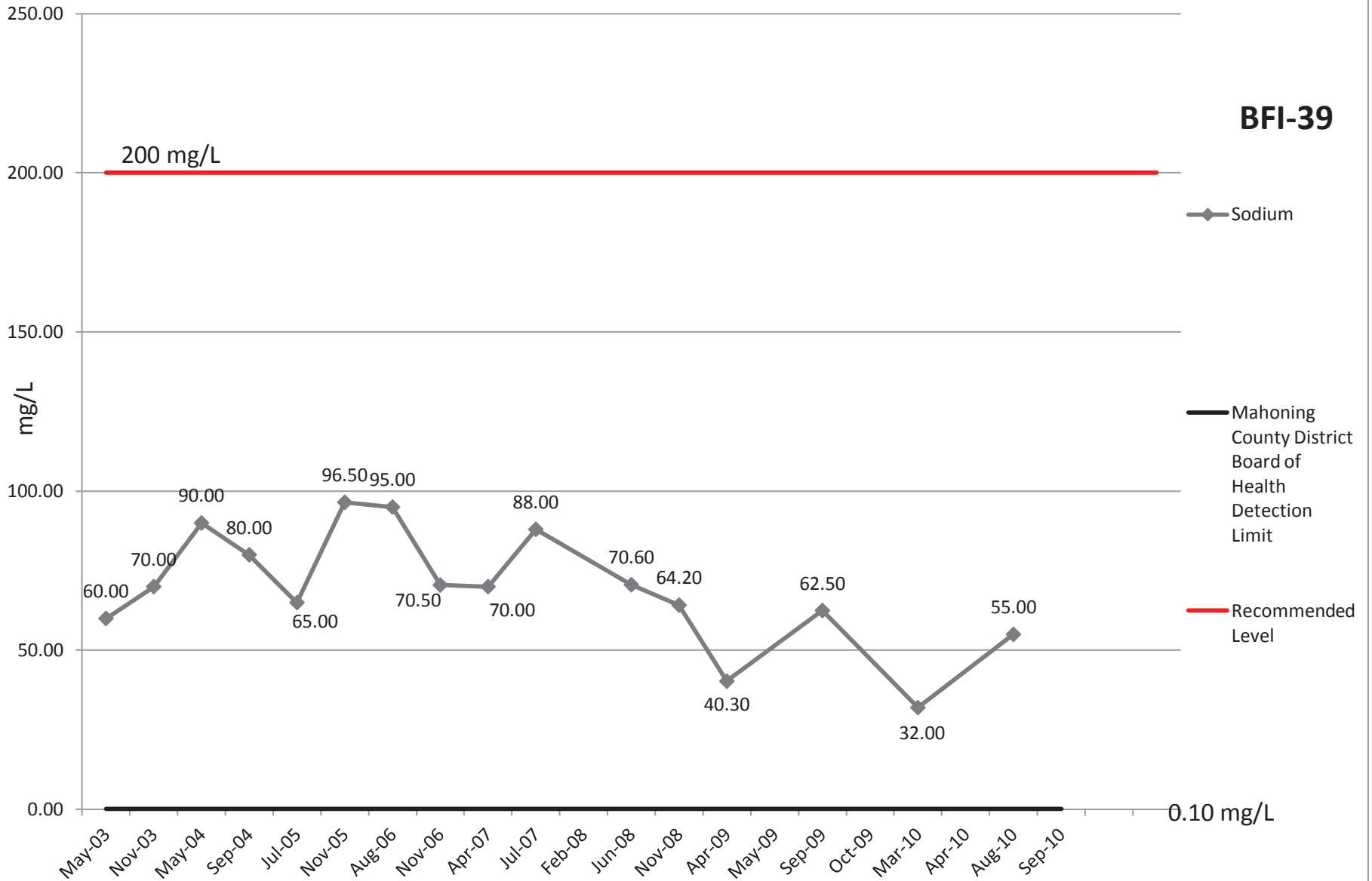
# Potassium



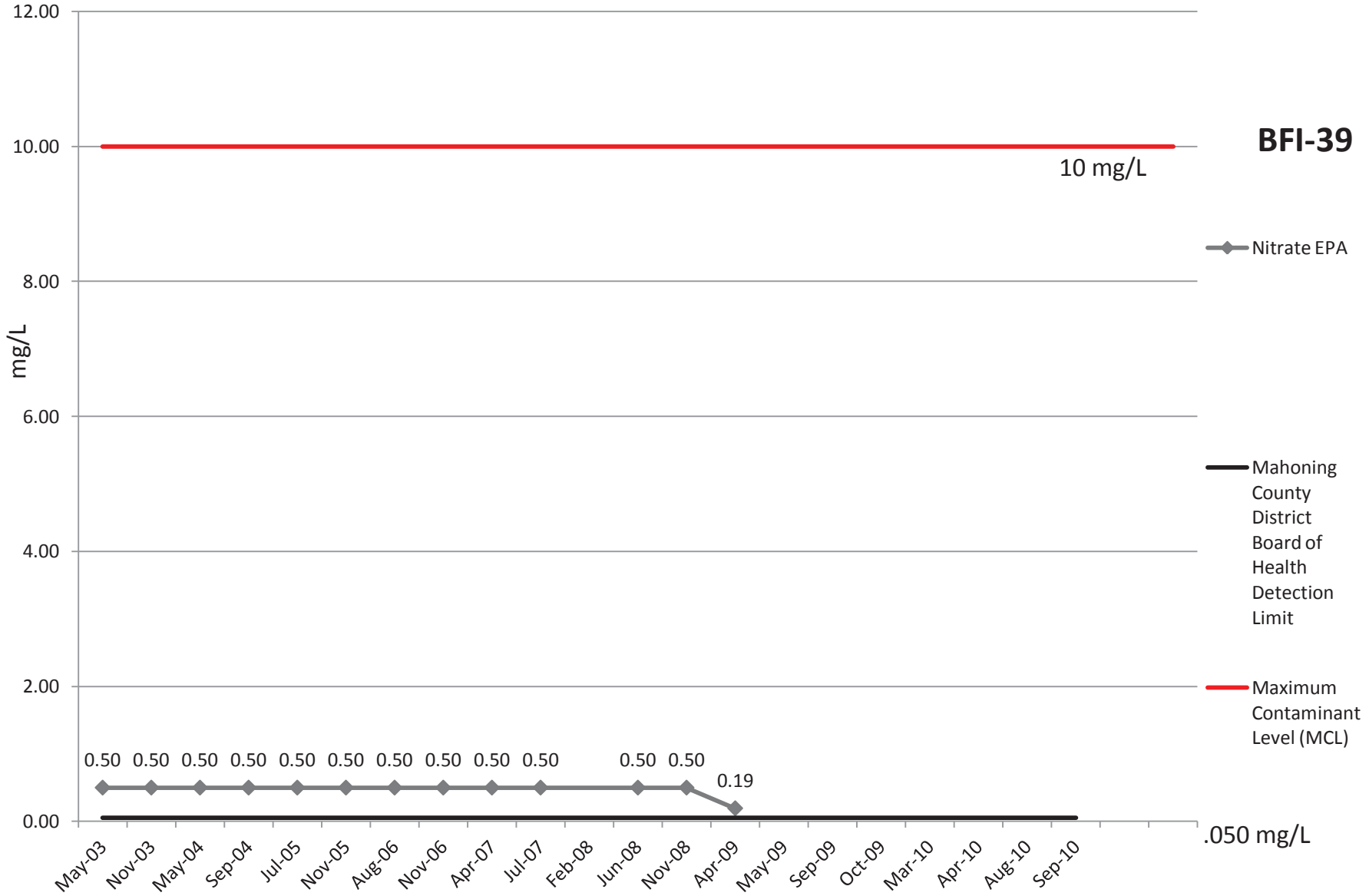


# Sodium

**BFI-39**

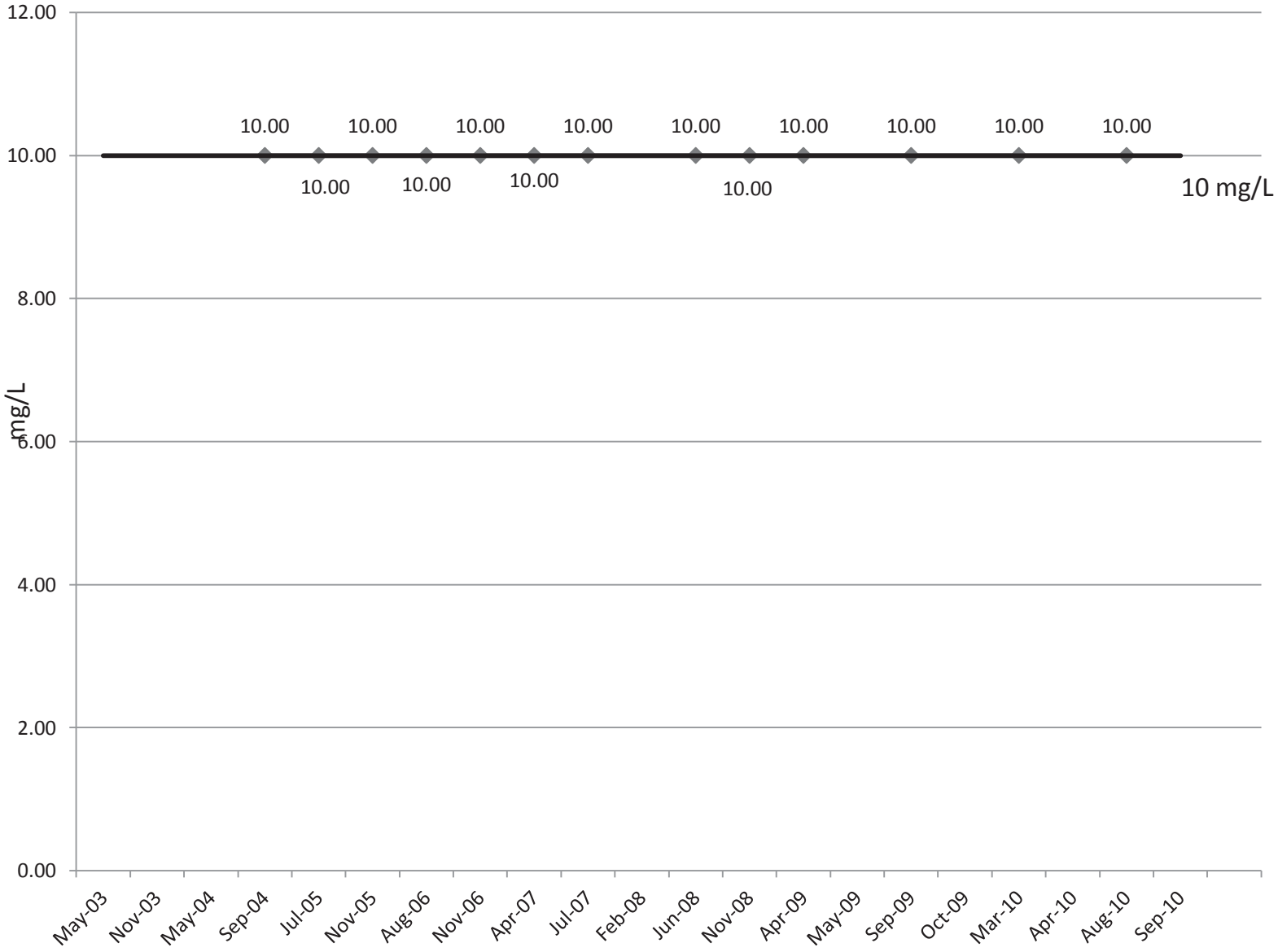


# Nitrate EPA



# COD

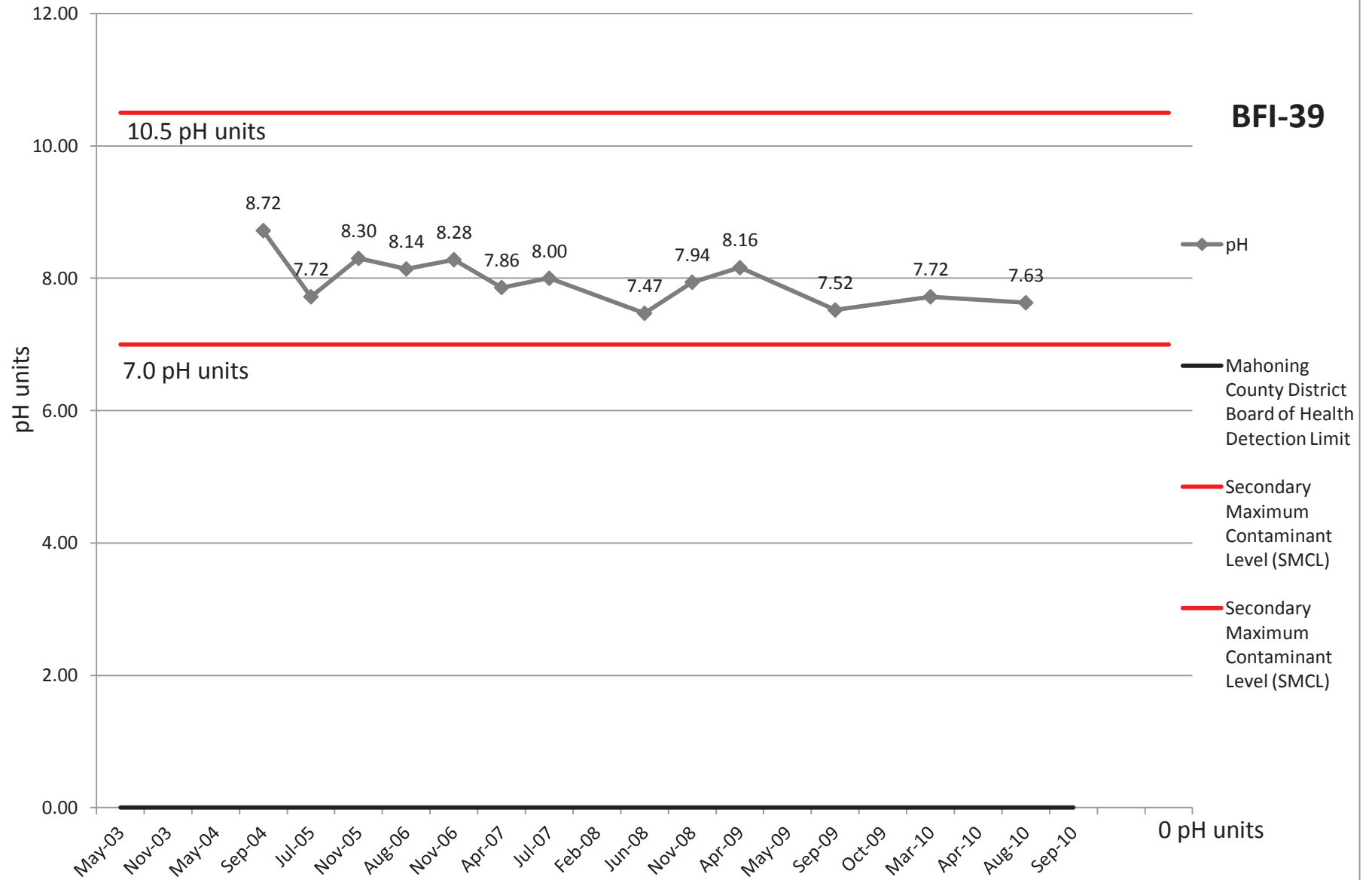
**BFI-39**



◆ COD

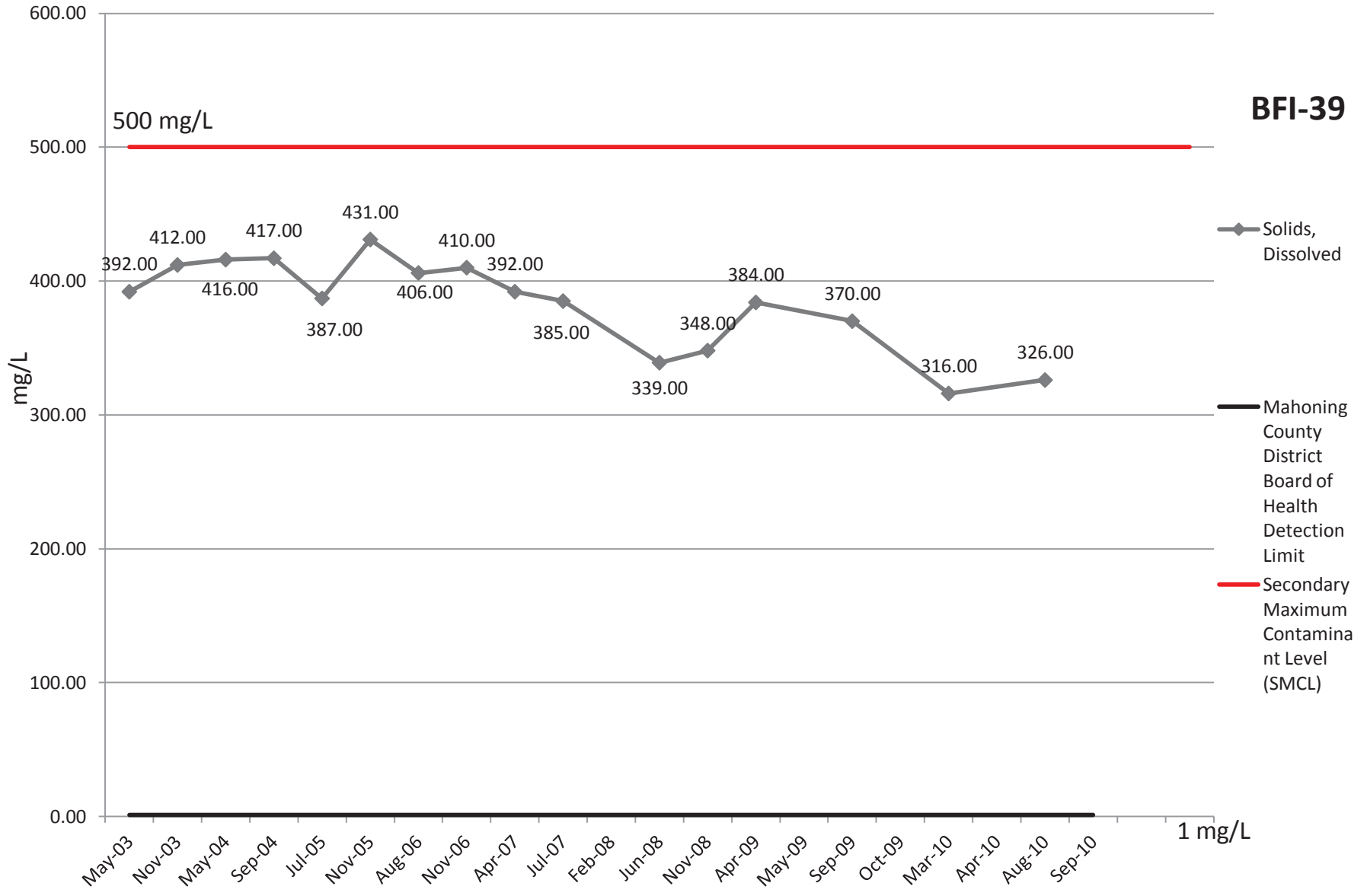
— Mahoning County District Board of Health Detection Limit

# pH



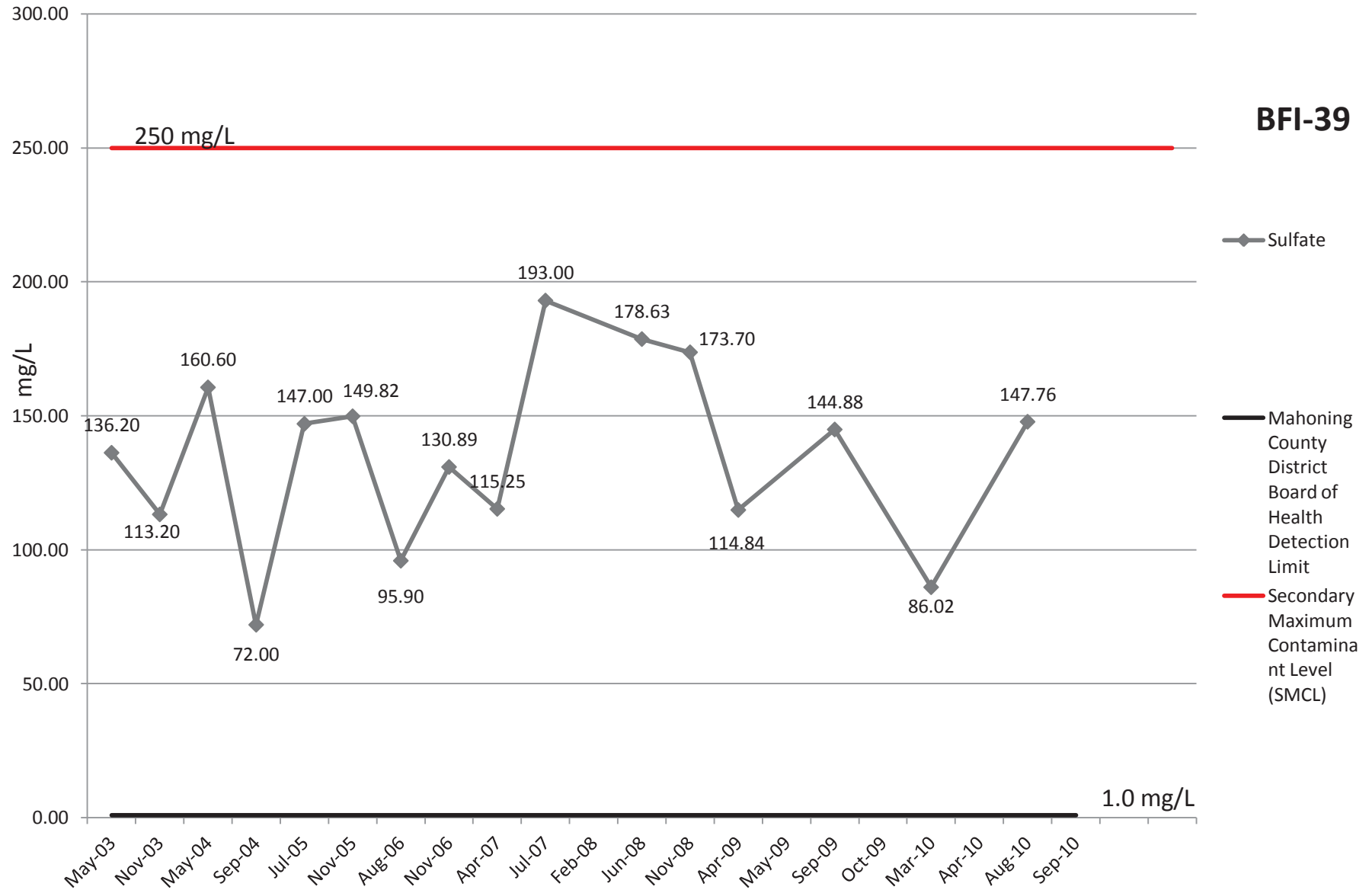
# Solids, Dissolved

**BFI-39**



# Sulfate

**BFI-39**



# Bacteria

## BFI-39

Positive/Negative

◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

positive (1)

1.00

1.00

negative (0)

0.00

0.00

0.00

0.00

0.00

May-03

Nov-03

May-04

Sep-04

Jul-05

Nov-05

Aug-06

Nov-06

Apr-07

Jul-07

Feb-08

Jun-08

Nov-08

Apr-09

May-09

Sep-09

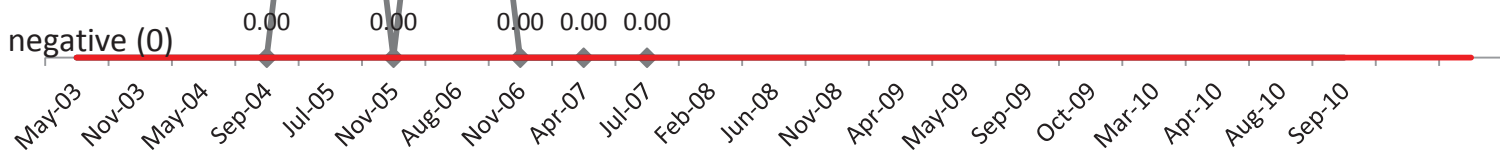
Oct-09

Mar-10

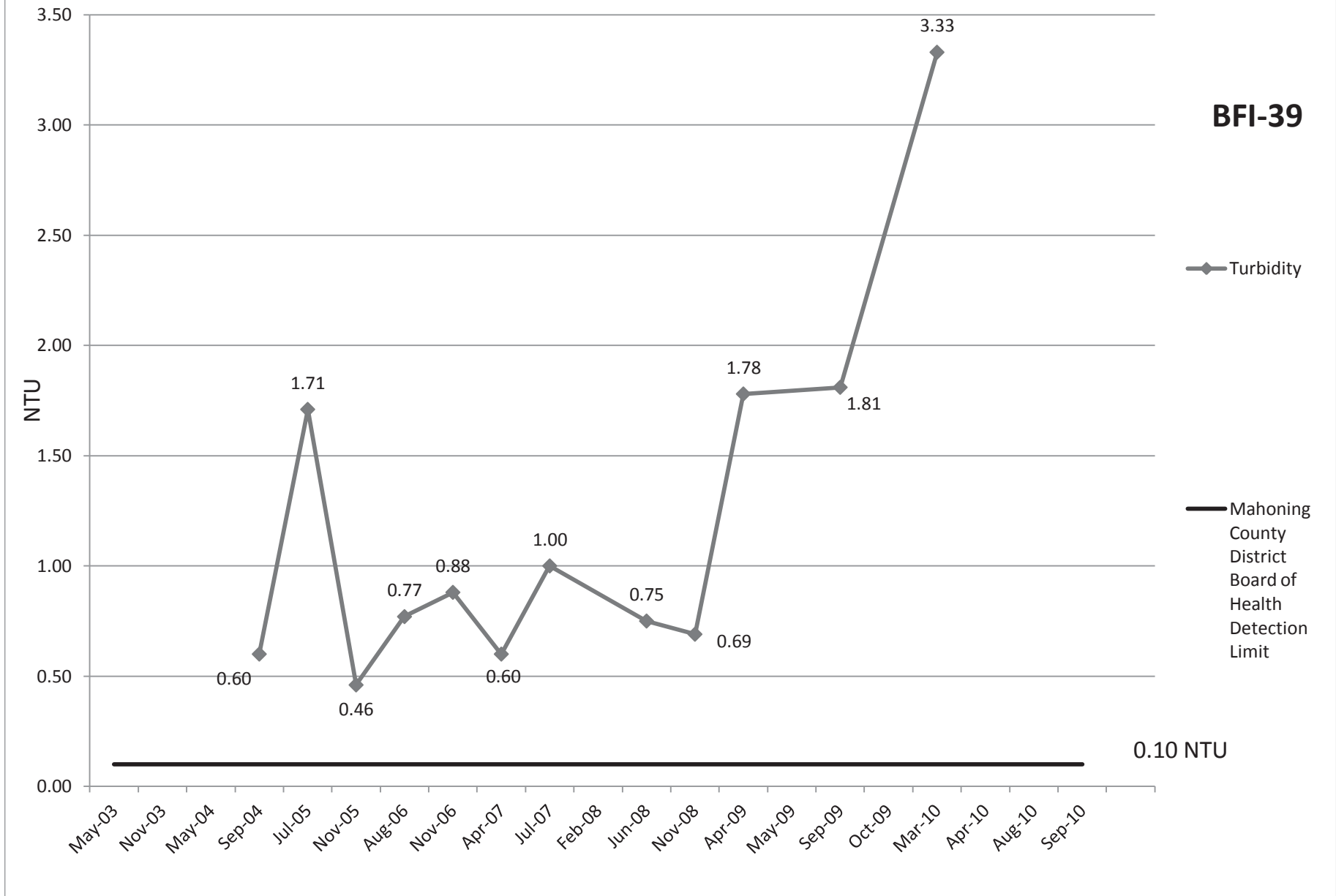
Apr-10

Aug-10

Sep-10

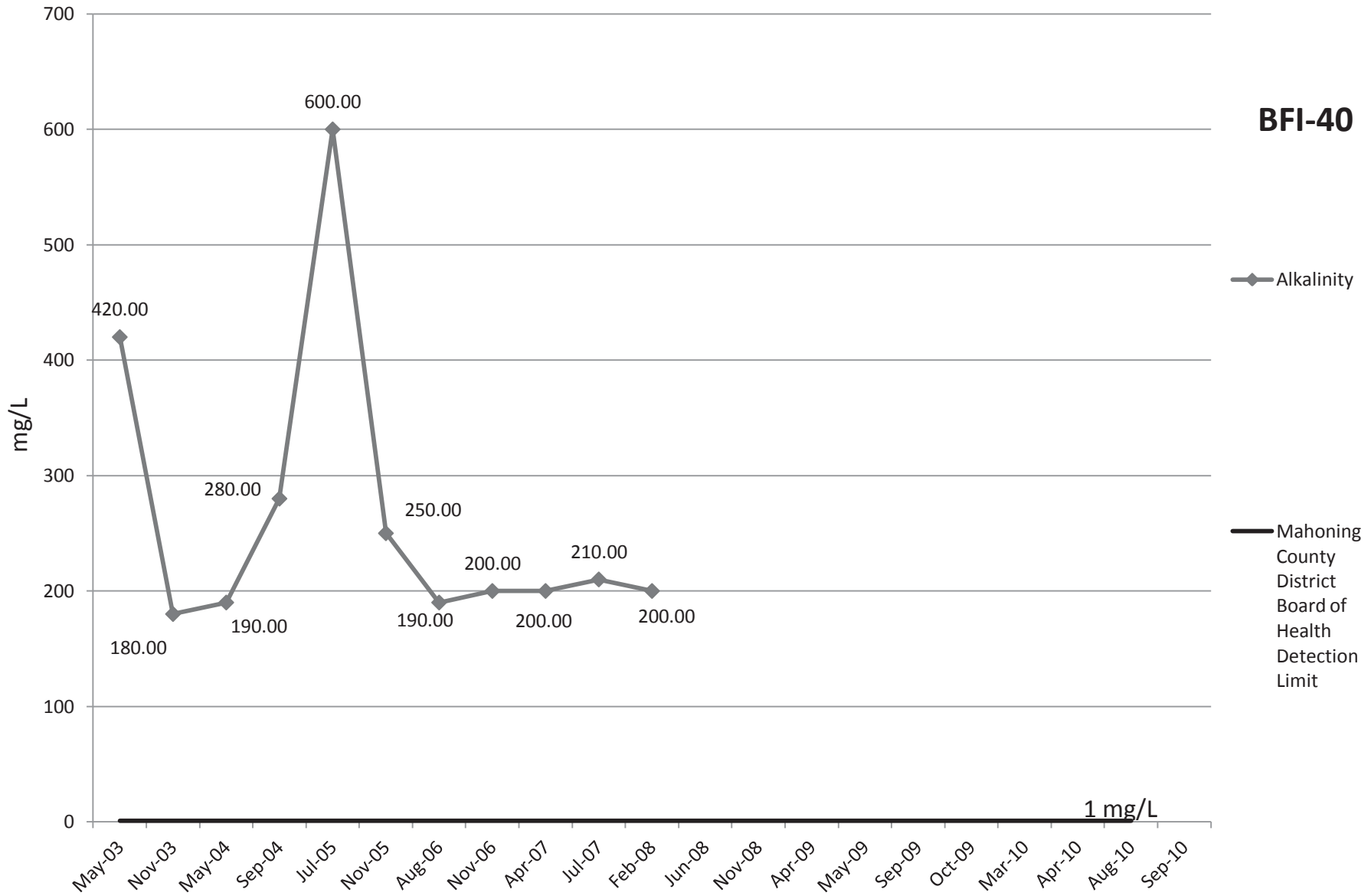


# Turbidity

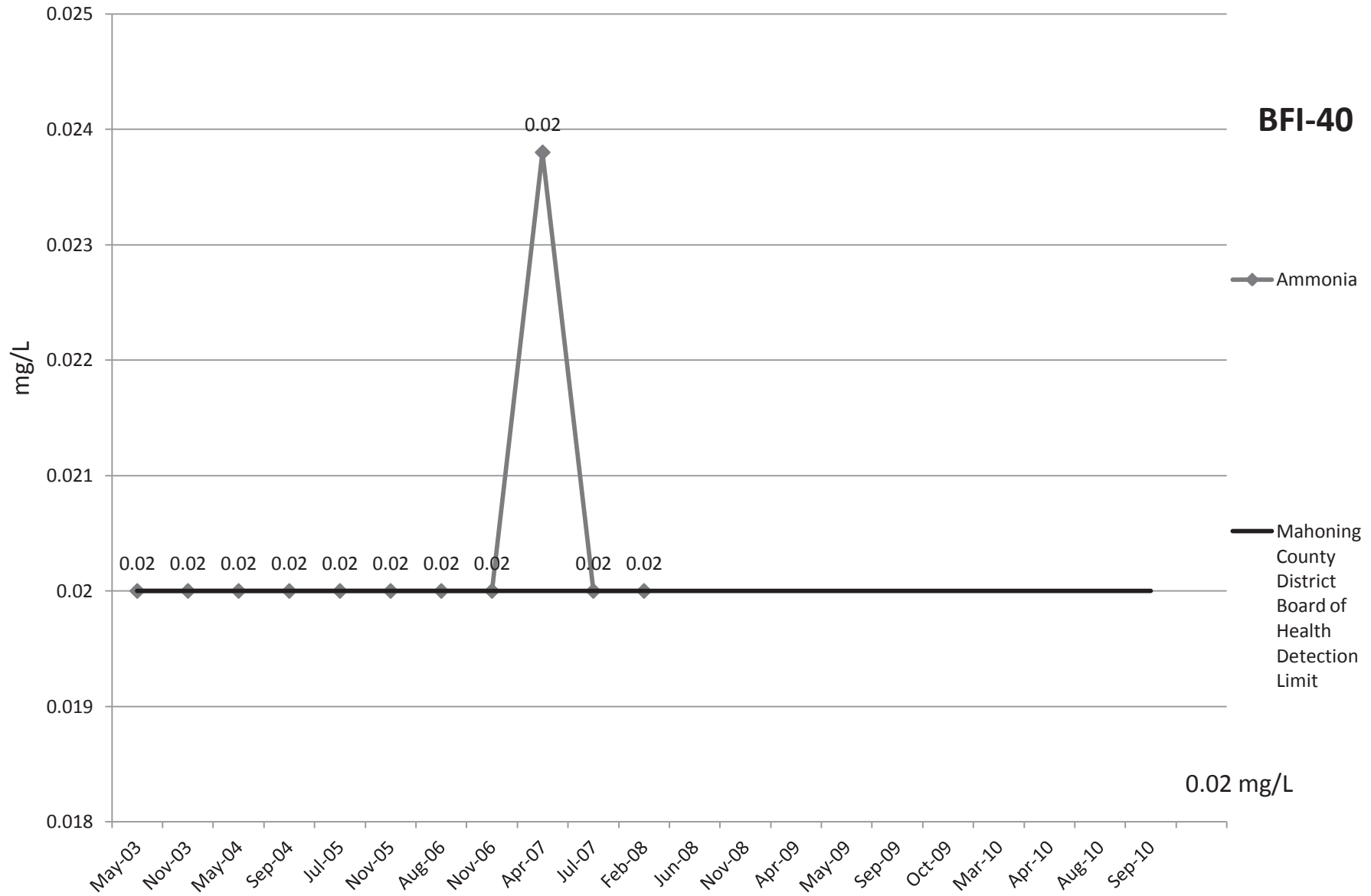




# Alkalinity



# Ammonia



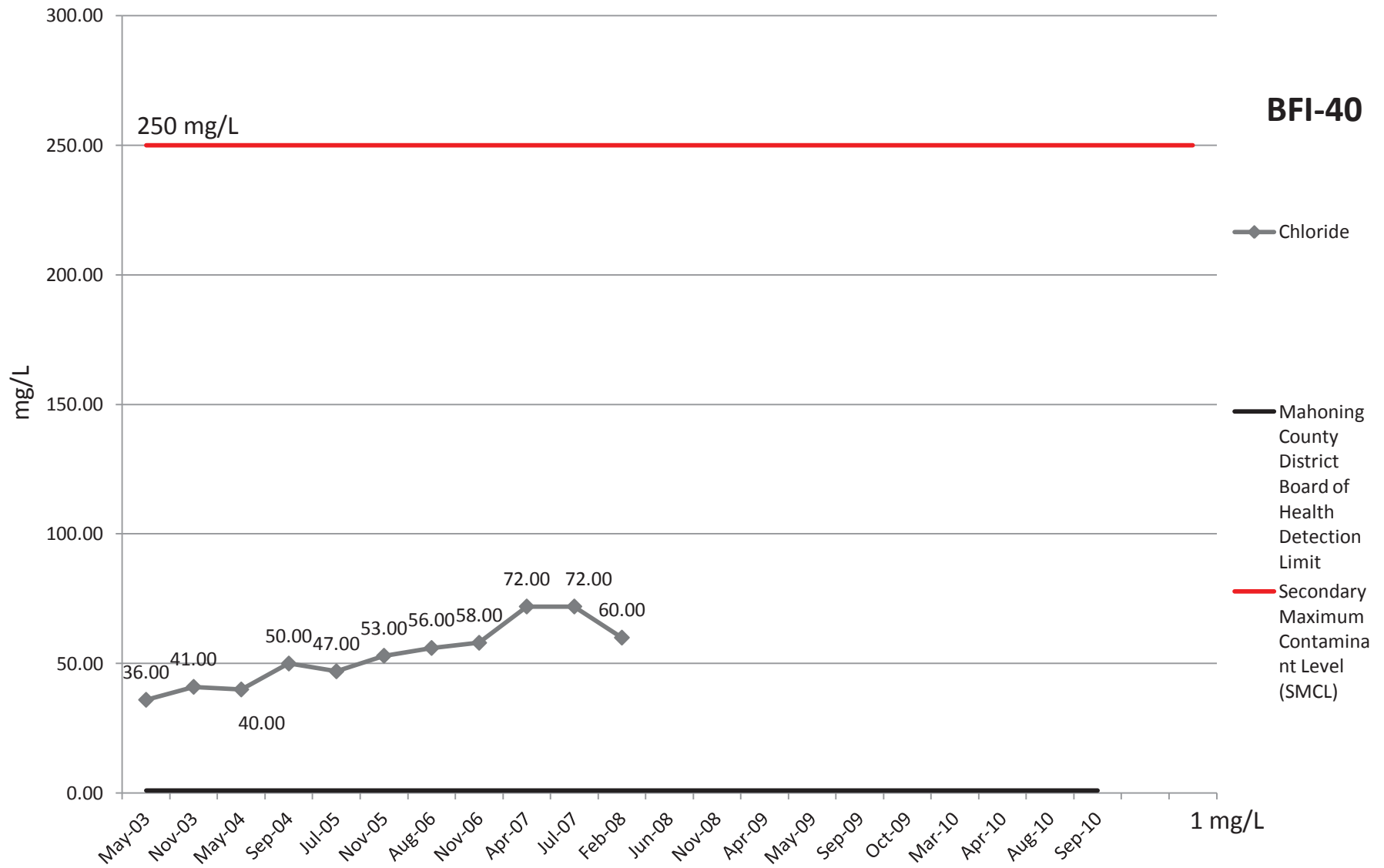
**BFI-40**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

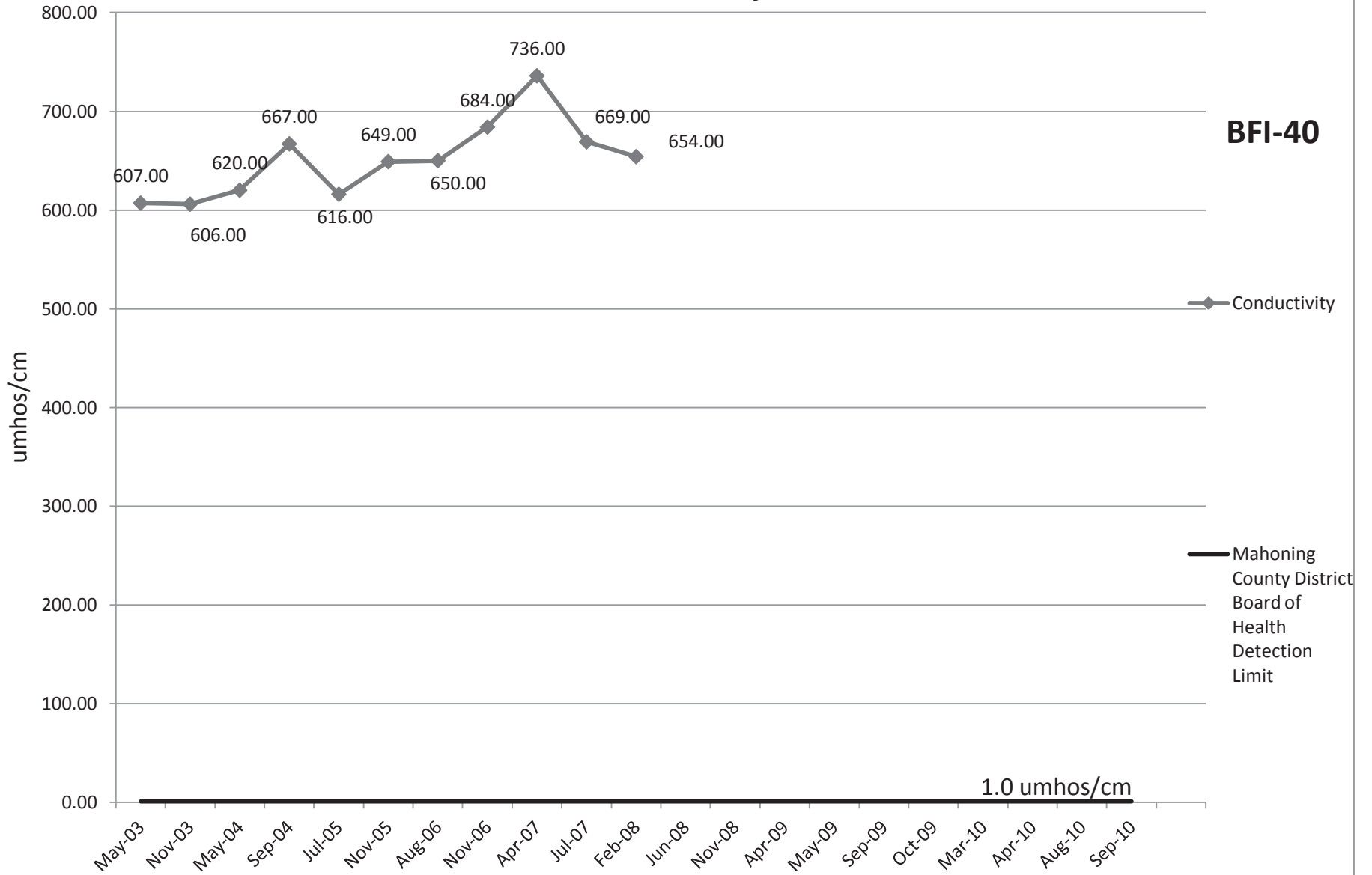
0.02 mg/L

# Chloride

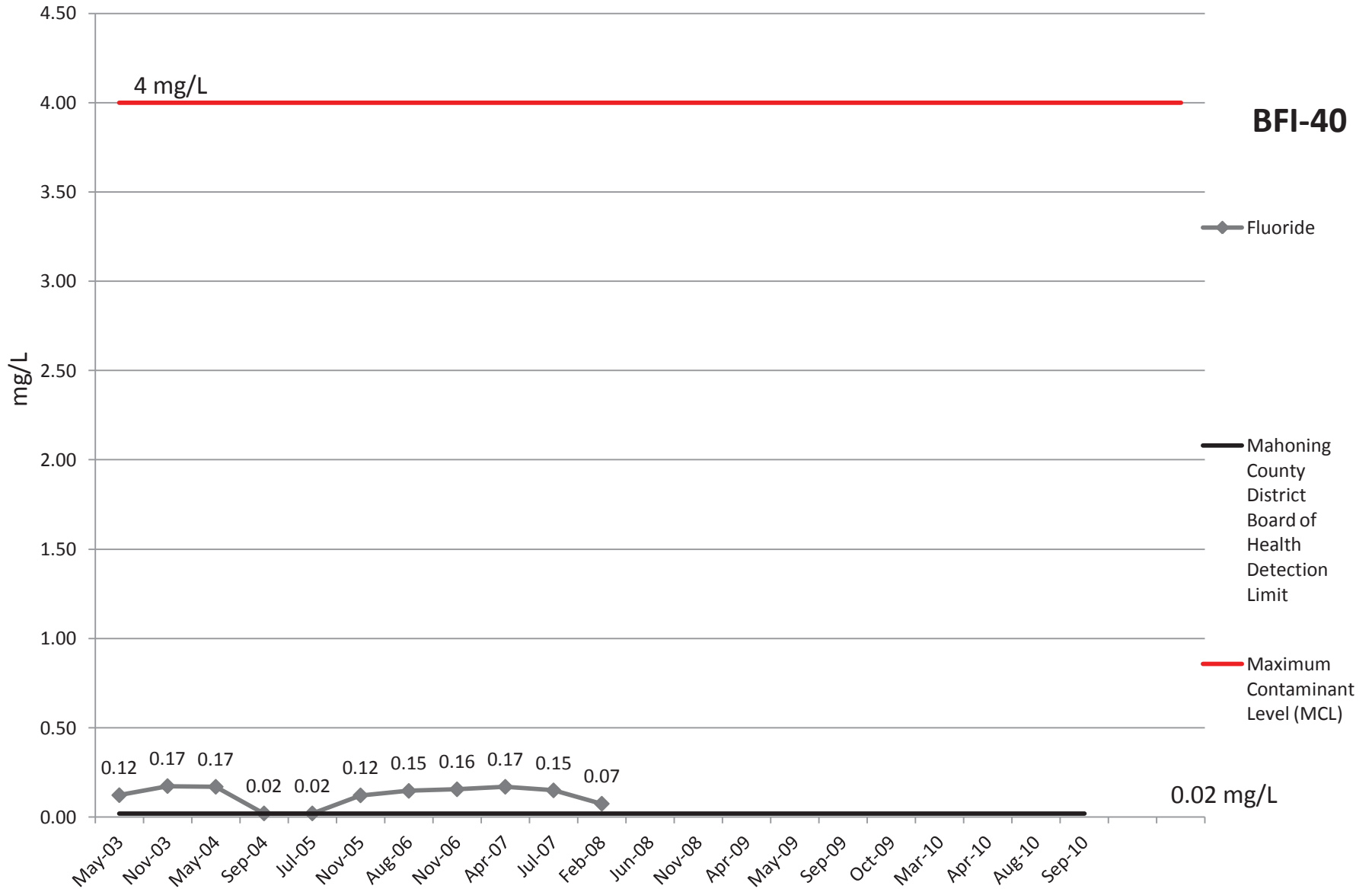


# Conductivity

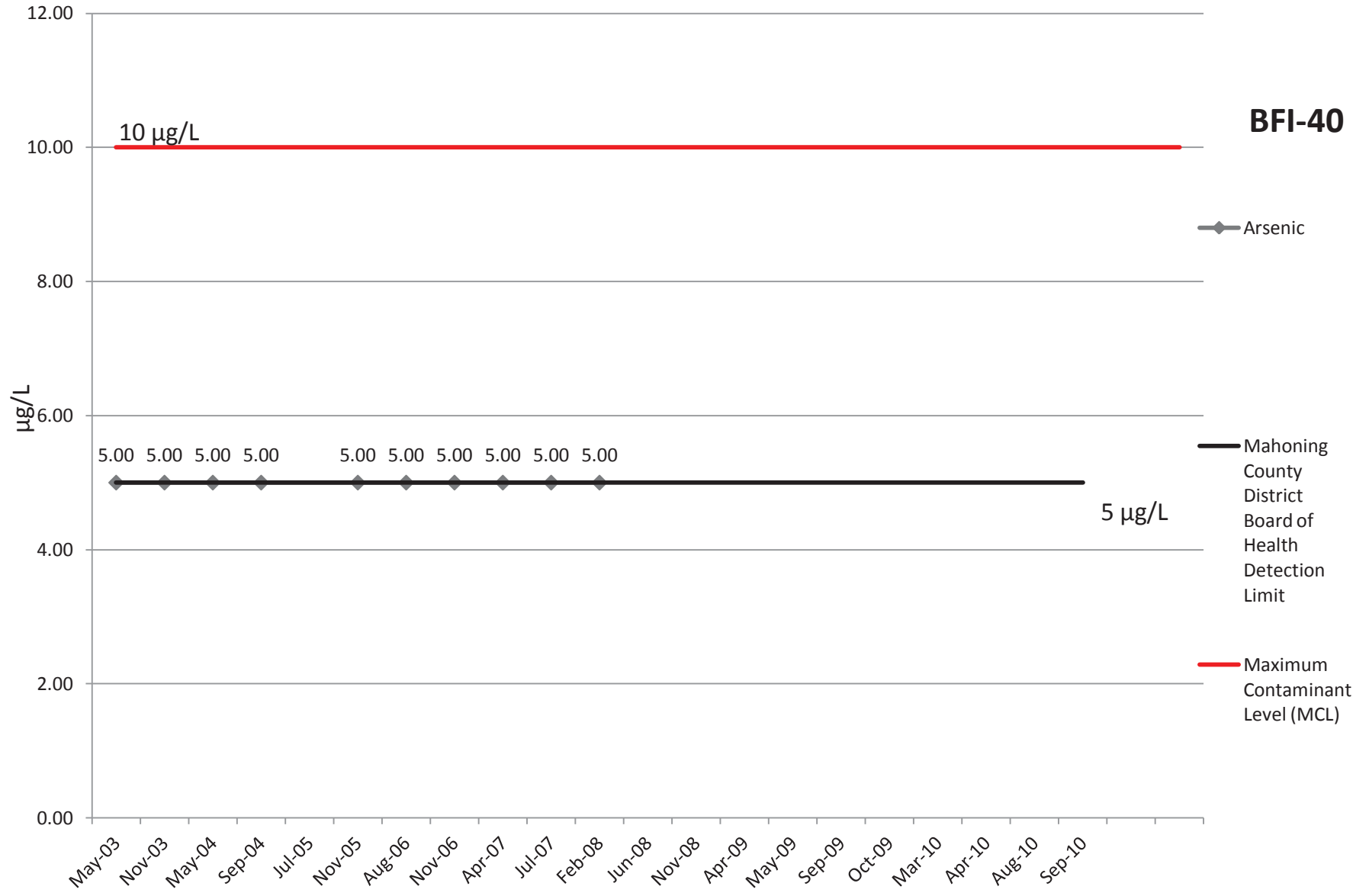
**BFI-40**



# Fluoride



# Arsenic



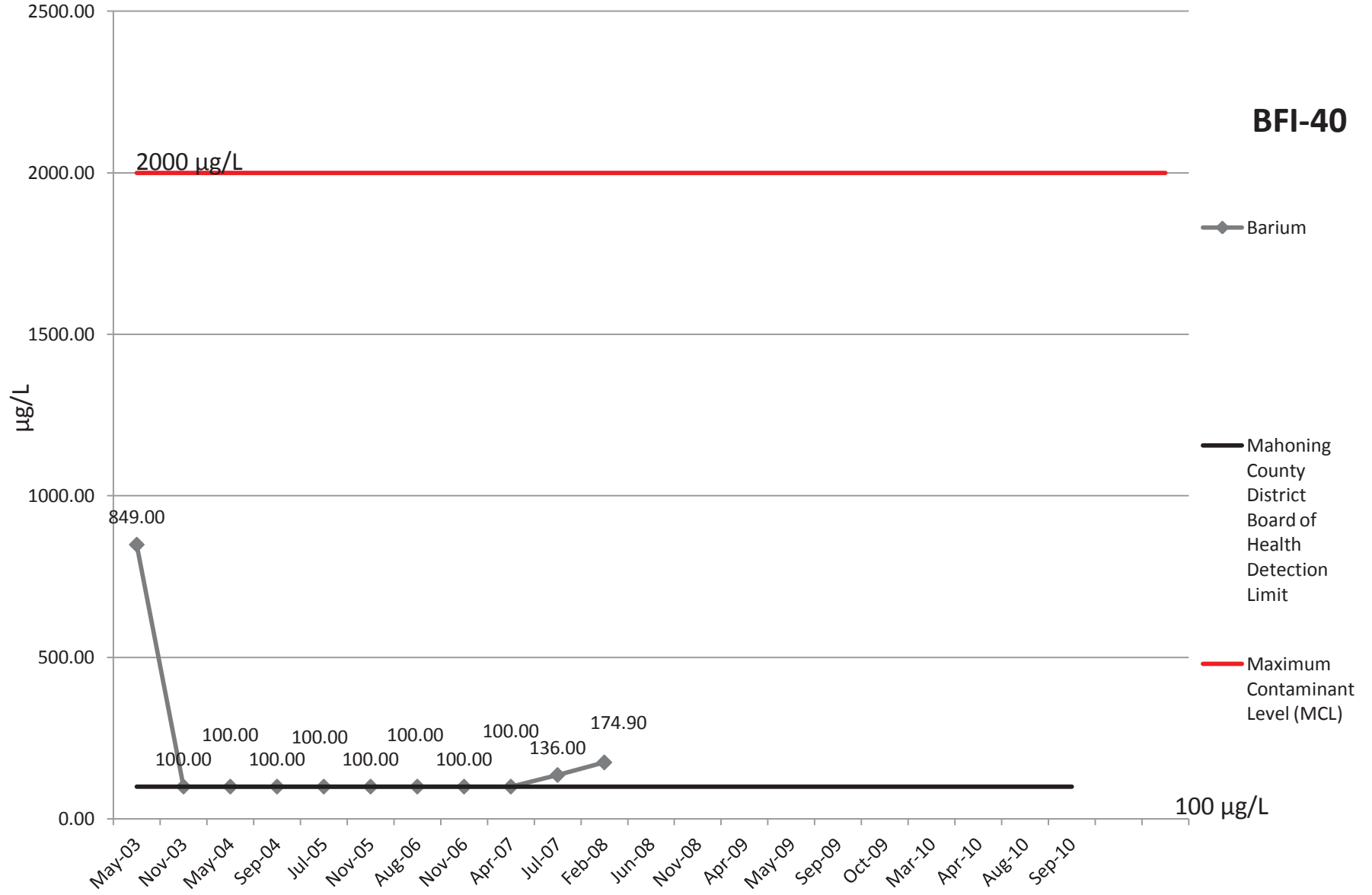
**BFI-40**

◆ Arsenic

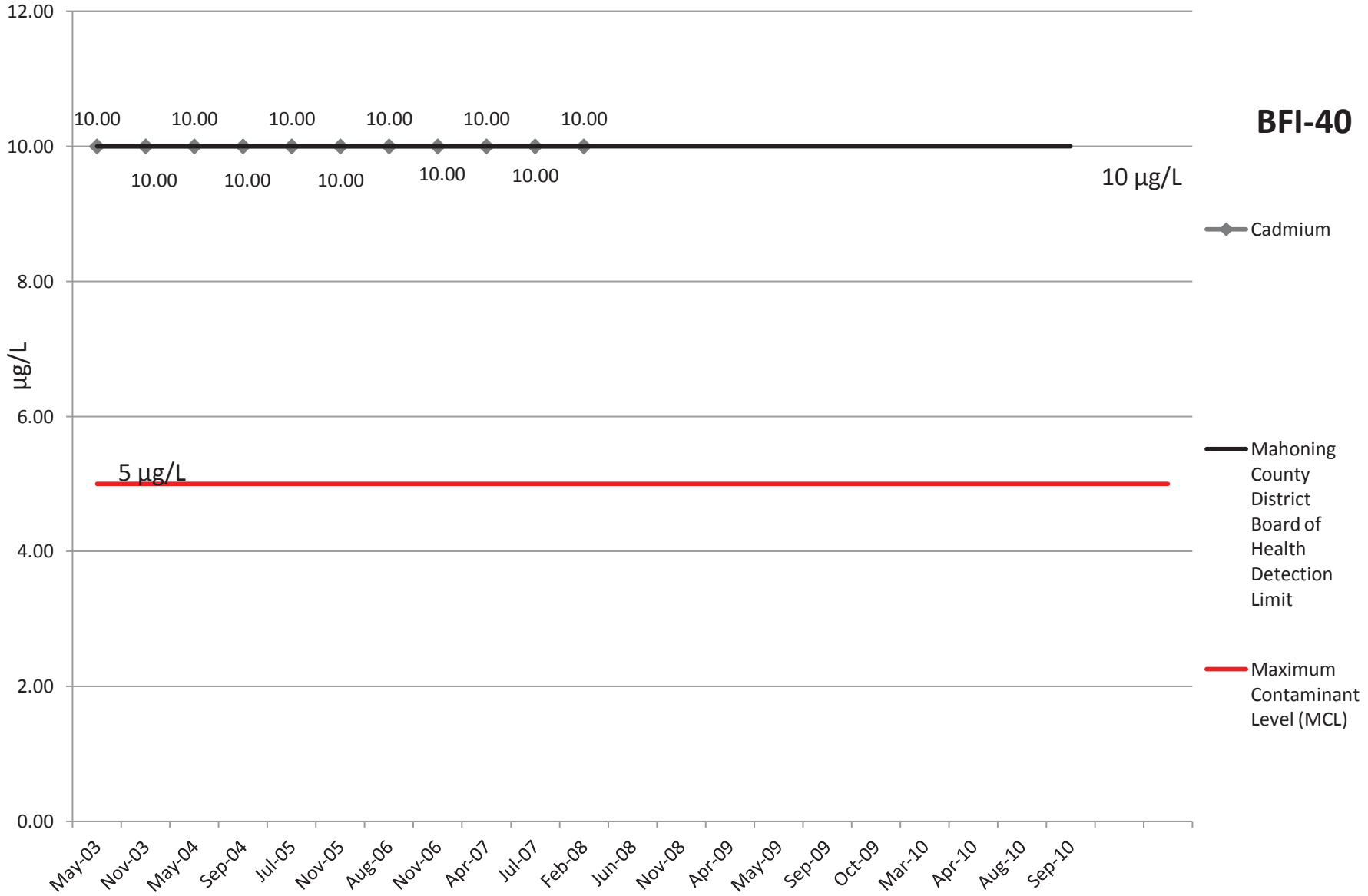
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

# Barium

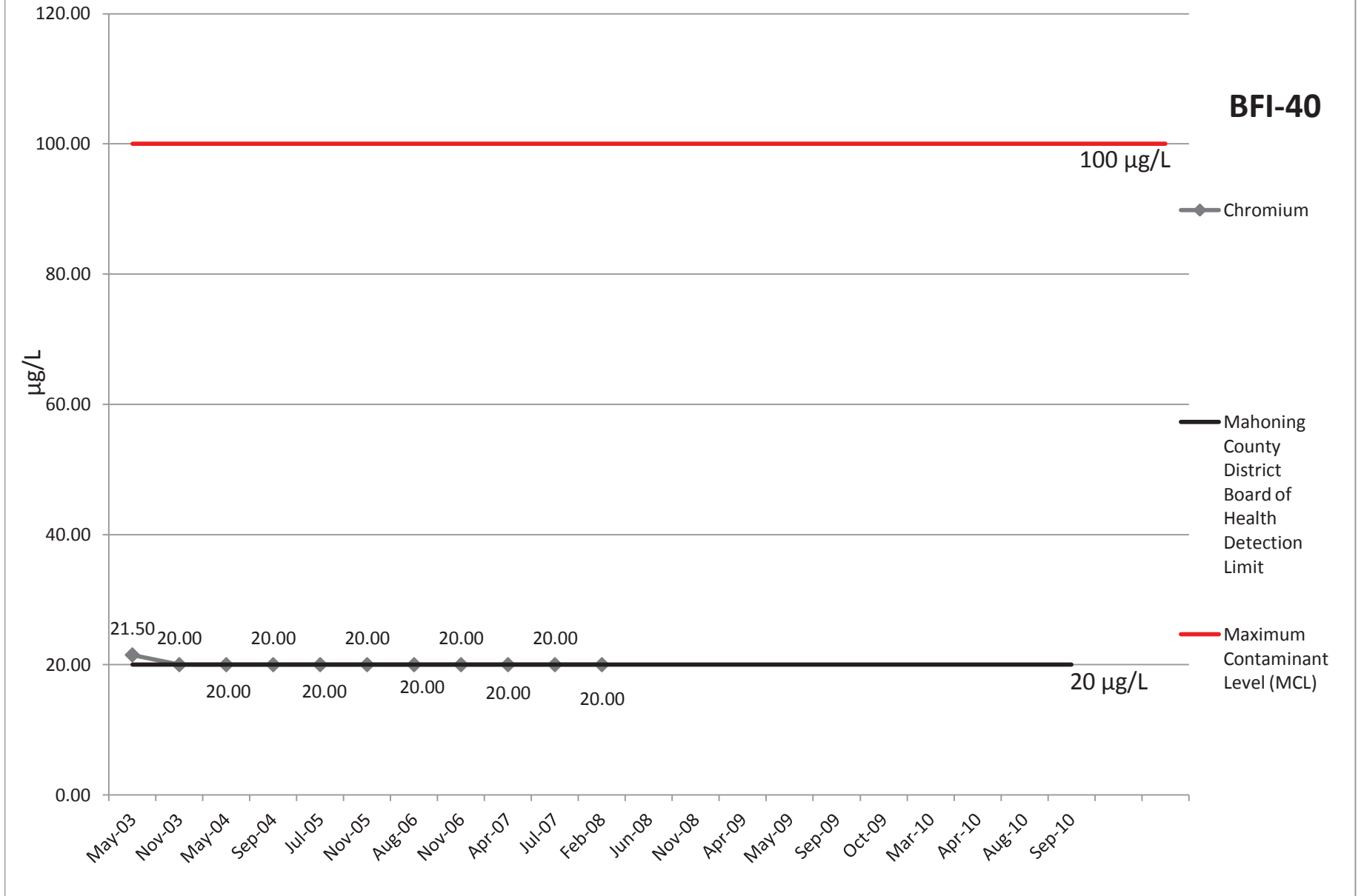


# Cadmium

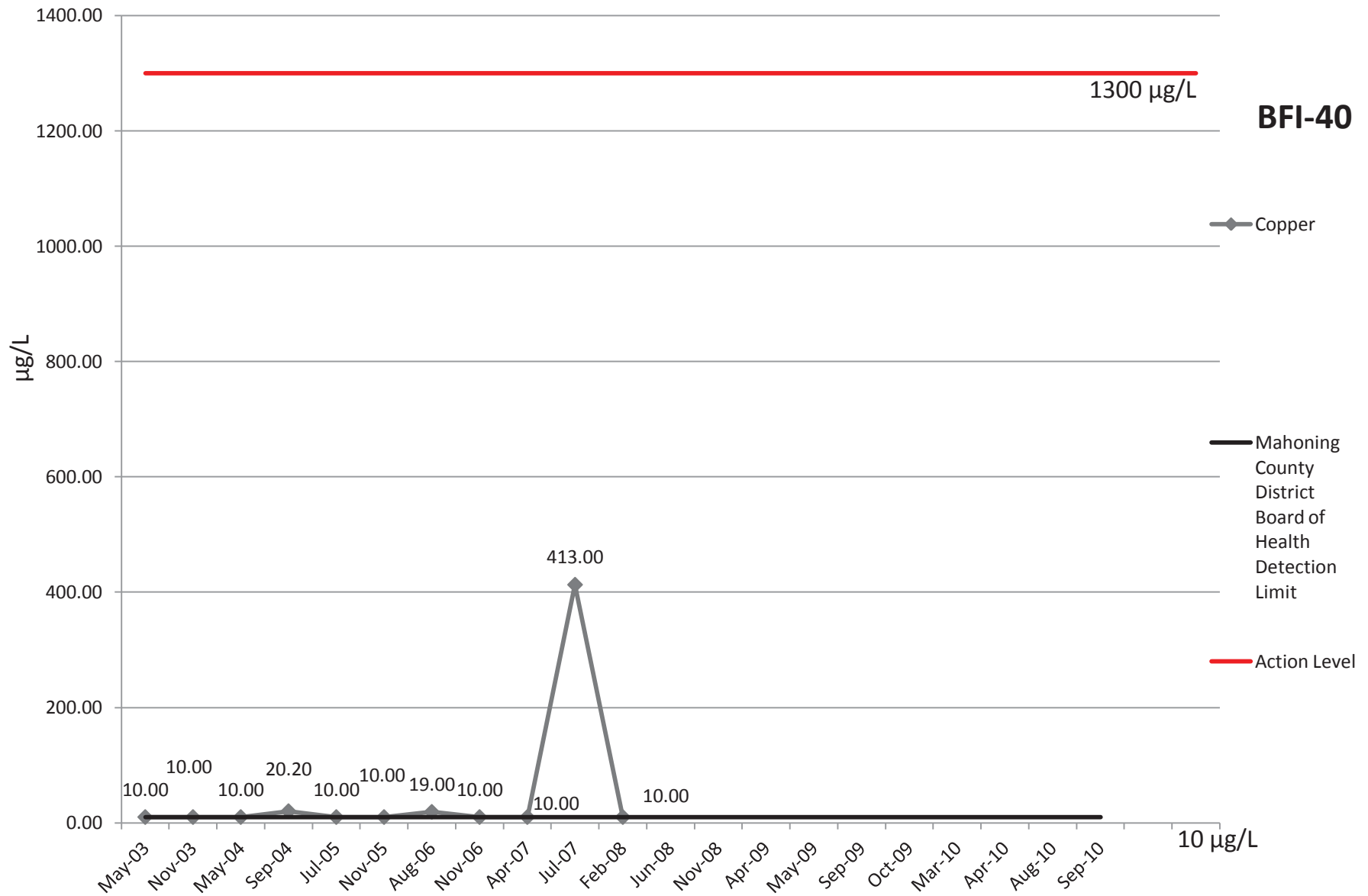




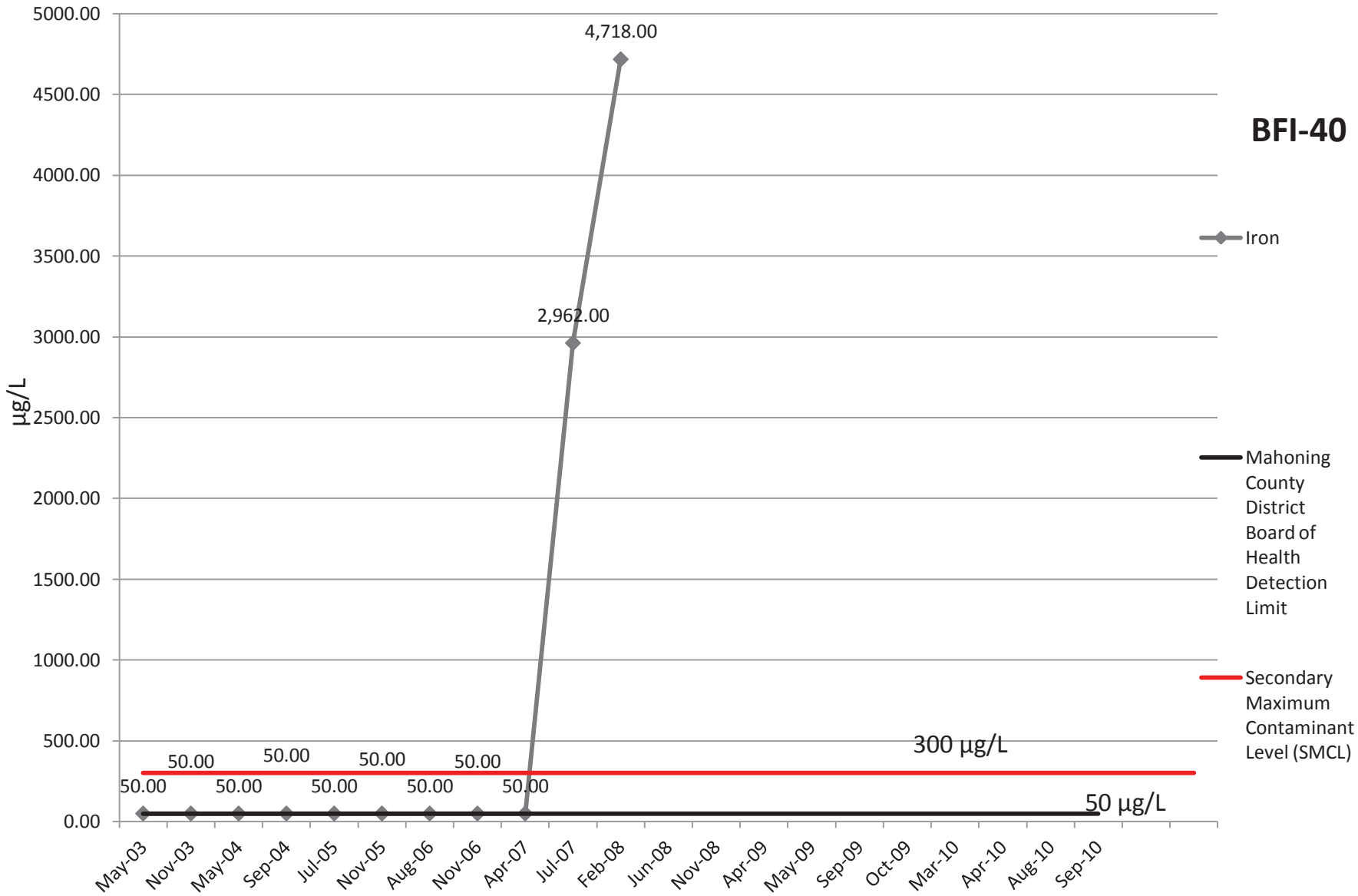
# Chromium



# Copper

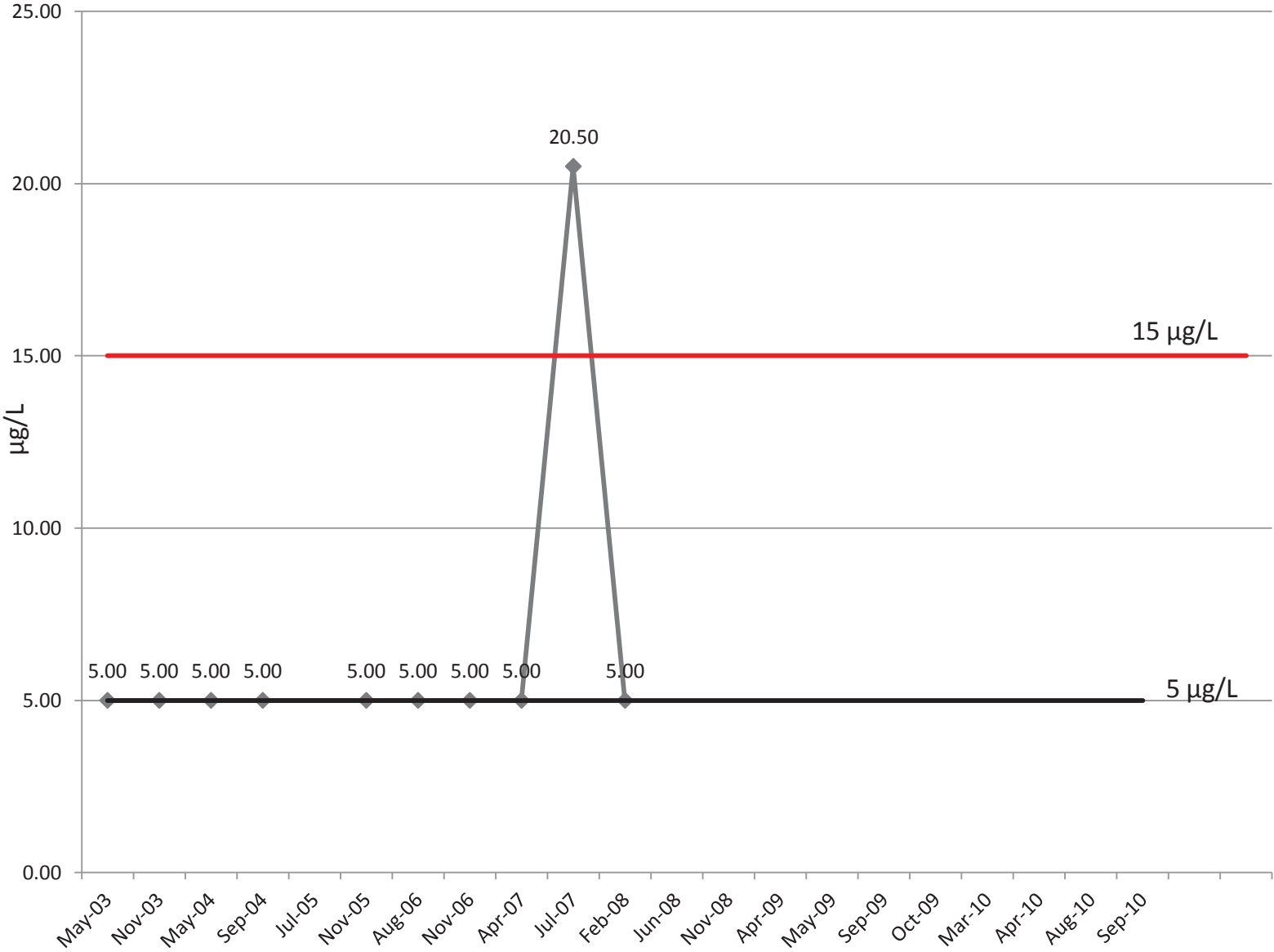


# Iron



# Lead

**BFI-40**



◆ Lead

— Mahoning County District Board of Health Detection Limit

— Action Level

15 µg/L

5 µg/L

20.50

5.00

5.00

5.00

5.00

5.00

5.00

5.00

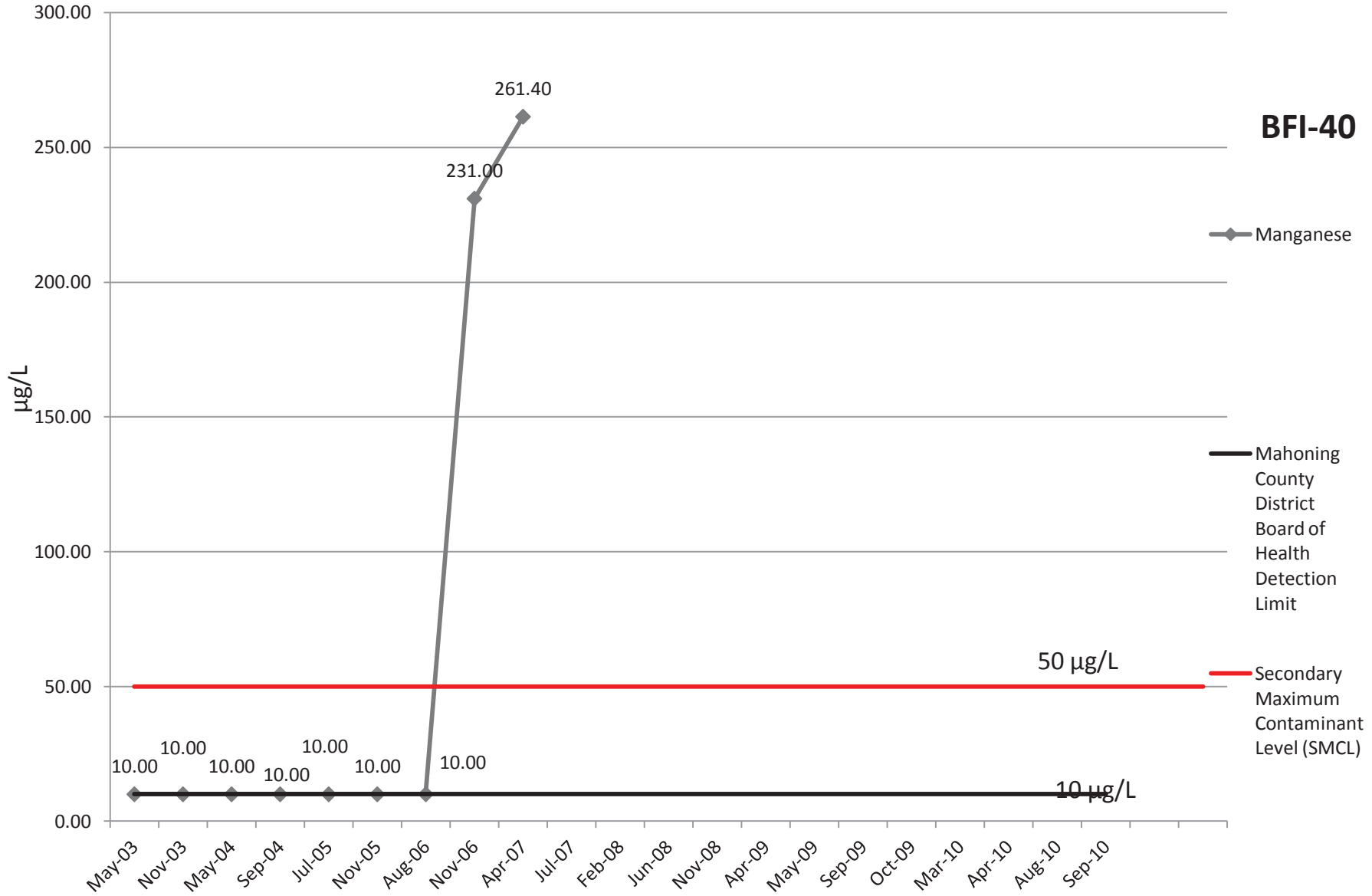
5.00

5.00

5.00

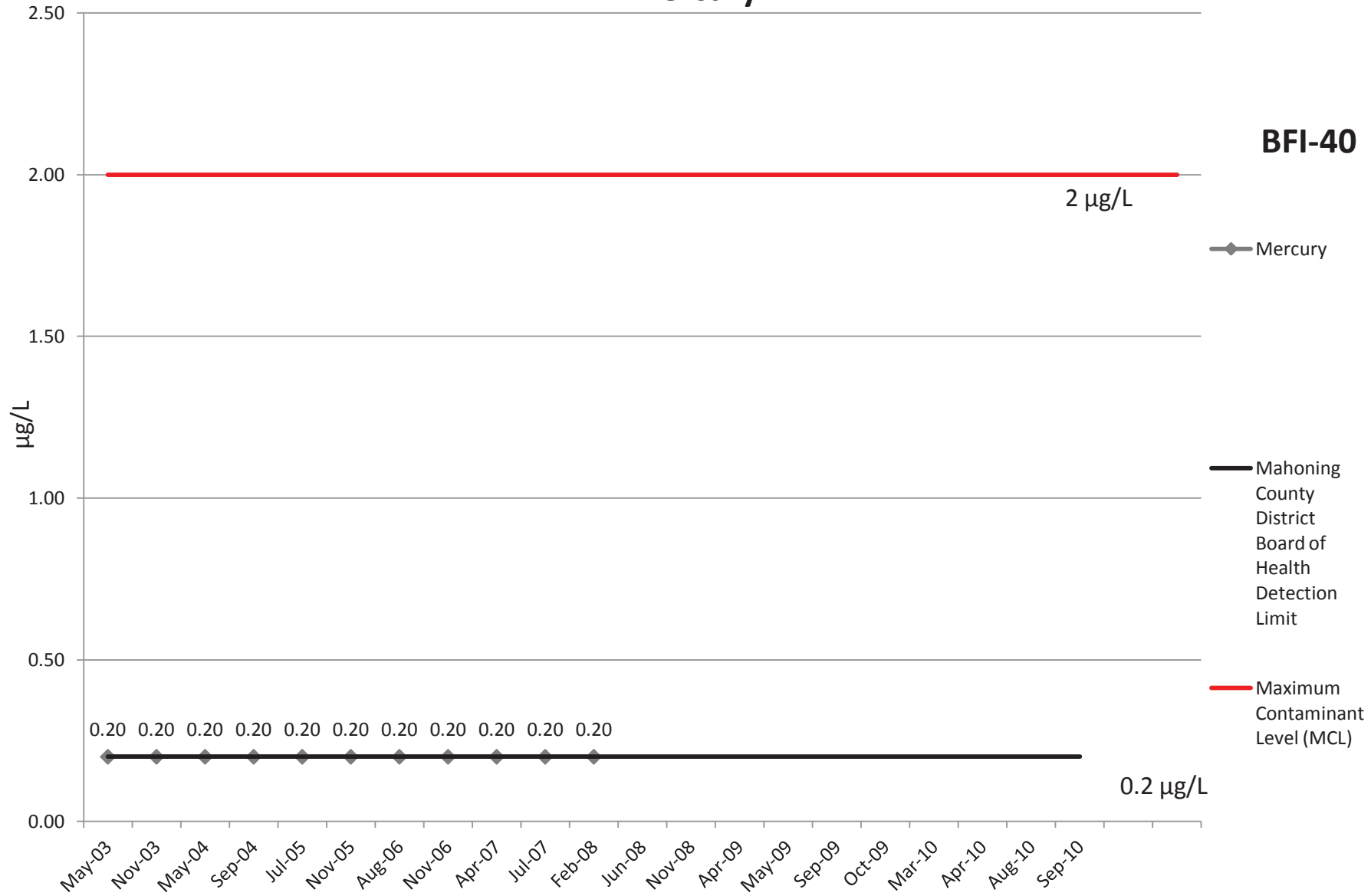
5 µg/L

# Manganese

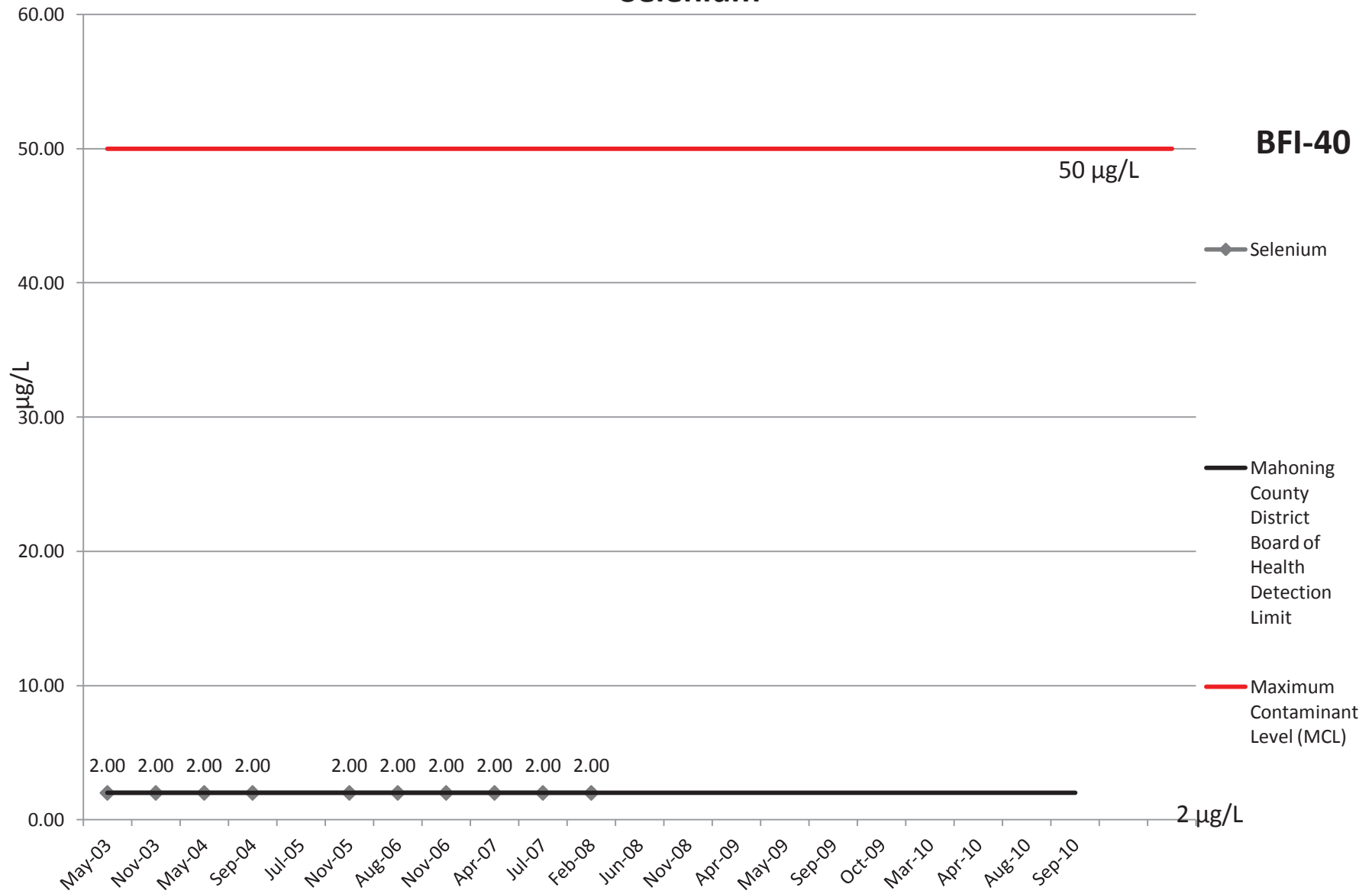


# Mercury

**BFI-40**



# Selenium



**BFI-40**

◆ Selenium

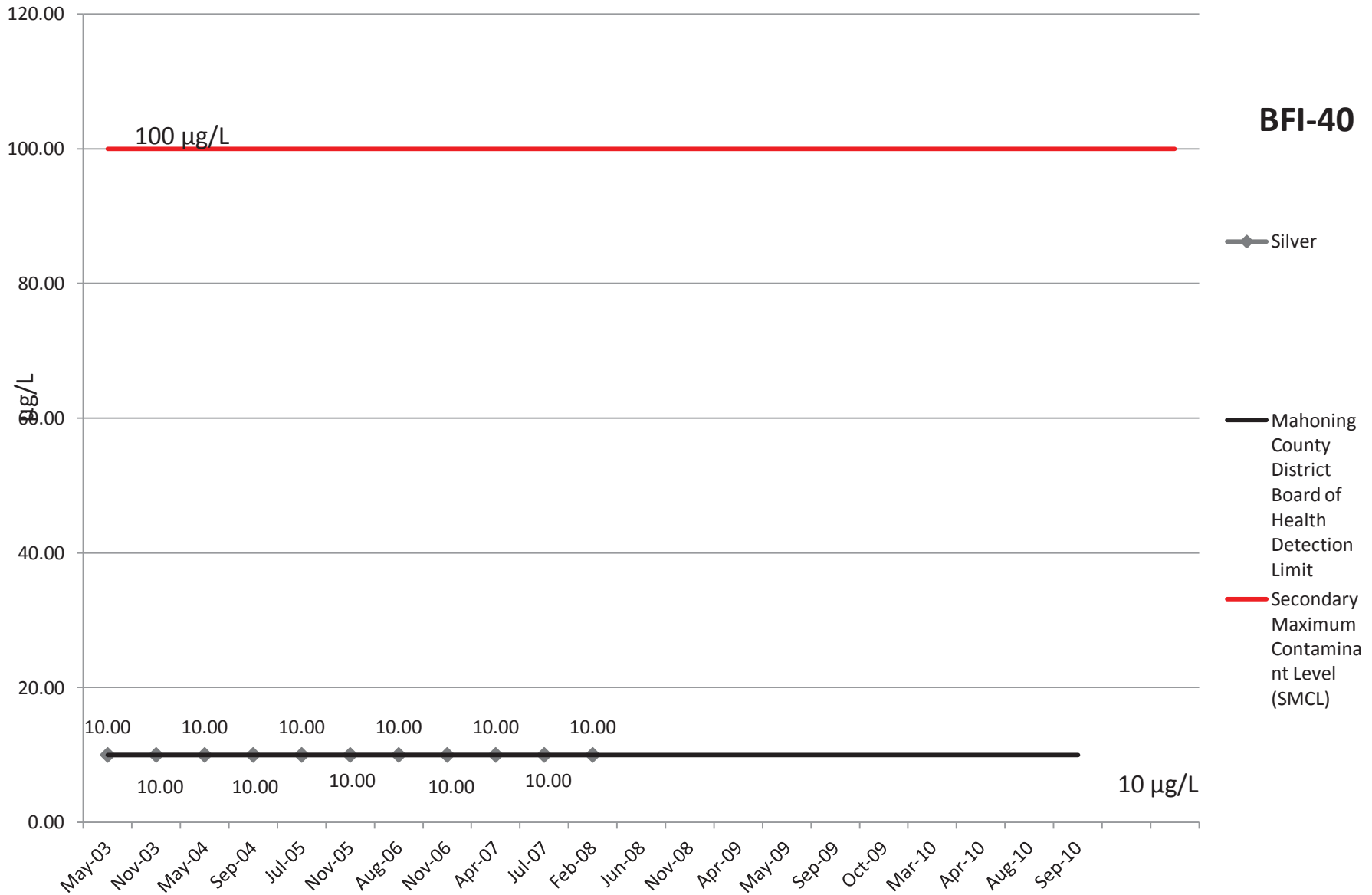
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

50  $\mu\text{g/L}$

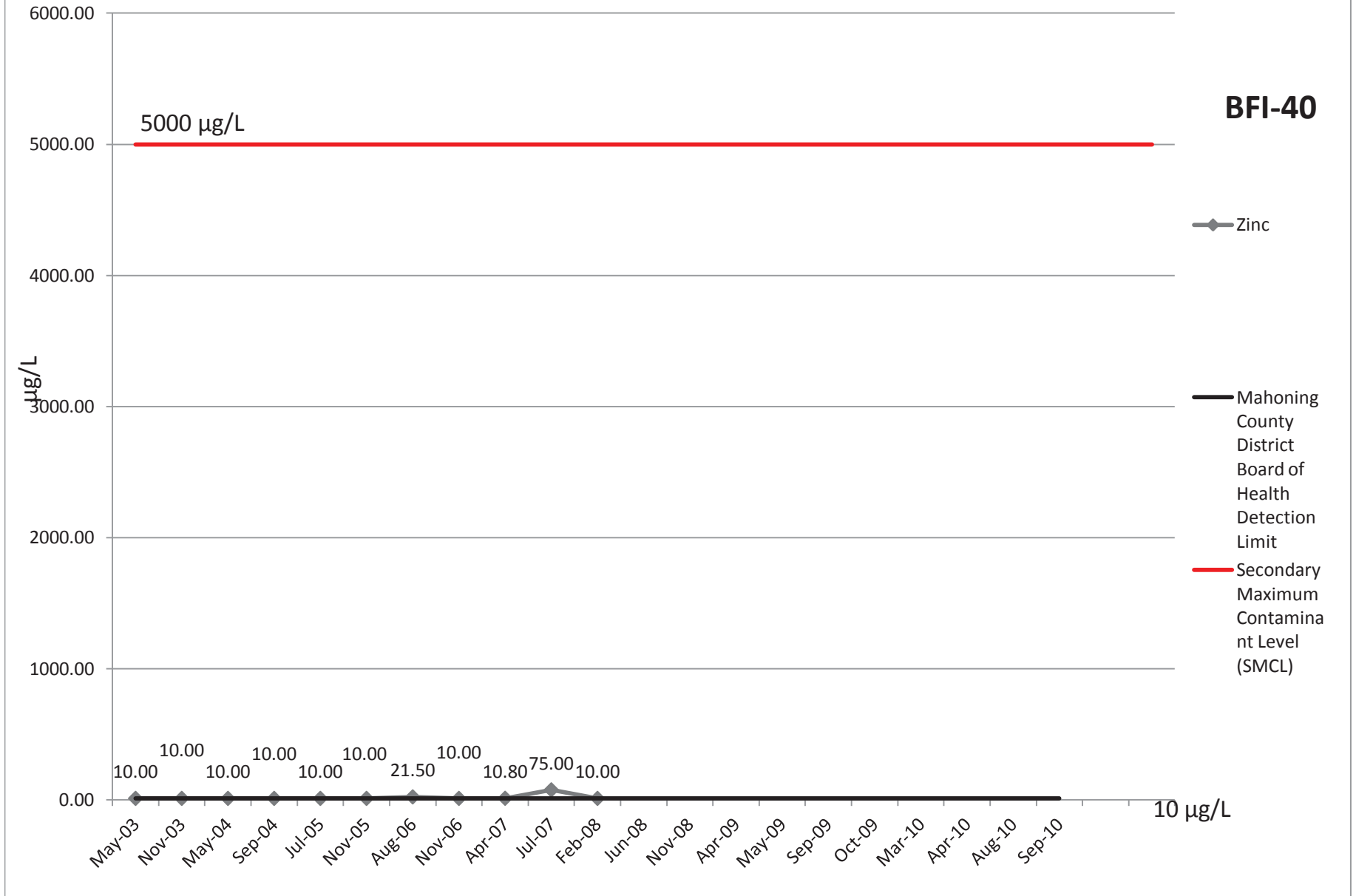
2  $\mu\text{g/L}$

# Silver

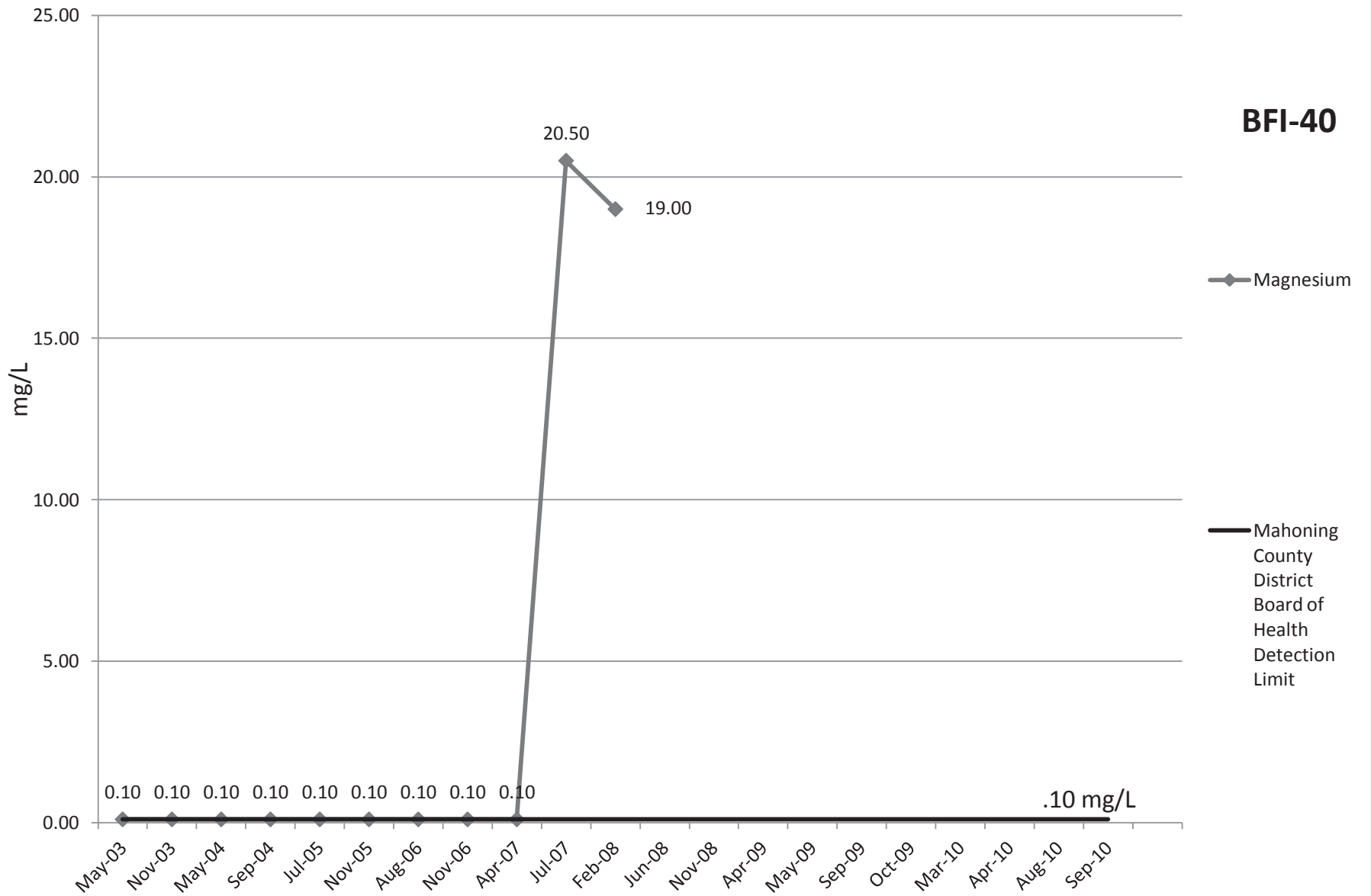




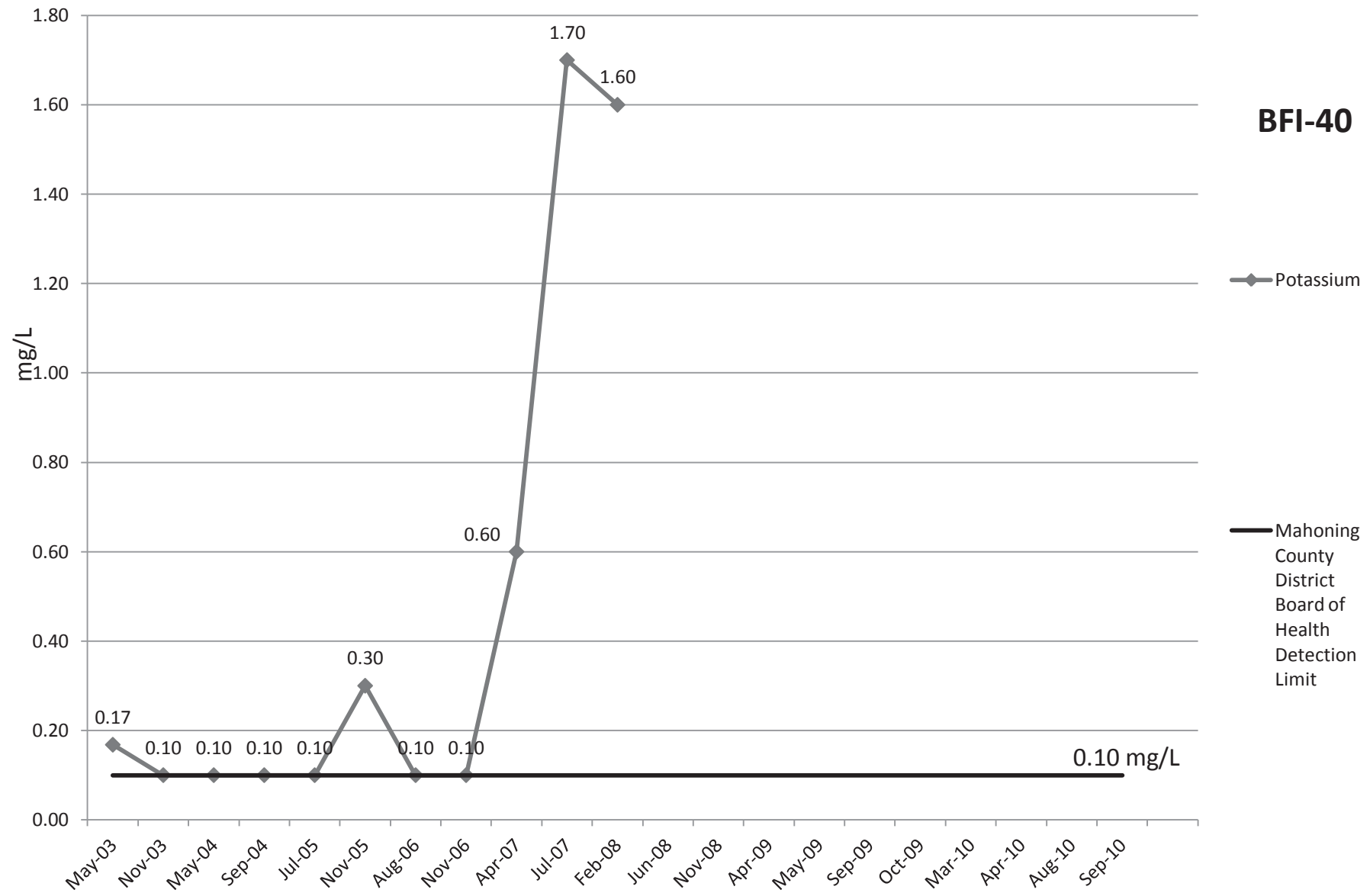
# Zinc



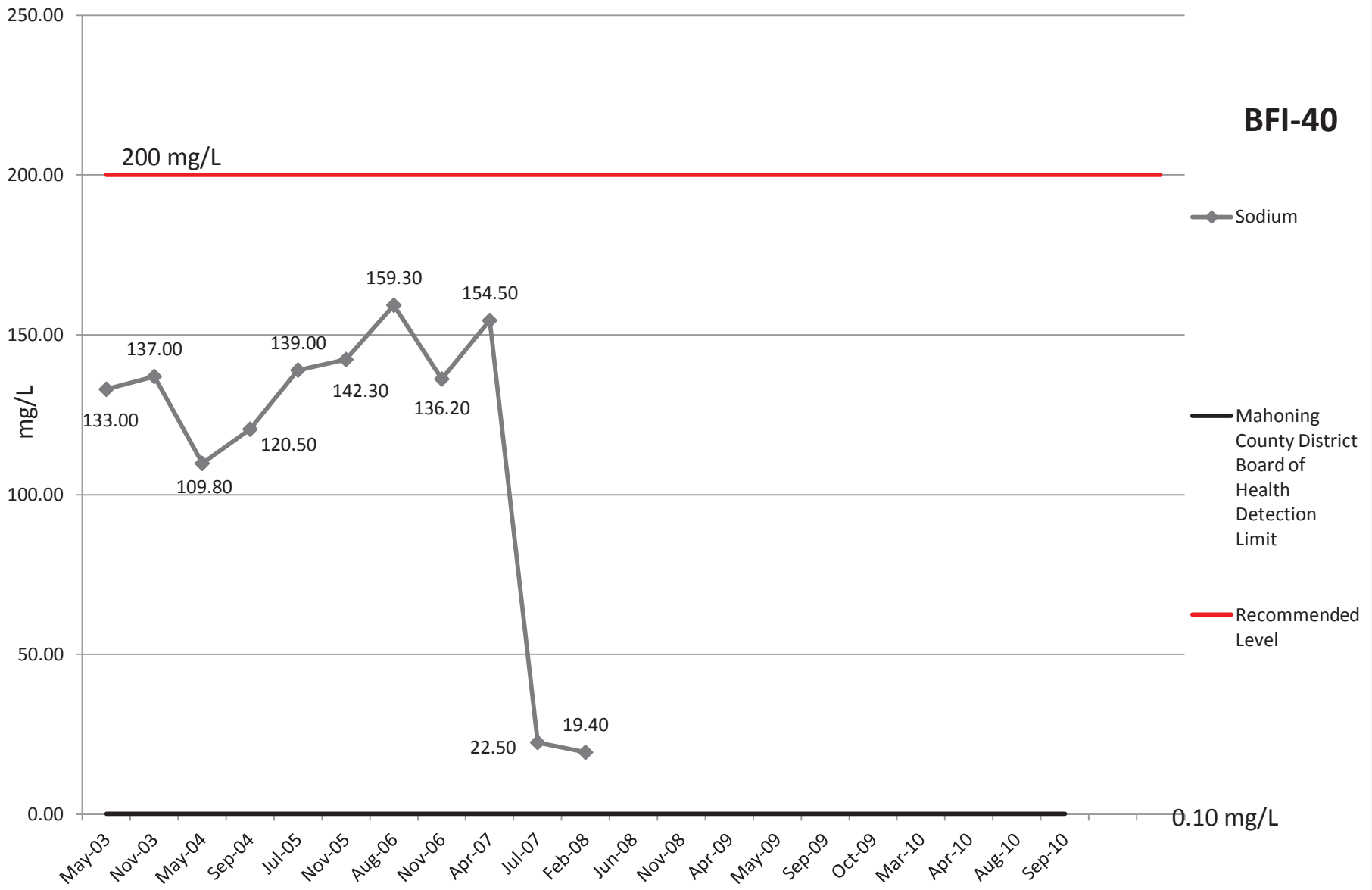
# Magnesium



# Potassium



# Sodium



**BFI-40**

200 mg/L

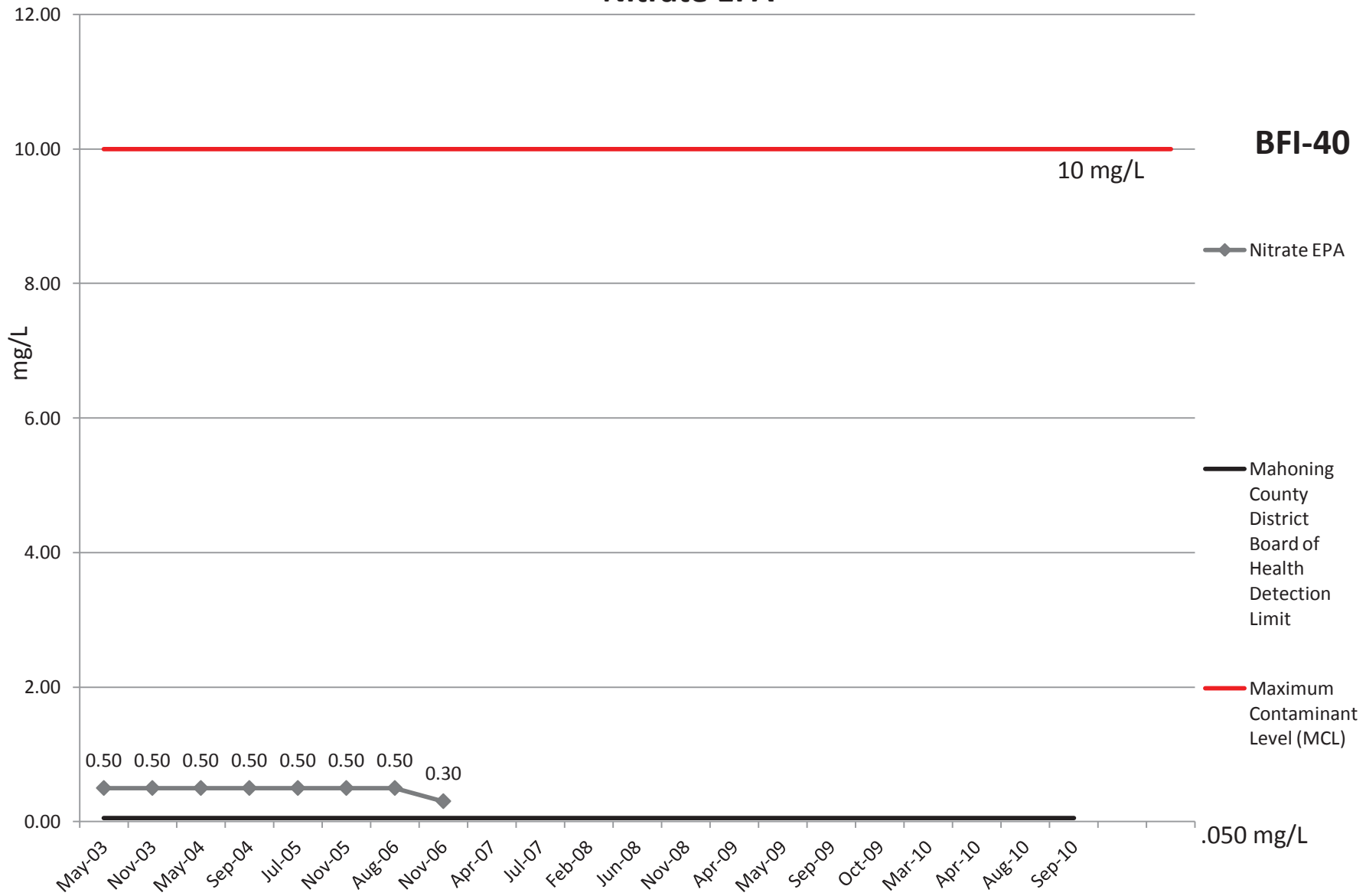
◆ Sodium

— Mahoning County District Board of Health Detection Limit

— Recommended Level

0.10 mg/L

# Nitrate EPA



**BFI-40**

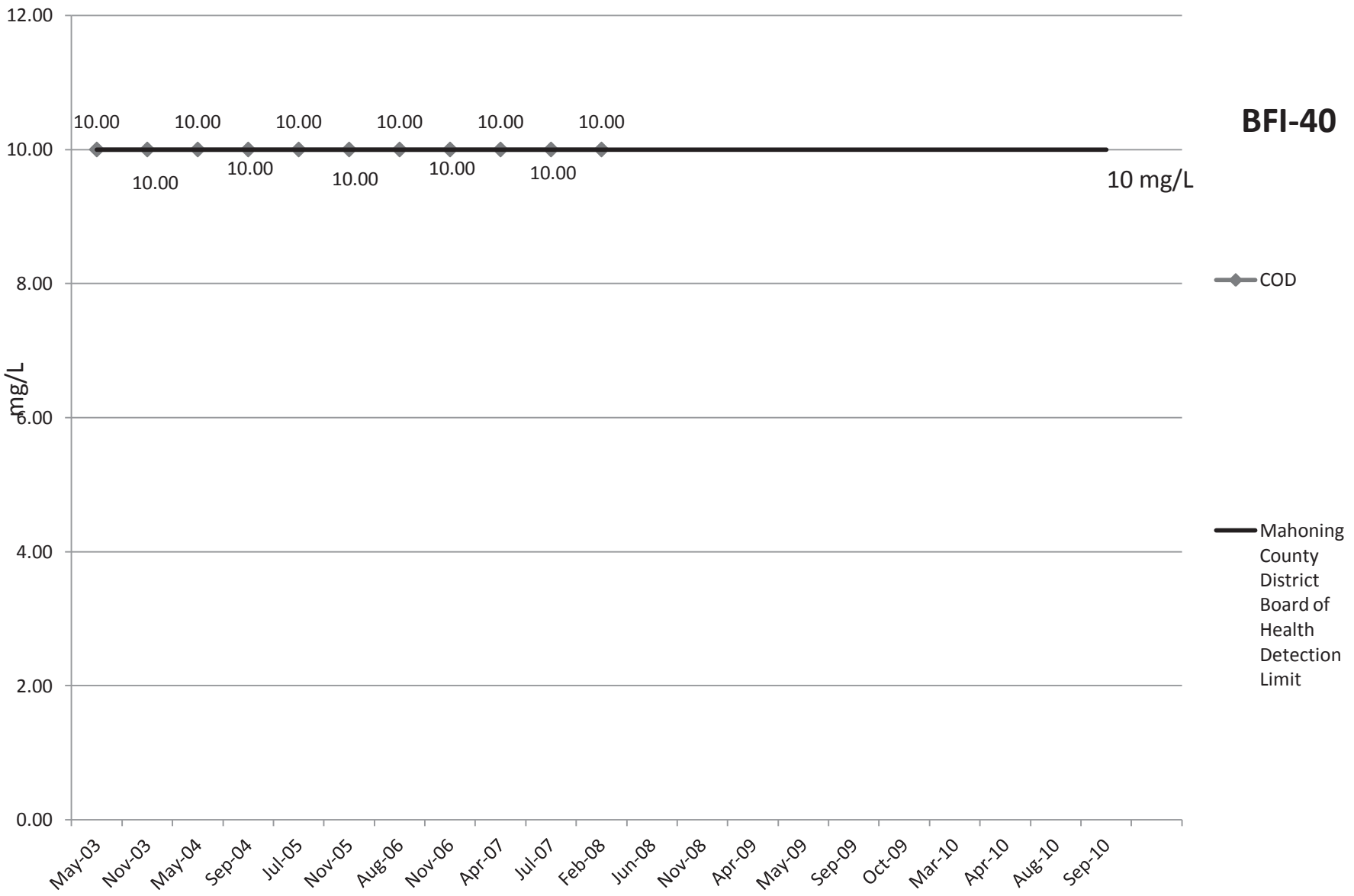
◆ Nitrate EPA

— Mahoning County District Board of Health Detection Limit

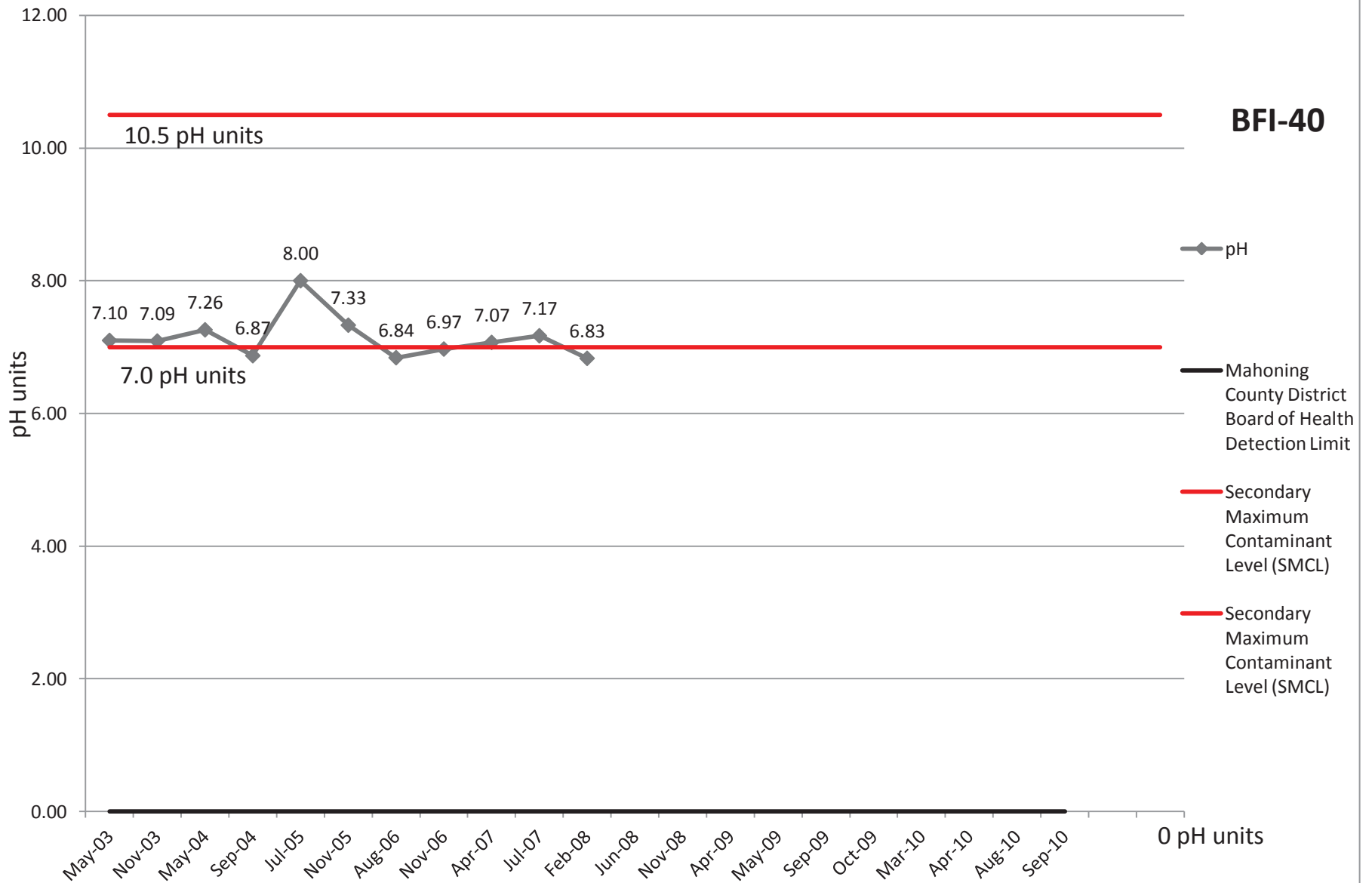
— Maximum Contaminant Level (MCL)

.050 mg/L

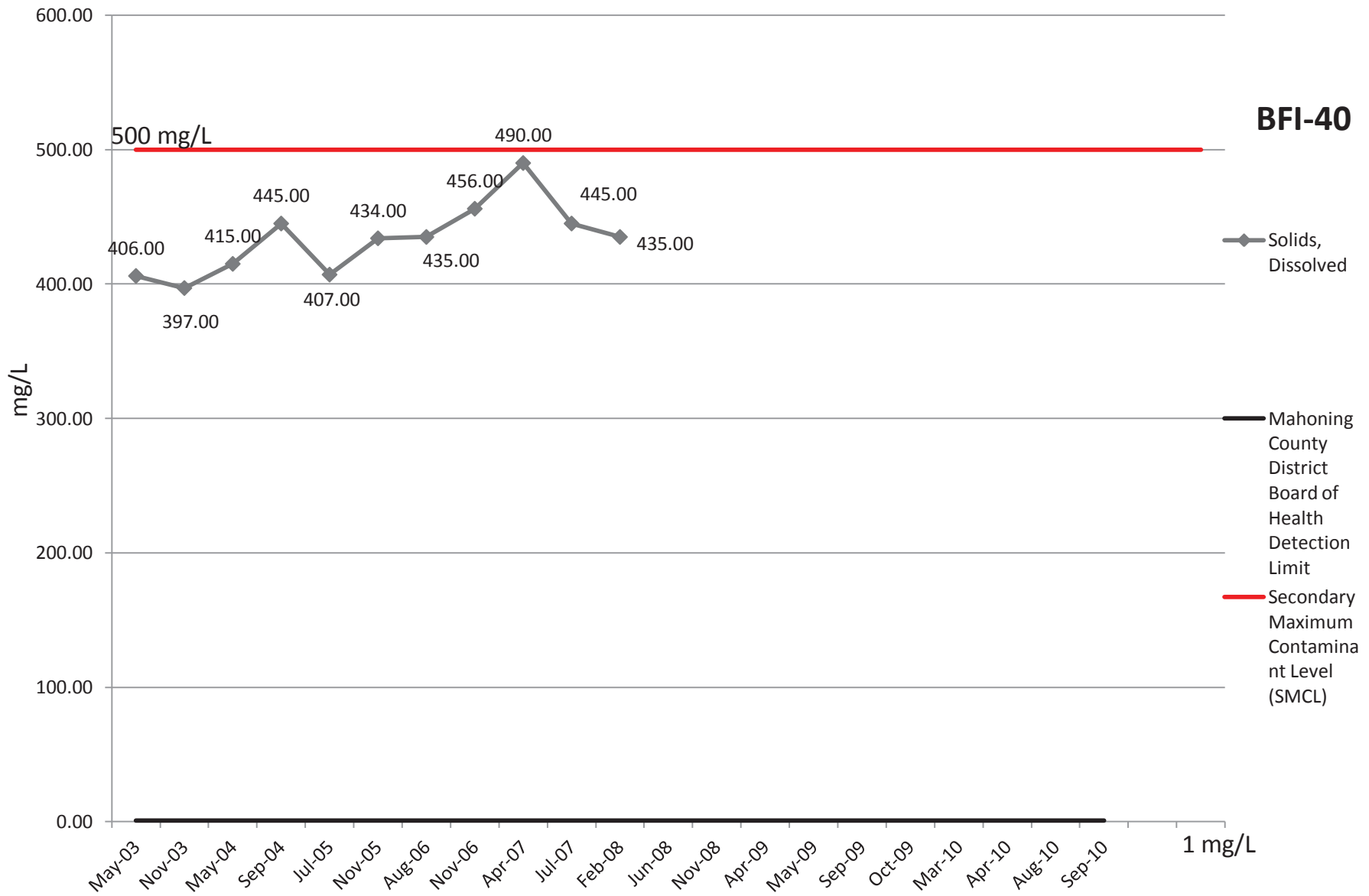
# COD



# pH

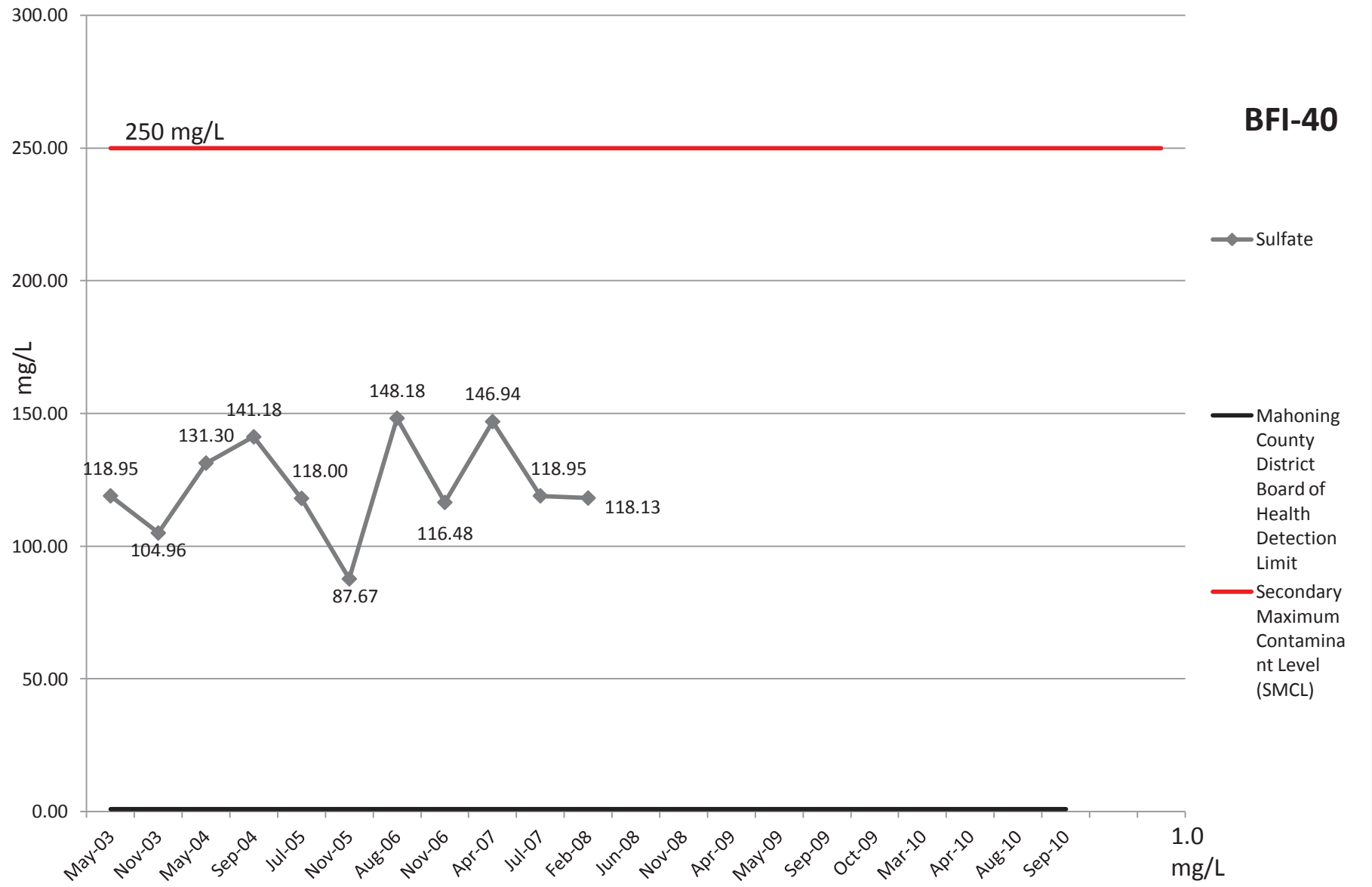


# Solids, Dissolved





# Sulfate



# Bacteria

positive (1)

**BFI-40**

Positive/Negative

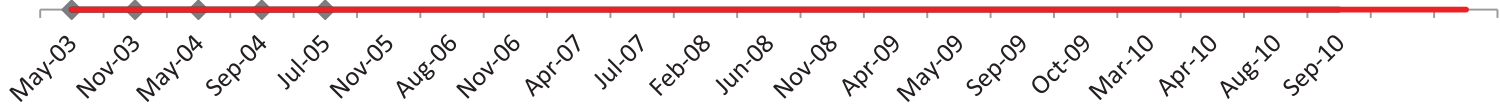
◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

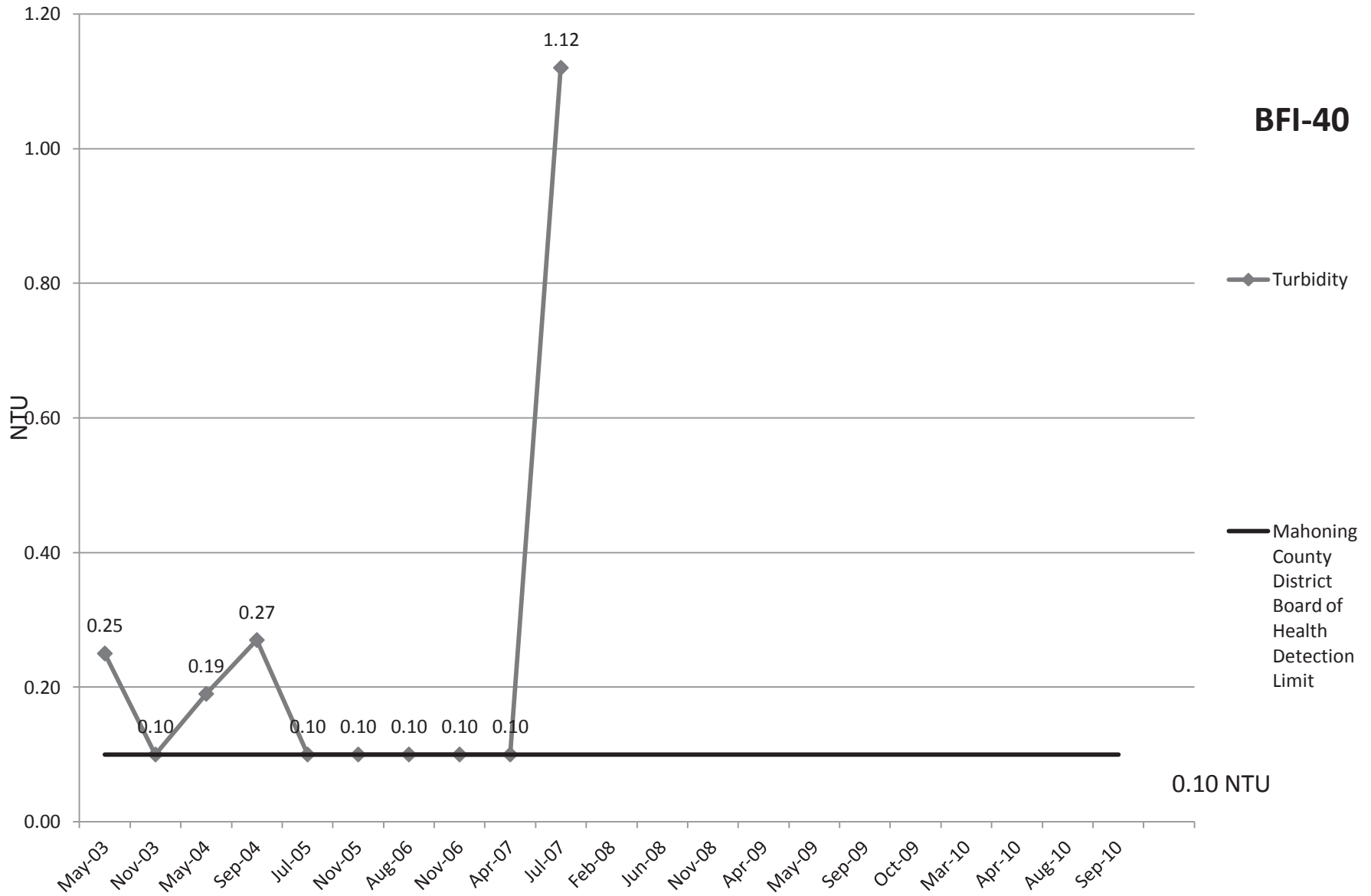
— Maximum  
Contaminant  
Level (MCL)

0.00 0.00 0.00 0.00 0.00

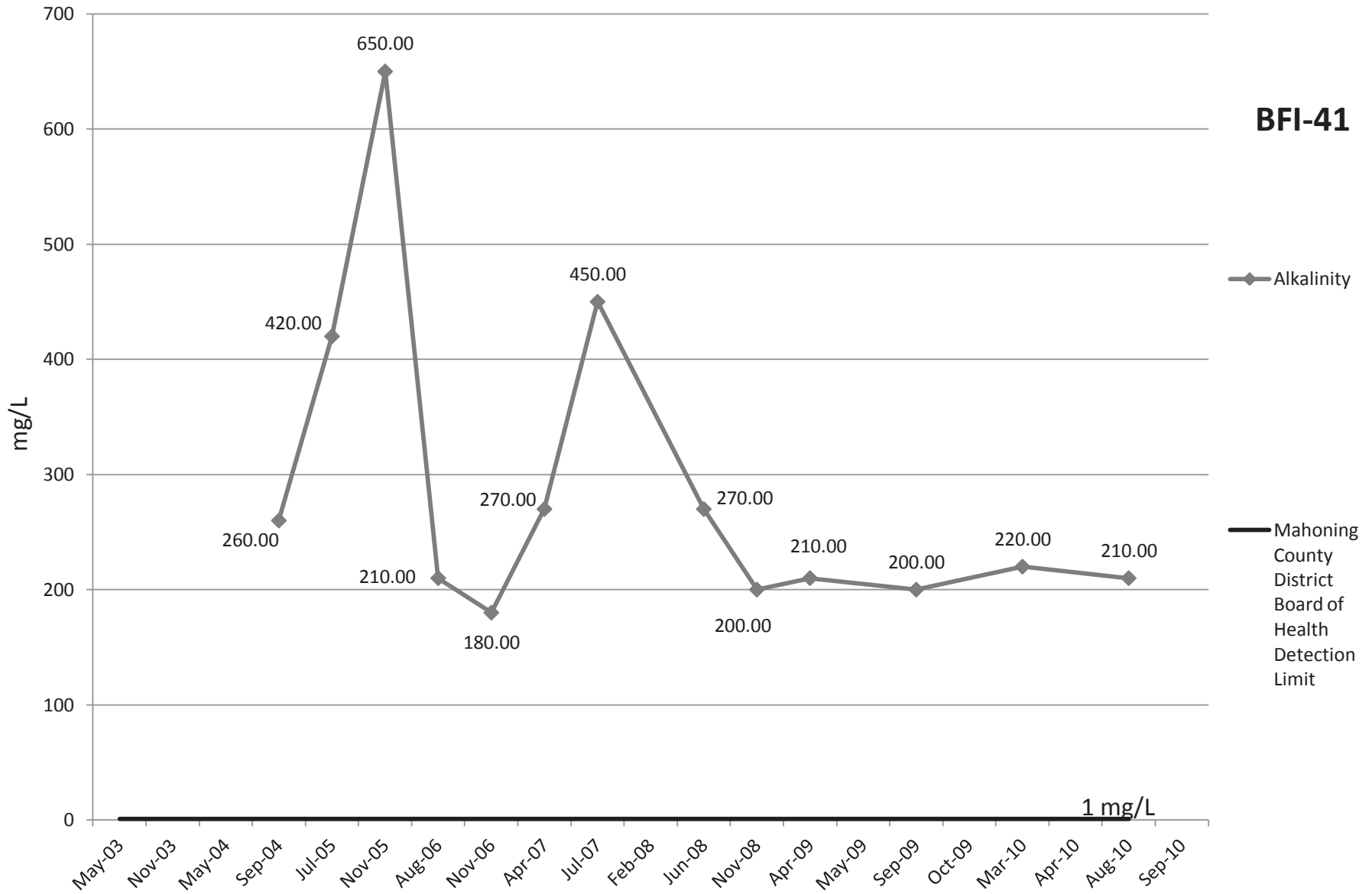
negative (0)



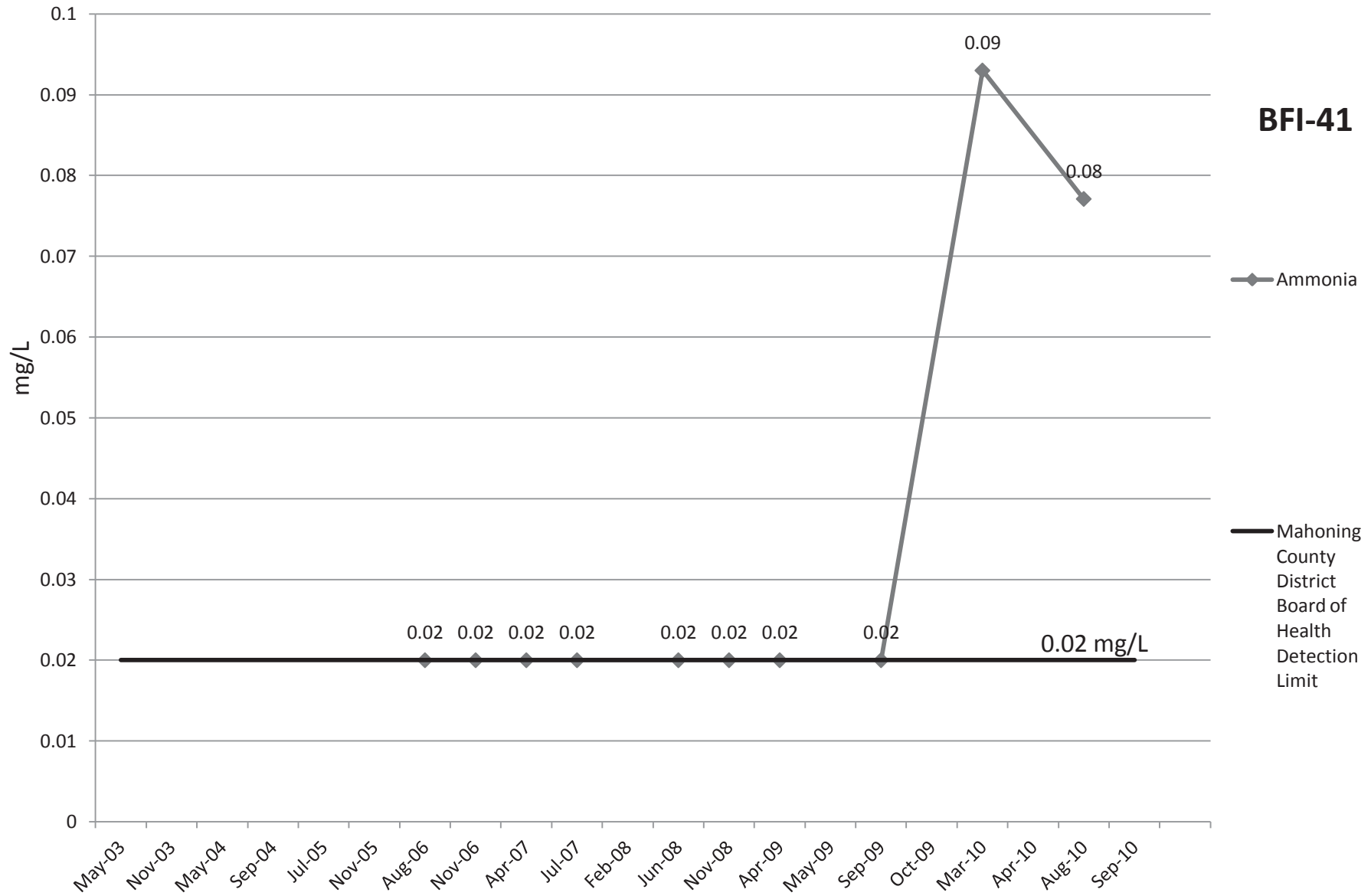
# Turbidity



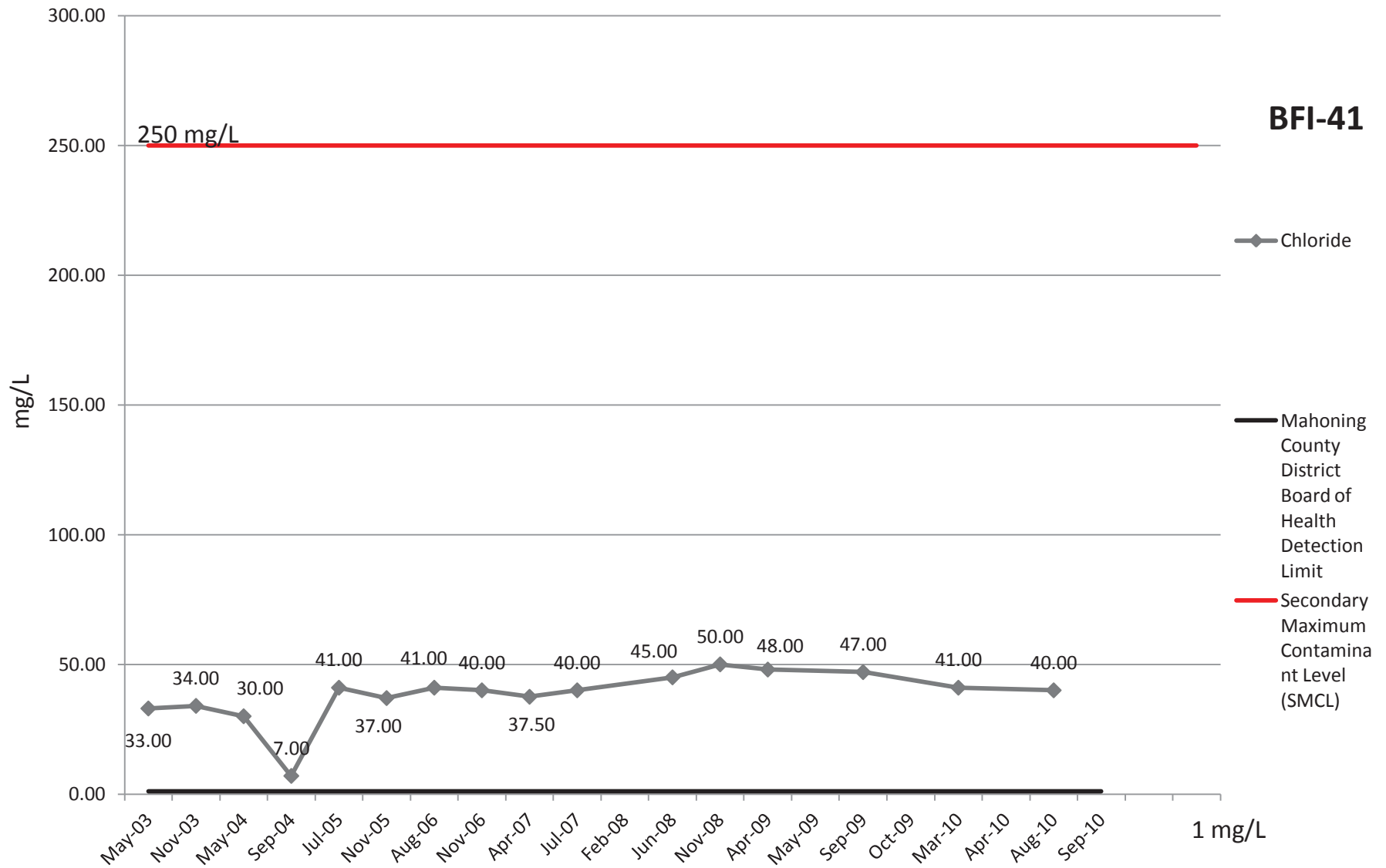
# Alkalinity



# Ammonia

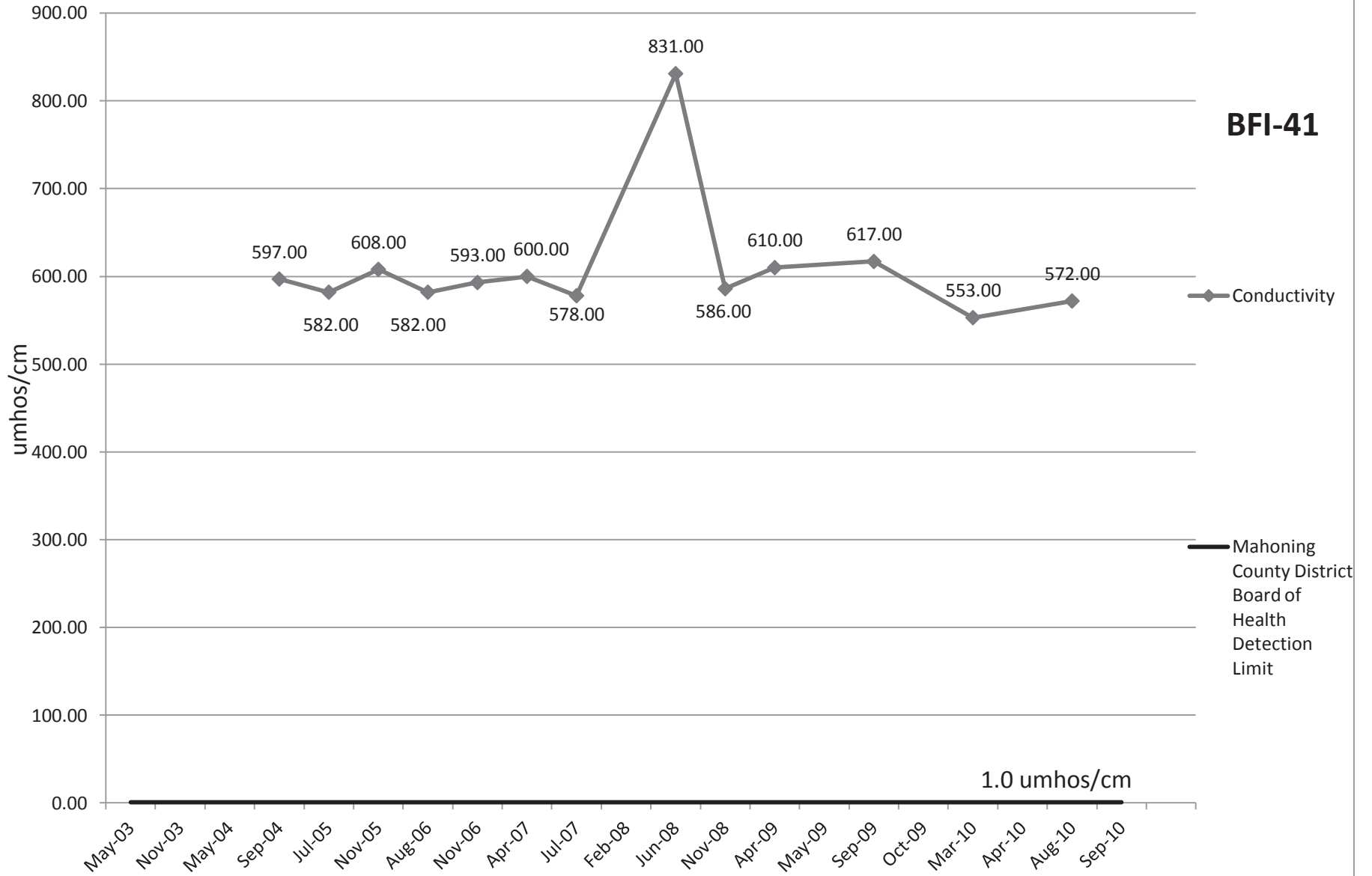


# Chloride

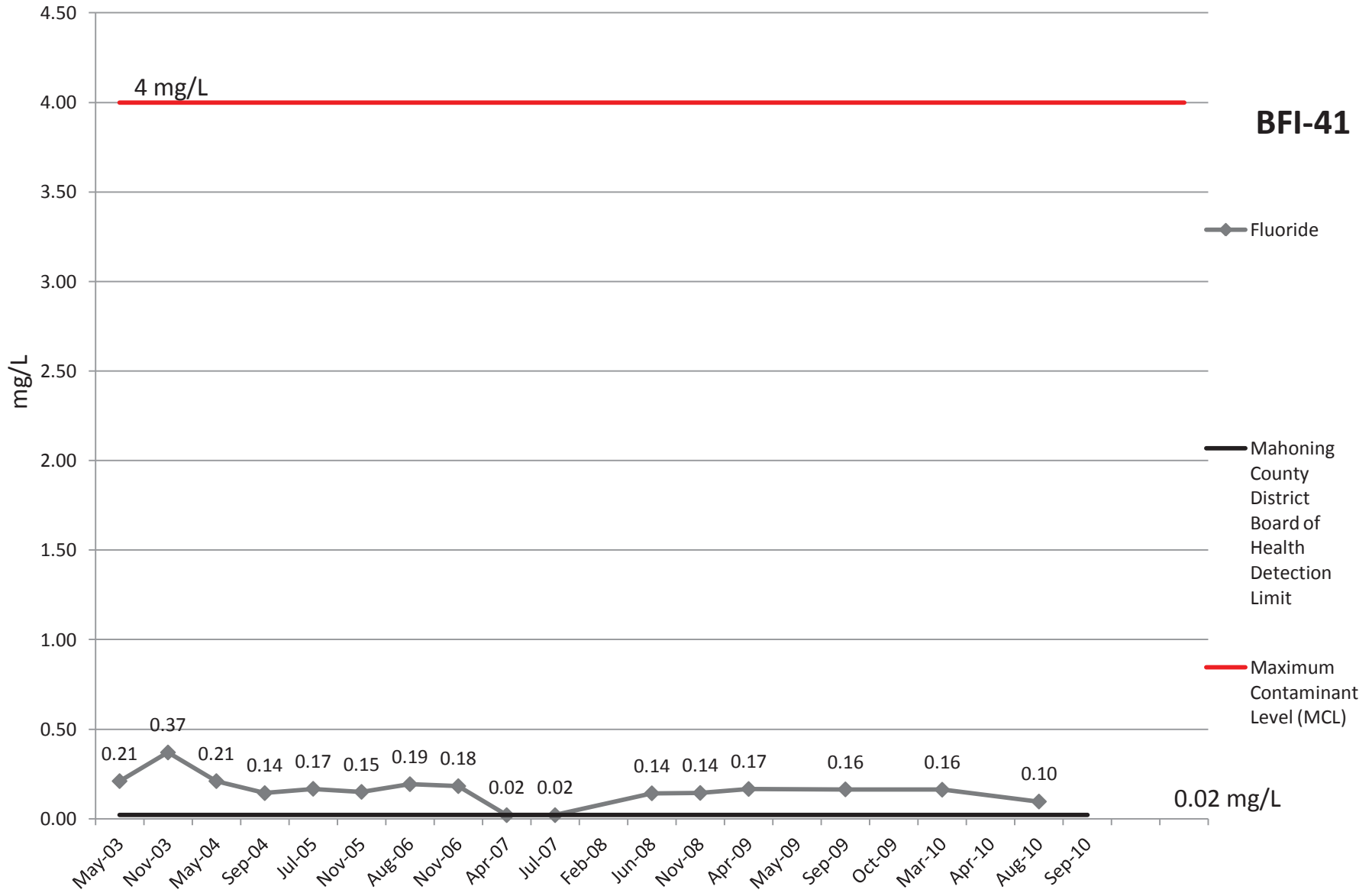


# Conductivity

**BFI-41**



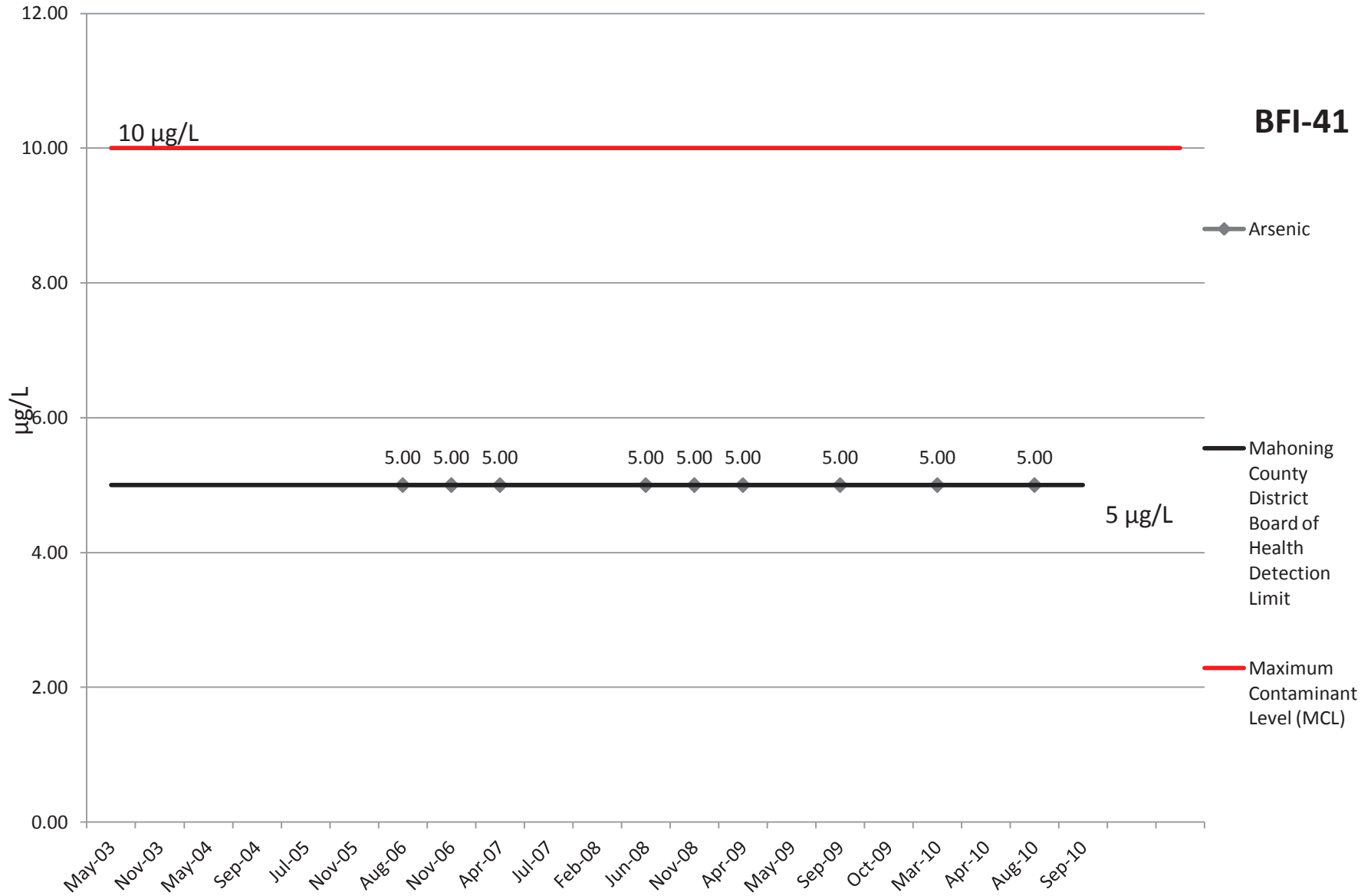
# Fluoride





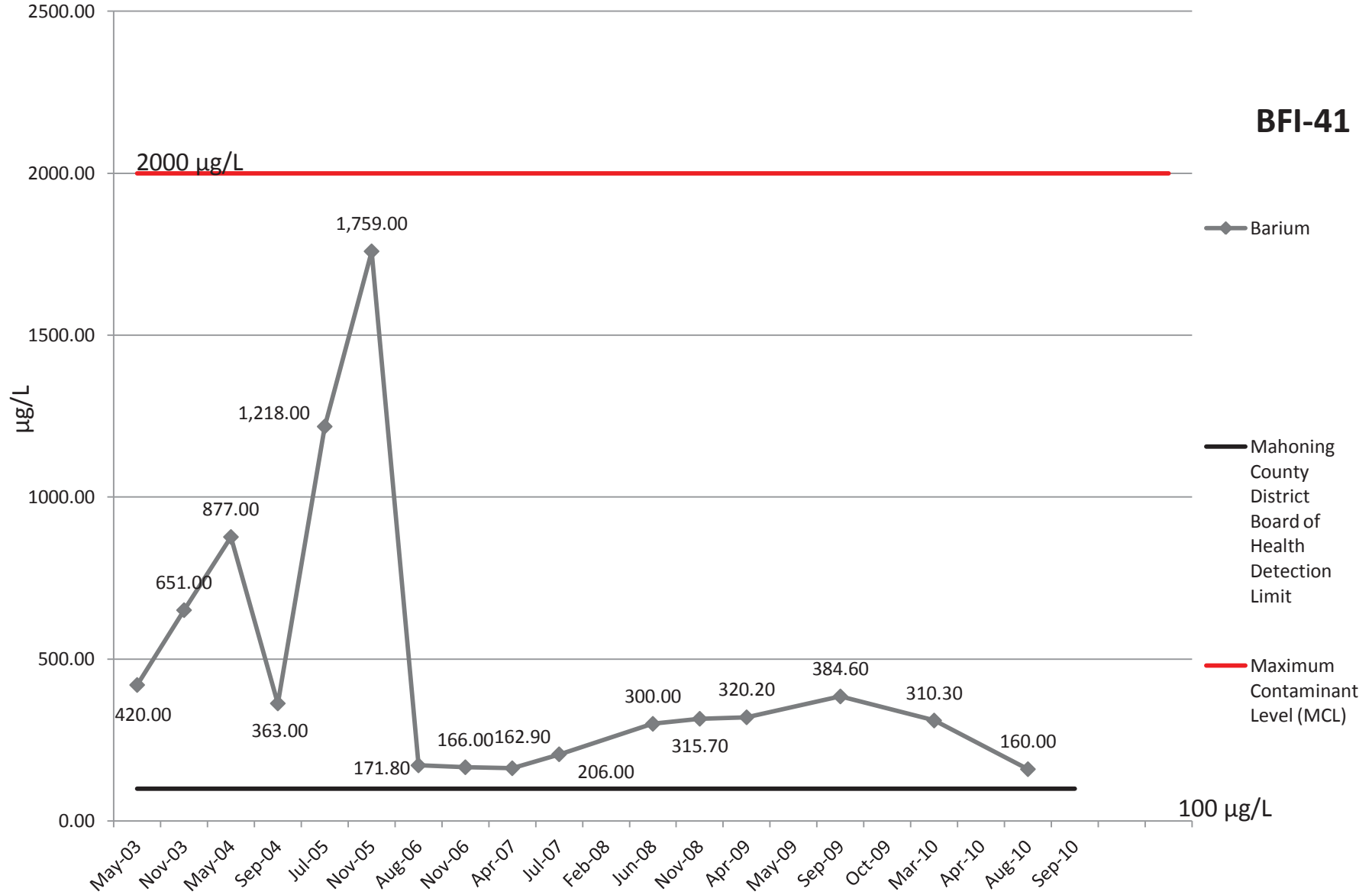
# Arsenic

**BFI-41**

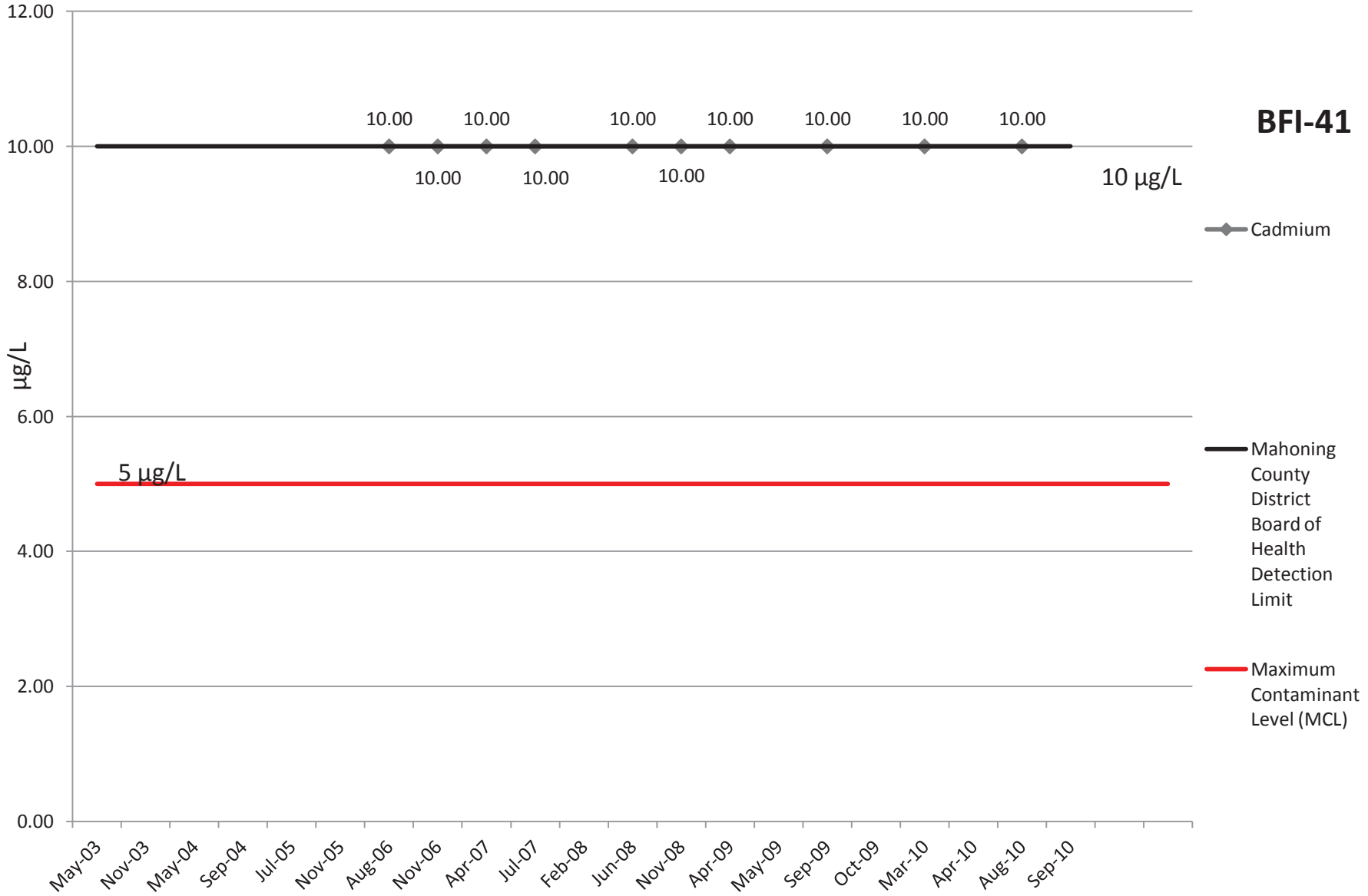


# Barium

**BFI-41**



# Cadmium



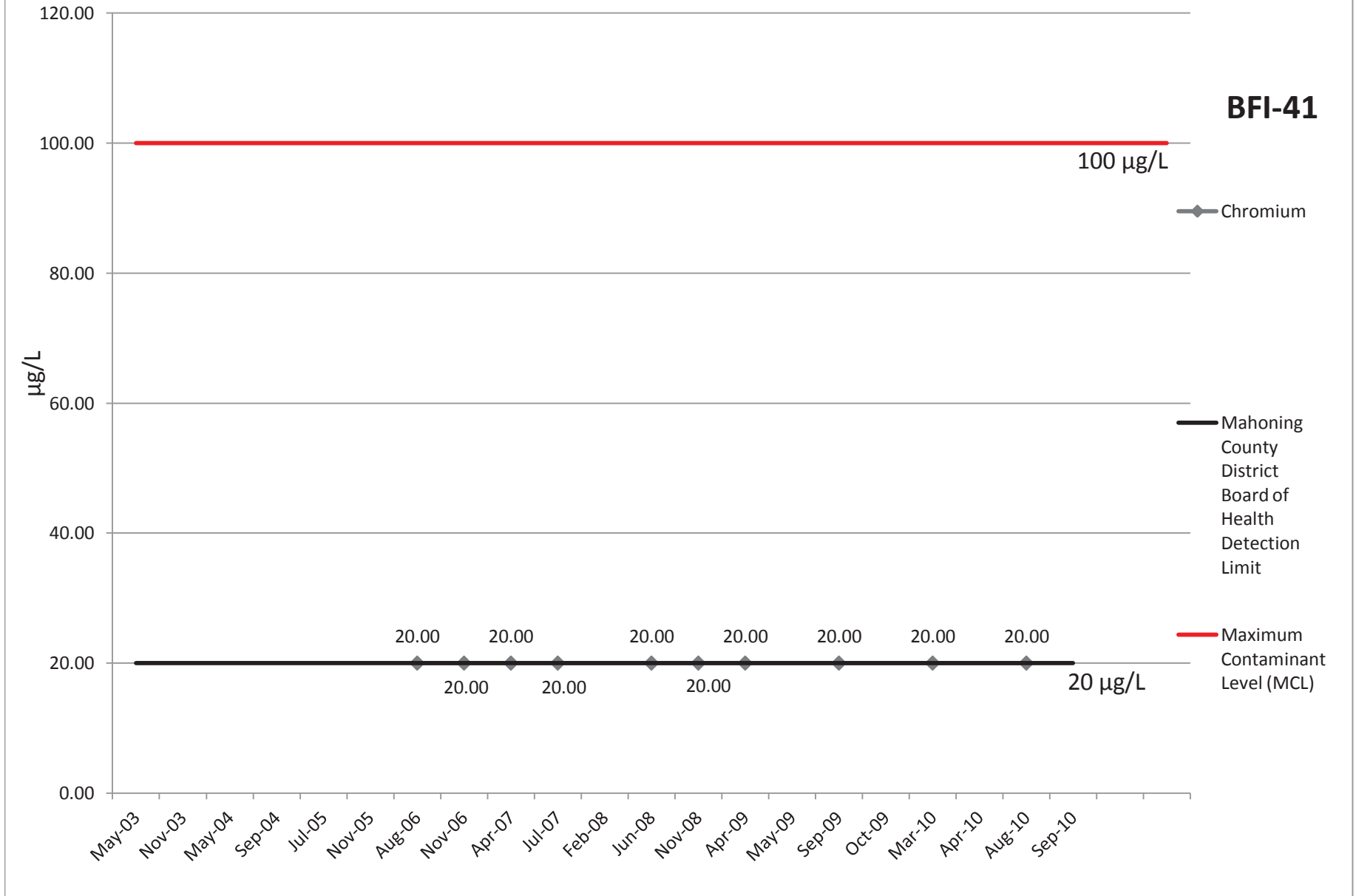
**BFI-41**

◆ Cadmium

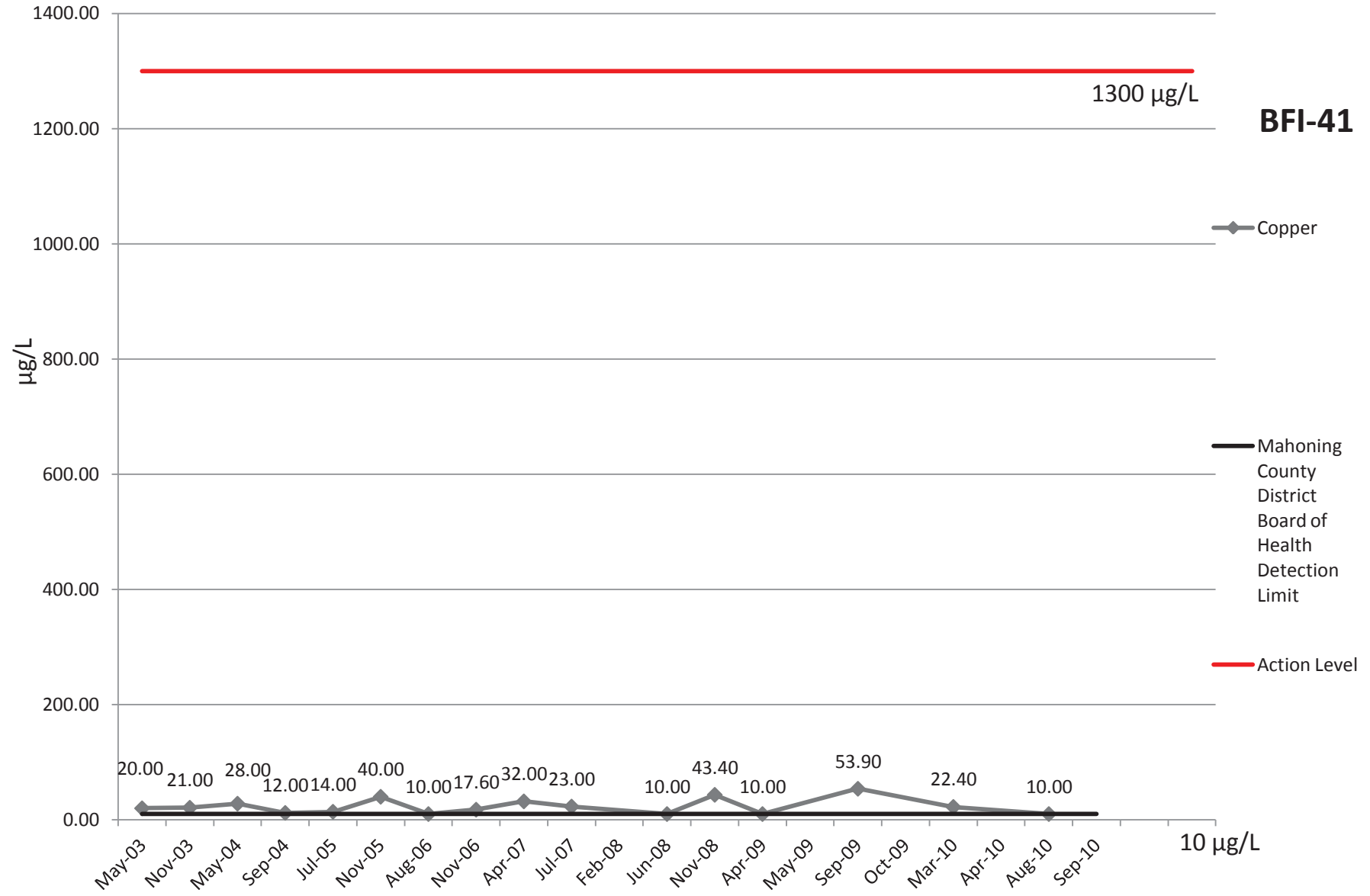
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

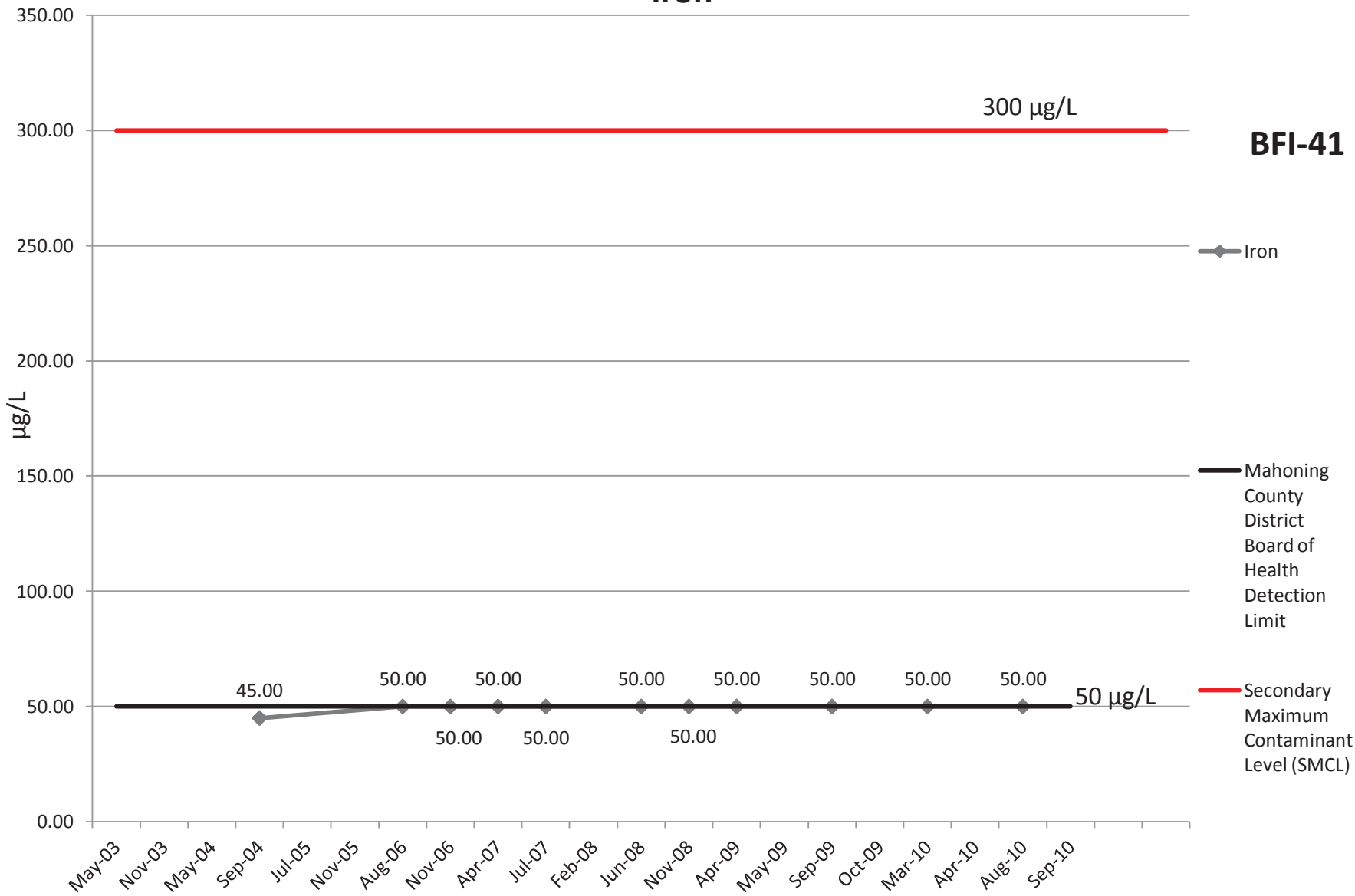
# Chromium



# Copper



# Iron



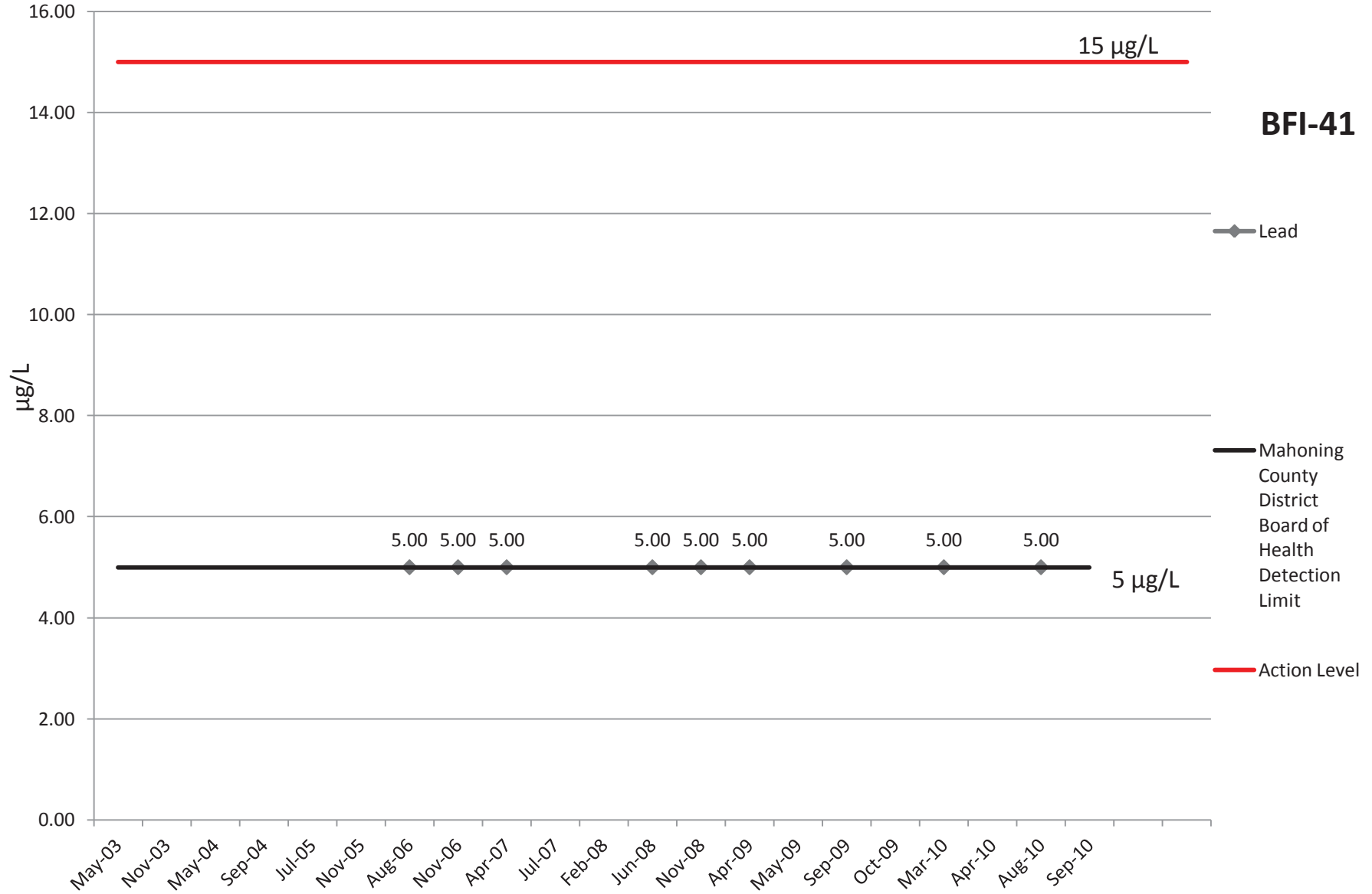
**BFI-41**

Iron

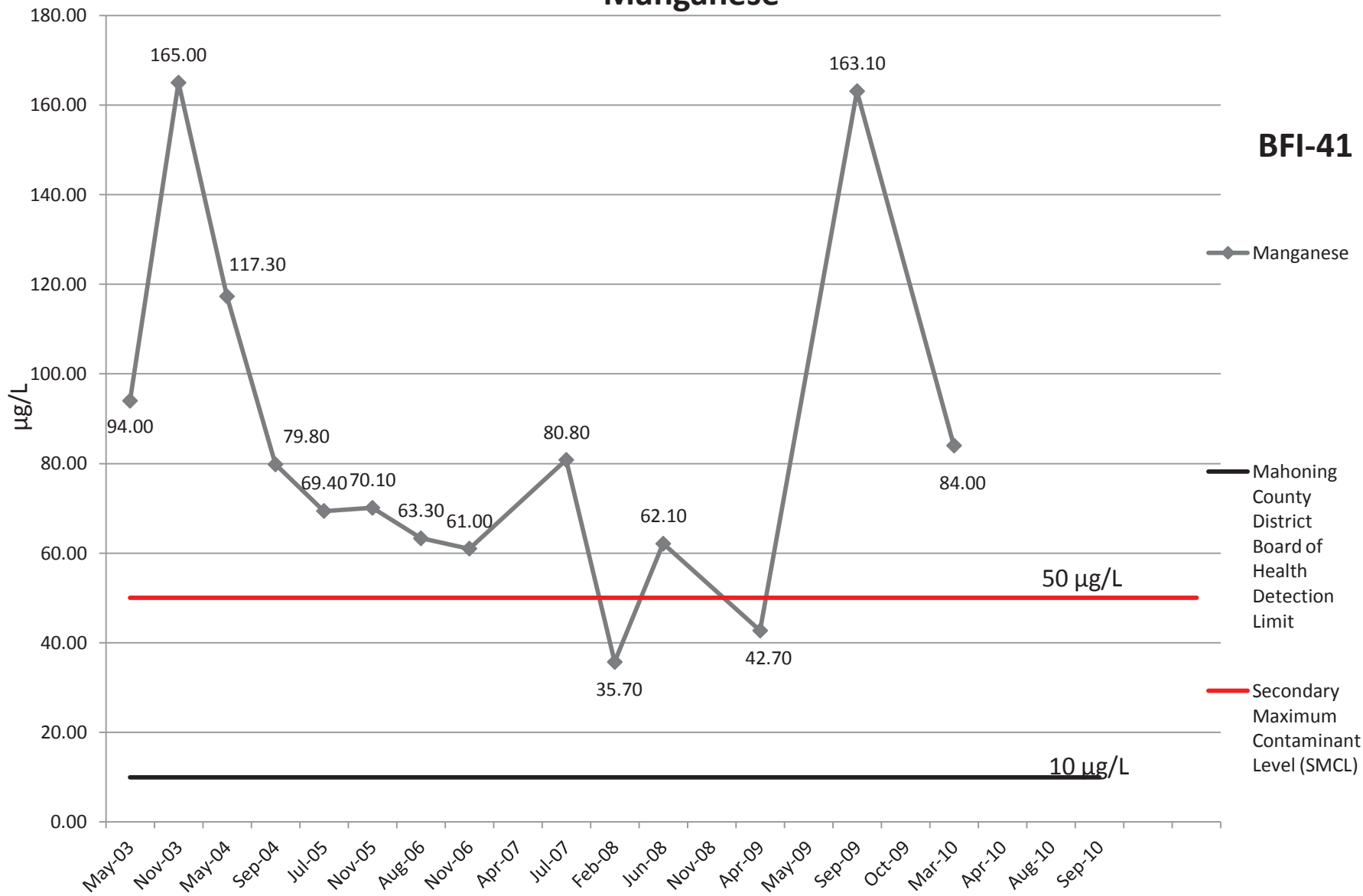
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Secondary  
Maximum  
Contaminant  
Level (SMCL)

# Lead



# Manganese





# Mercury

**BFI-41**

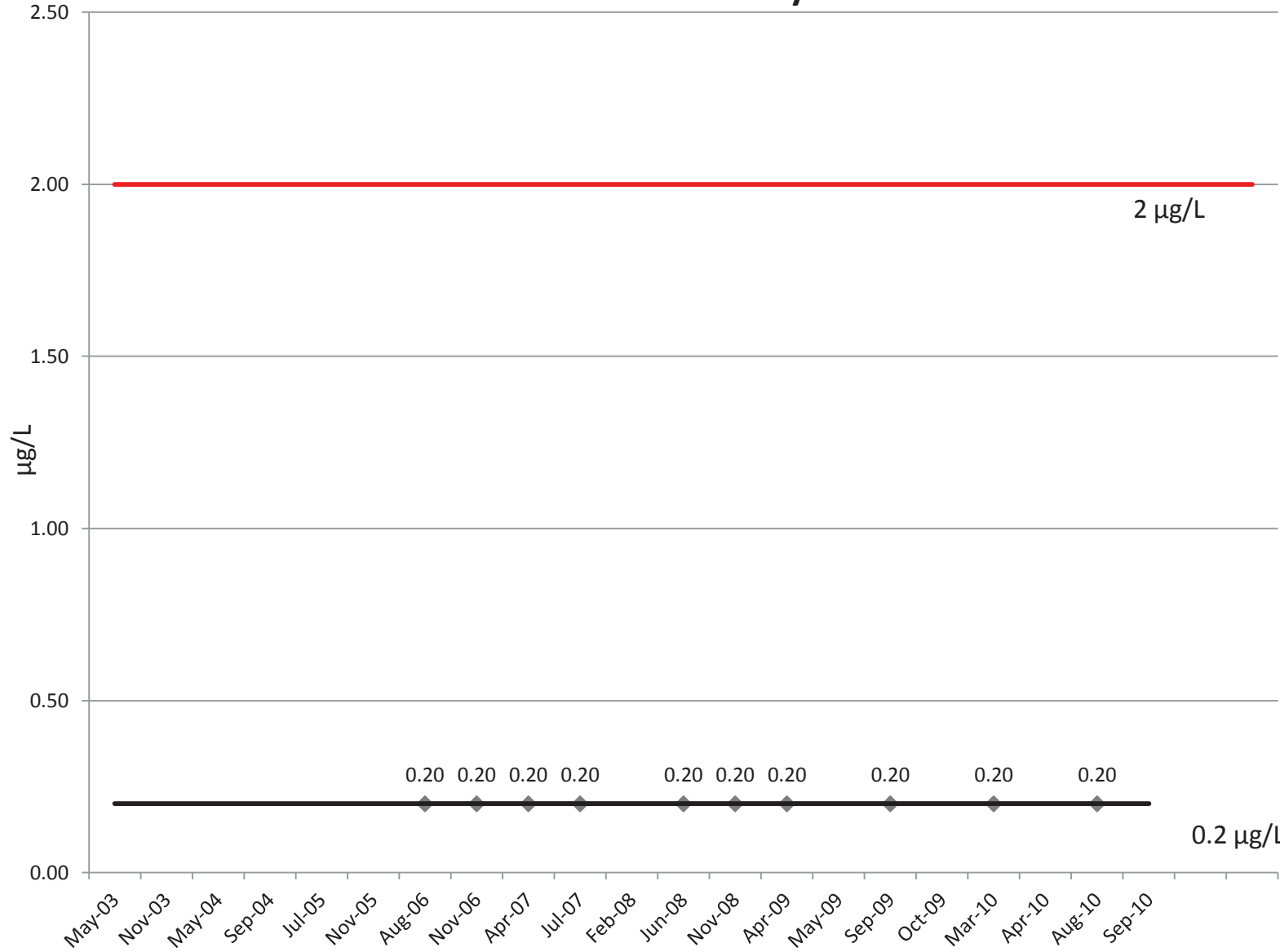
2 µg/L

Mercury

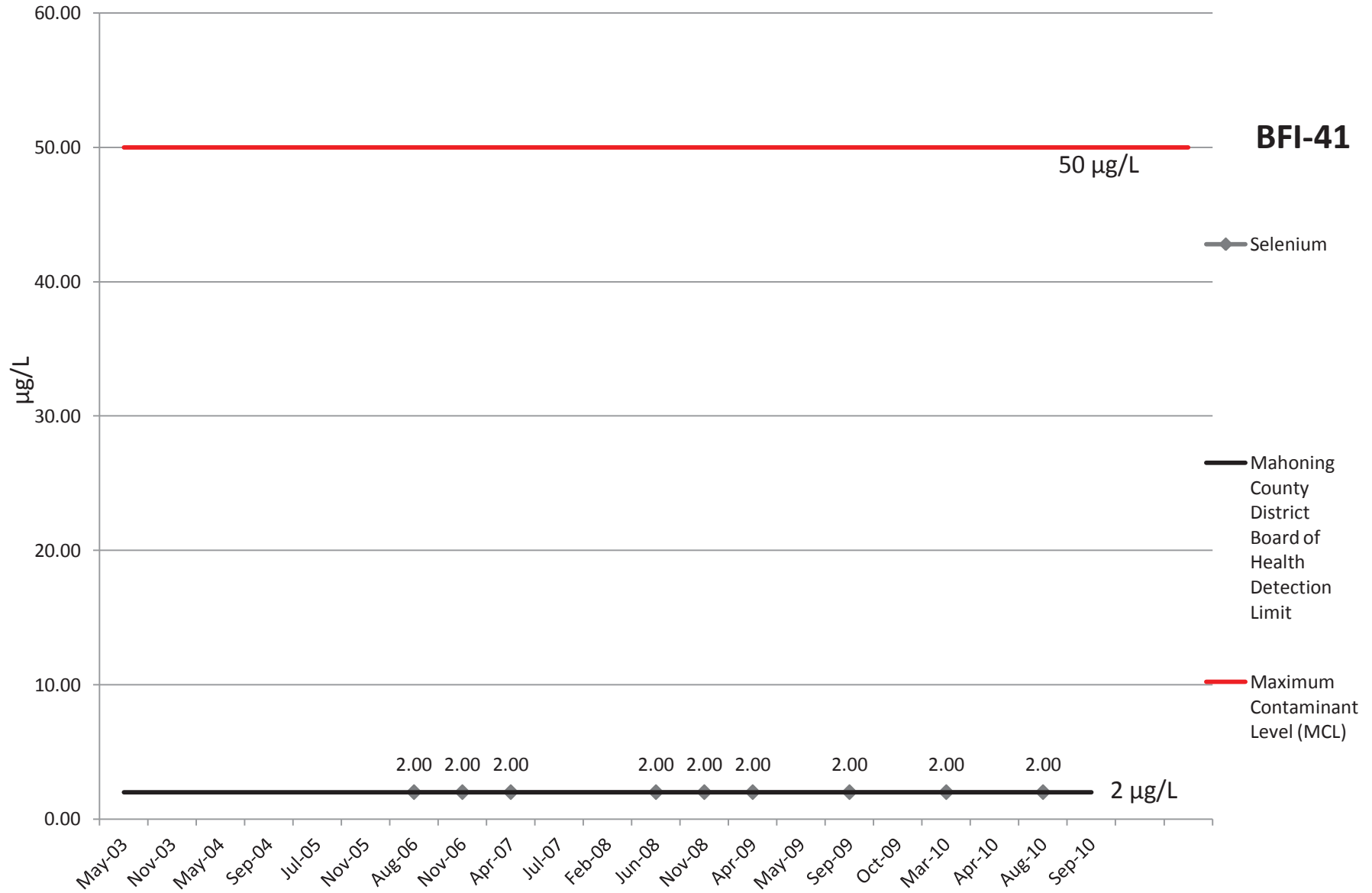
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

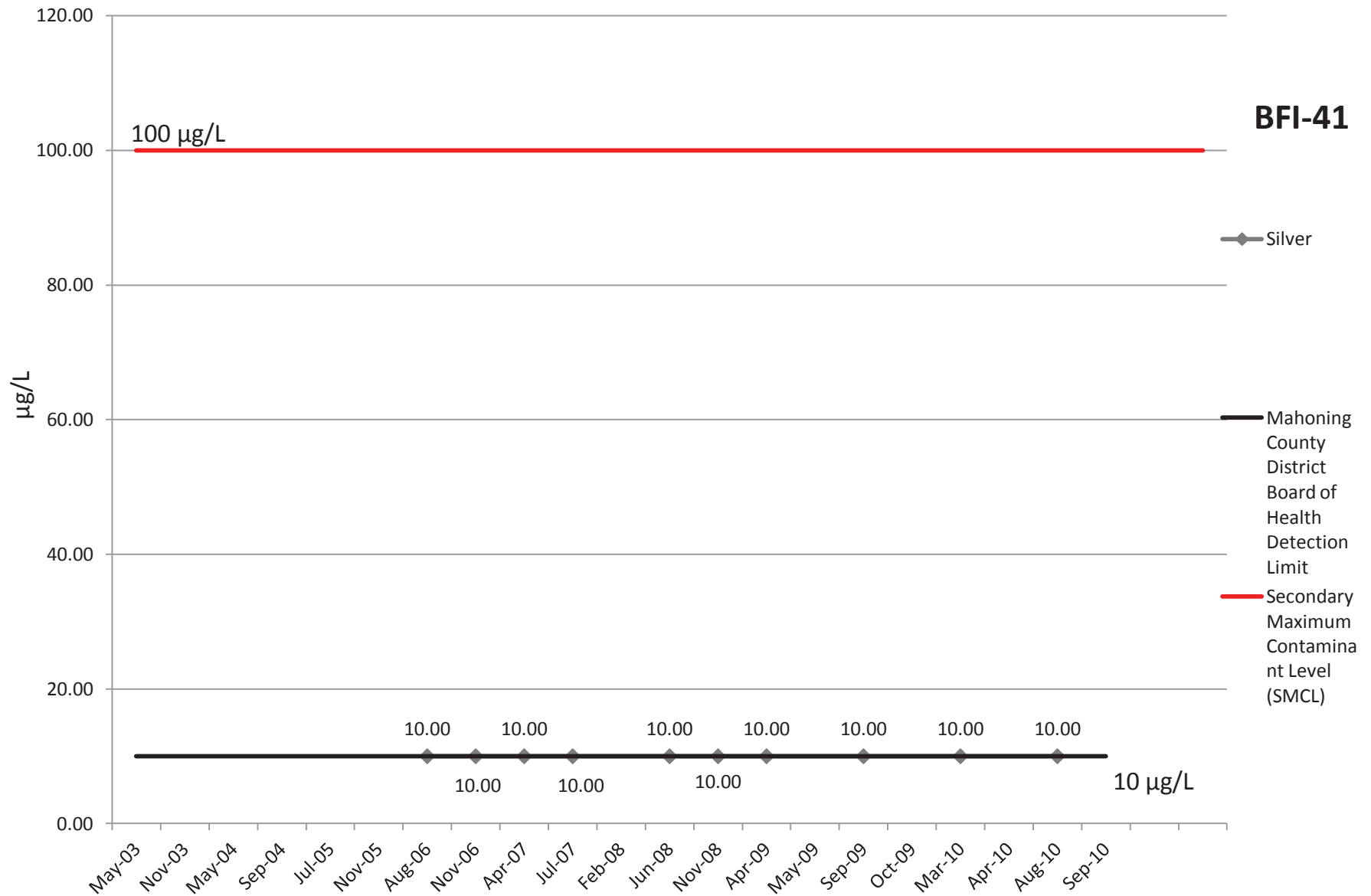
0.2 µg/L



# Selenium



# Silver



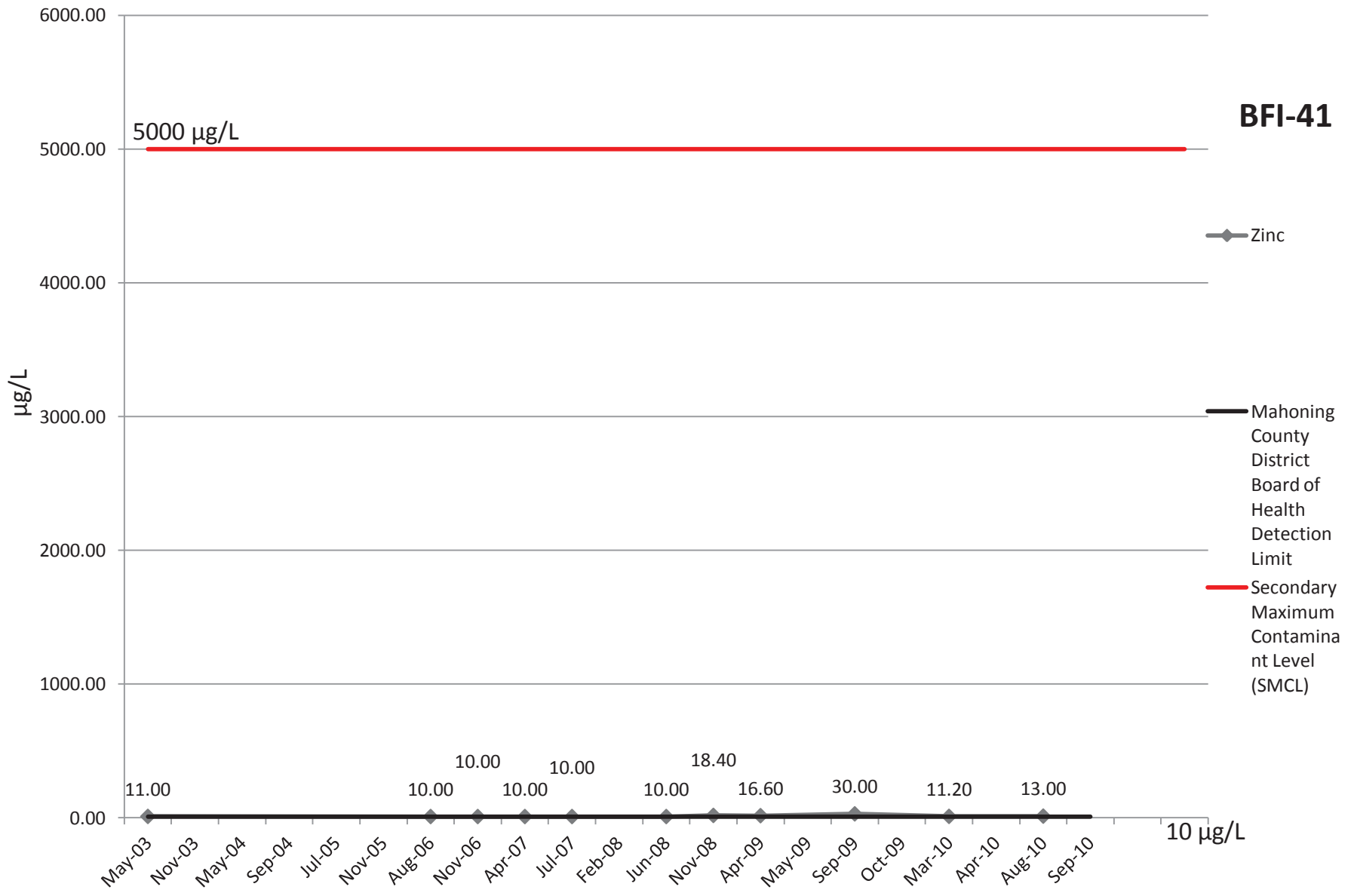
**BFI-41**

◆ Silver

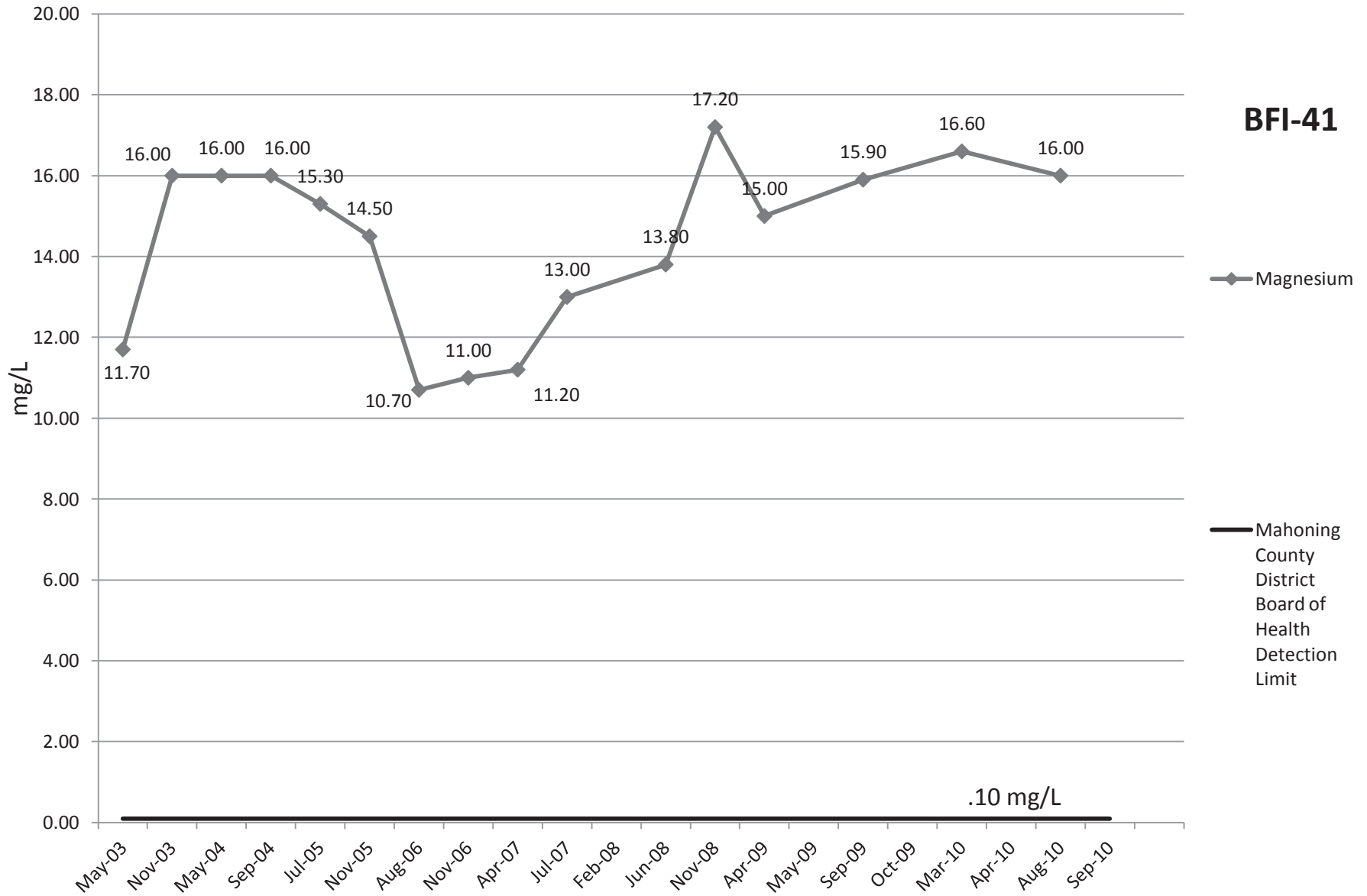
— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

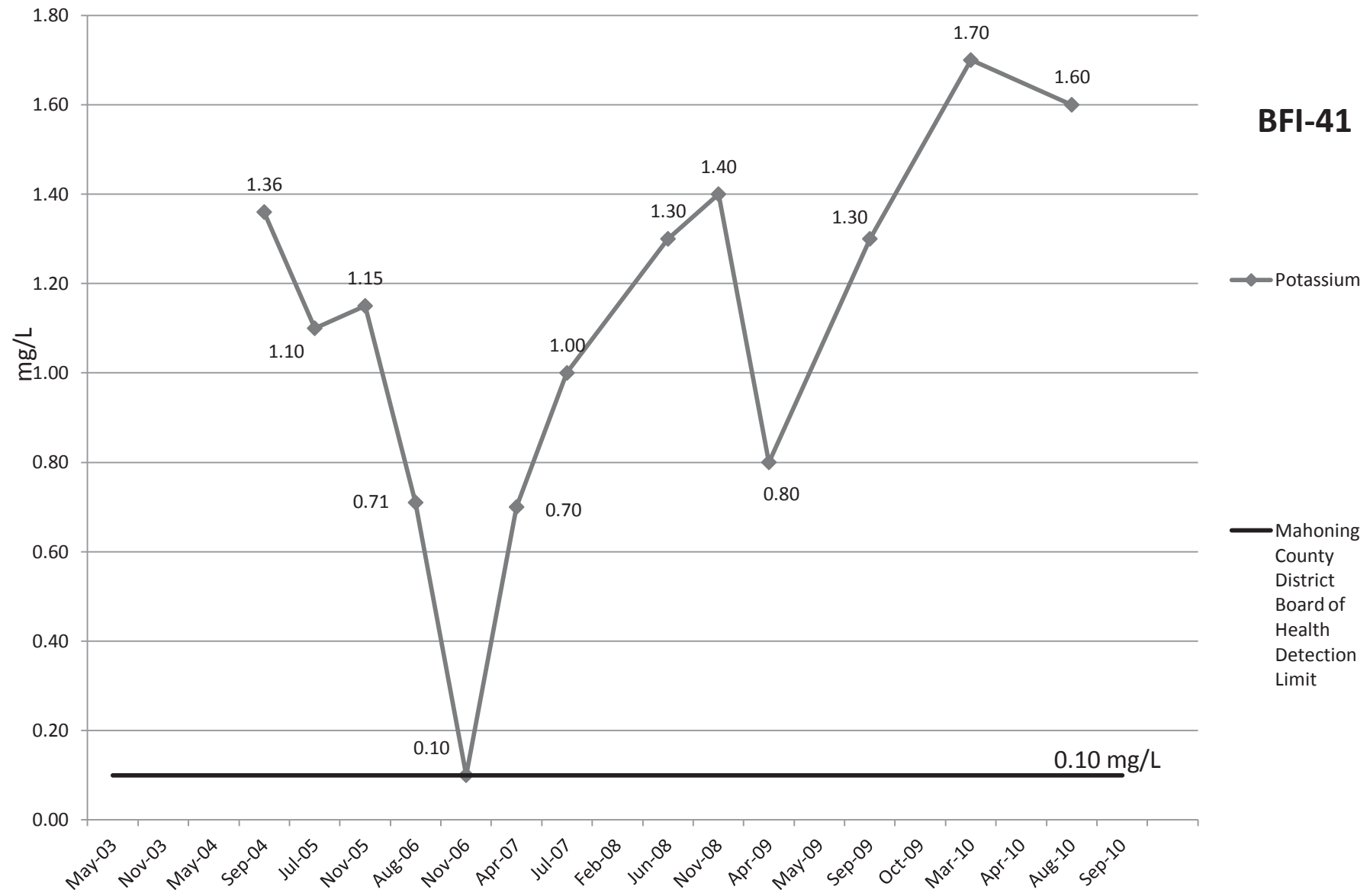
# Zinc



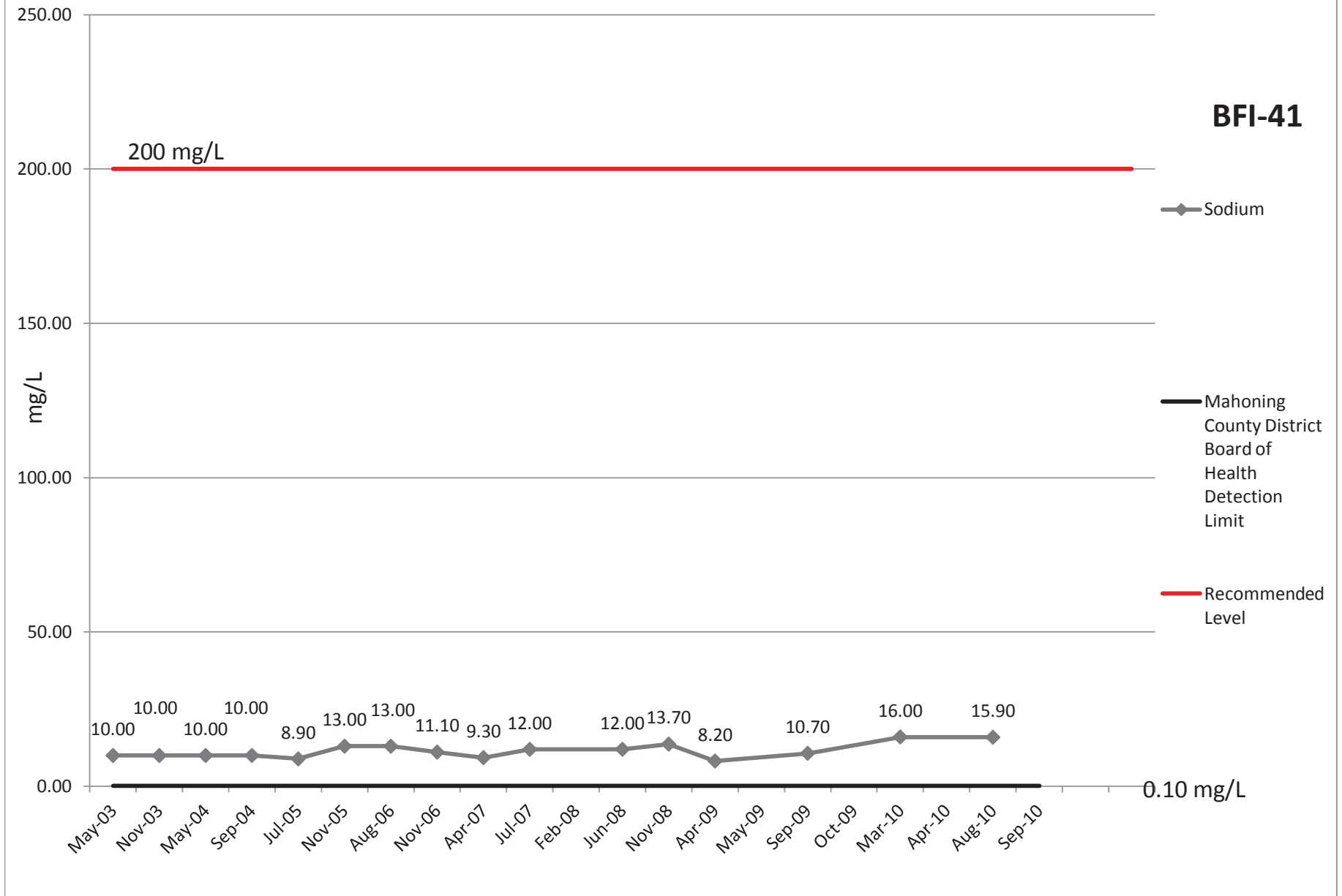
# Magnesium



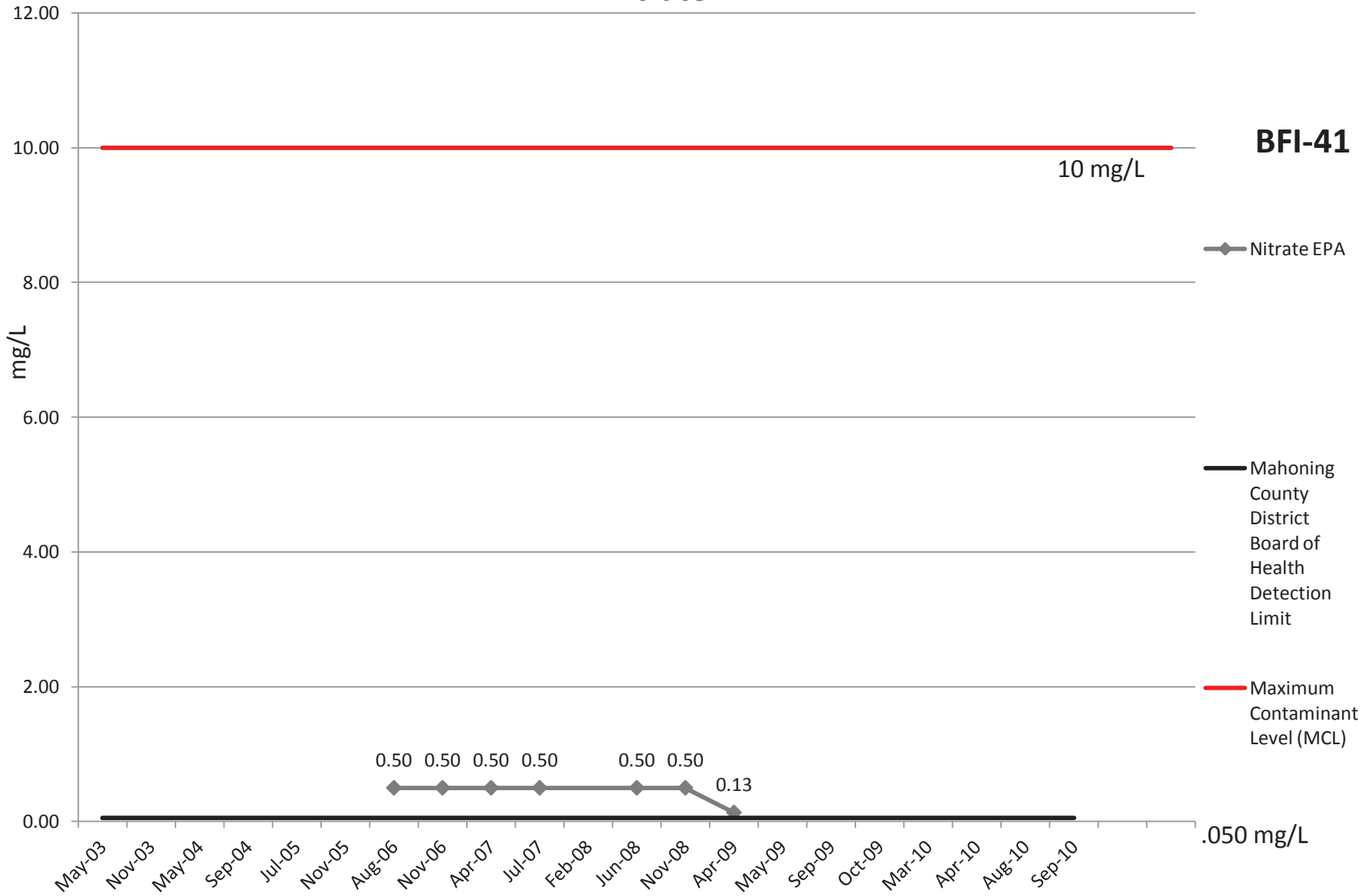
# Potassium



# Sodium

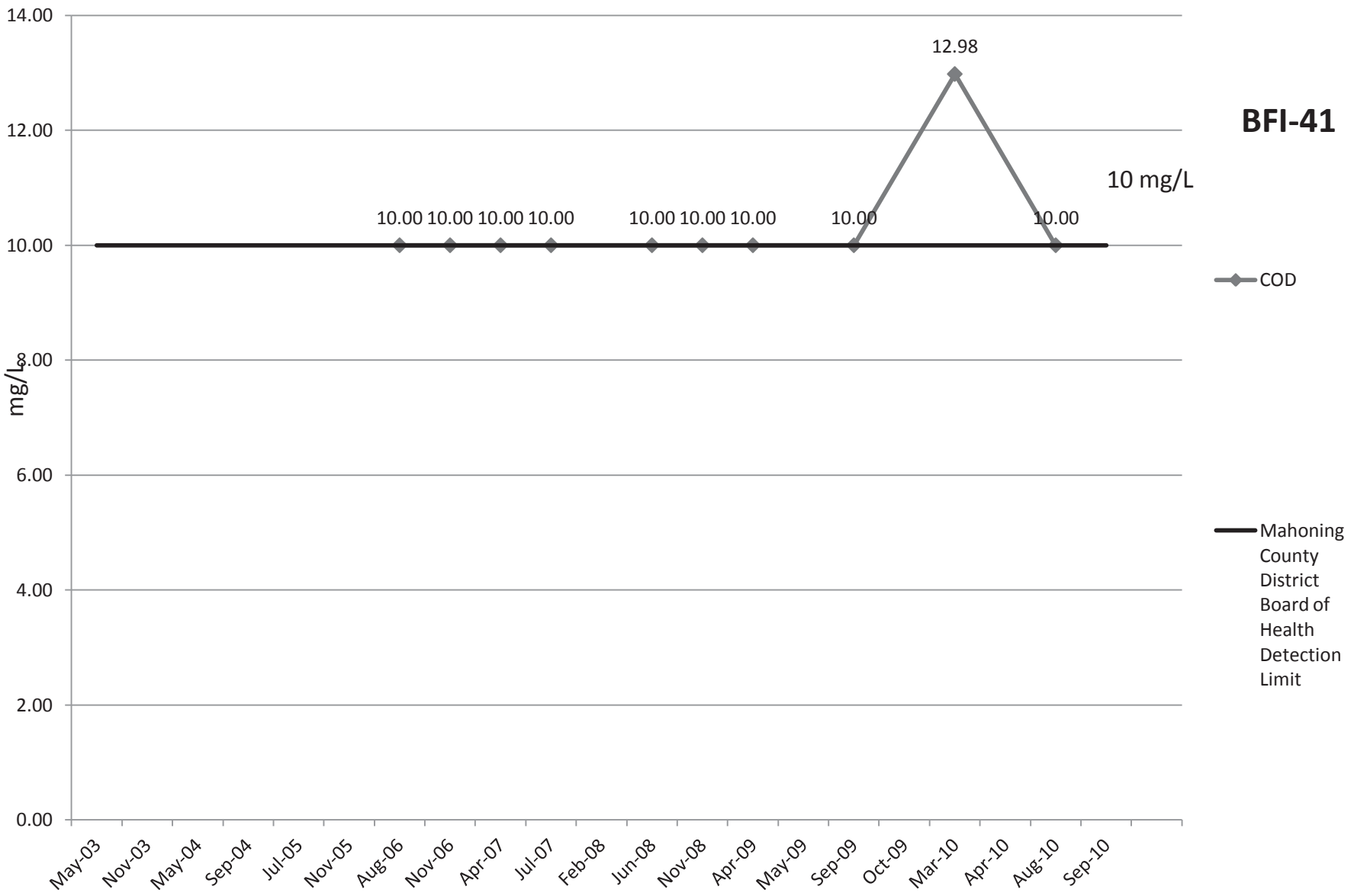


# Nitrate EPA





# COD



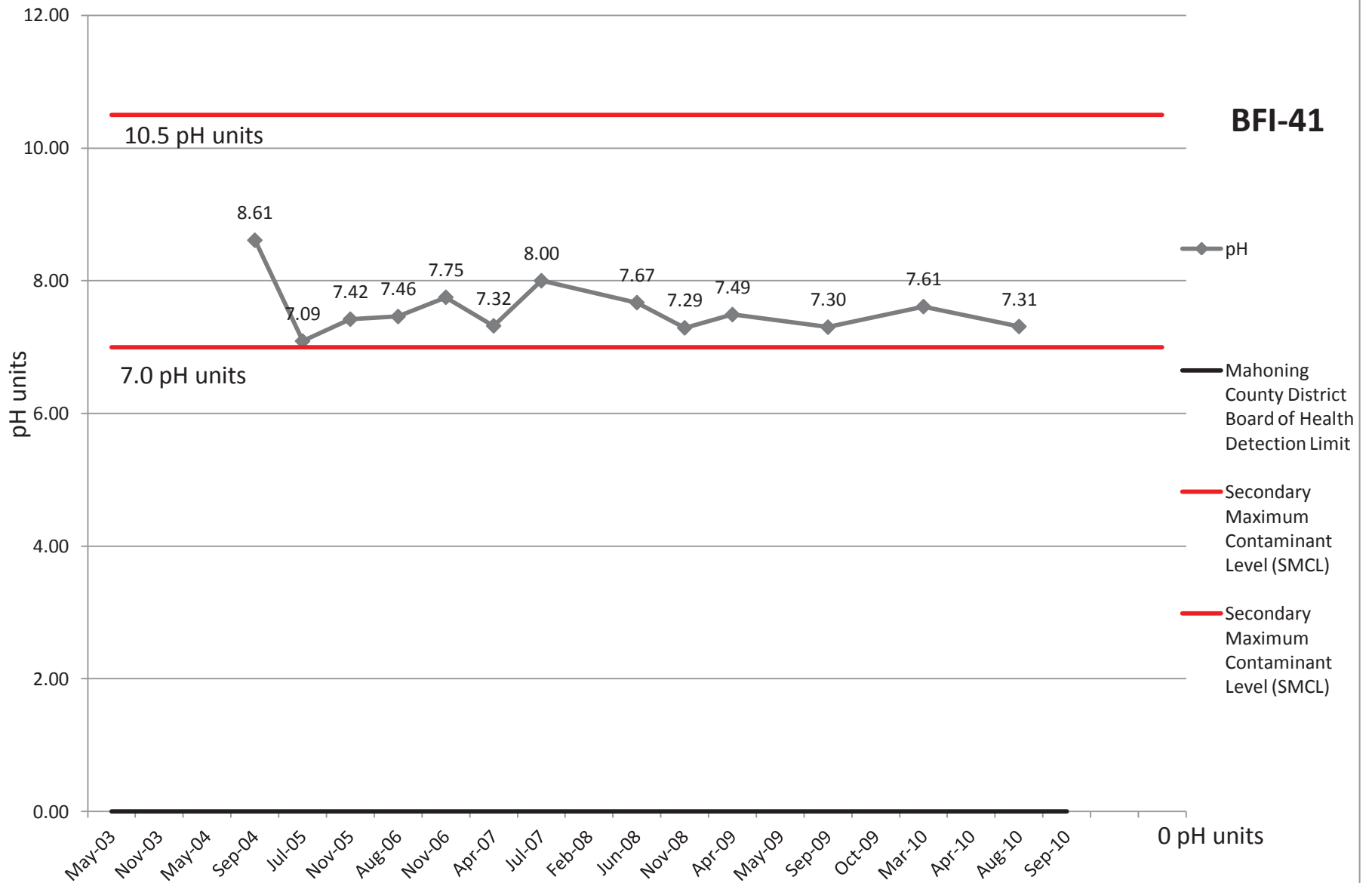
**BFI-41**

10 mg/L

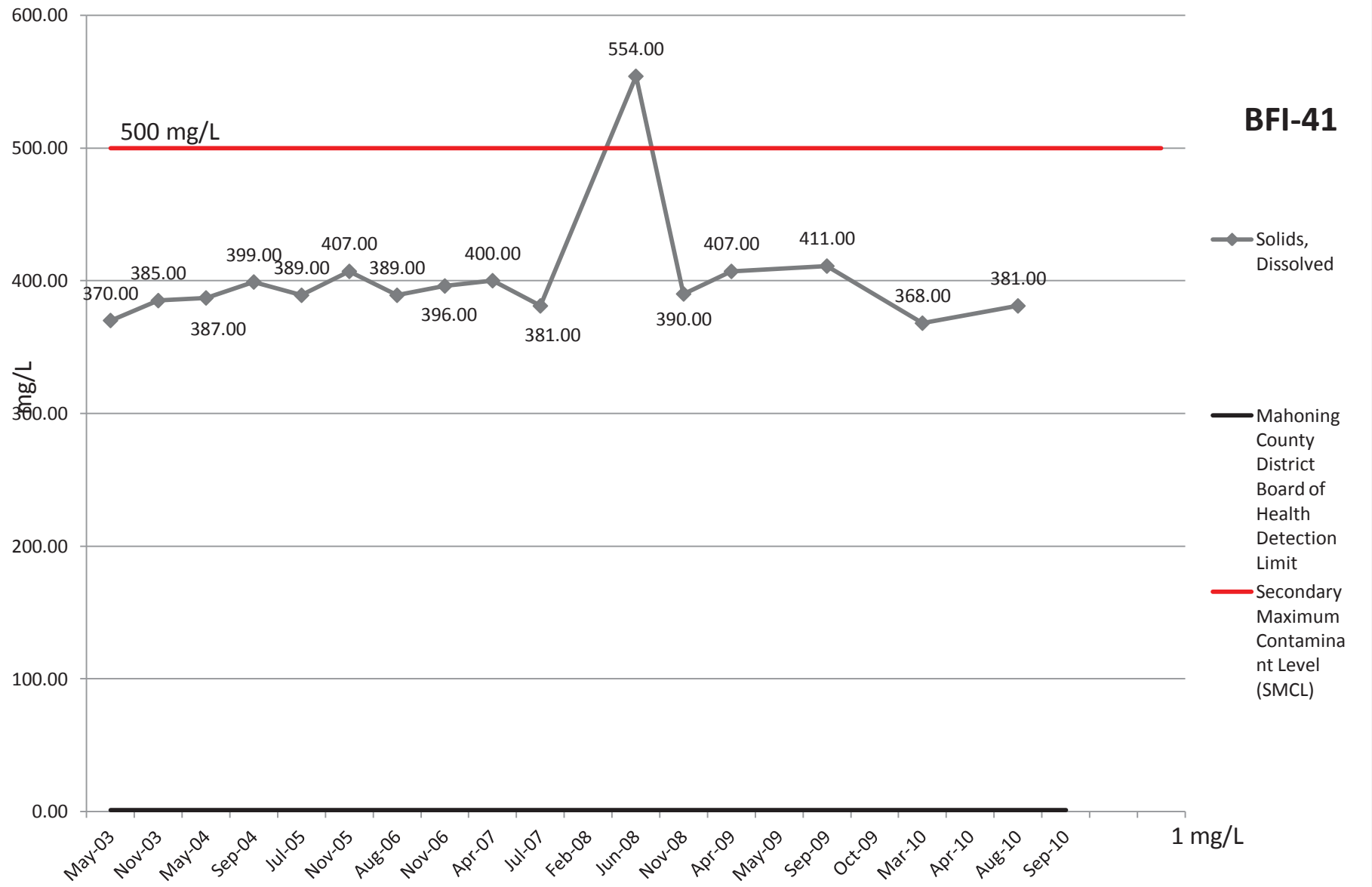
◆ COD

— Mahoning County District Board of Health Detection Limit

# pH

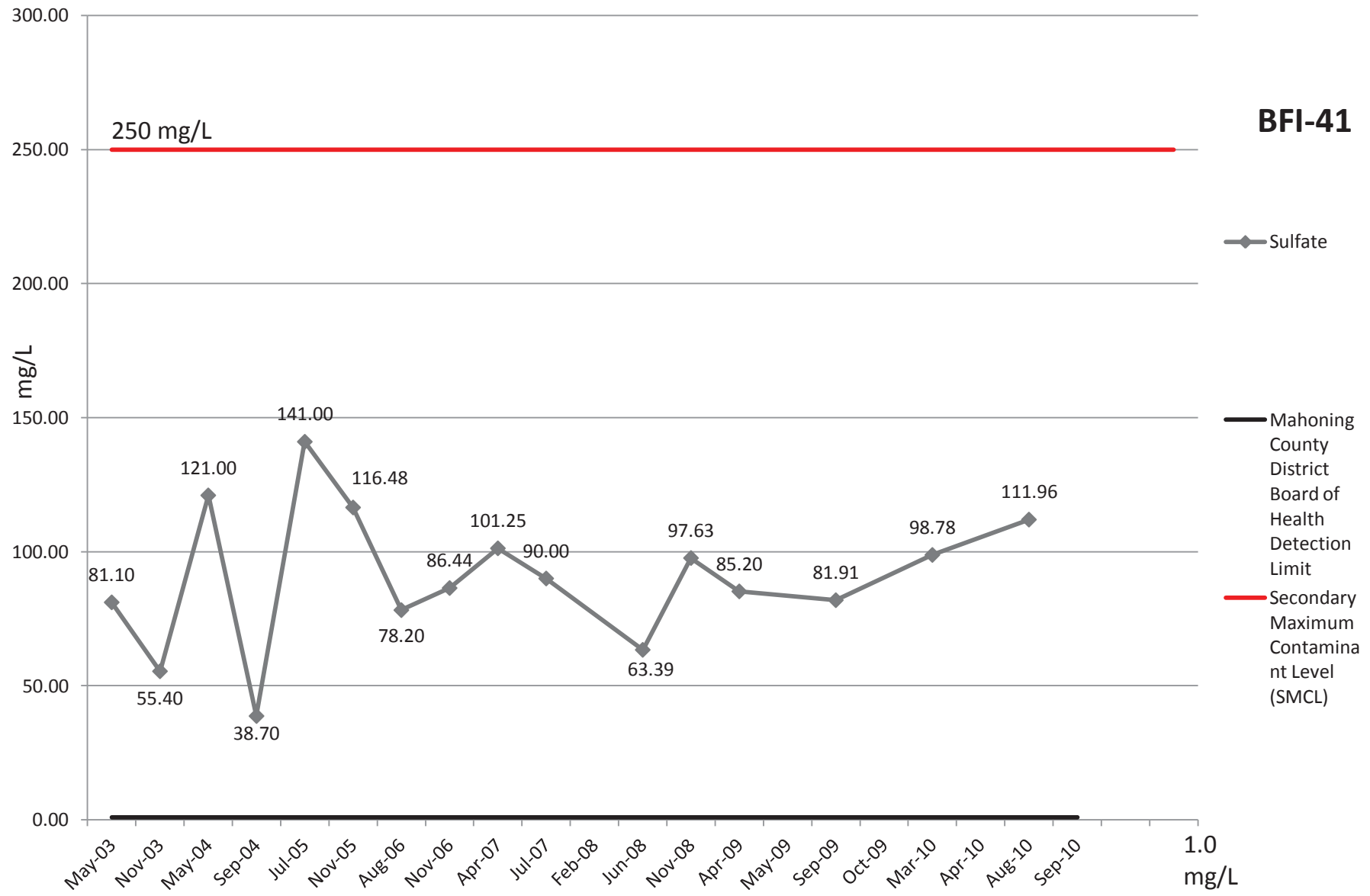


# Solids, Dissolved



# Sulfate

**BFI-41**



# Bacteria

## BFI-41

Positive/Negative

positive (1)

1.00

1.00

0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

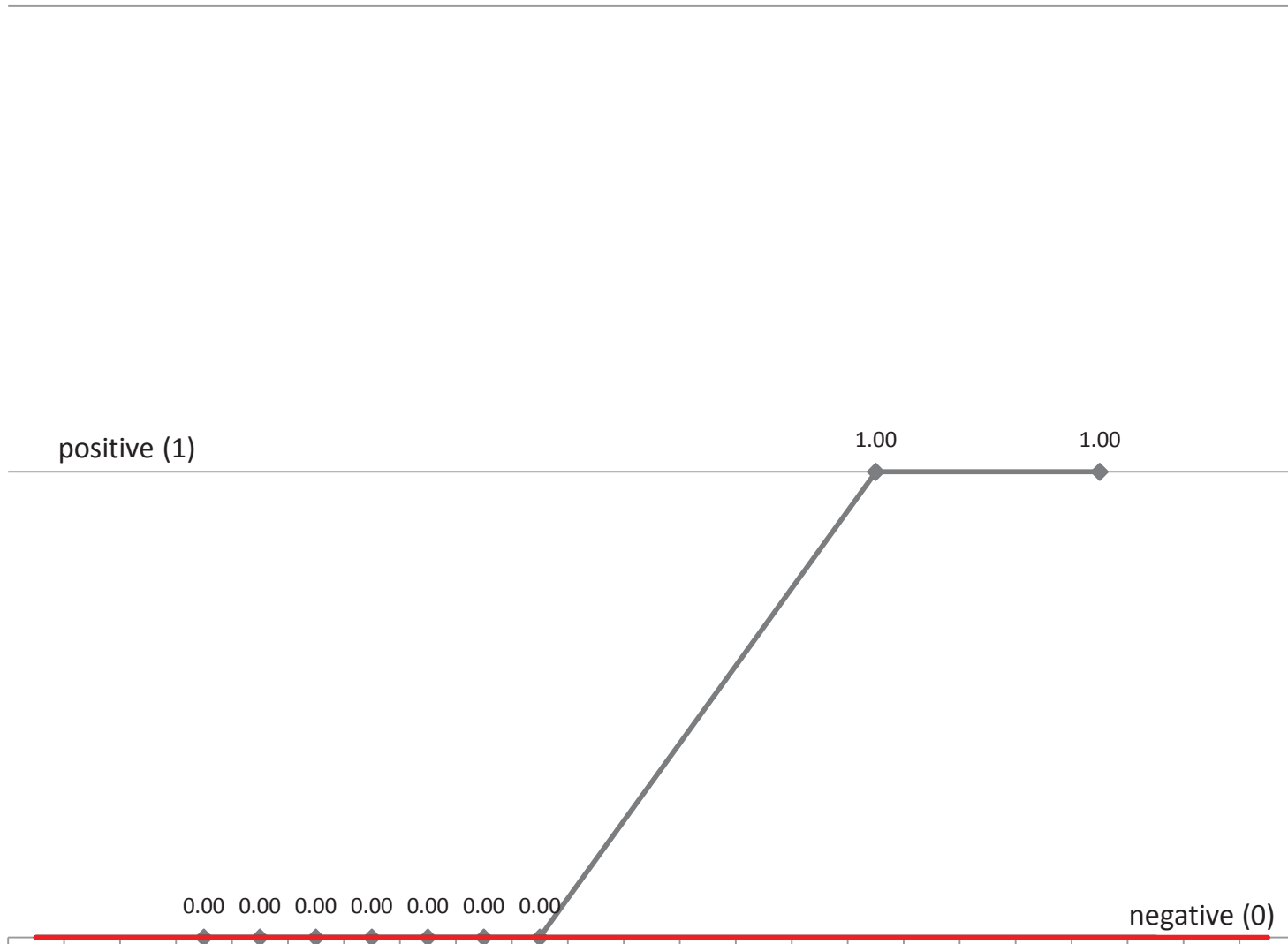
negative (0)

◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

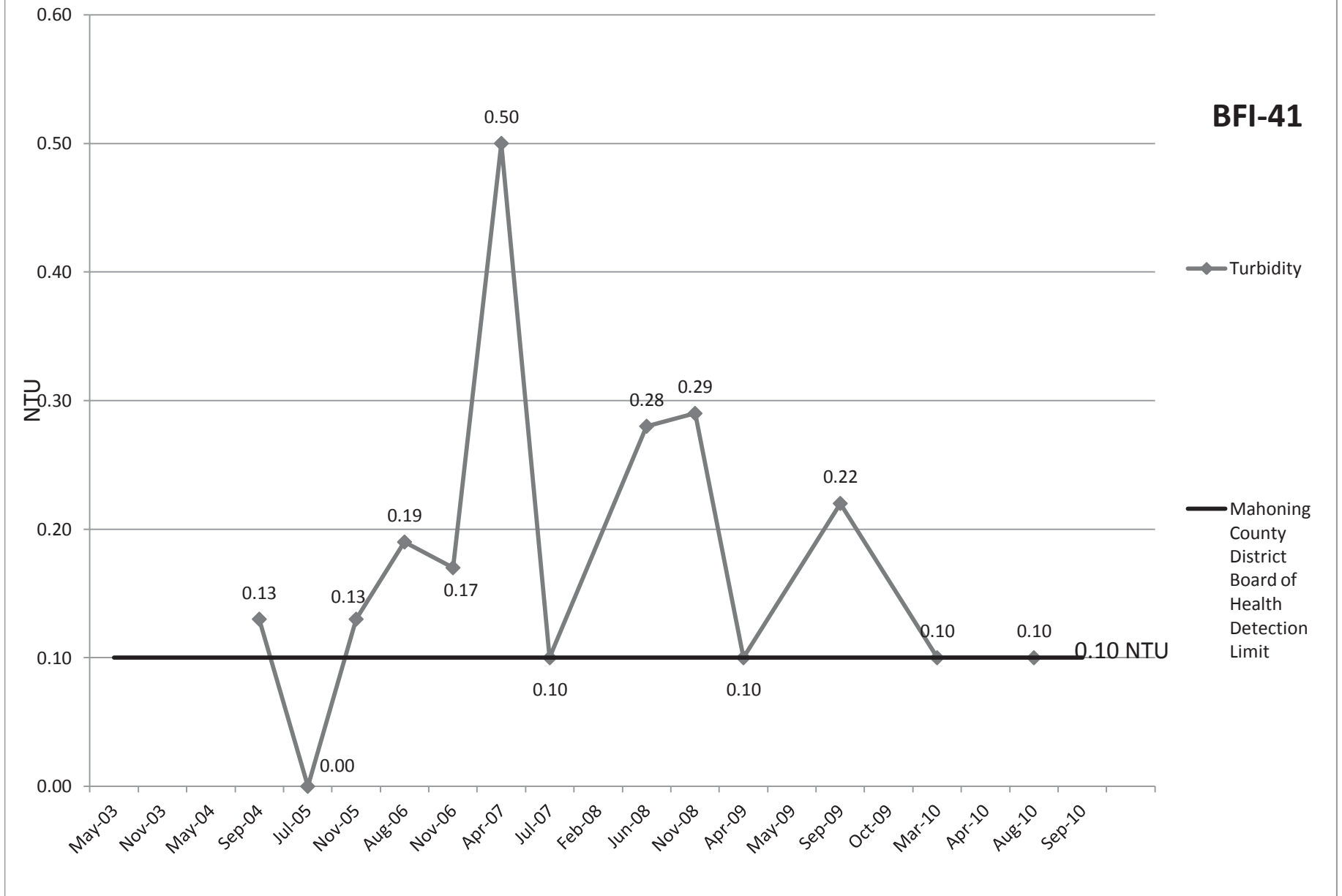
— Maximum  
Contaminant  
Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

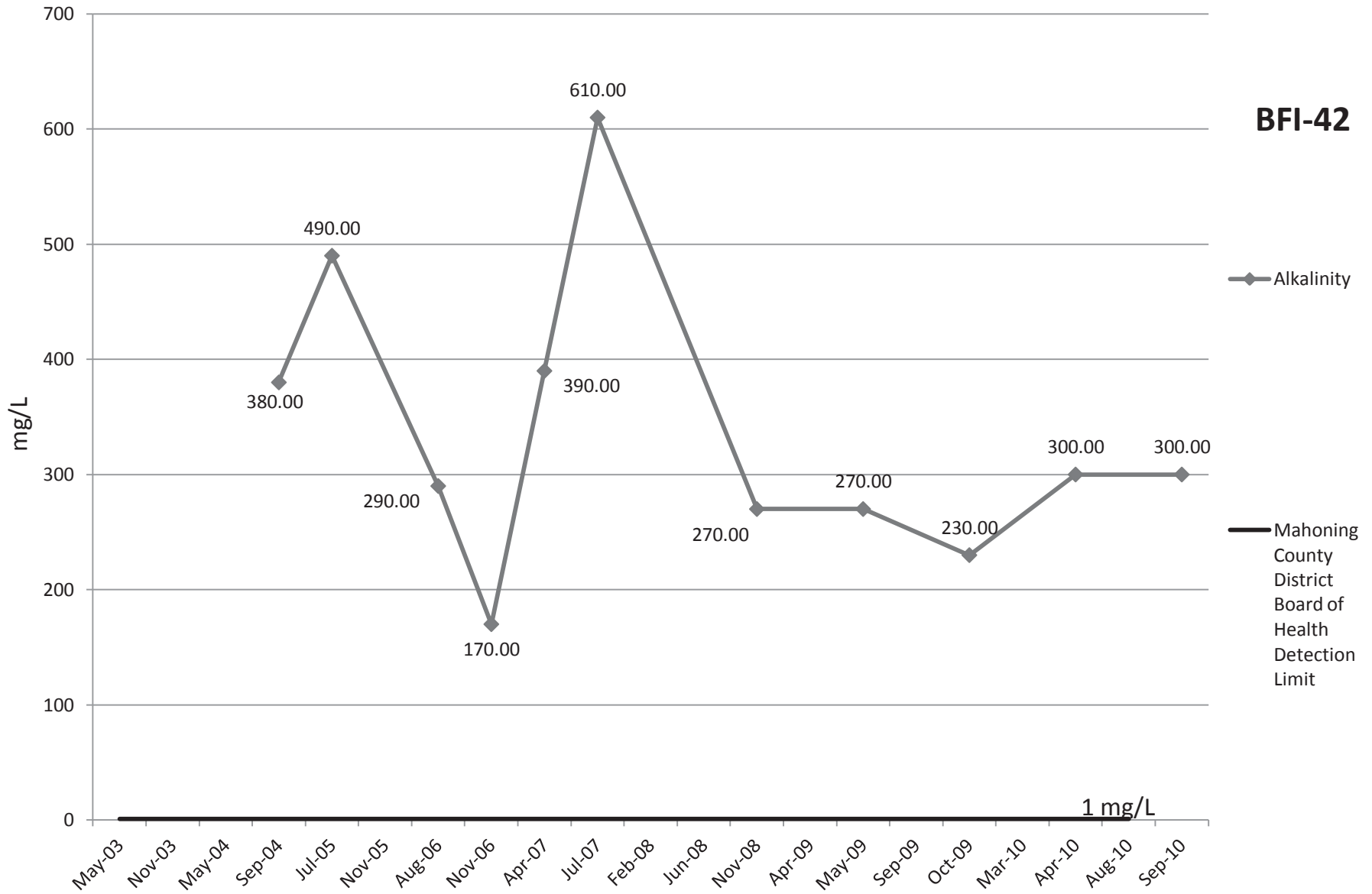


Date	Bacteria Level
May-03	0.00
Nov-03	0.00
May-04	0.00
Sep-04	0.00
Jul-05	0.00
Nov-05	0.00
Aug-06	0.00
Nov-06	0.00
Apr-07	0.00
Jul-07	0.00
Feb-08	0.00
Jun-08	0.00
Nov-08	0.00
Apr-09	0.00
May-09	0.00
Sep-09	1.00
Oct-09	1.00
Mar-10	1.00
Apr-10	1.00
Aug-10	1.00
Sep-10	1.00

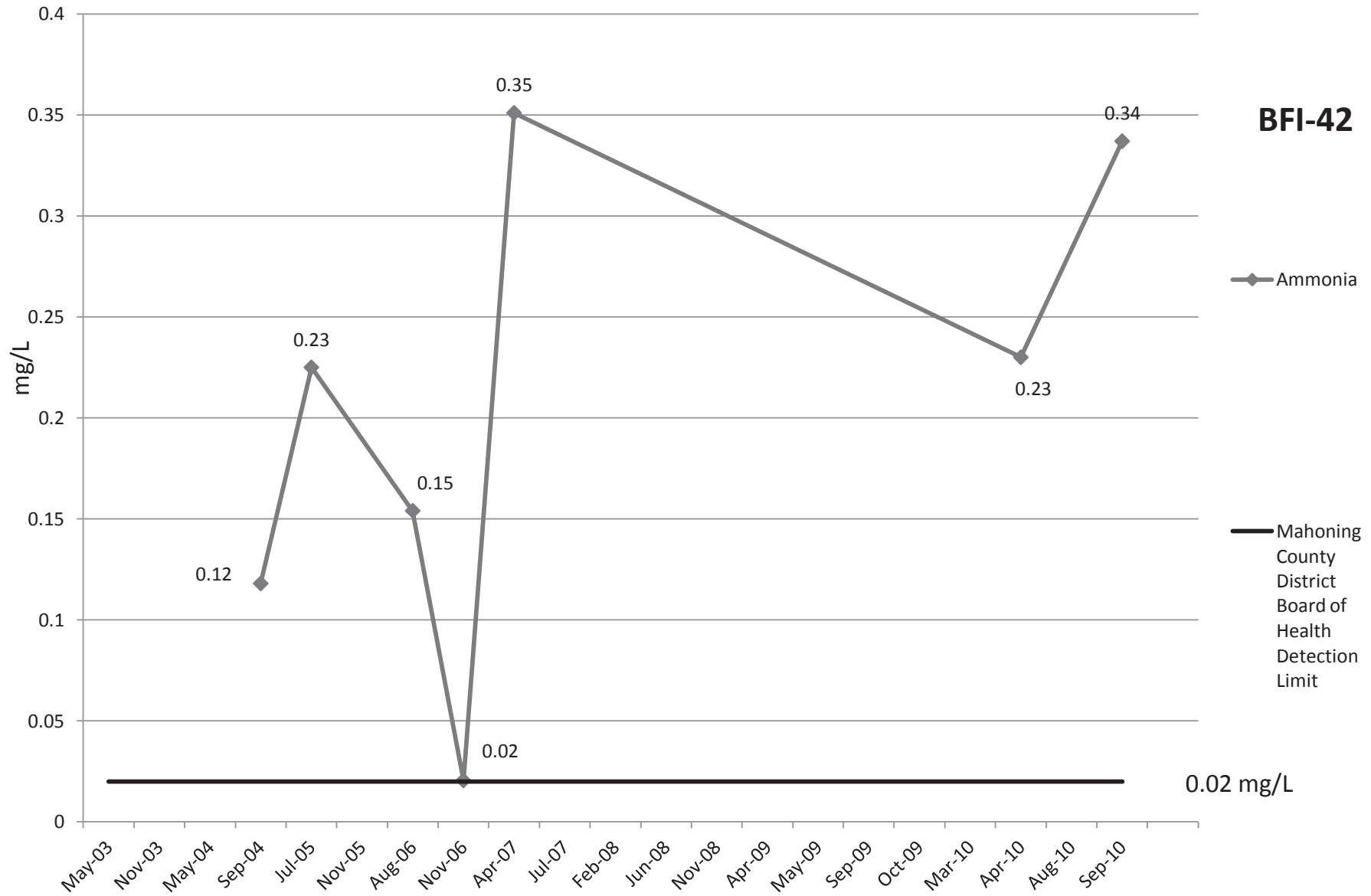
# Turbidity



# Alkalinity

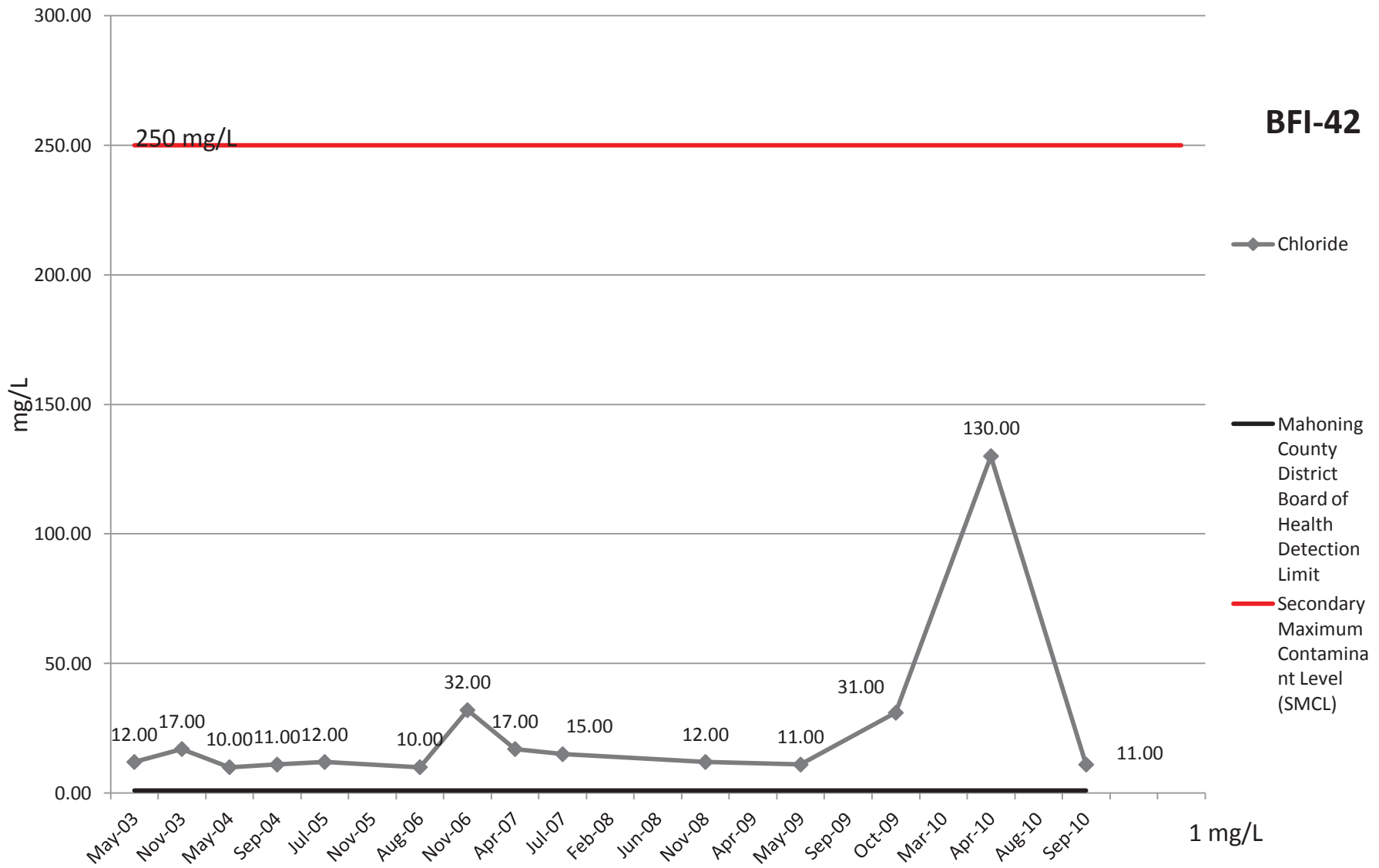


# Ammonia



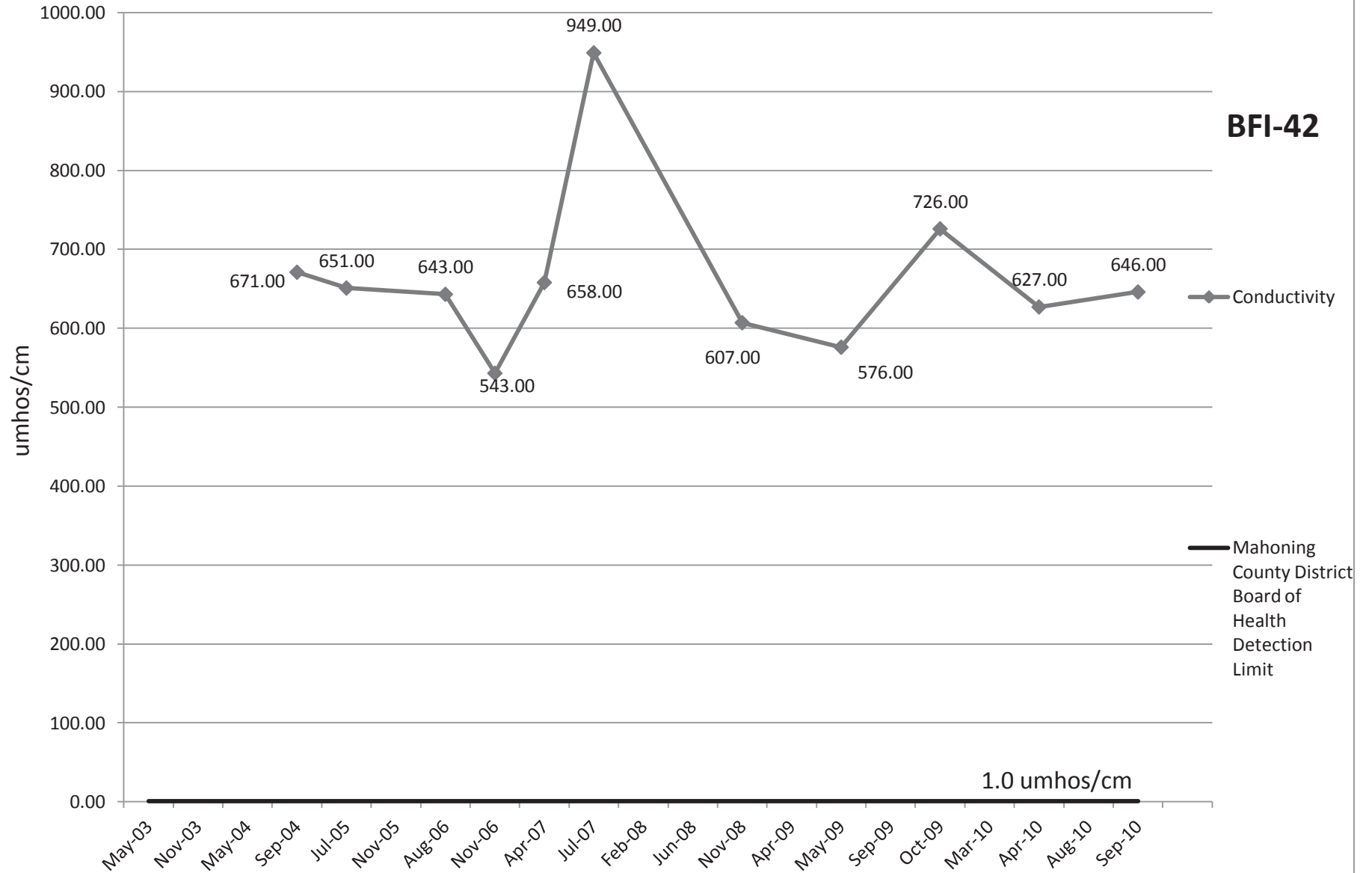


# Chloride

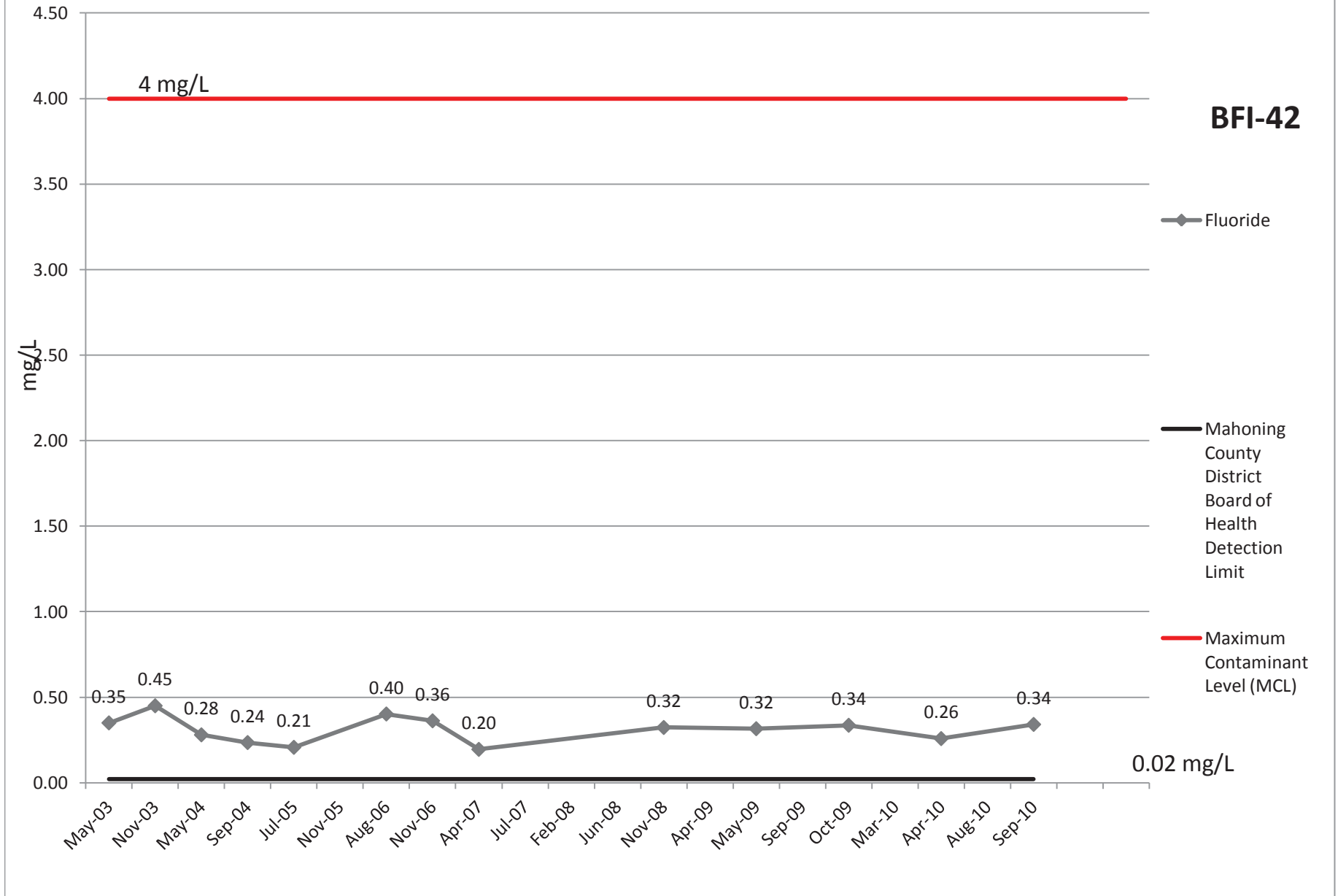


# Conductivity

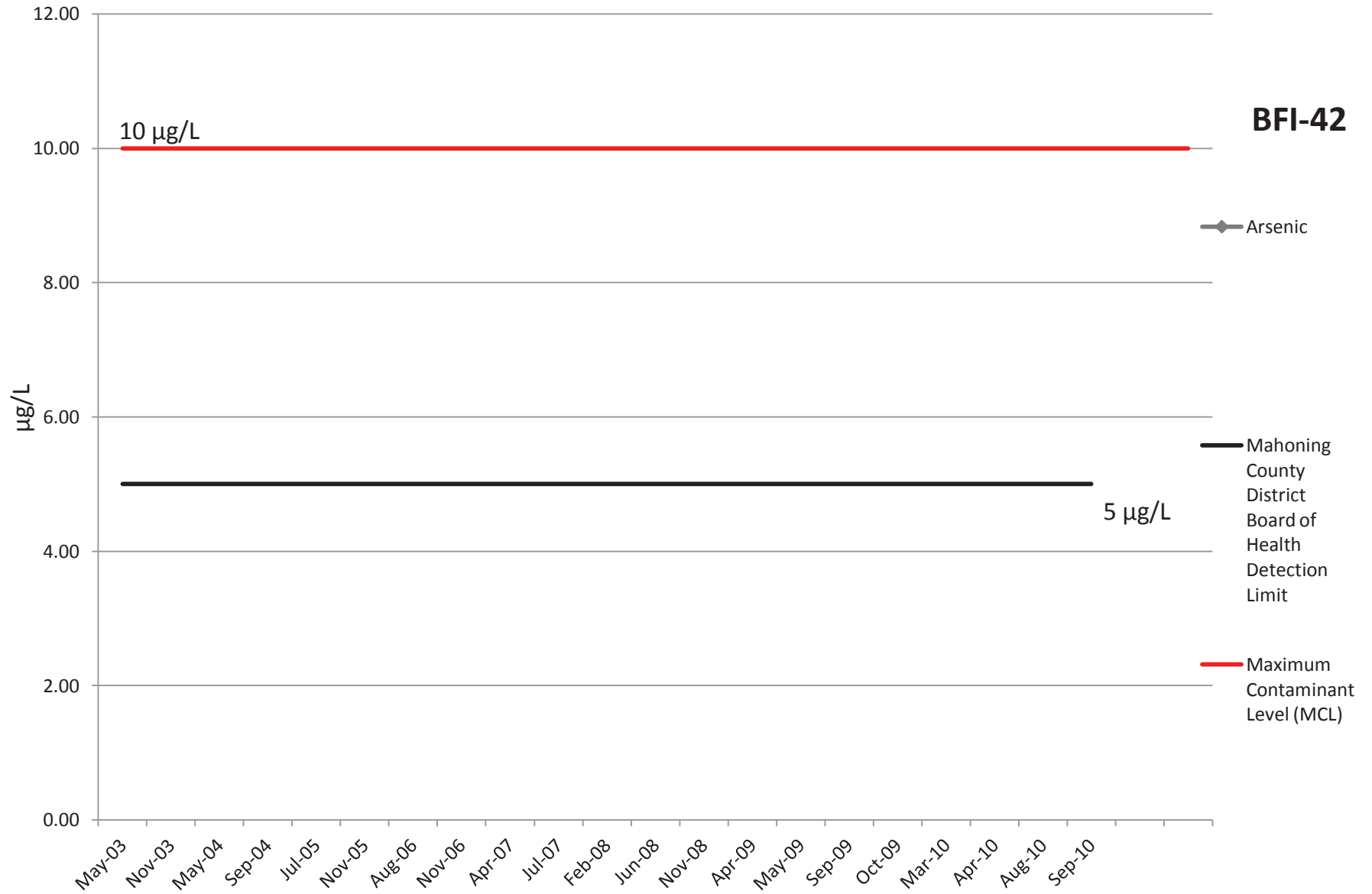
**BFI-42**



# Fluoride

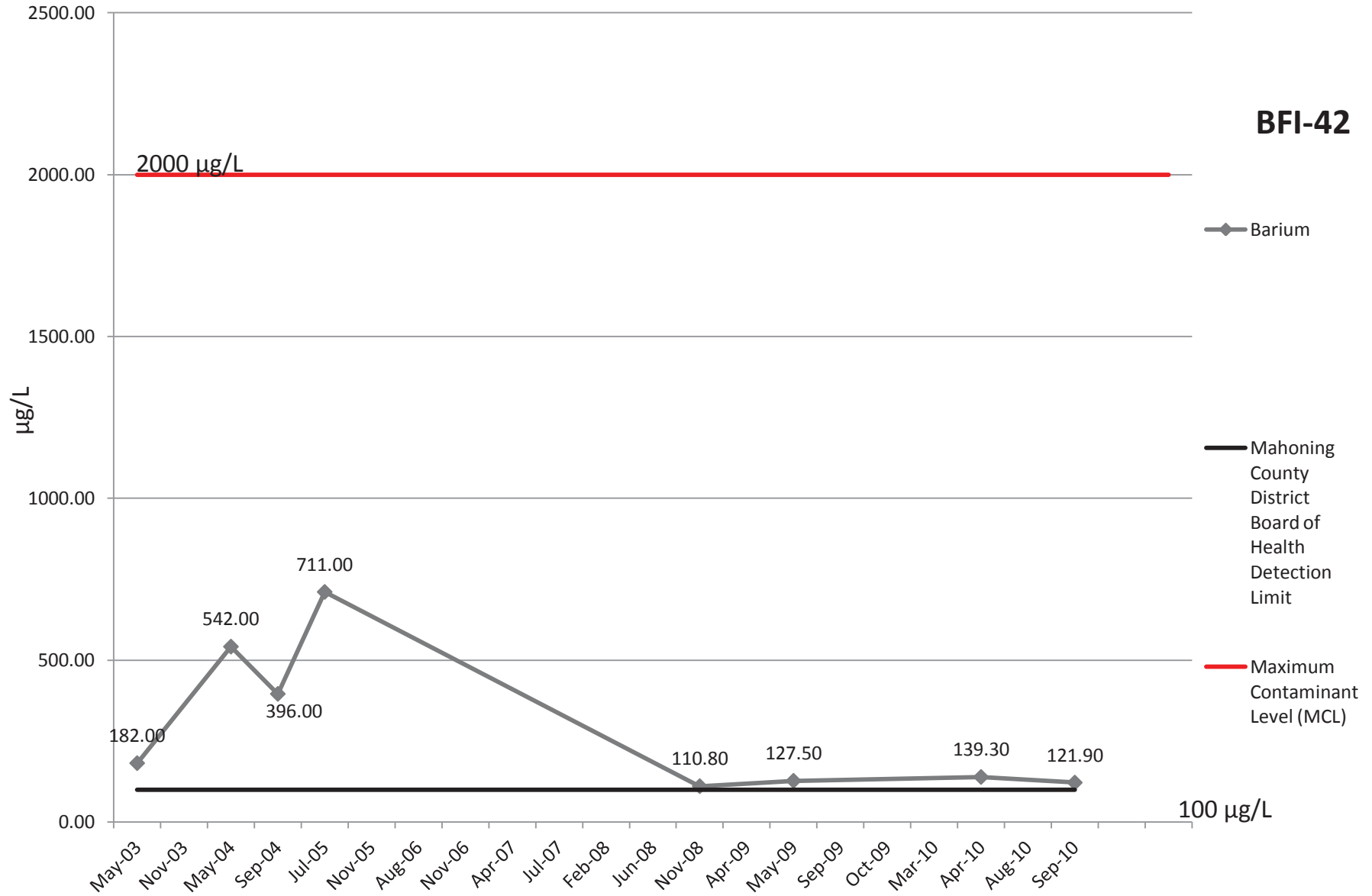


# Arsenic



# Barium

**BFI-42**



# Cadmium

**BFI-42**

10 µg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

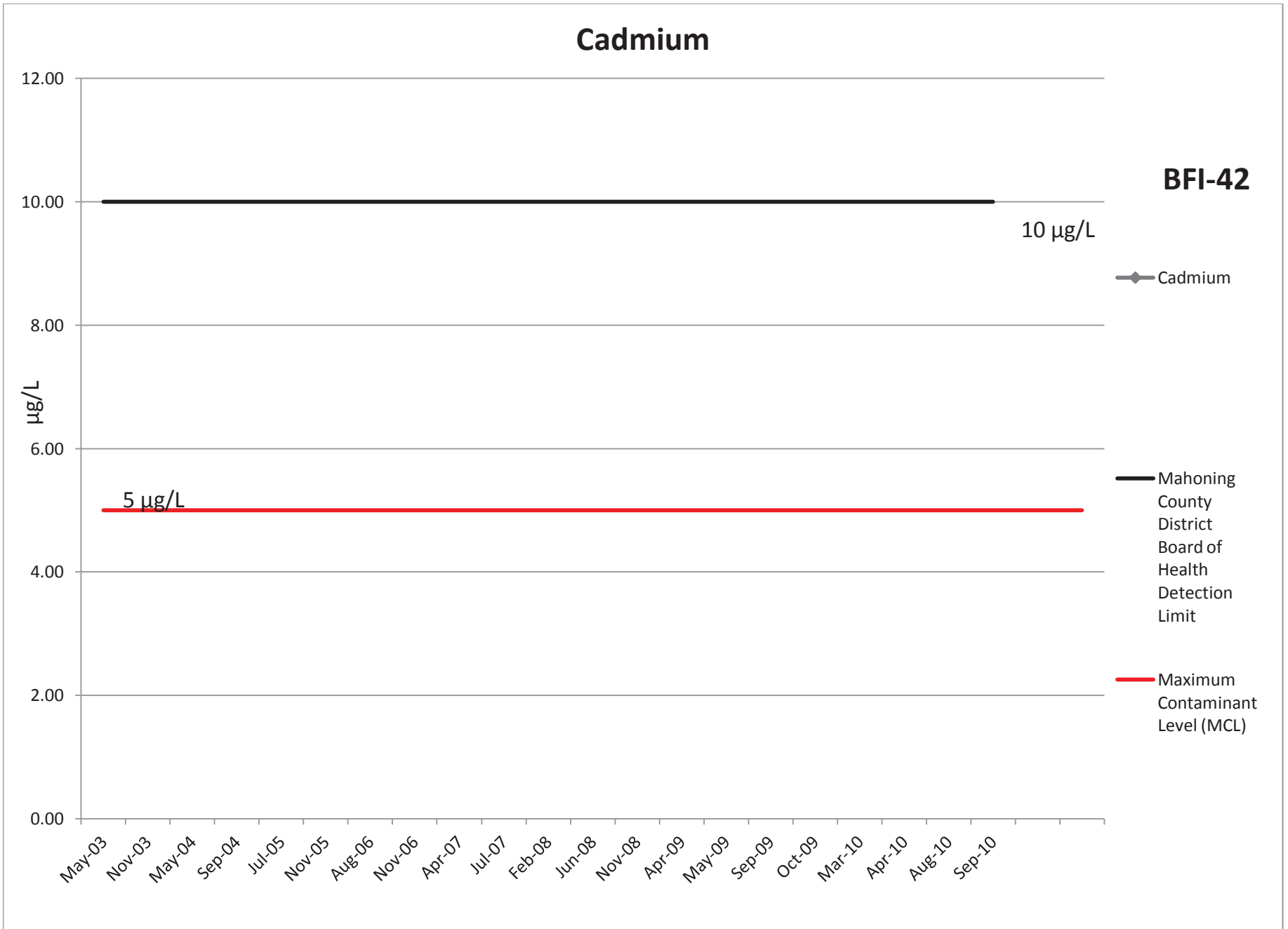
5 µg/L

◆ Cadmium

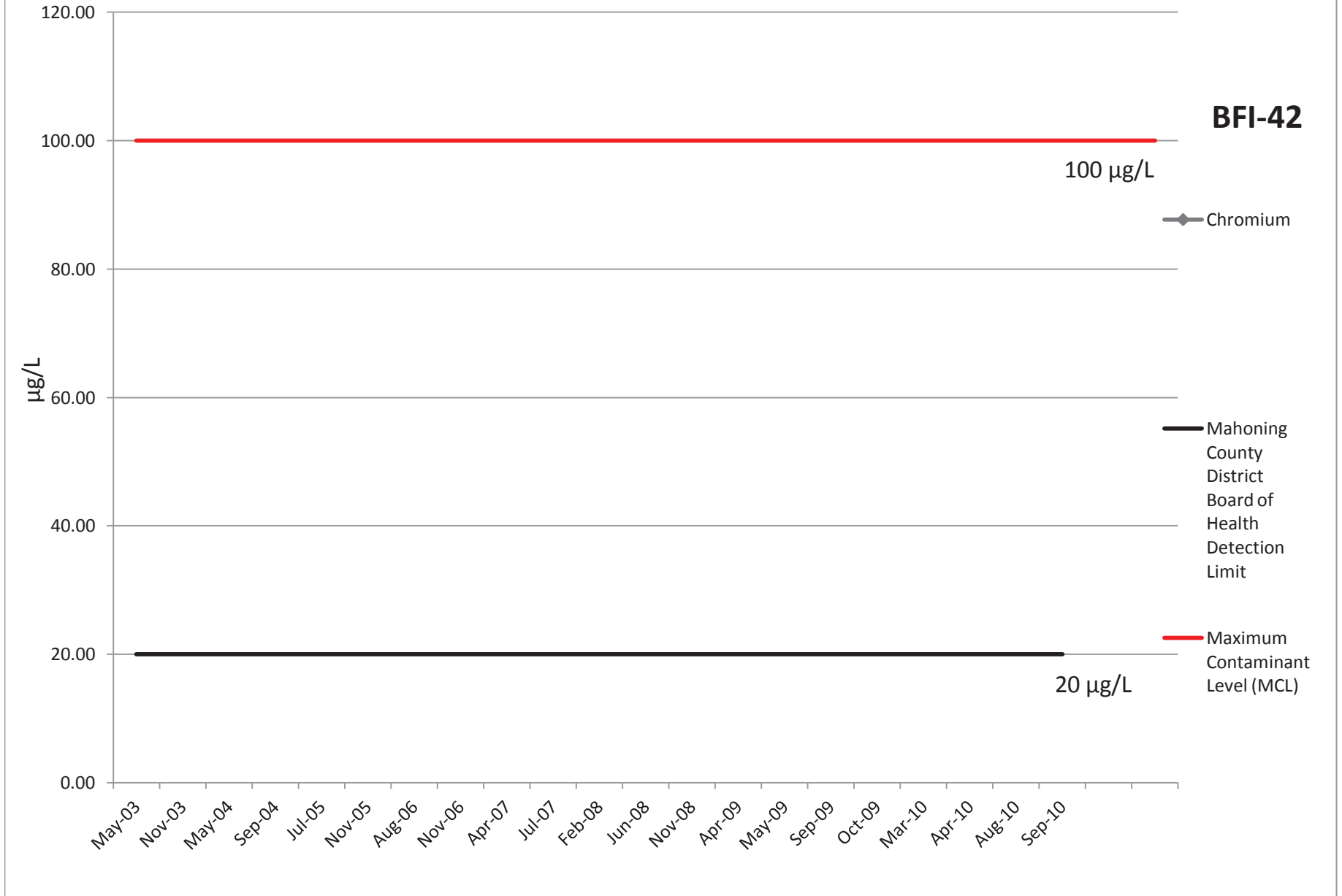
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

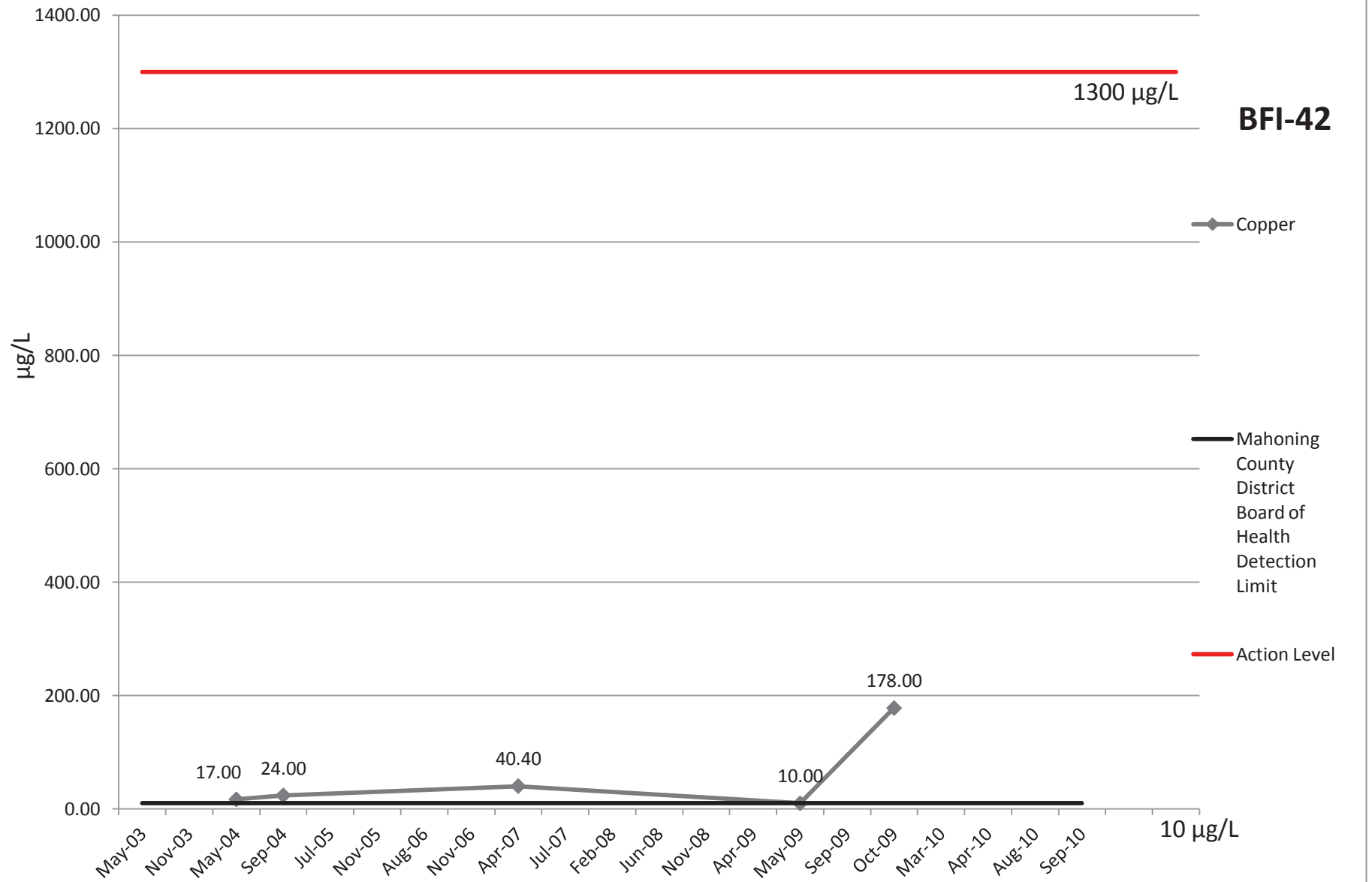
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# Chromium



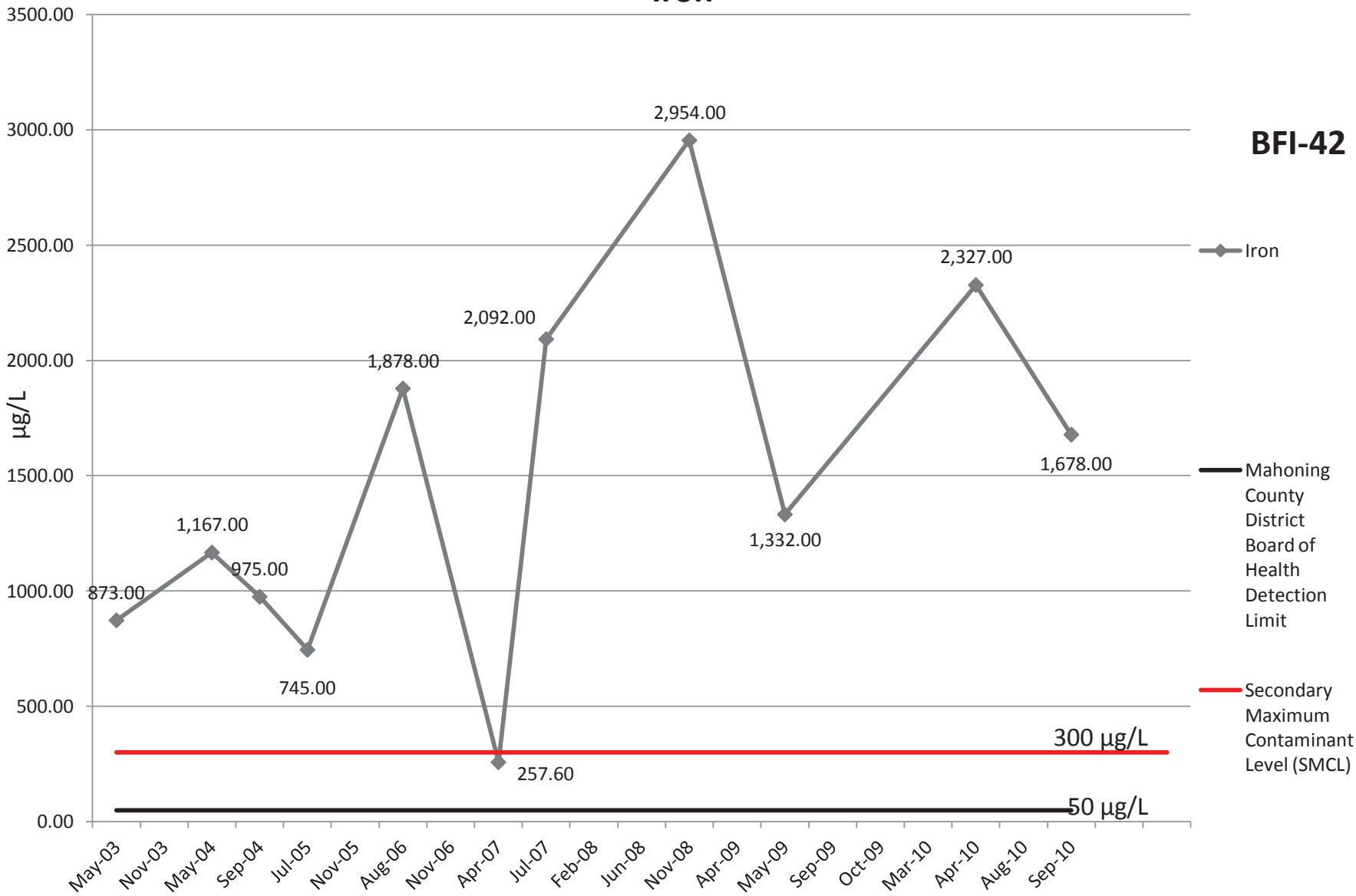
# Copper





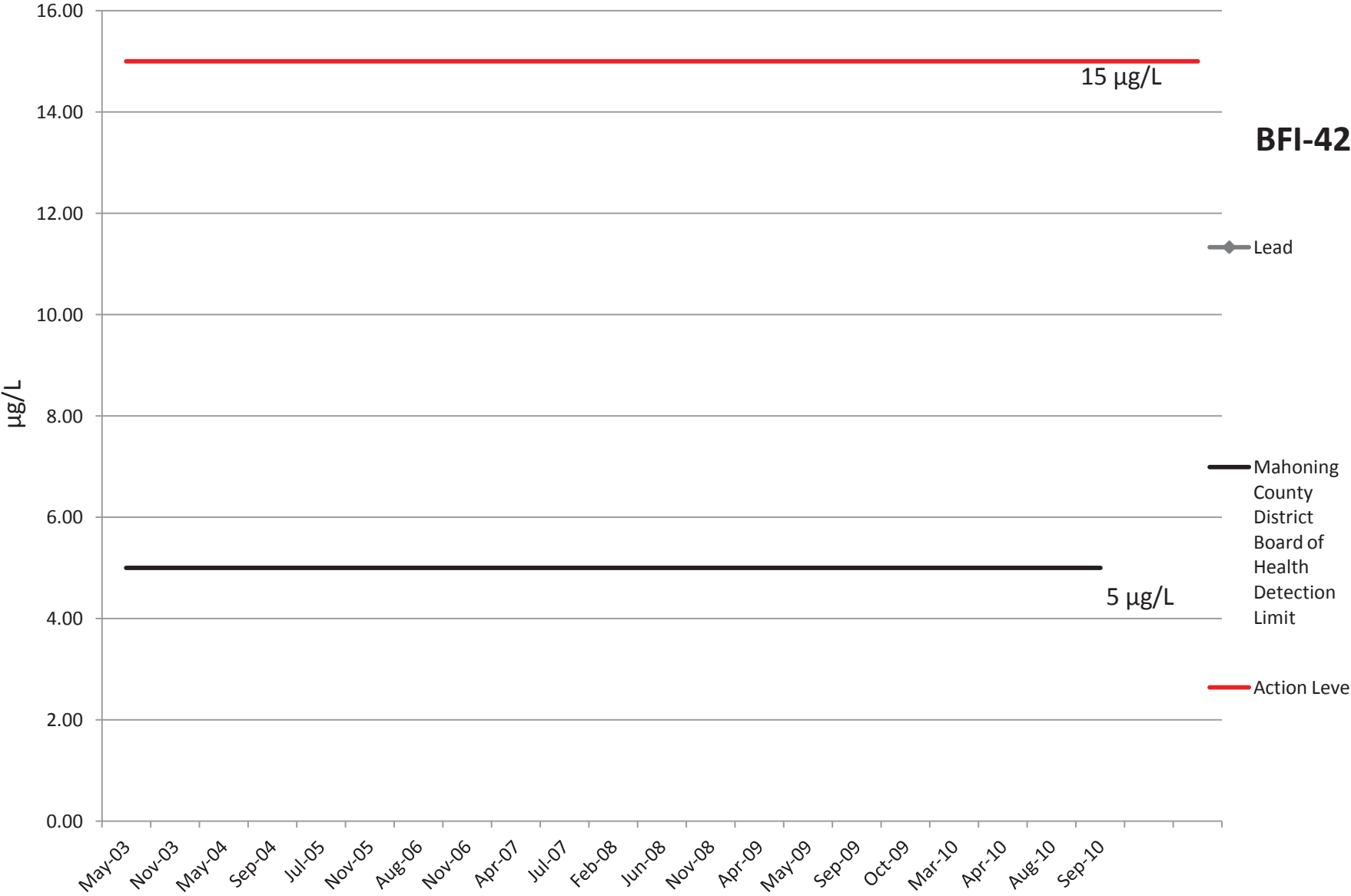
# Iron

**BFI-42**



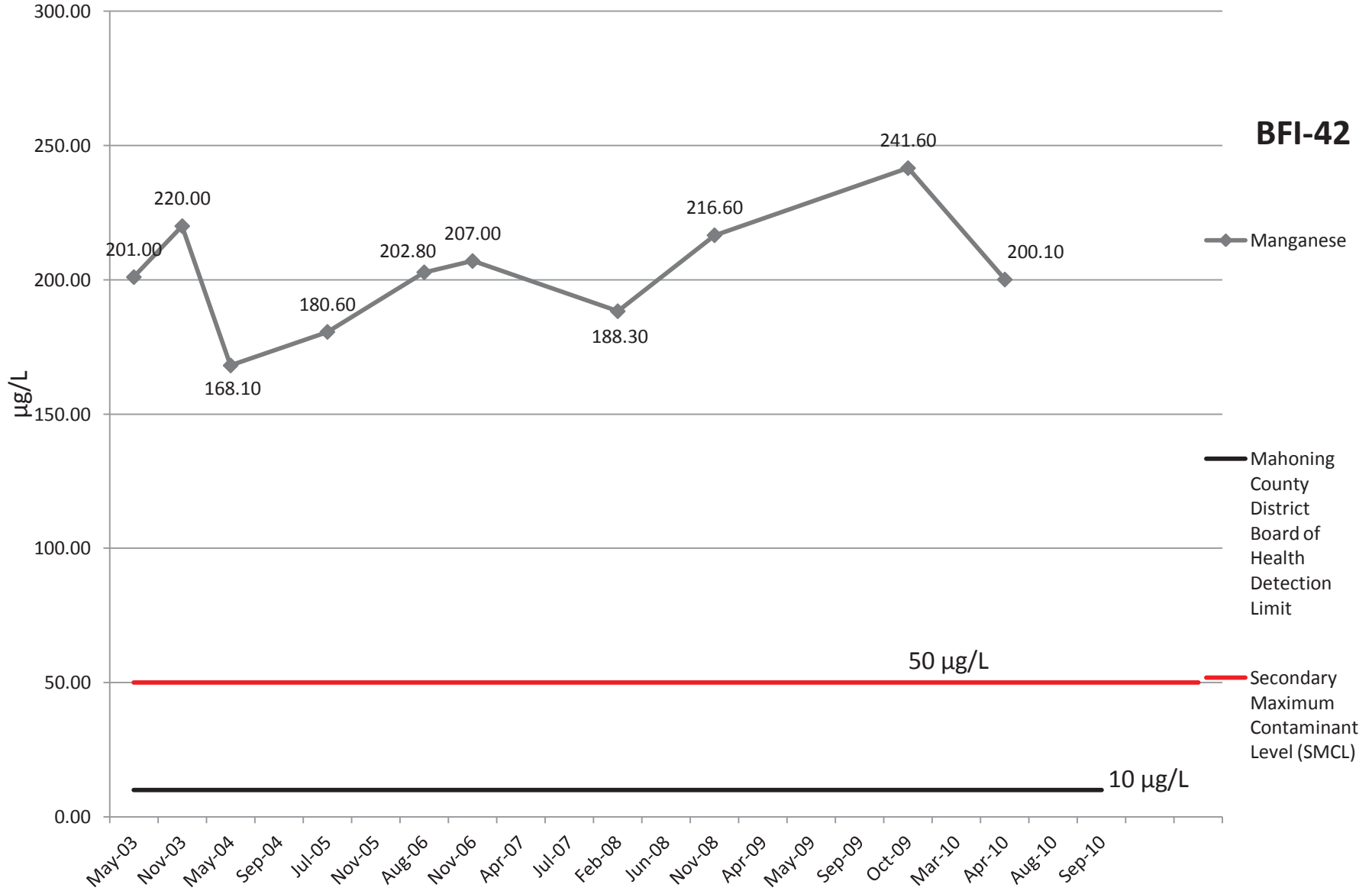
# Lead

**BFI-42**



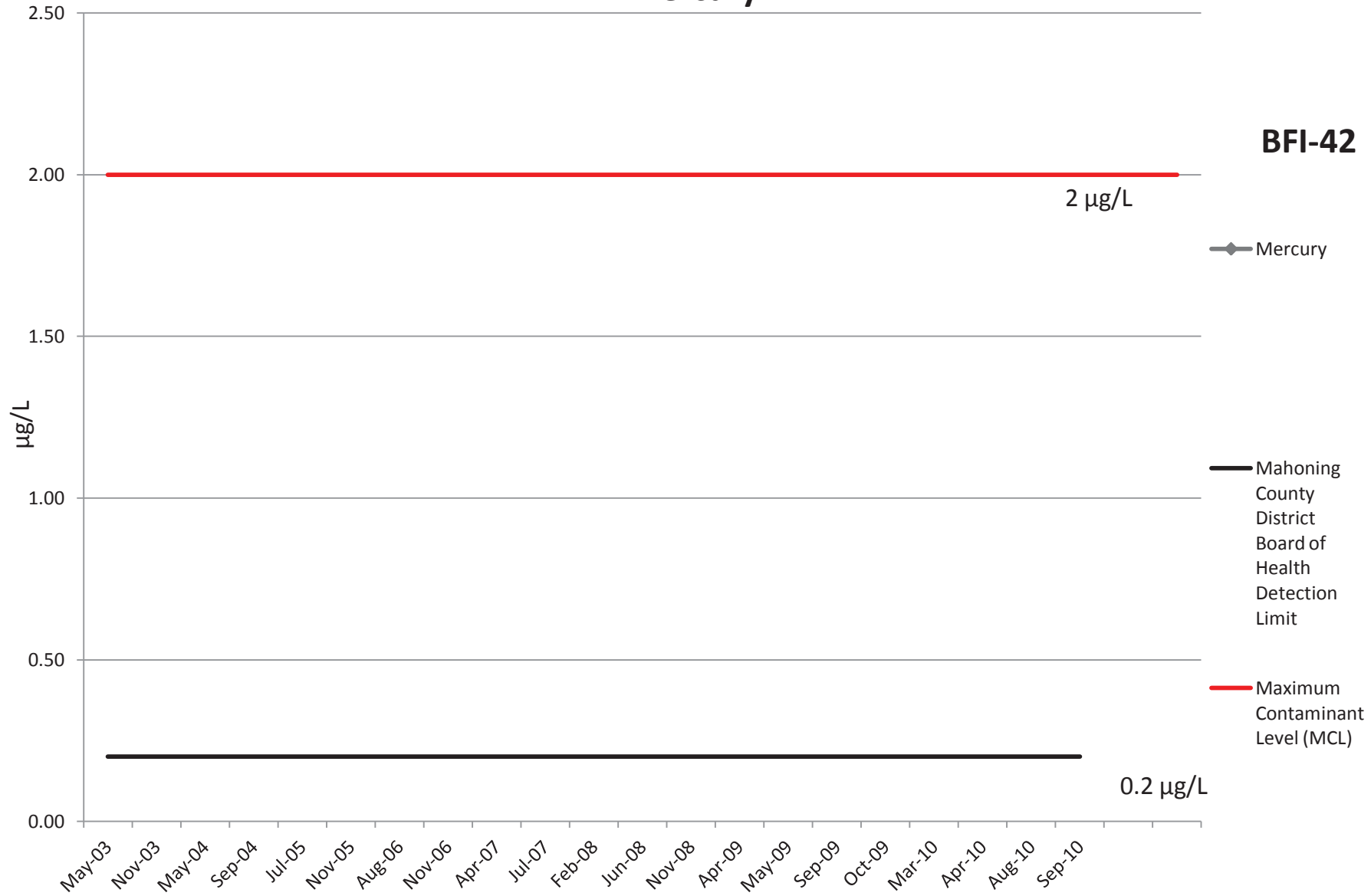
# Manganese

**BFI-42**

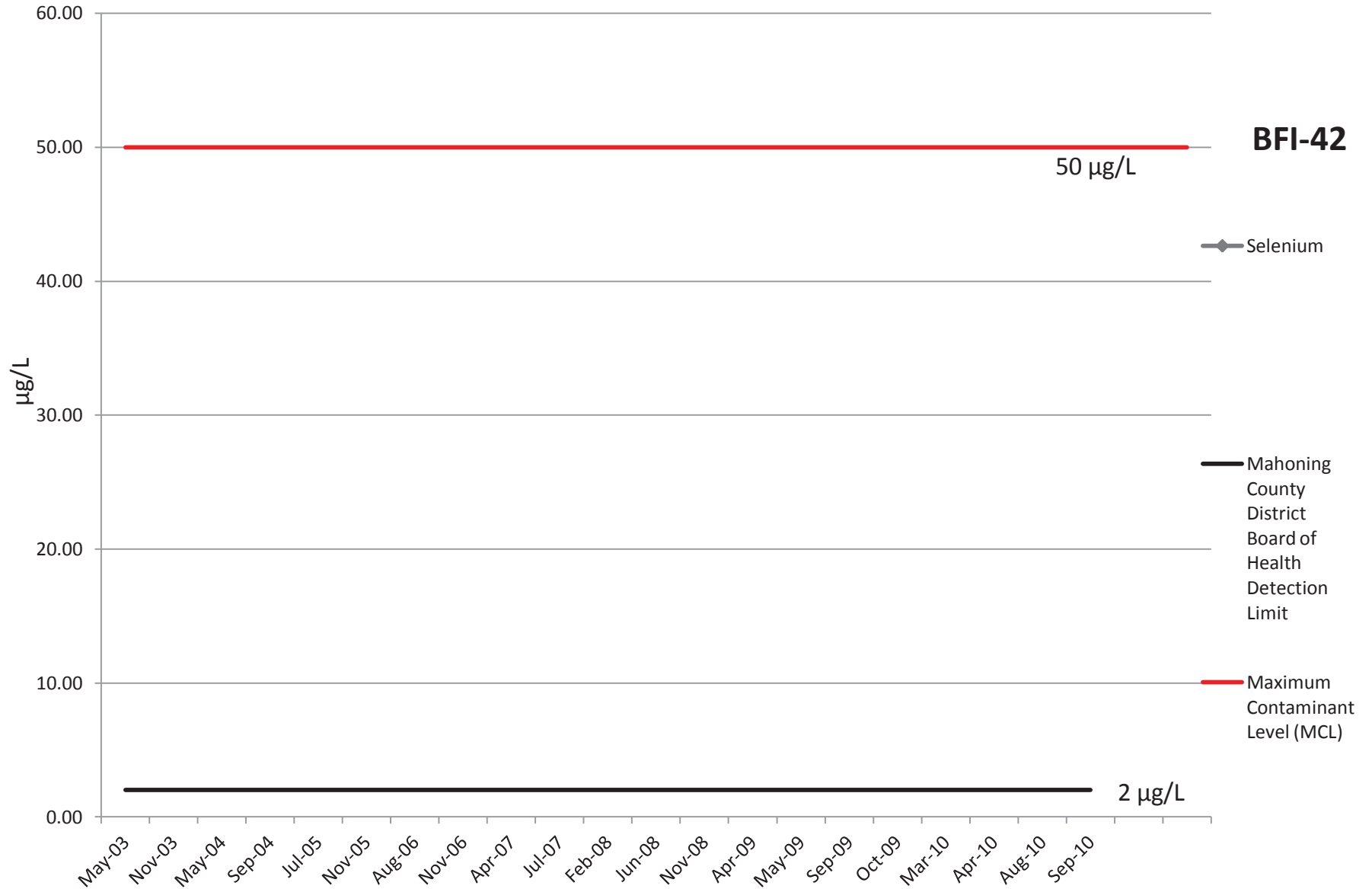


# Mercury

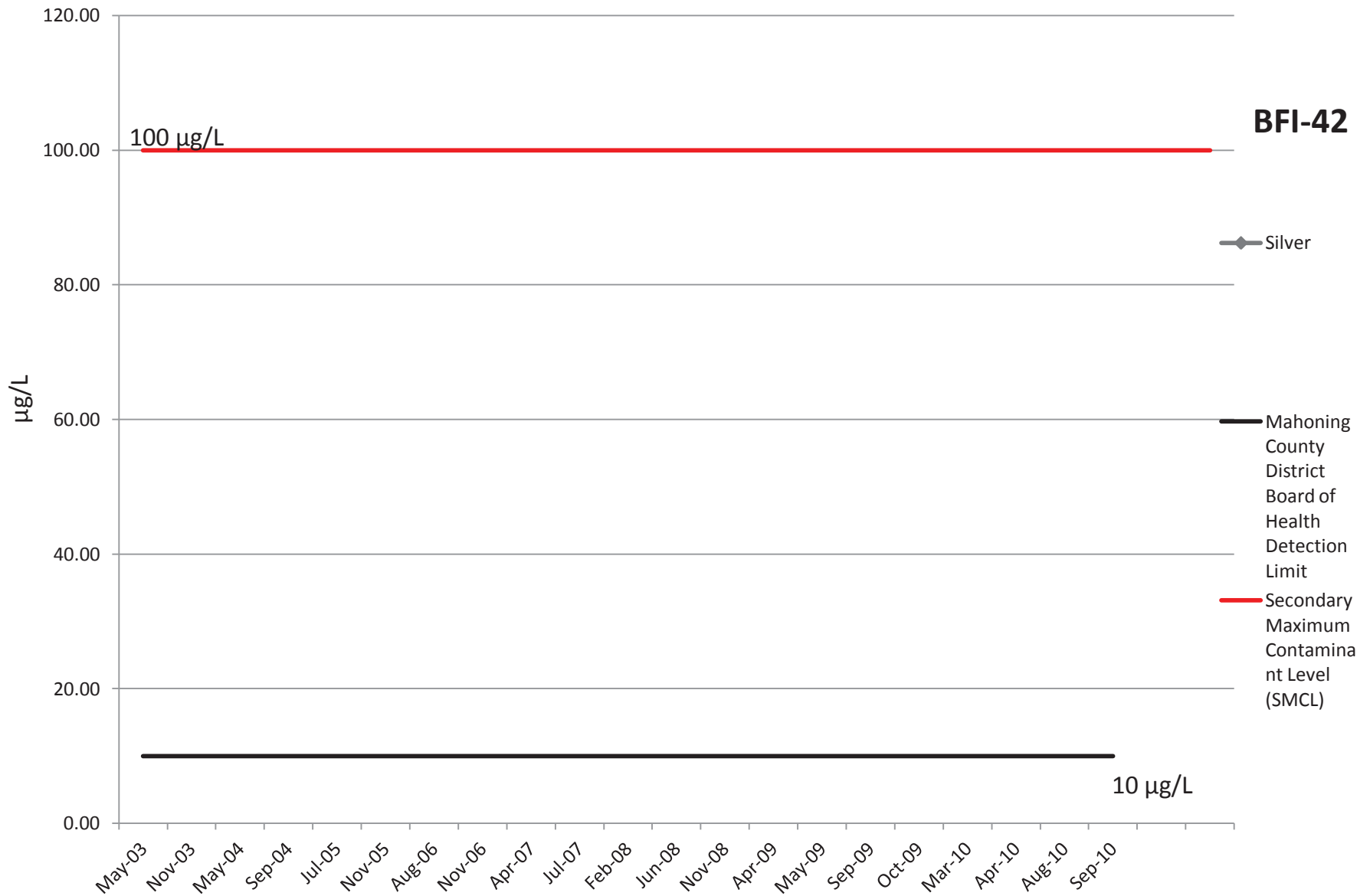
**BFI-42**



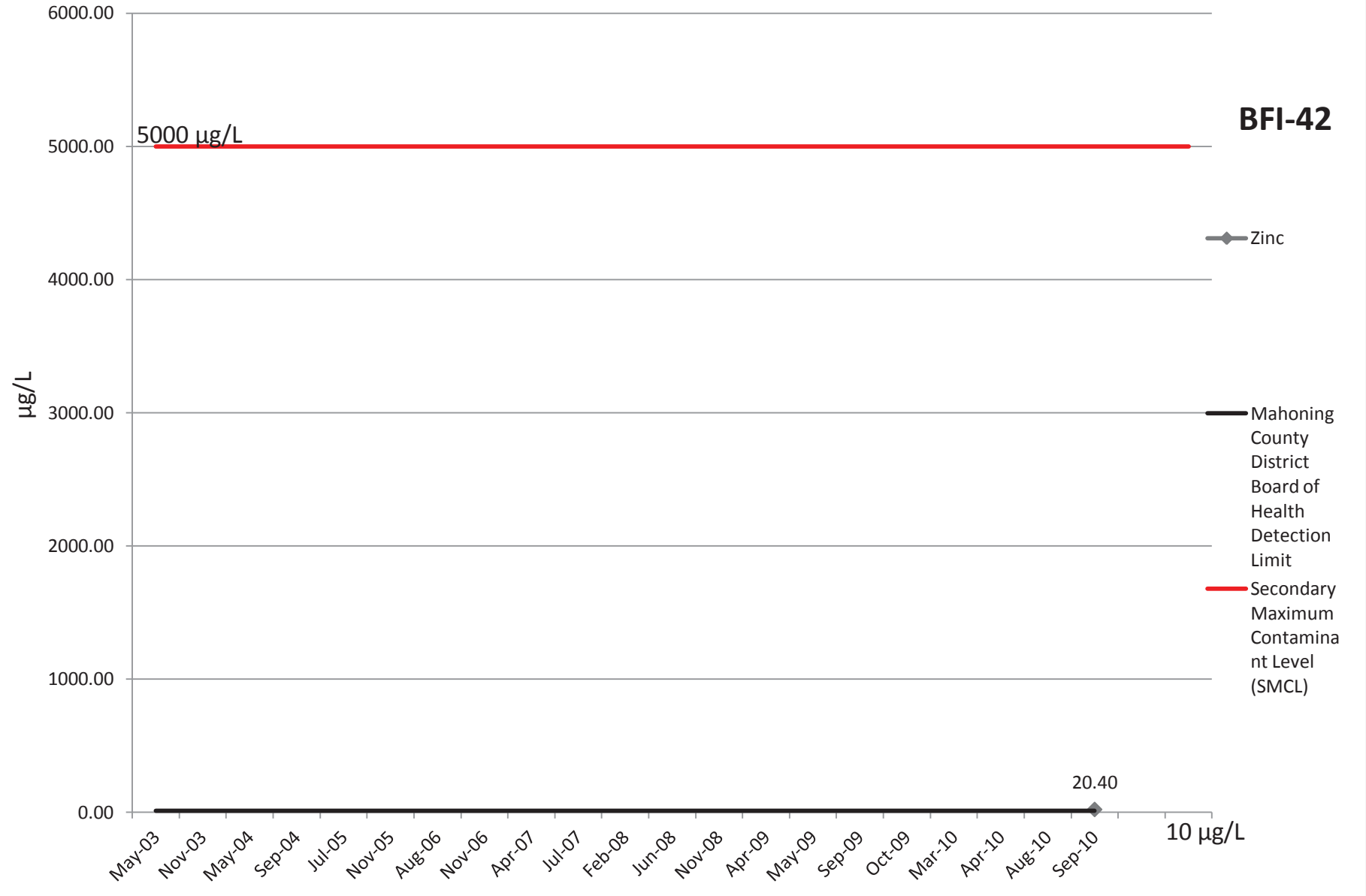
# Selenium



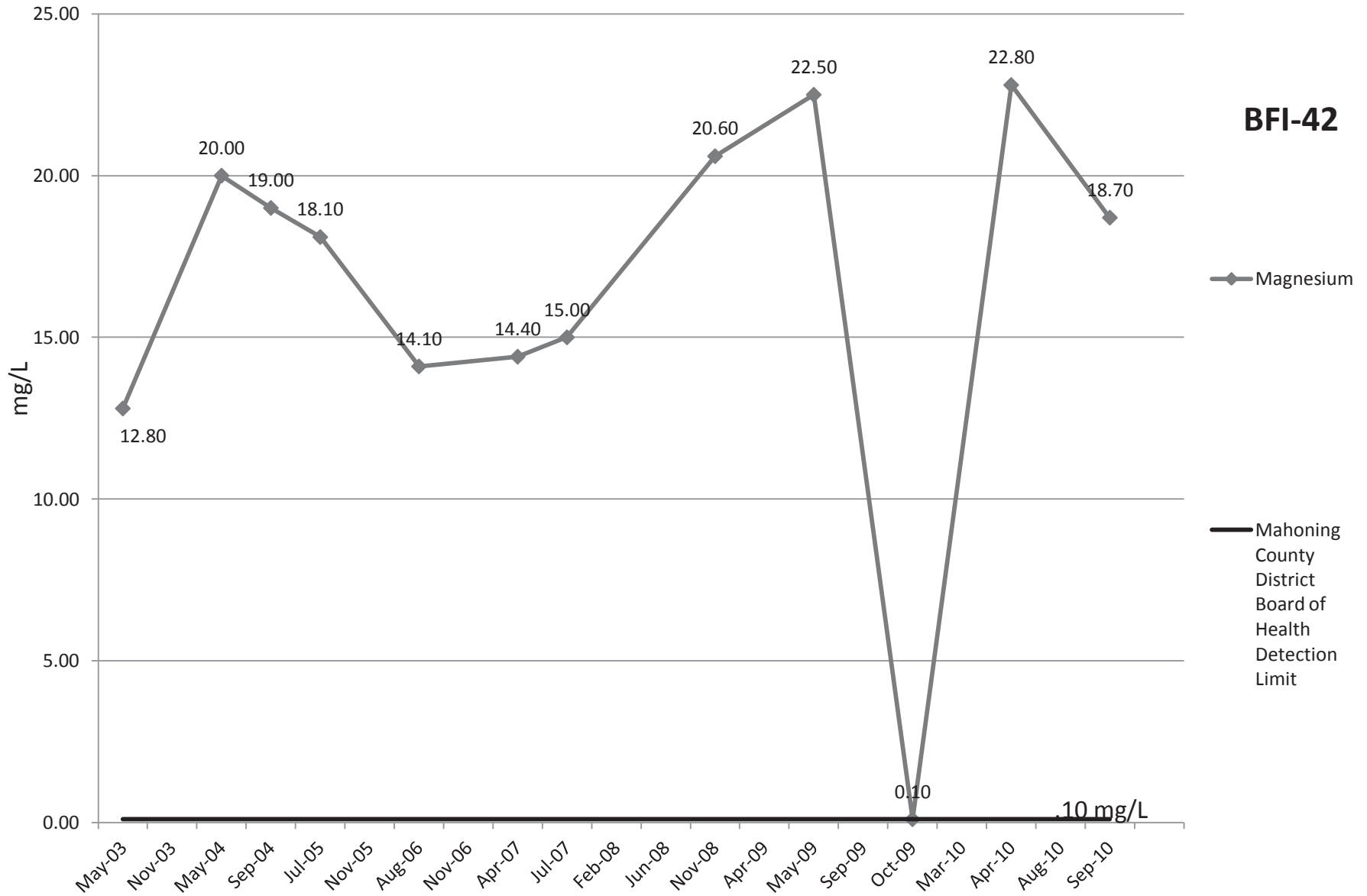
# Silver



# Zinc

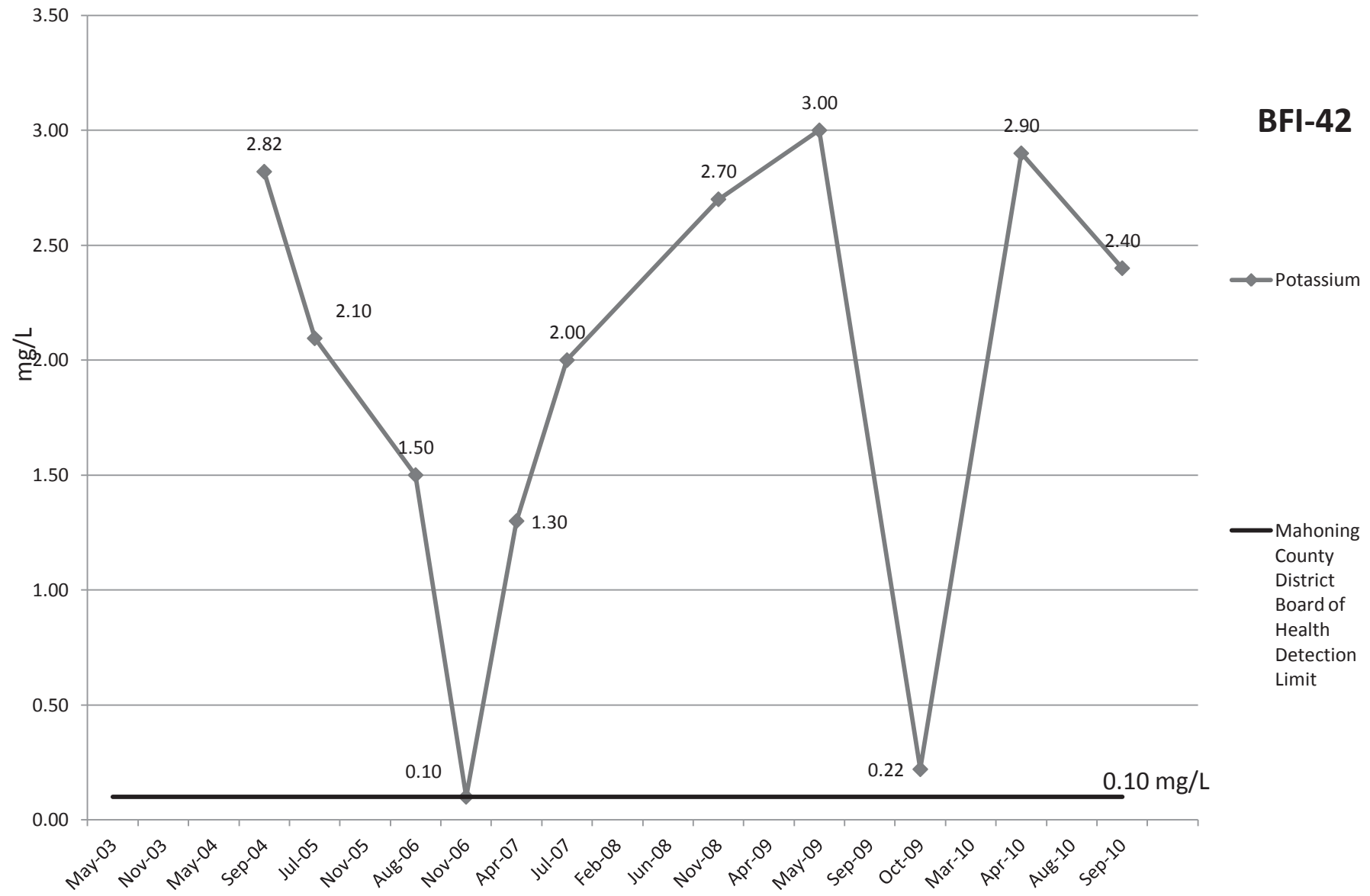


# Magnesium

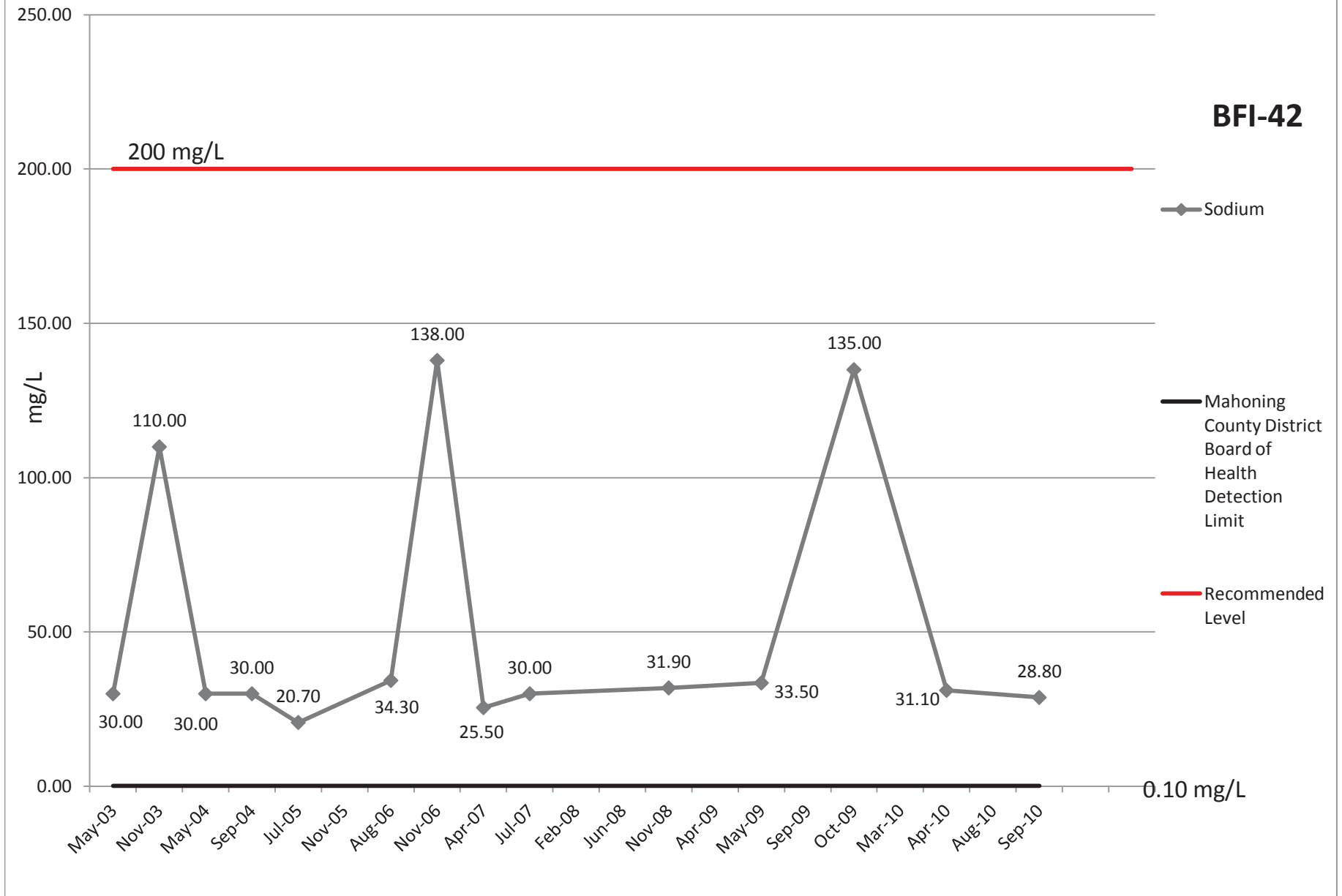




# Potassium



# Sodium



# Nitrate EPA

**BFI-42**

10 mg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

mg/L

◆ Nitrate EPA

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

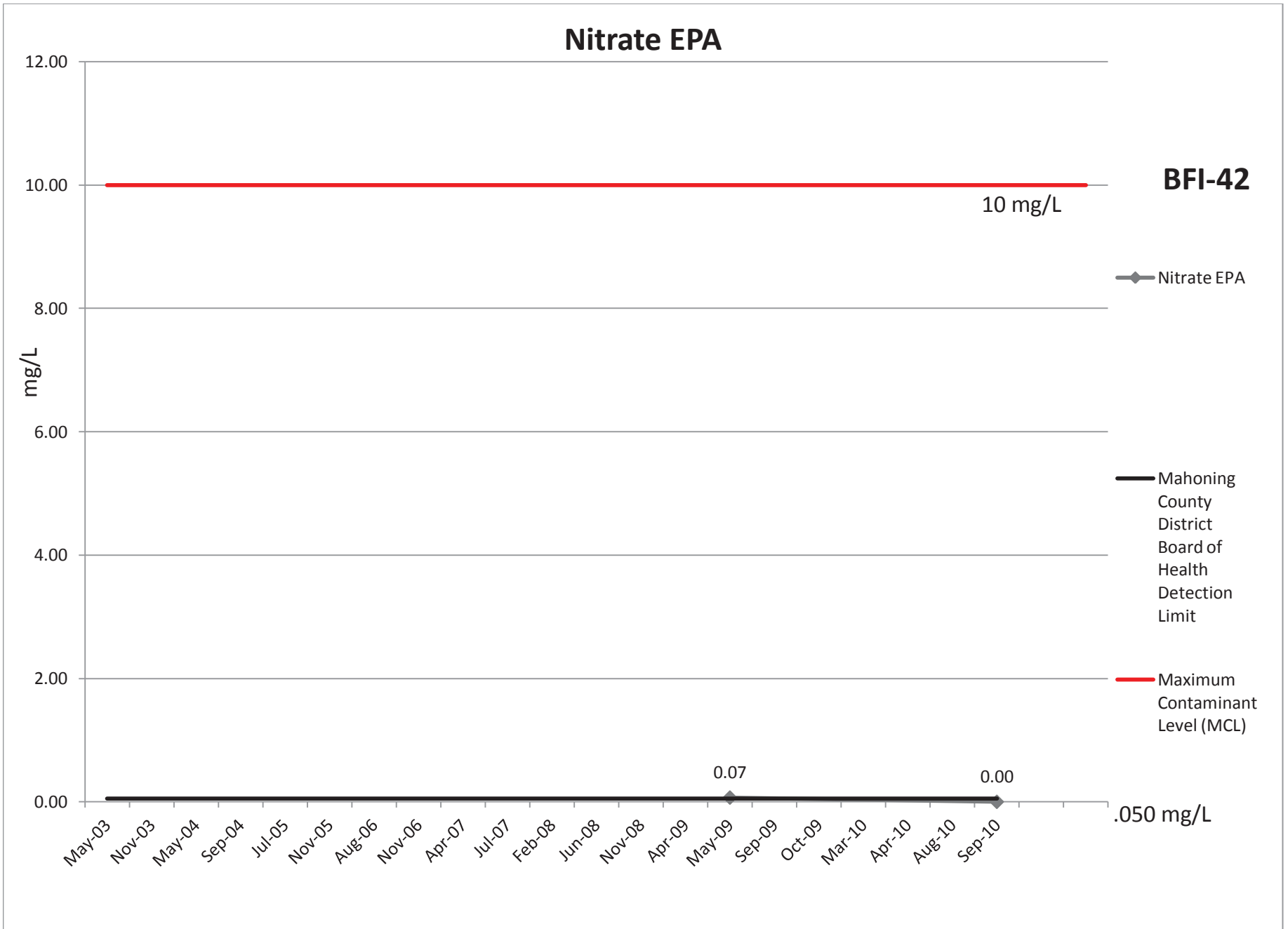
— Maximum  
Contaminant  
Level (MCL)

0.07

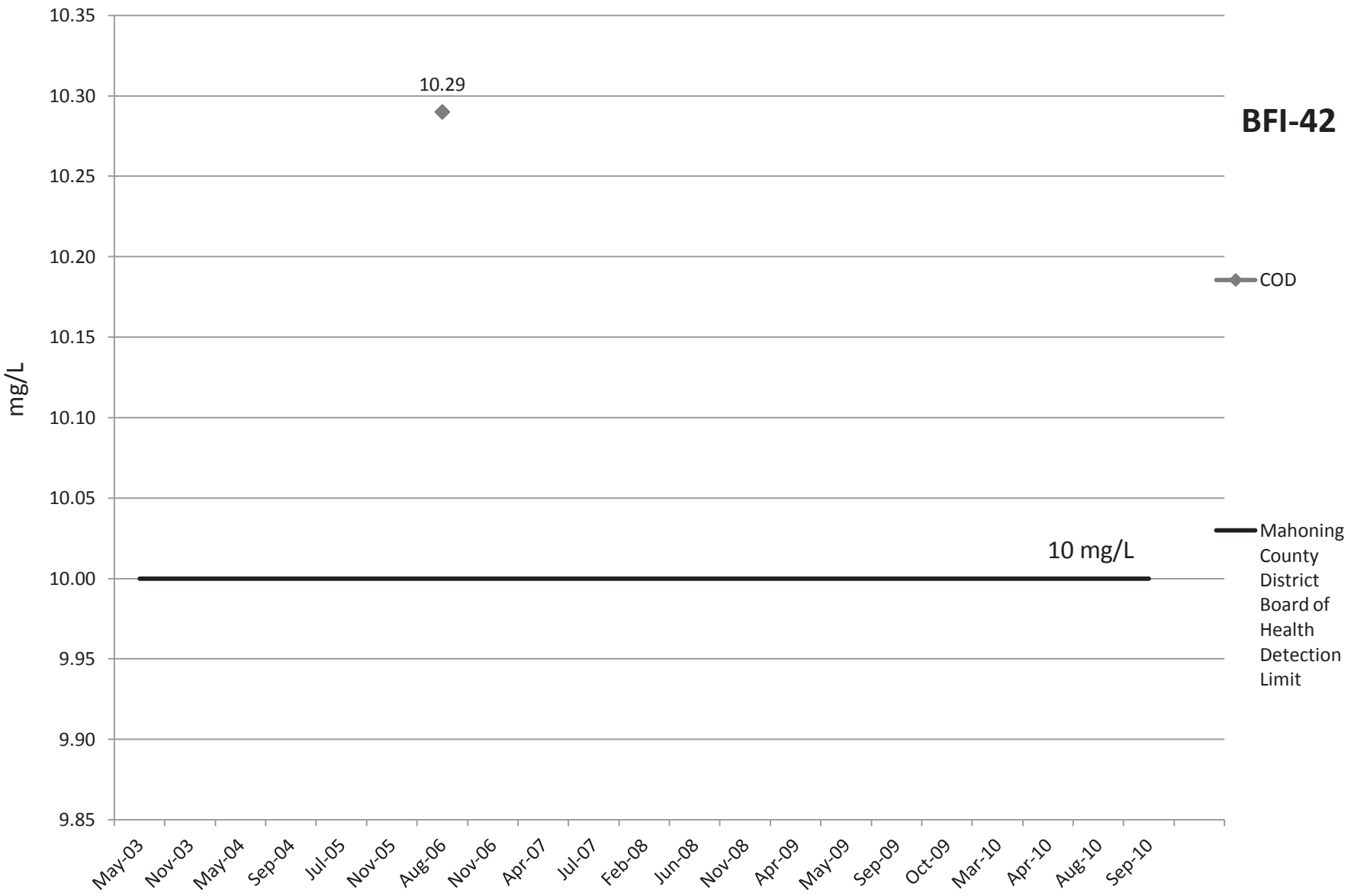
0.00

.050 mg/L

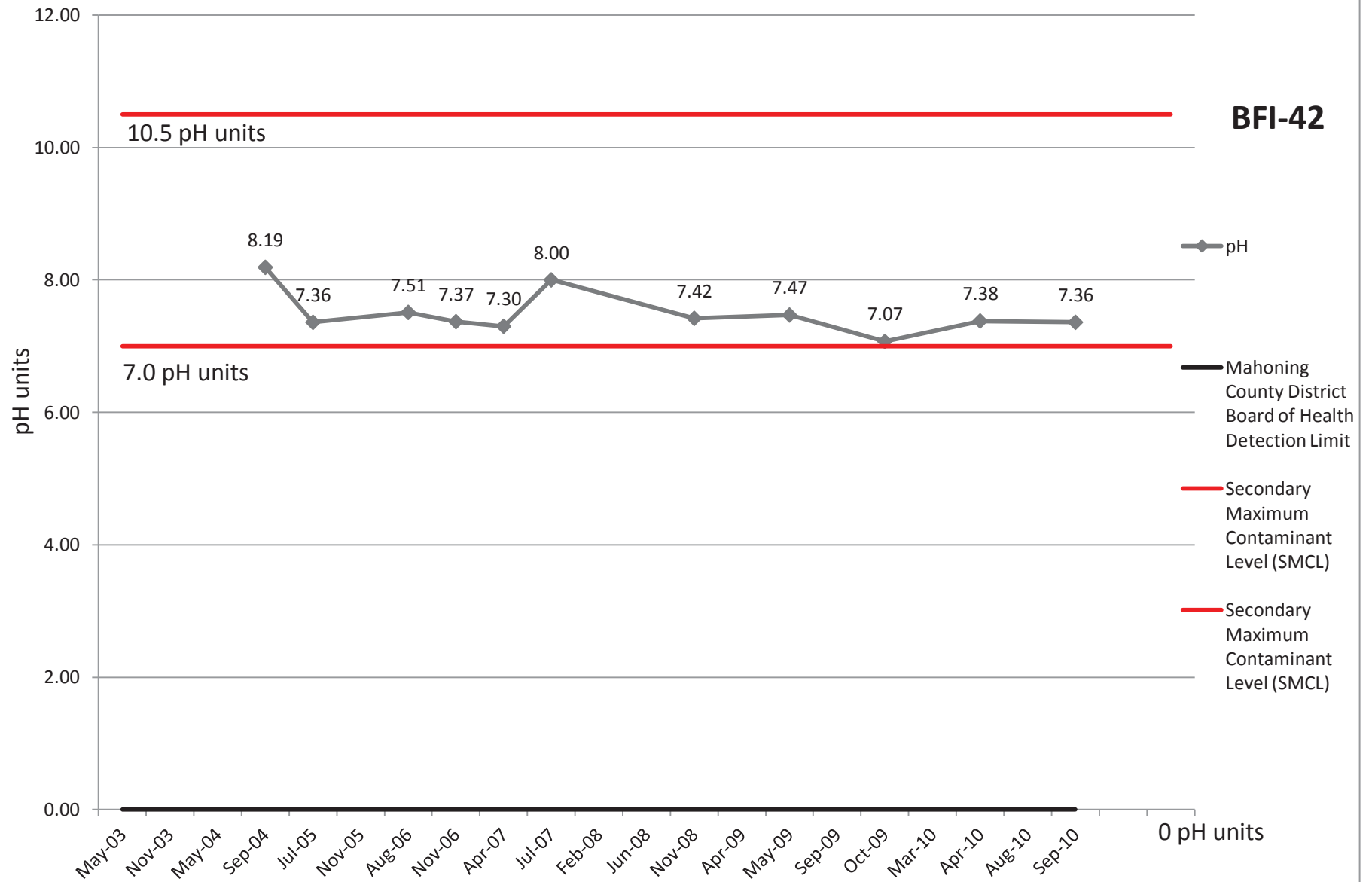
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# COD

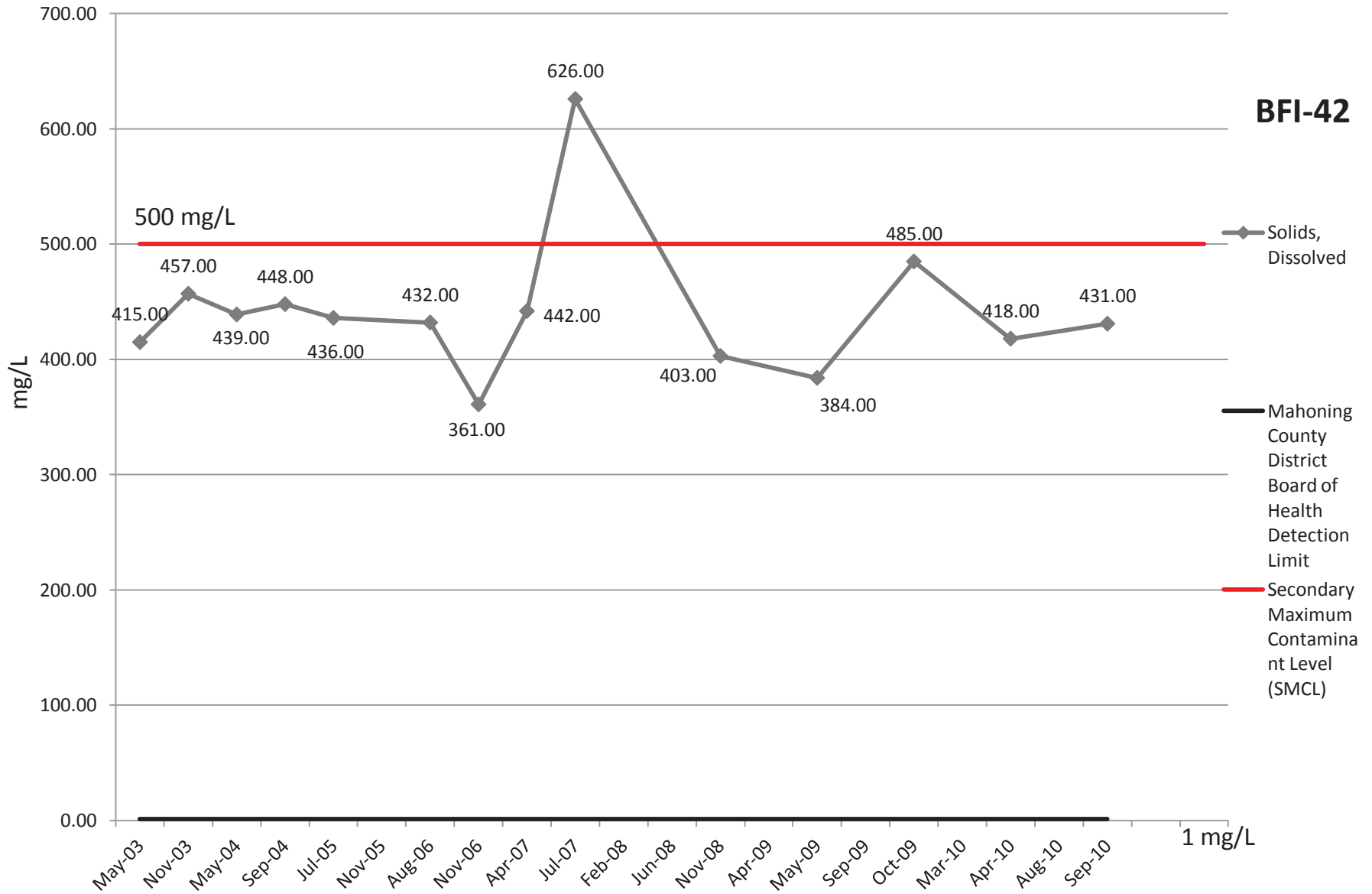


# pH

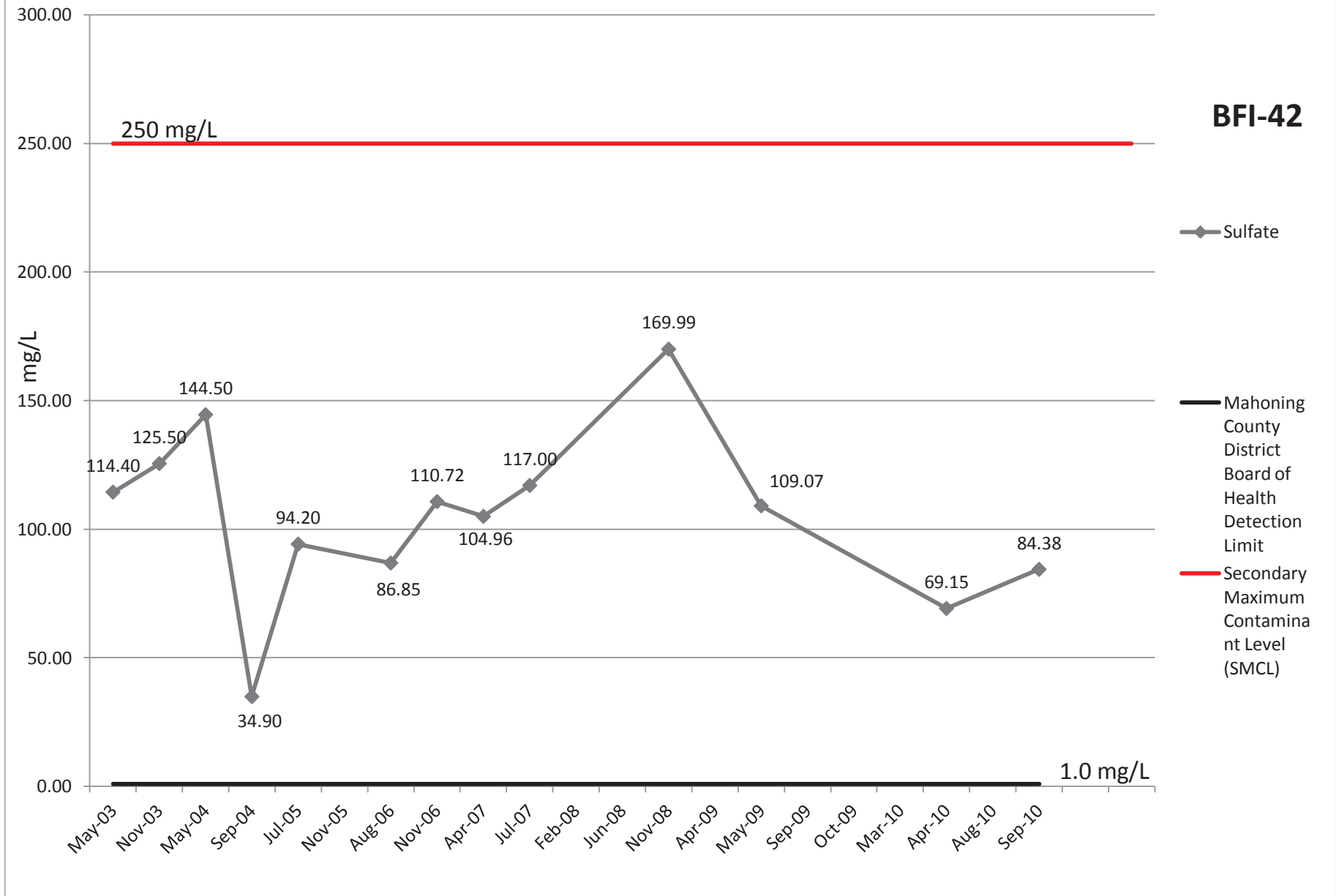


# Solids, Dissolved

**BFI-42**



# Sulfate



# Bacteria

**BFI-42**

Positive/Negative

◆ Bacteria

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

positive (1)

1.00

1.00

0.00

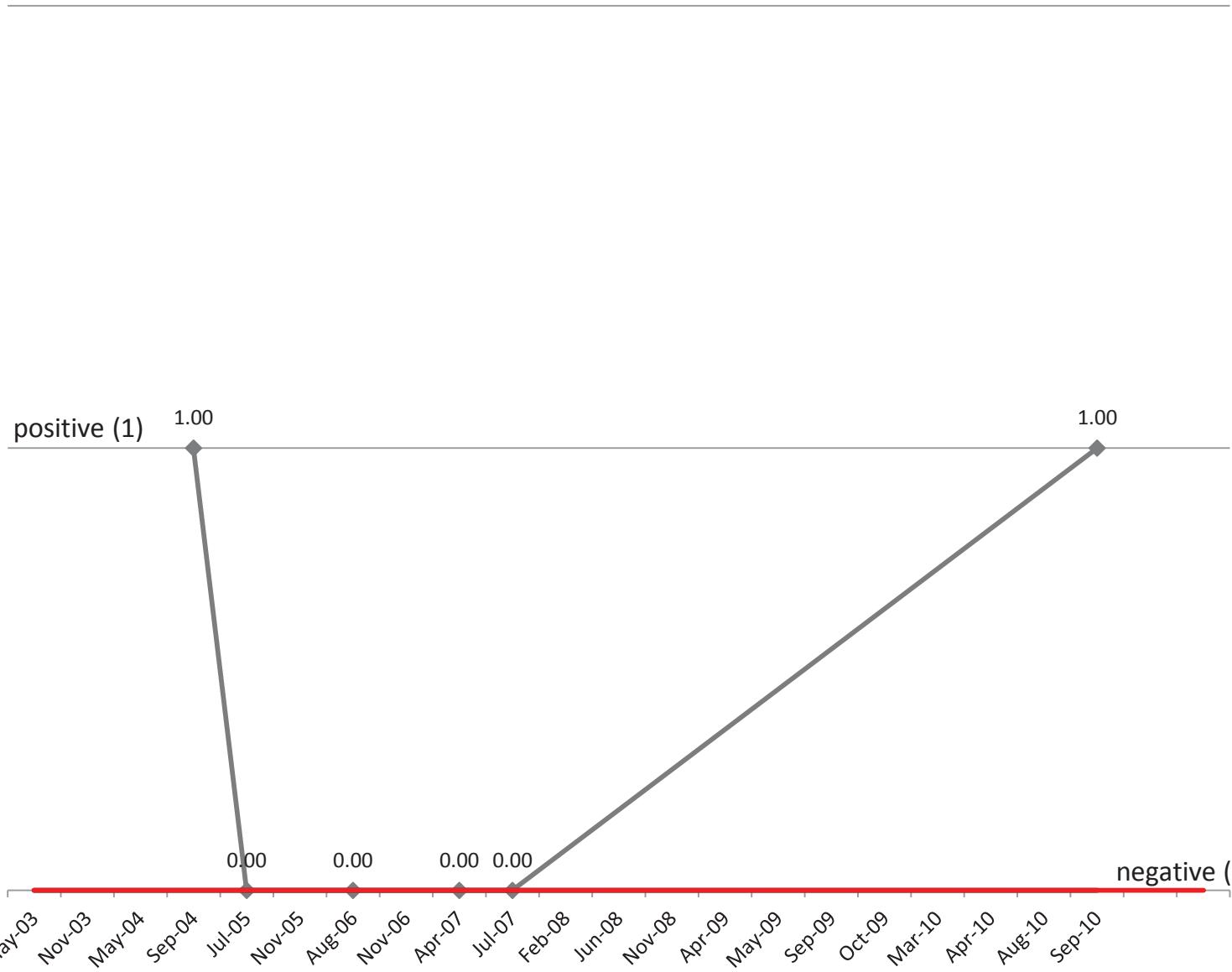
0.00

0.00

0.00

negative (0)

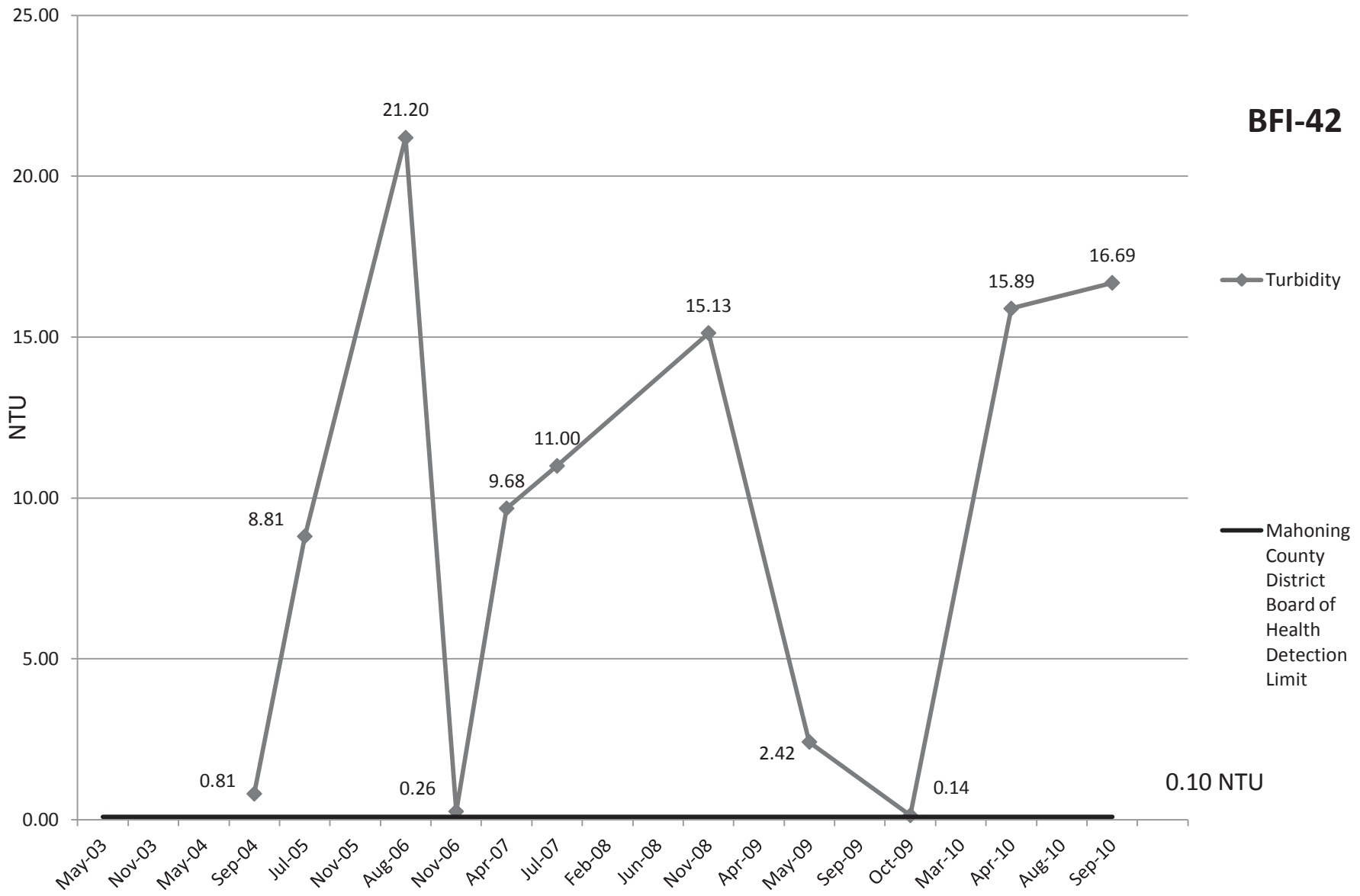
May-03  
Nov-03  
May-04  
Sep-04  
Jul-05  
Nov-05  
Aug-06  
Nov-06  
Apr-07  
Jul-07  
Feb-08  
Jun-08  
Nov-08  
Apr-09  
May-09  
Sep-09  
Oct-09  
Mar-10  
Apr-10  
Aug-10  
Sep-10



Date	Bacteria Level
May-03	0.00
Sep-04	1.00
Jul-05	0.00
Aug-06	0.00
Apr-07	0.00
Jul-07	0.00
Sep-10	1.00

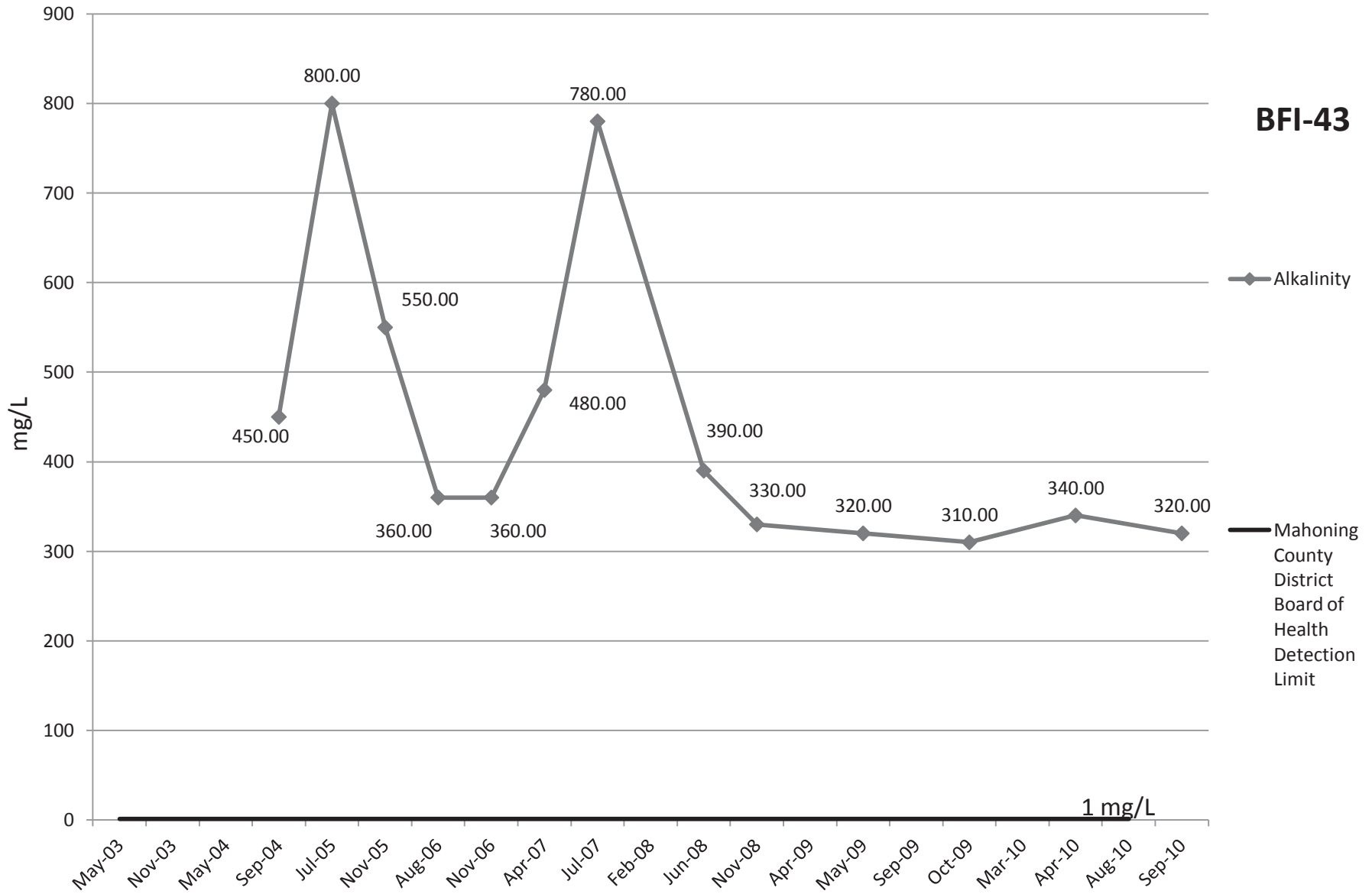


# Turbidity

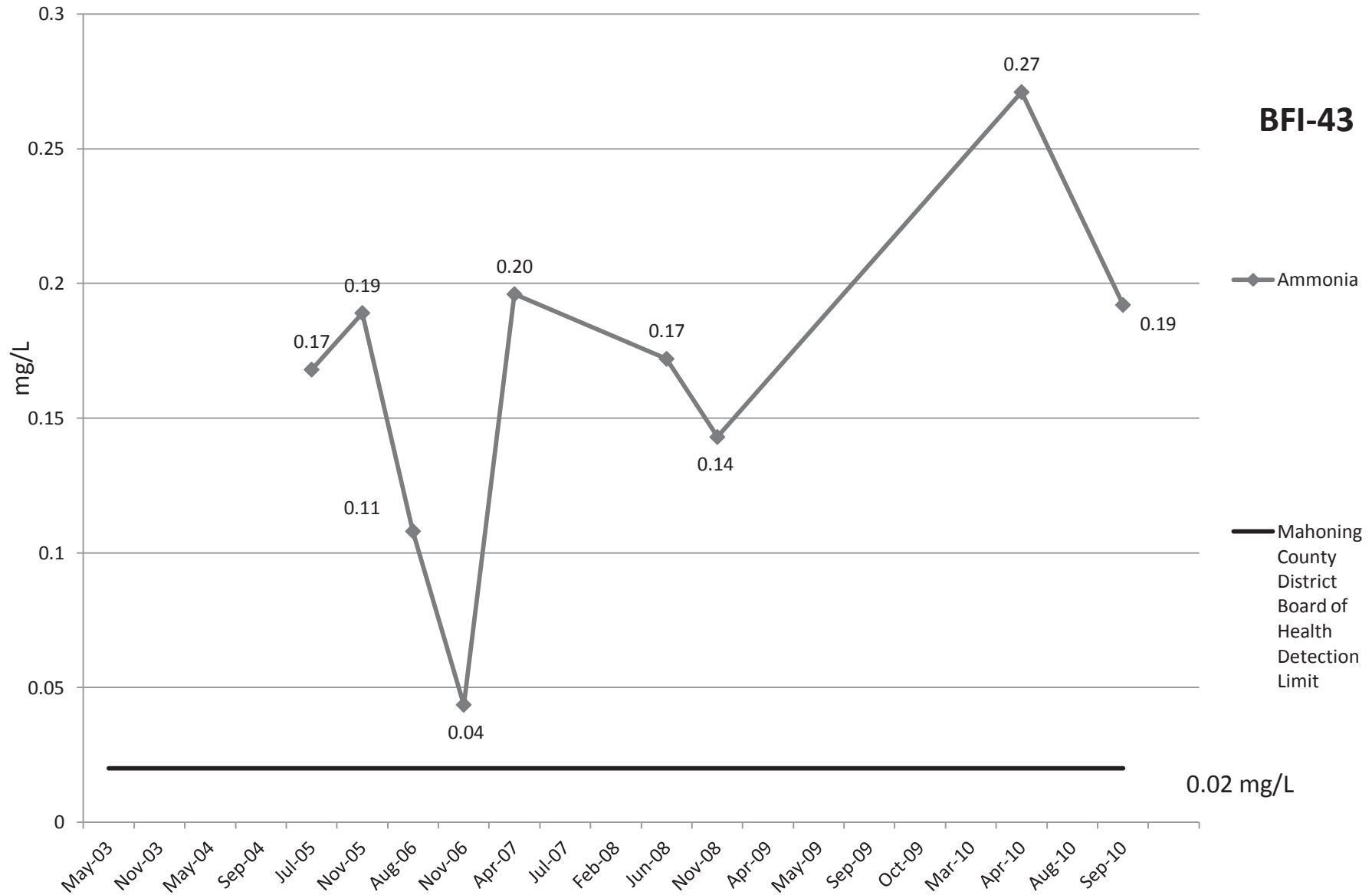


# Alkalinity

**BFI-43**

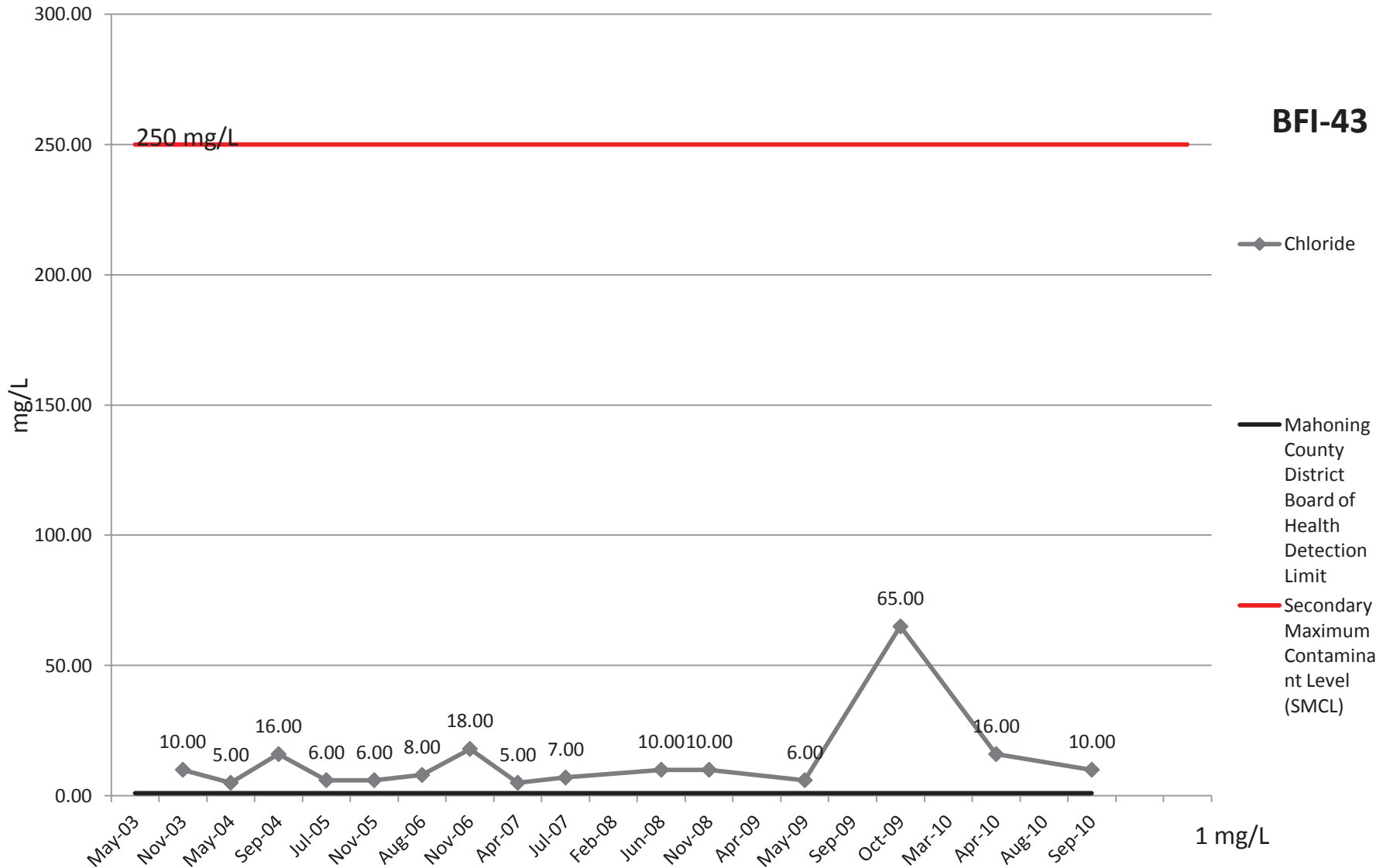


# Ammonia



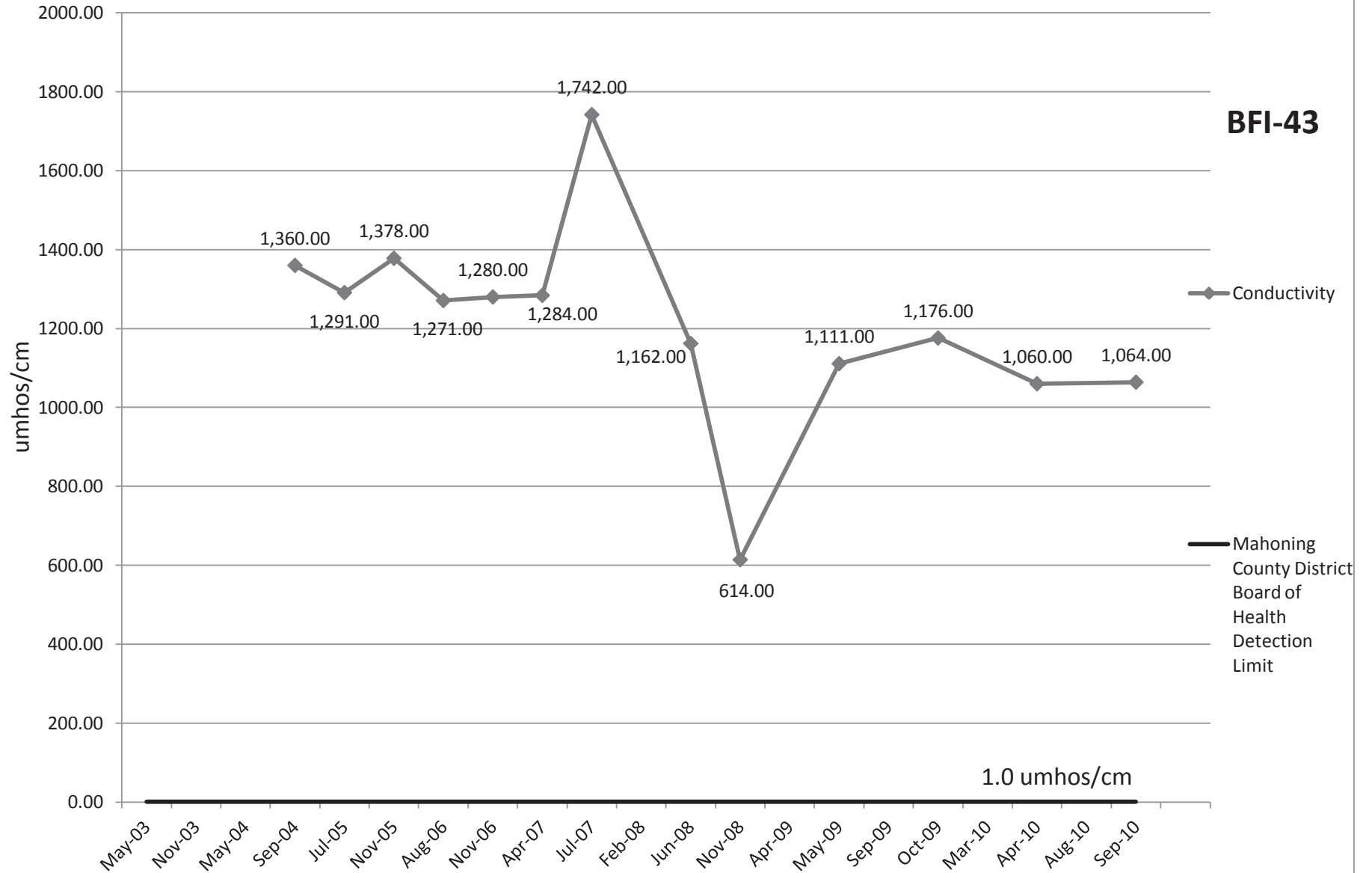
# Chloride

**BFI-43**

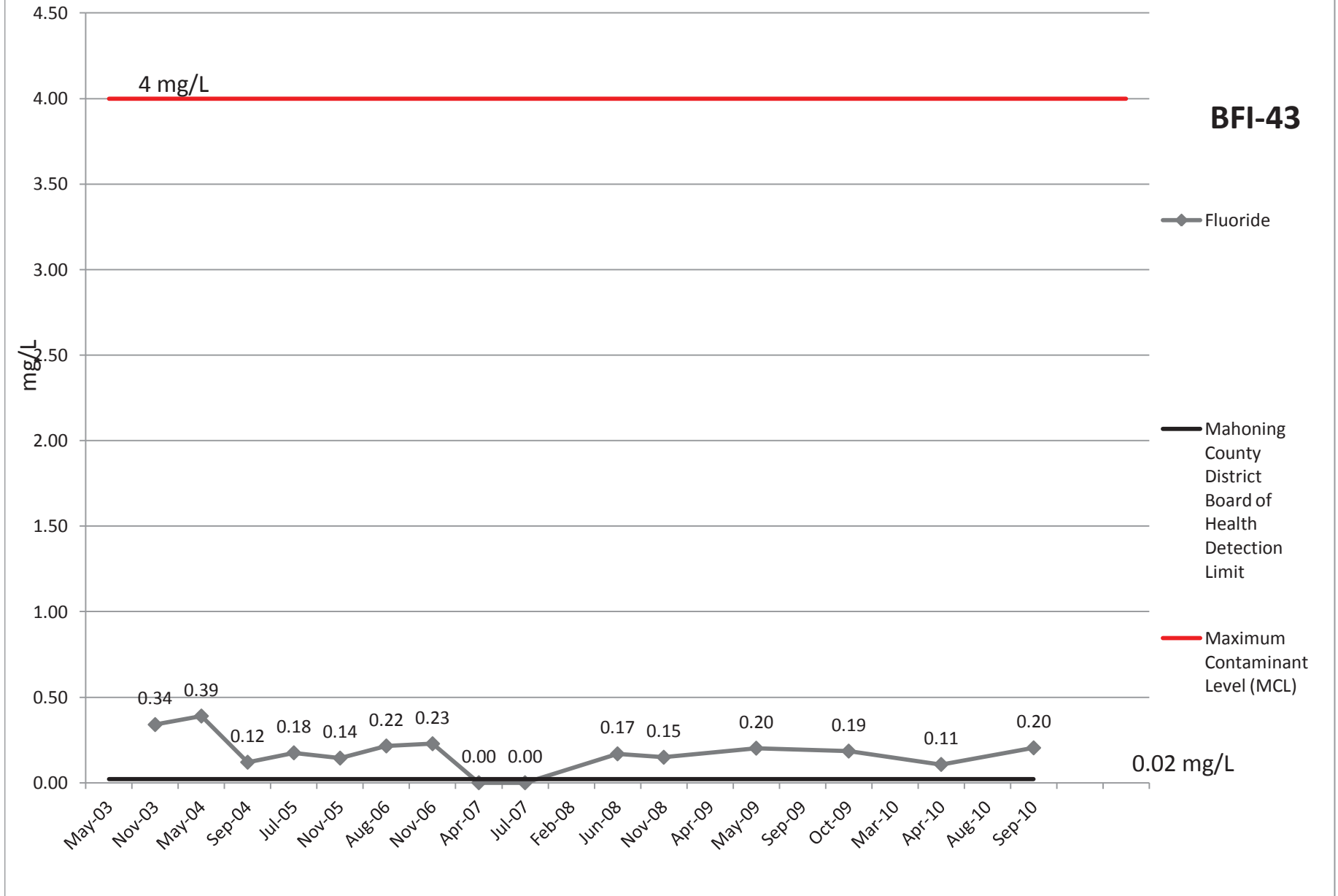


# Conductivity

**BFI-43**

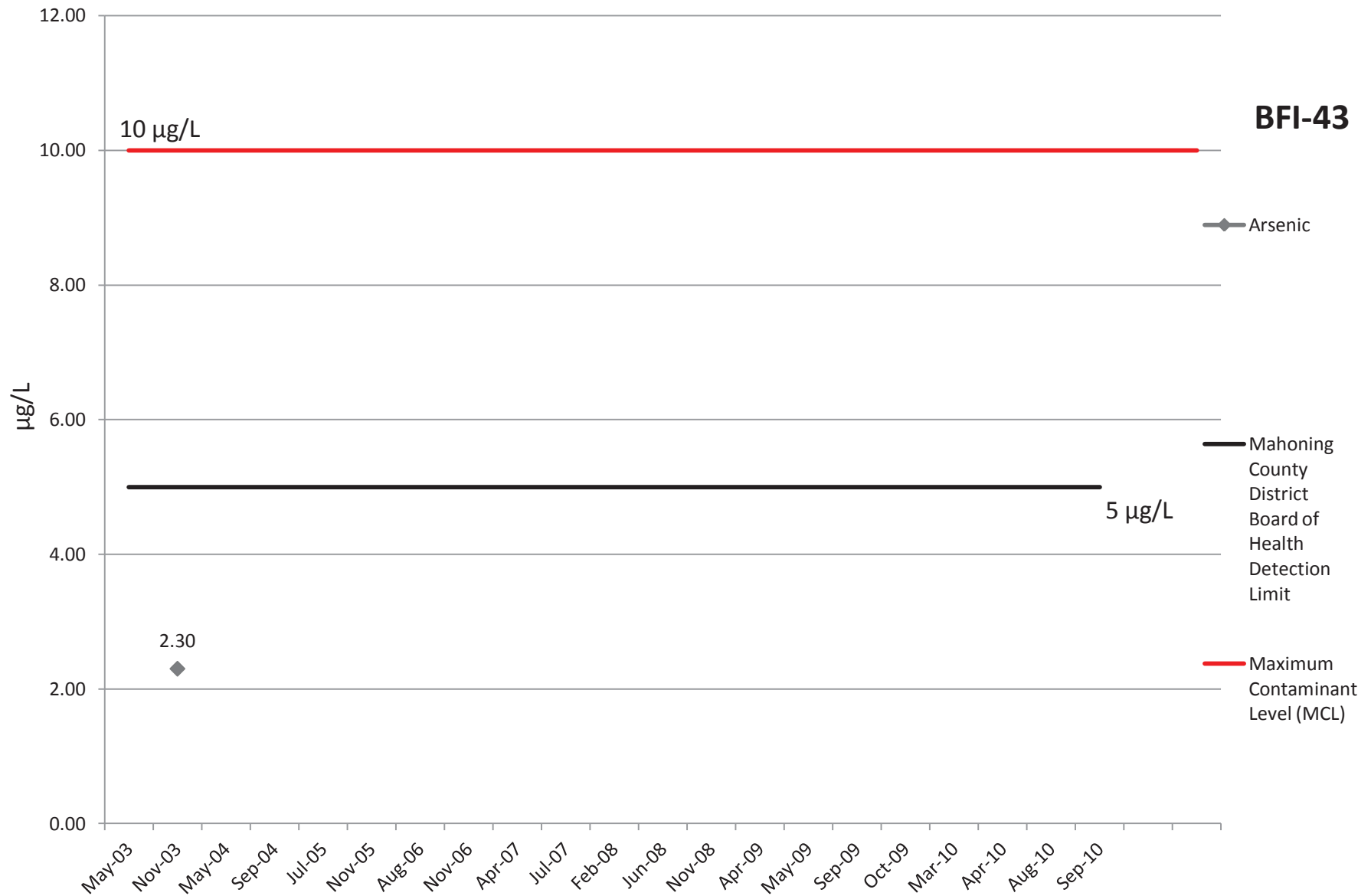


# Fluoride

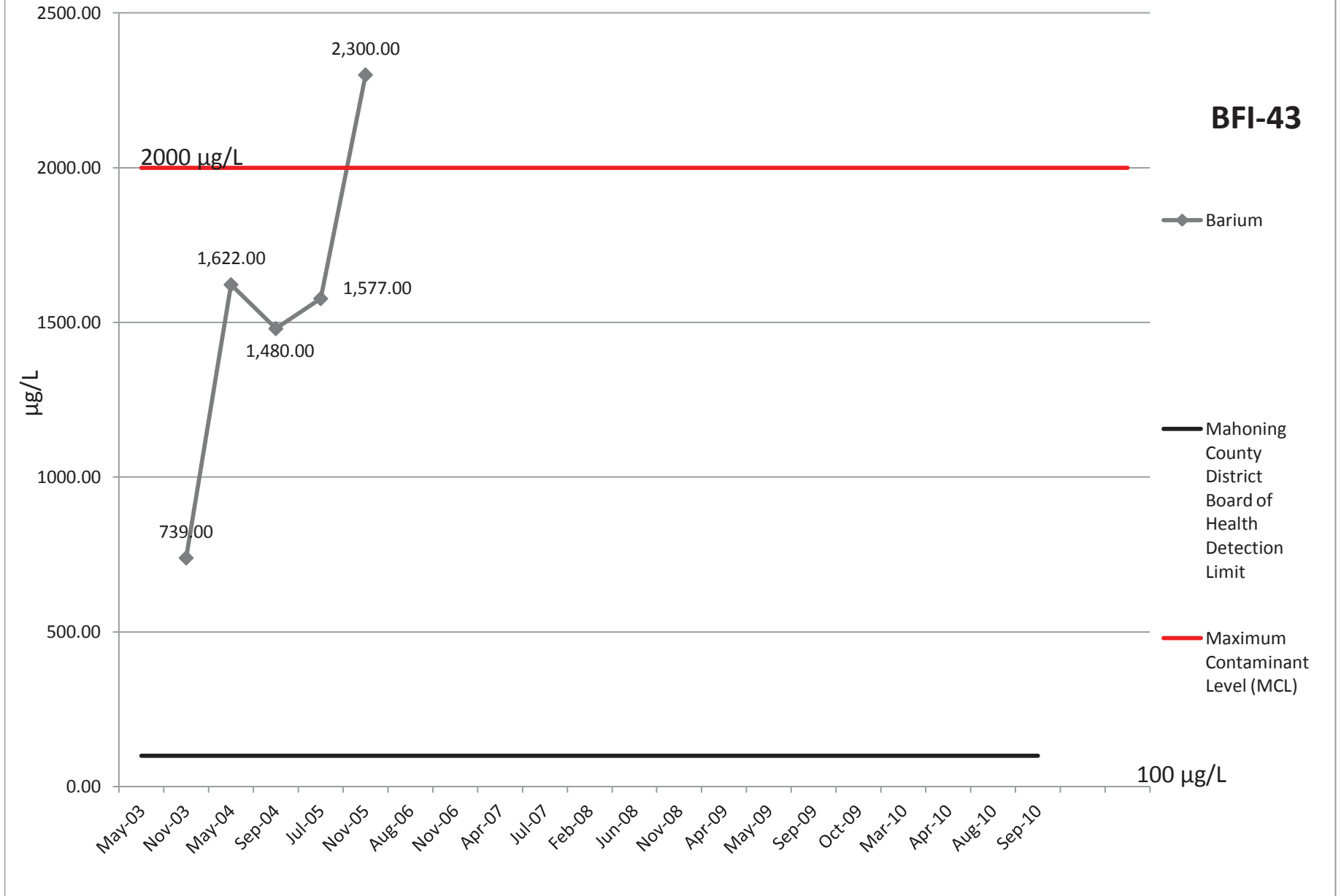


# Arsenic

**BFI-43**



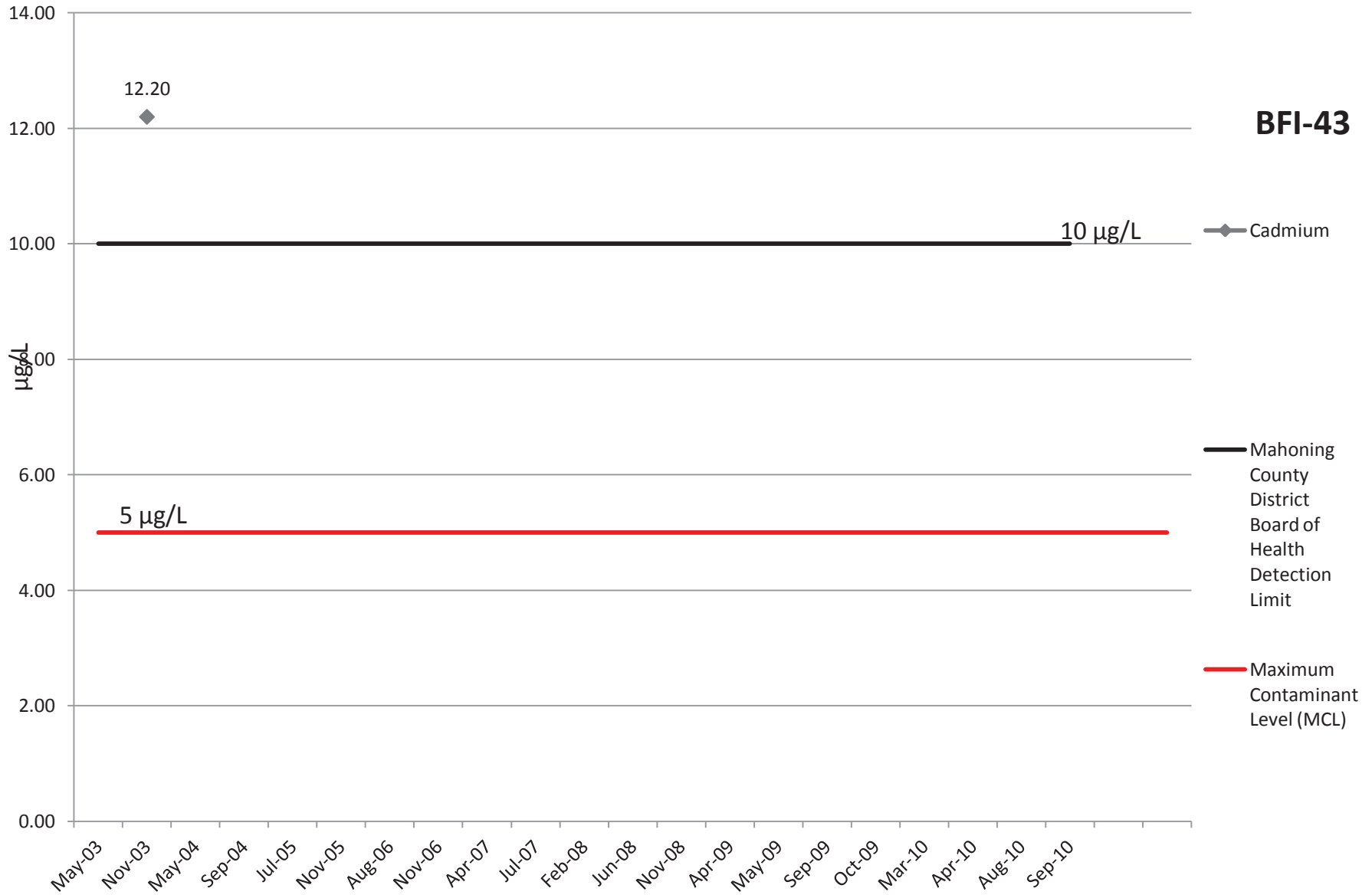
# Barium



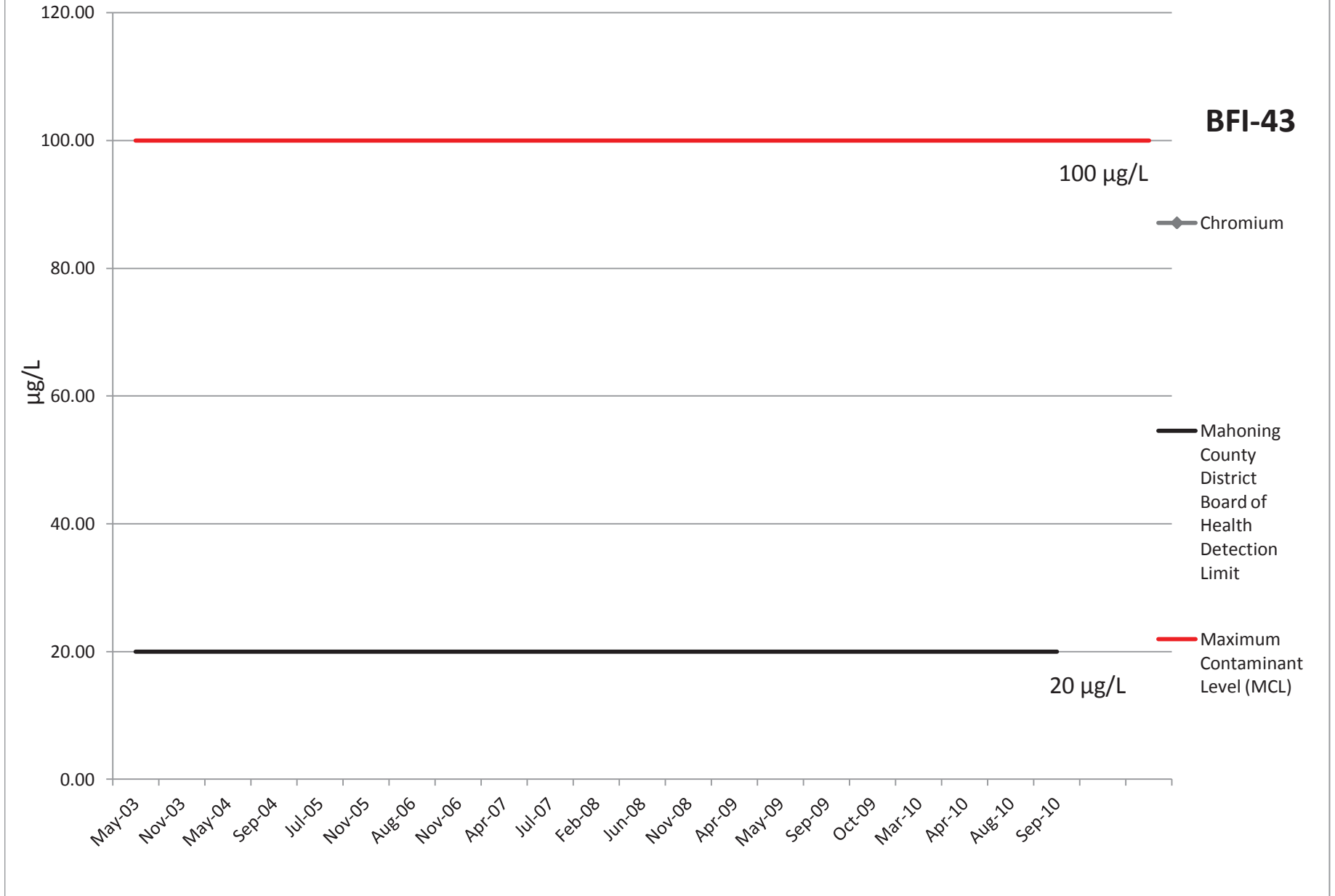


# Cadmium

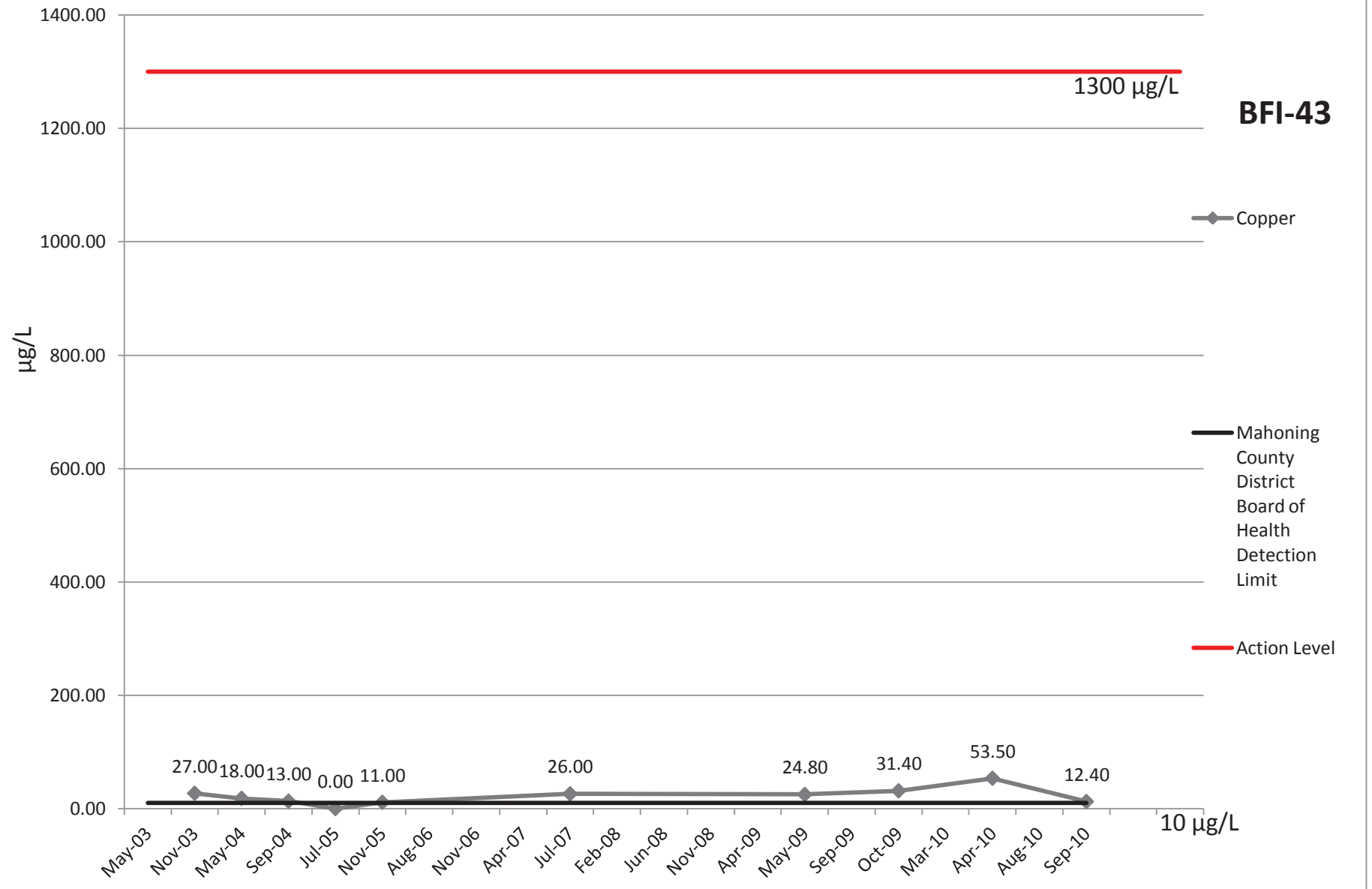
**BFI-43**



# Chromium

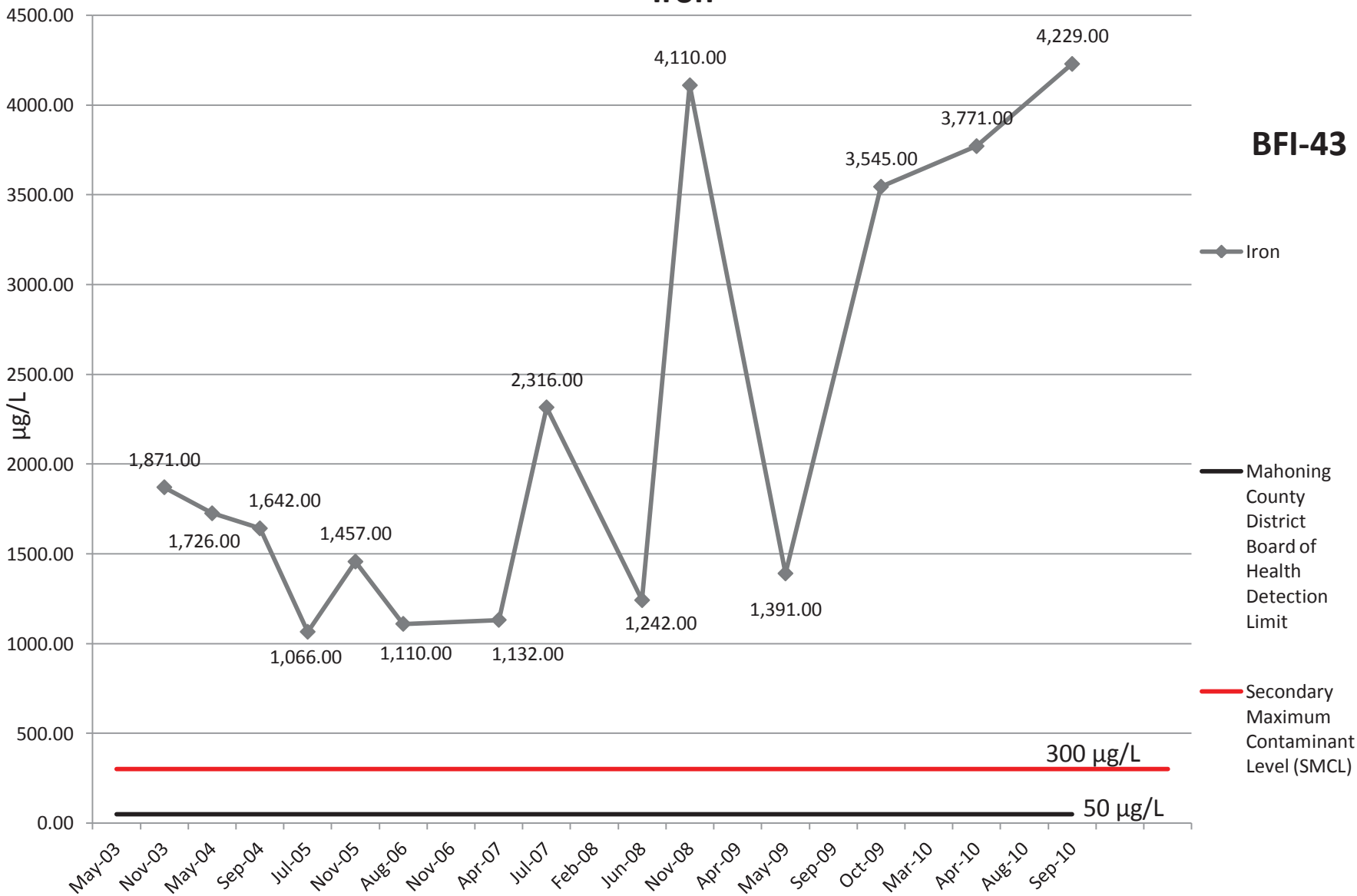


# Copper

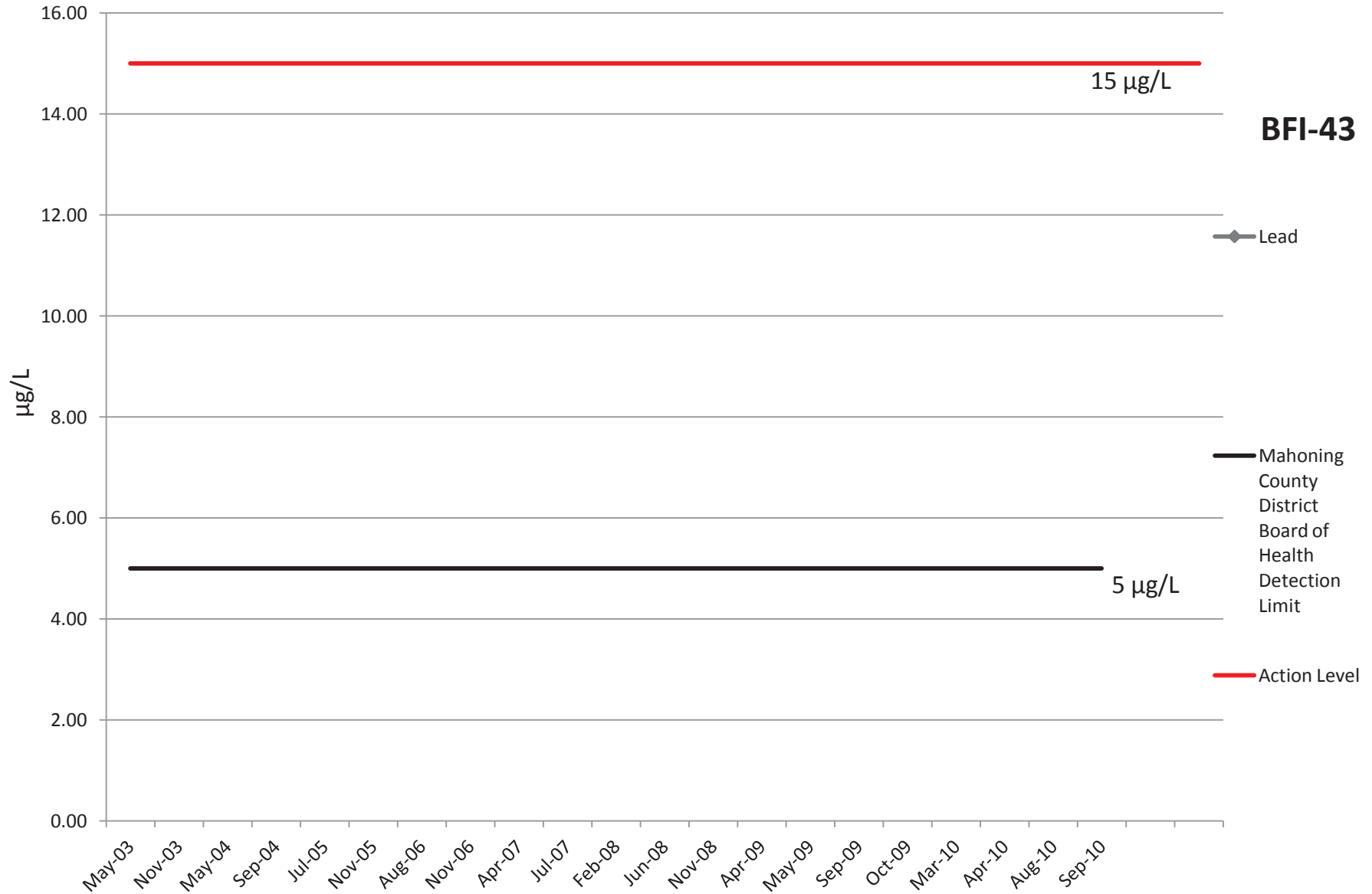


# Iron

**BFI-43**

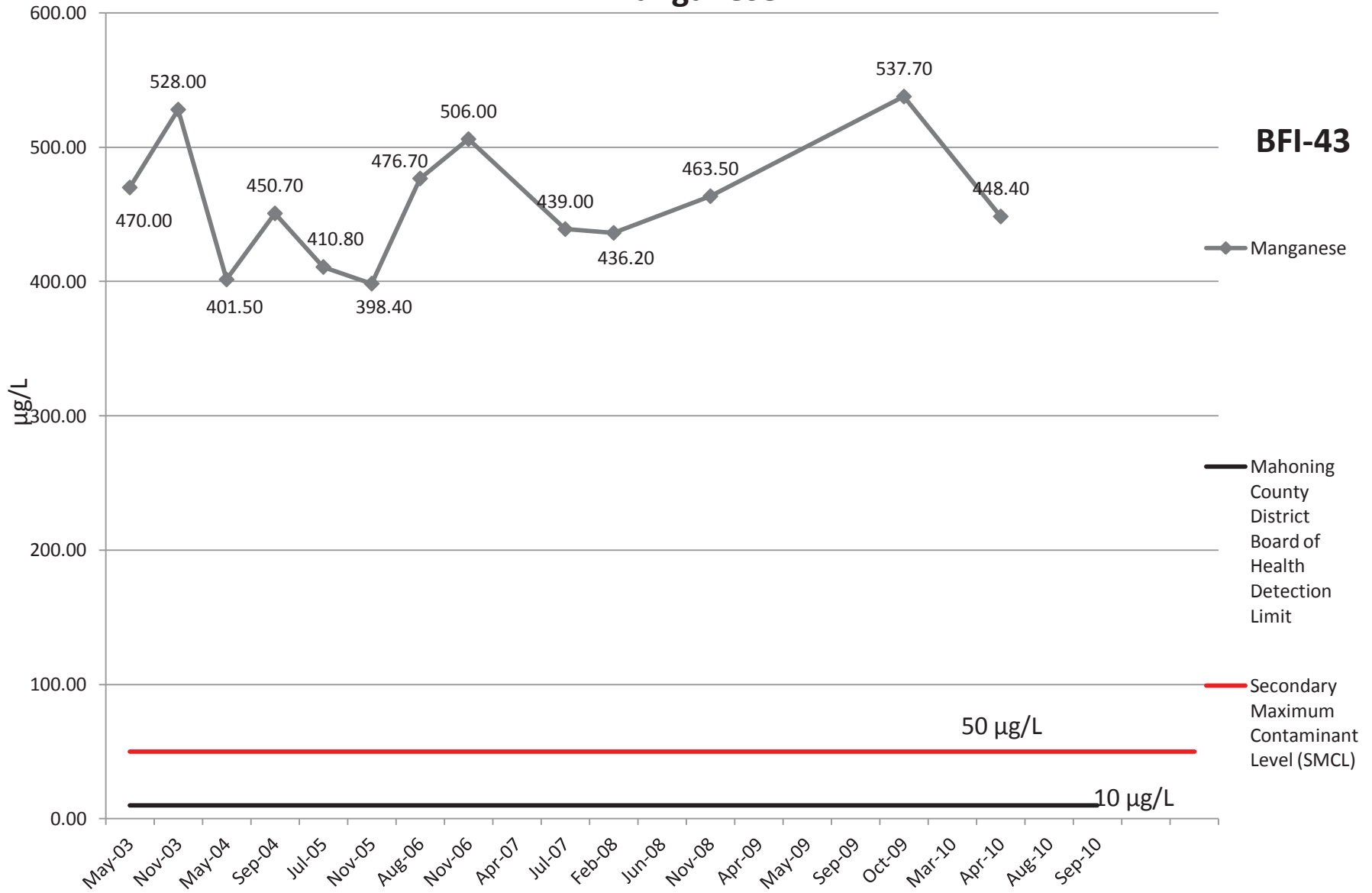


# Lead



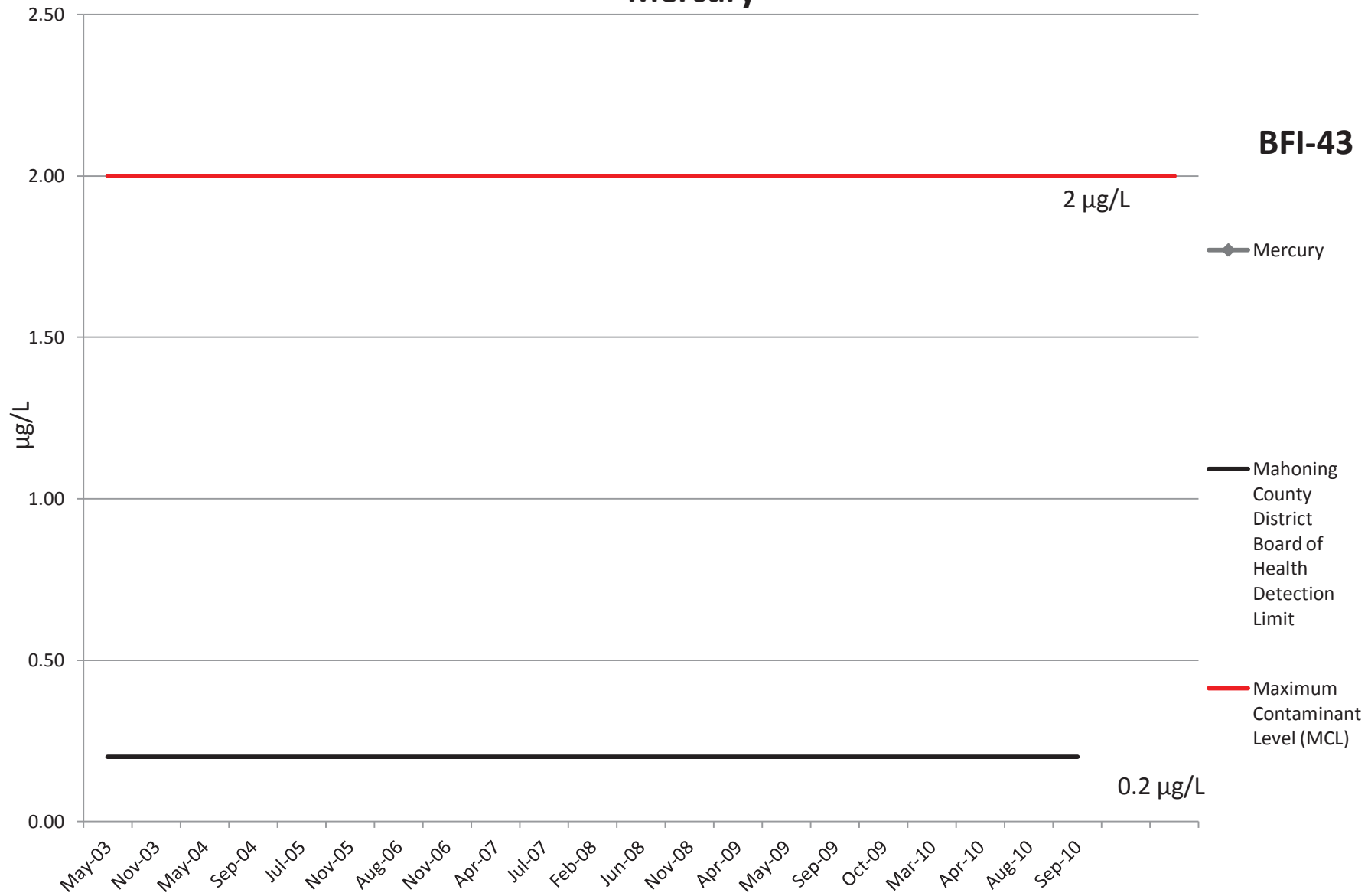
# Manganese

**BFI-43**

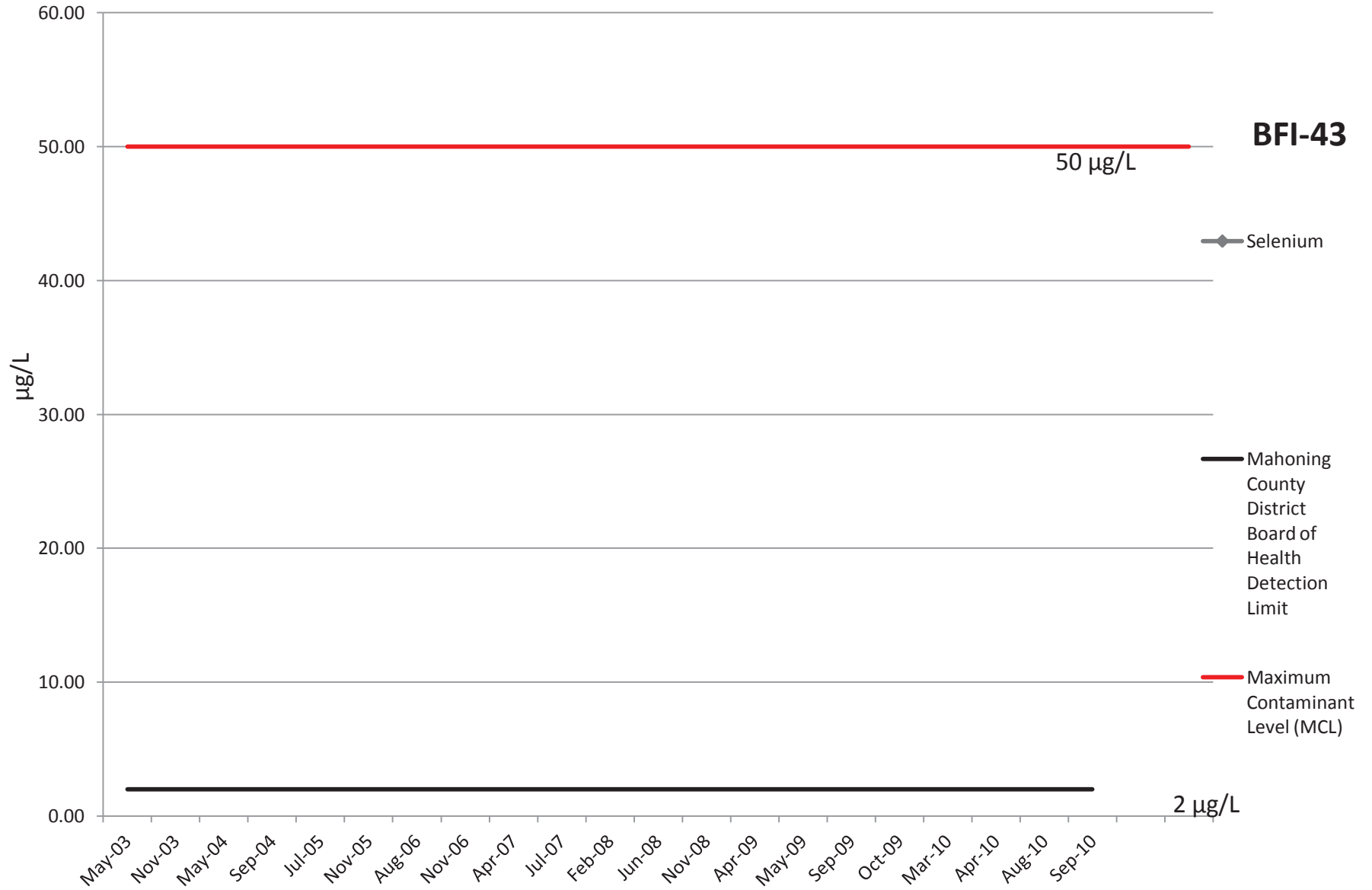


# Mercury

**BFI-43**



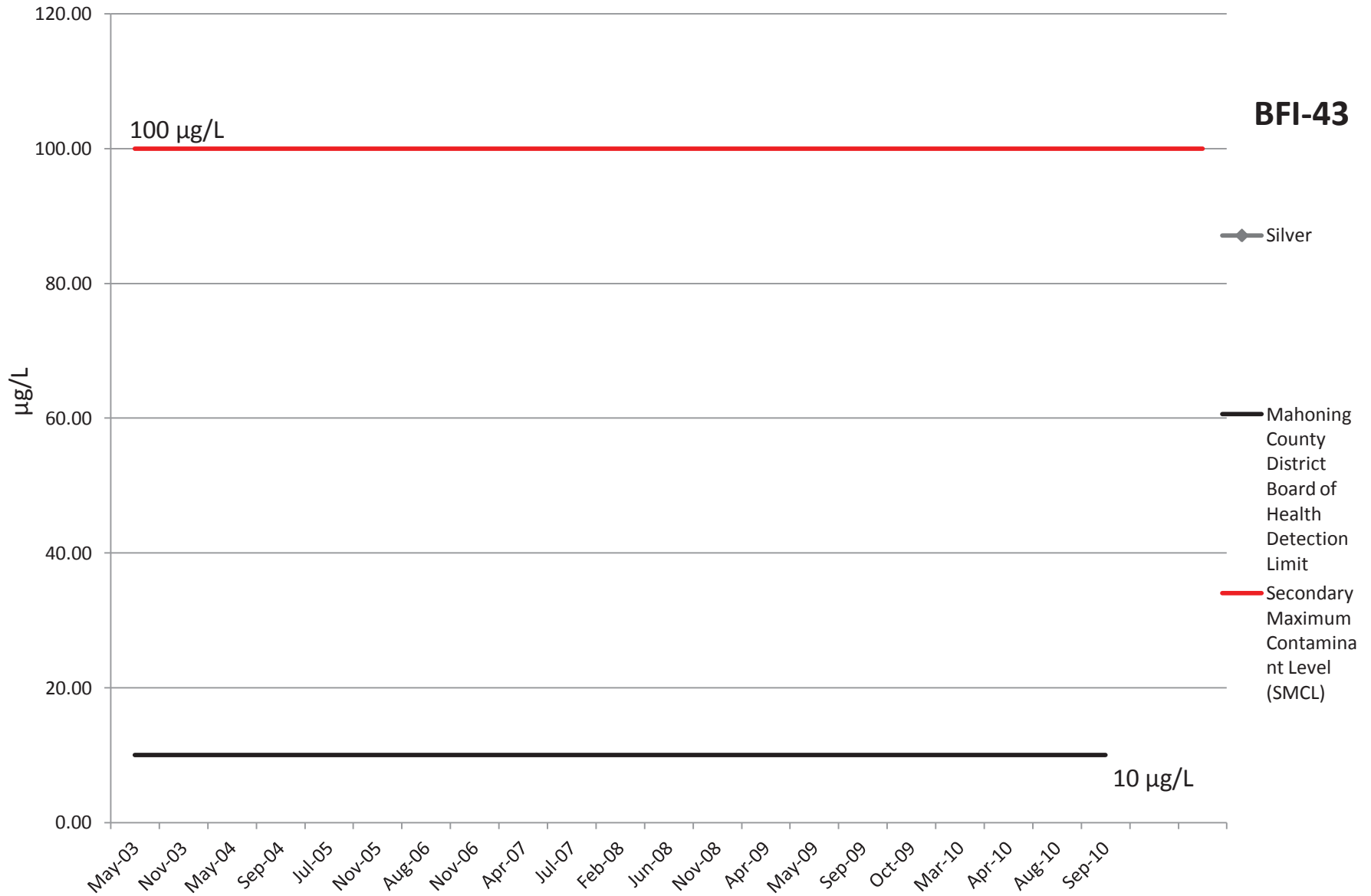
# Selenium



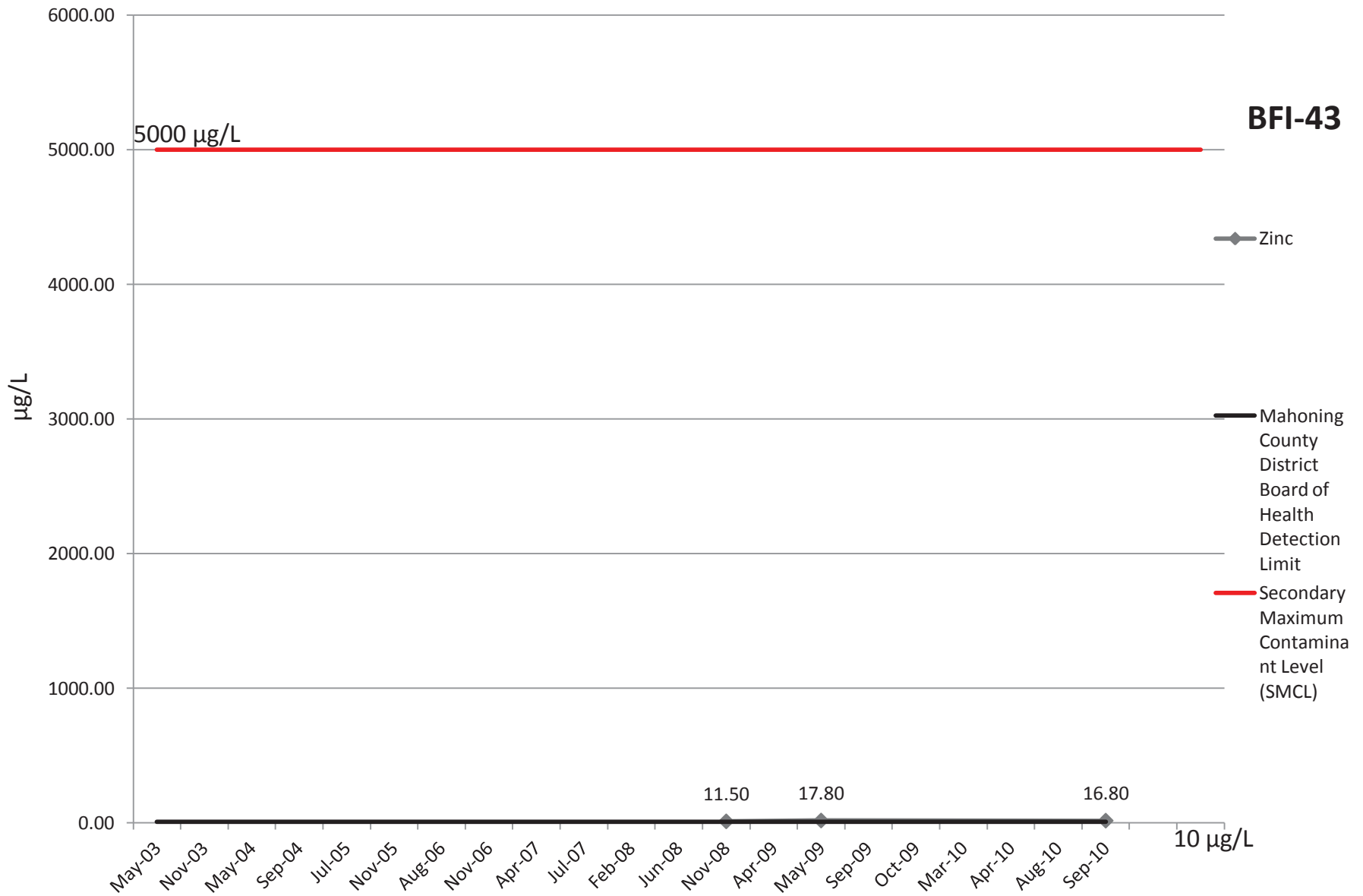


# Silver

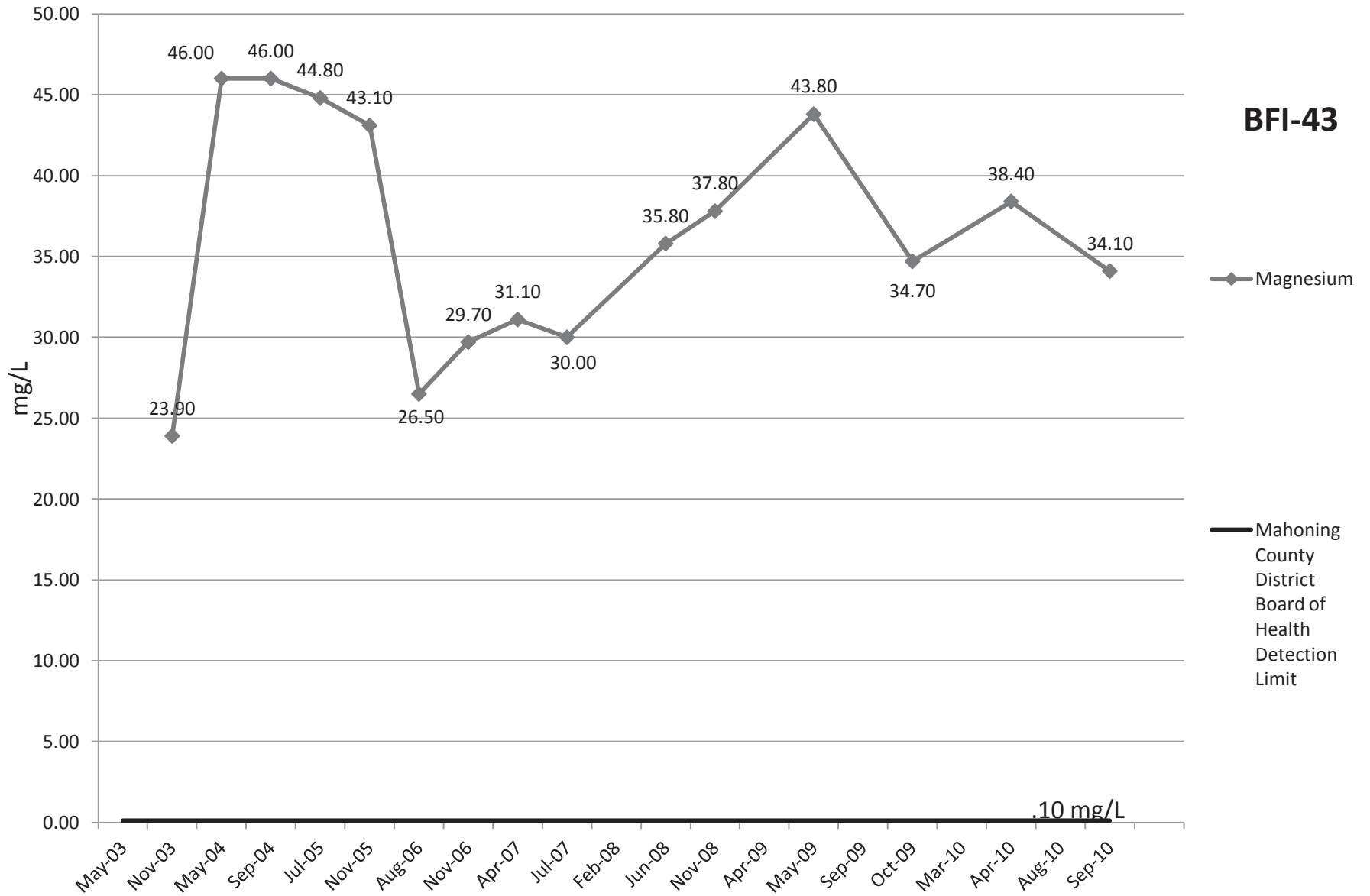
**BFI-43**



# Zinc

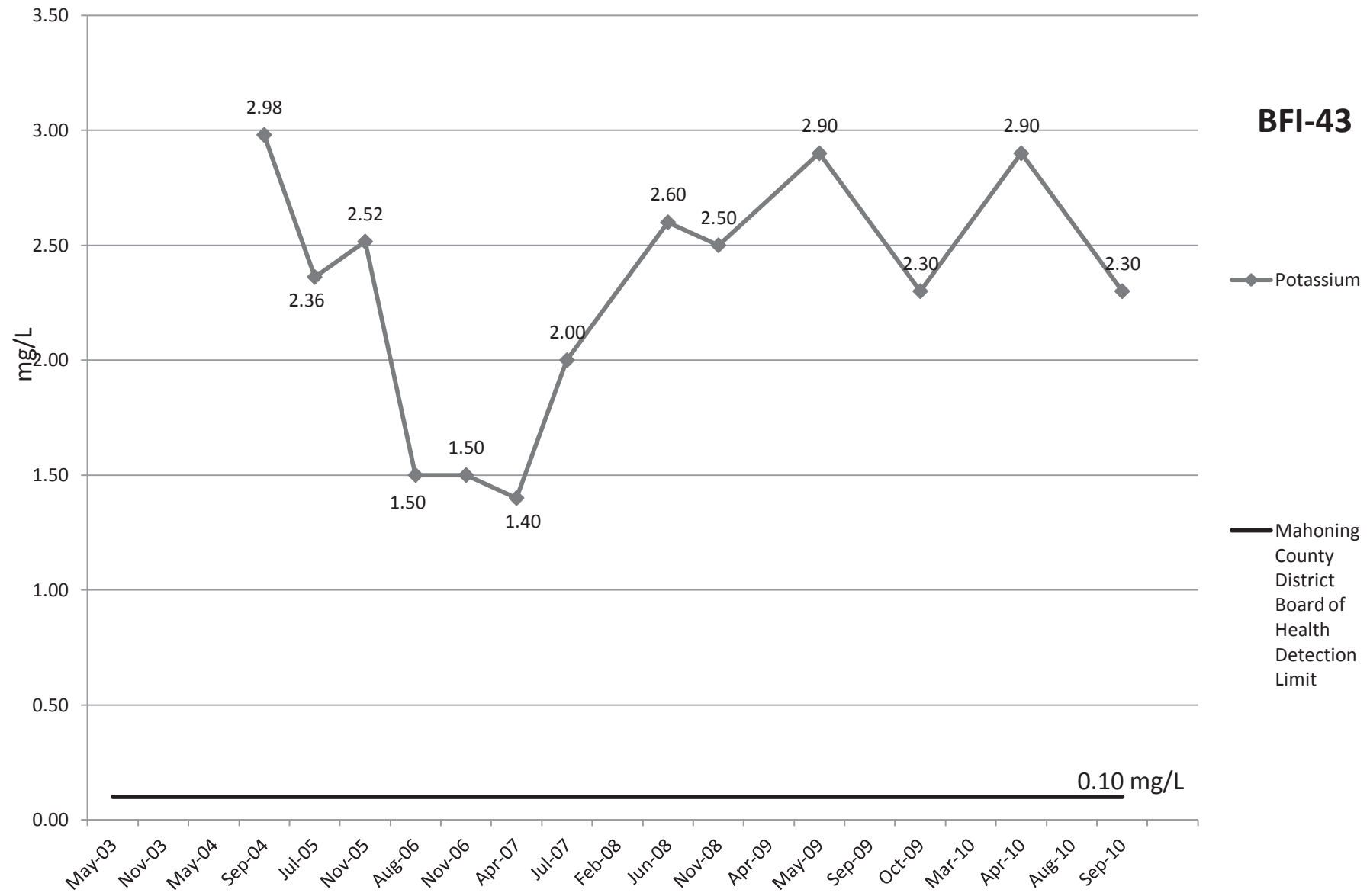


# Magnesium

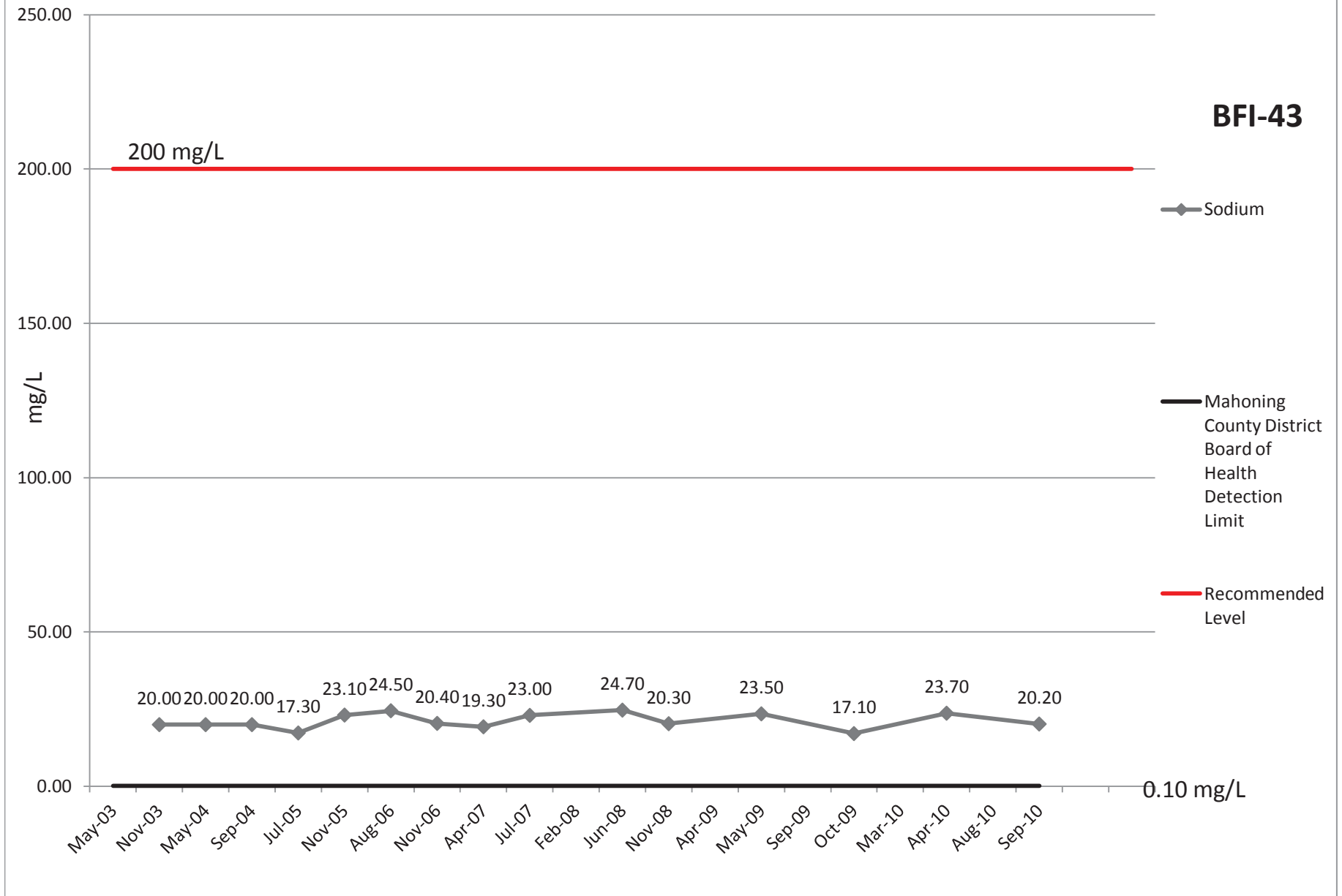


# Potassium

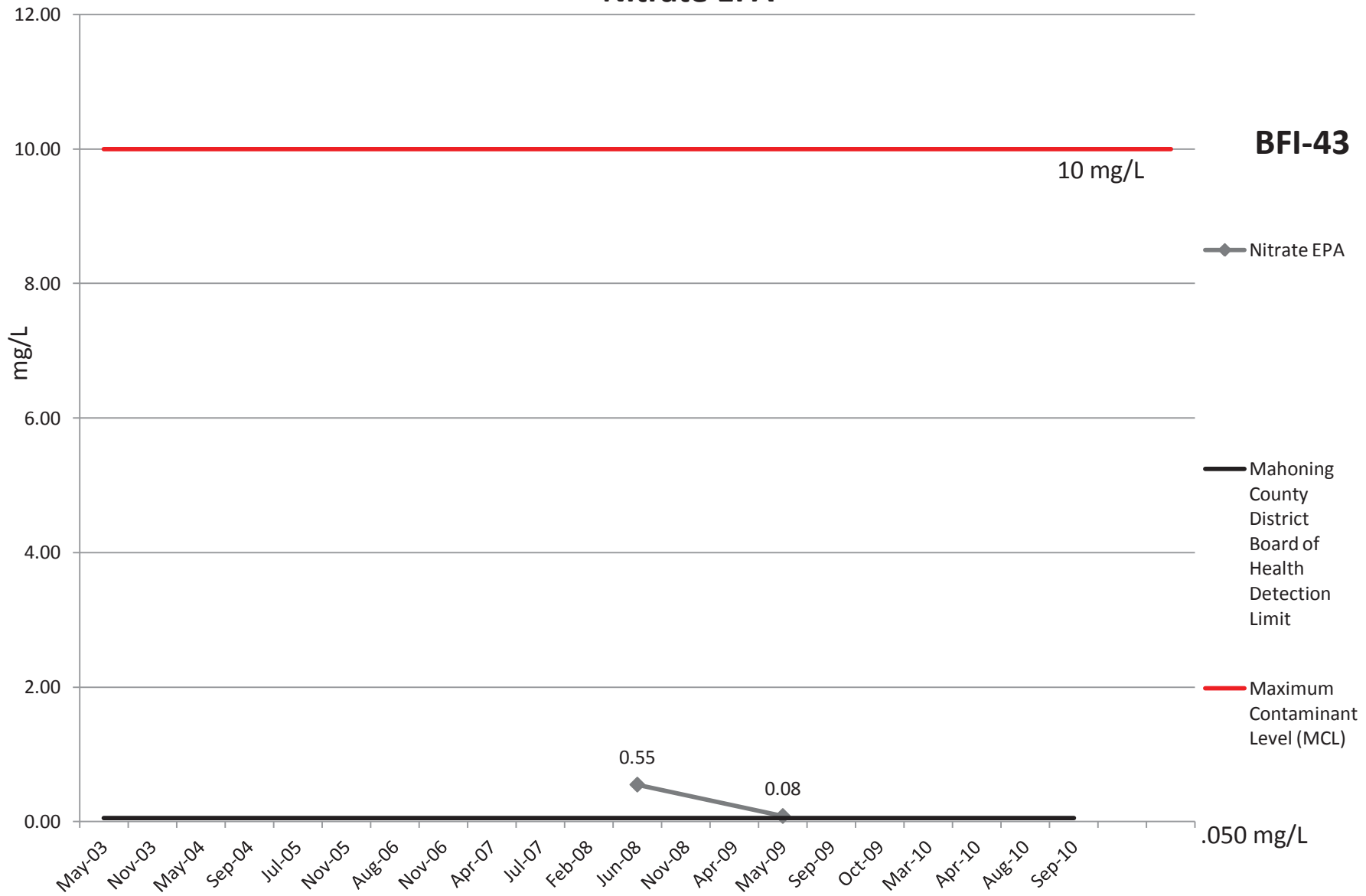
**BFI-43**



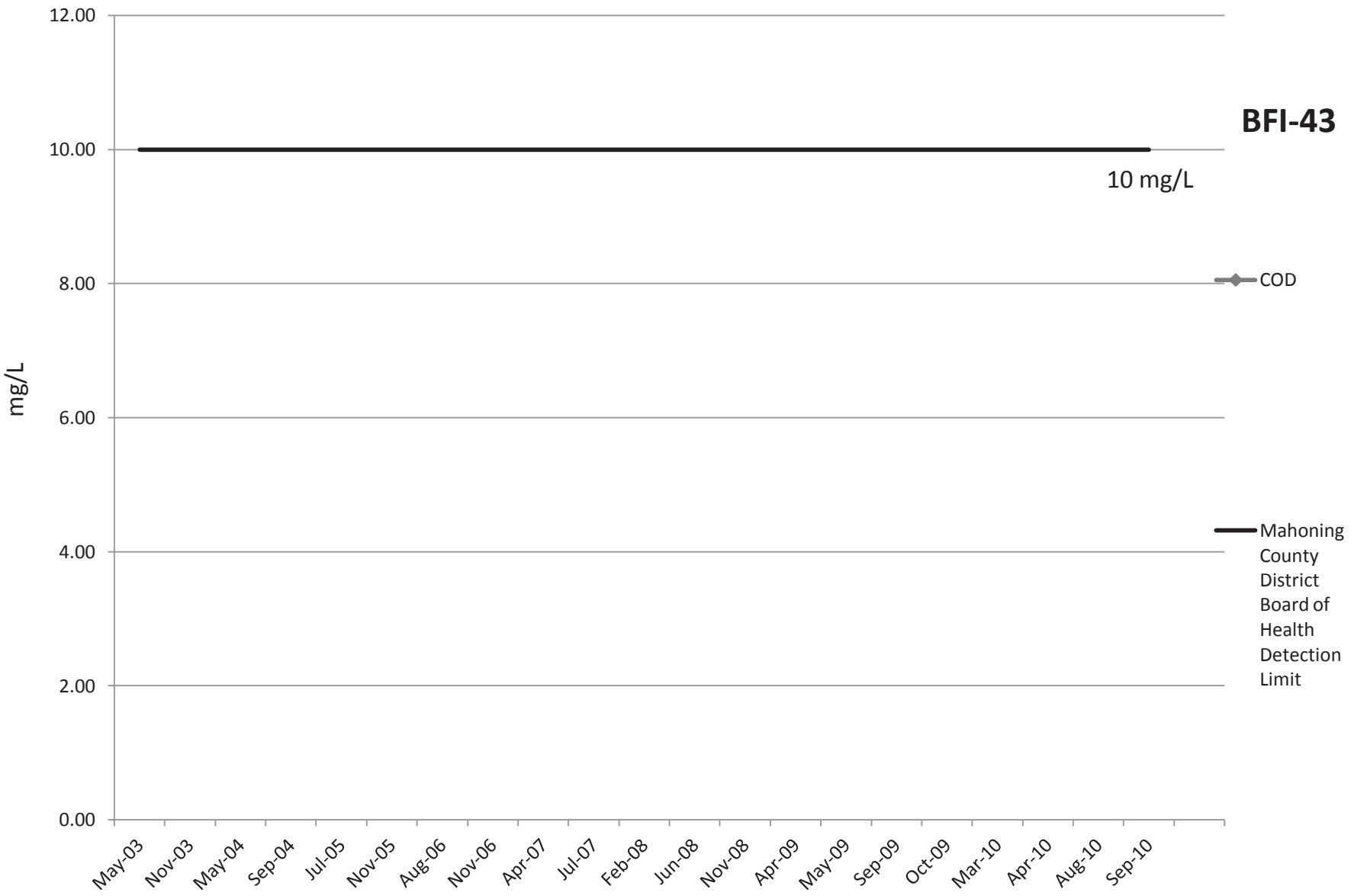
# Sodium



# Nitrate EPA



# COD



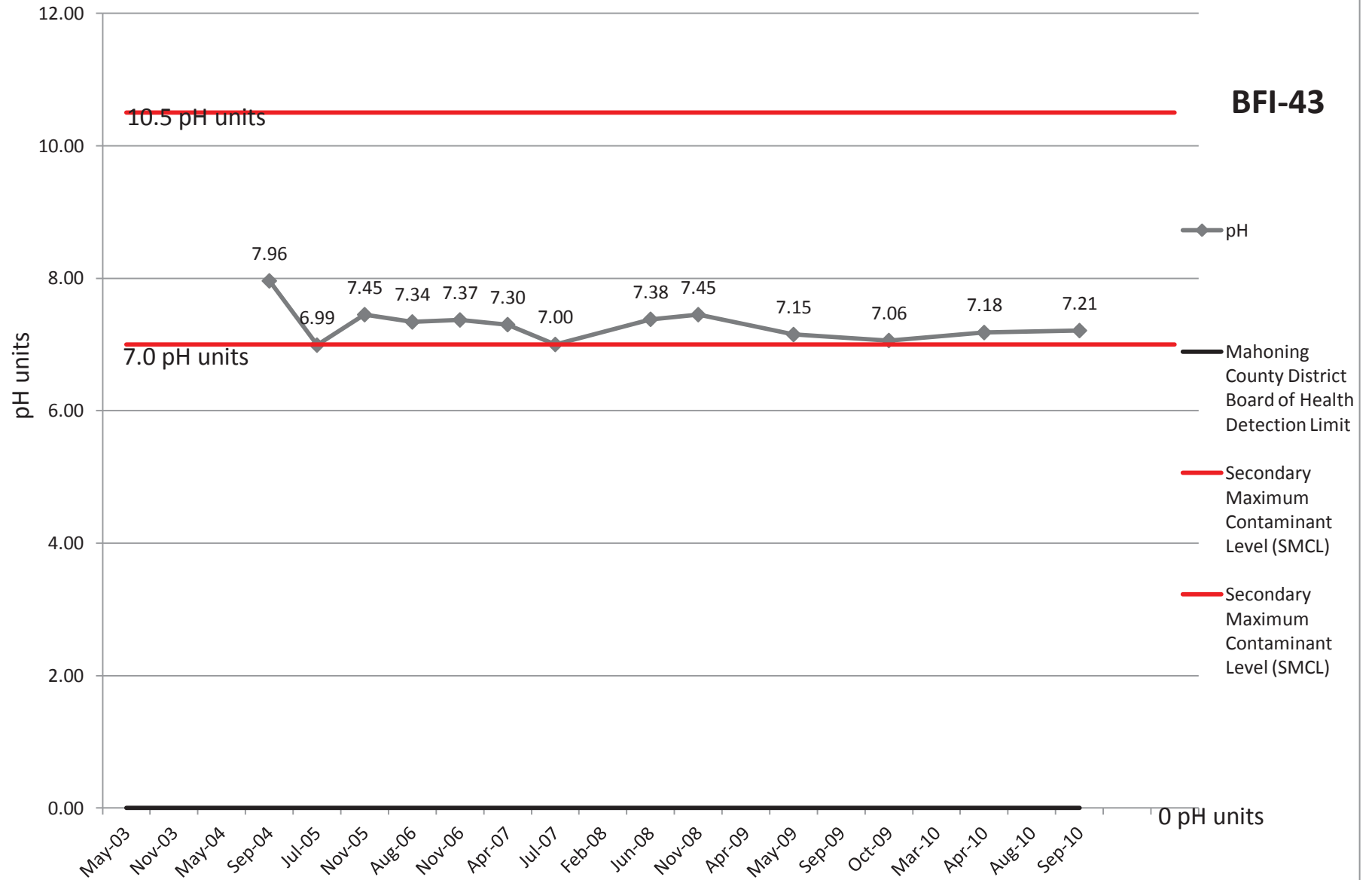
**BFI-43**

10 mg/L

—◆— COD

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

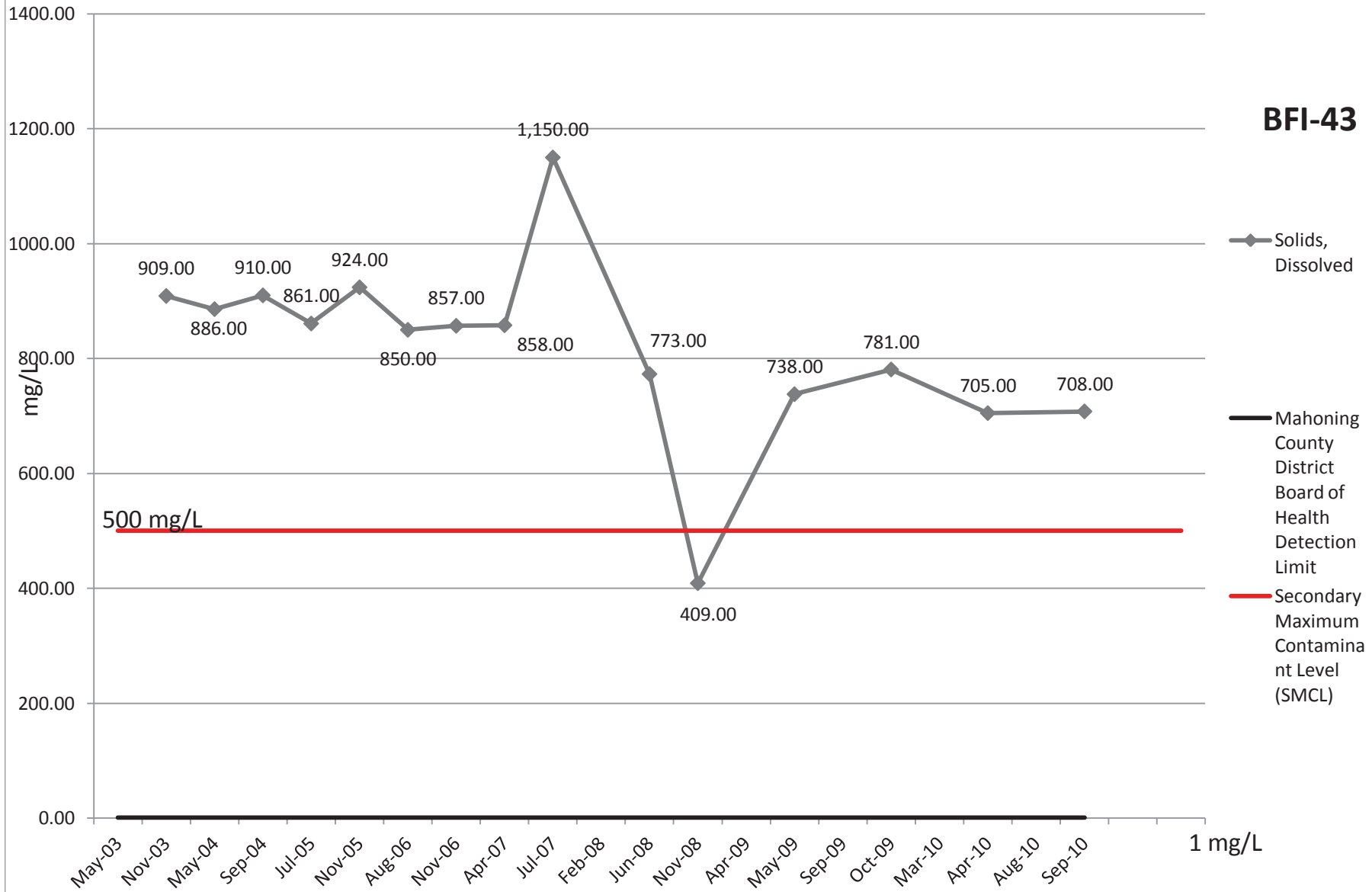
# pH





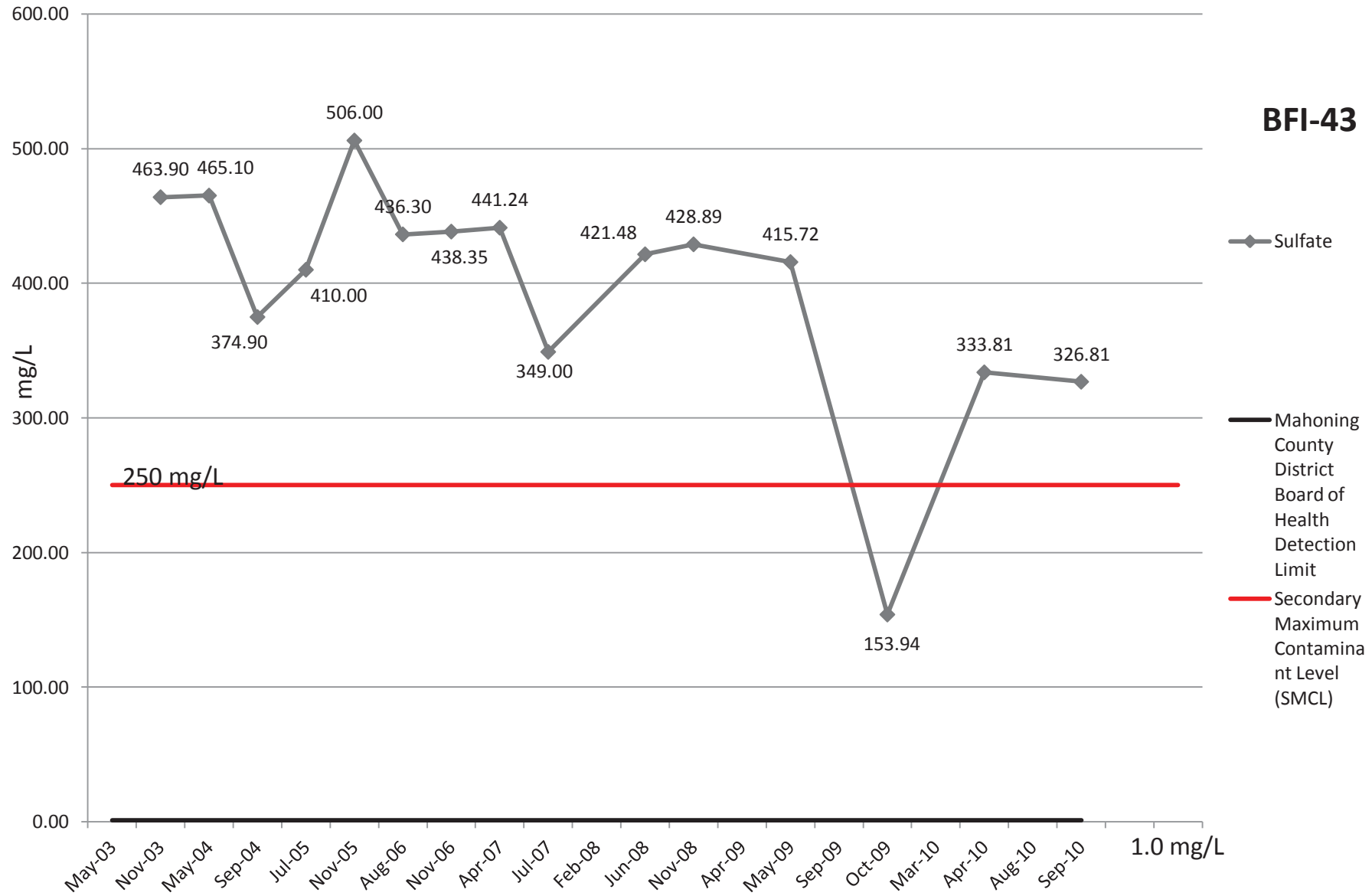
# Solids, Dissolved

**BFI-43**



# Sulfate

**BFI-43**



# Bacteria

**BFI-43**

Positive/Negative

◆ Bacteria

positive (1)

1.00

1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

negative (0)

0.00

0.00

0.00

0.00

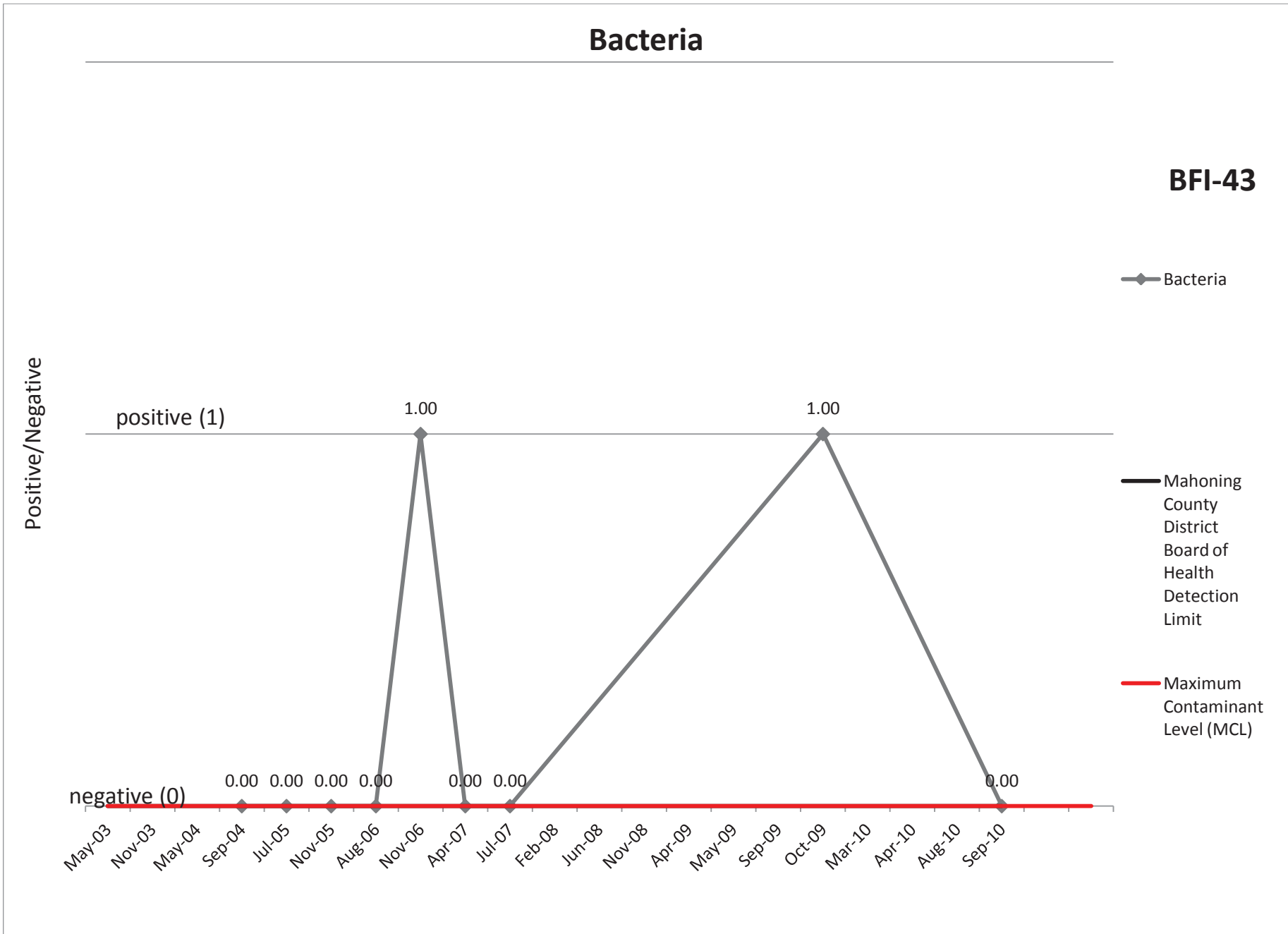
0.00

0.00

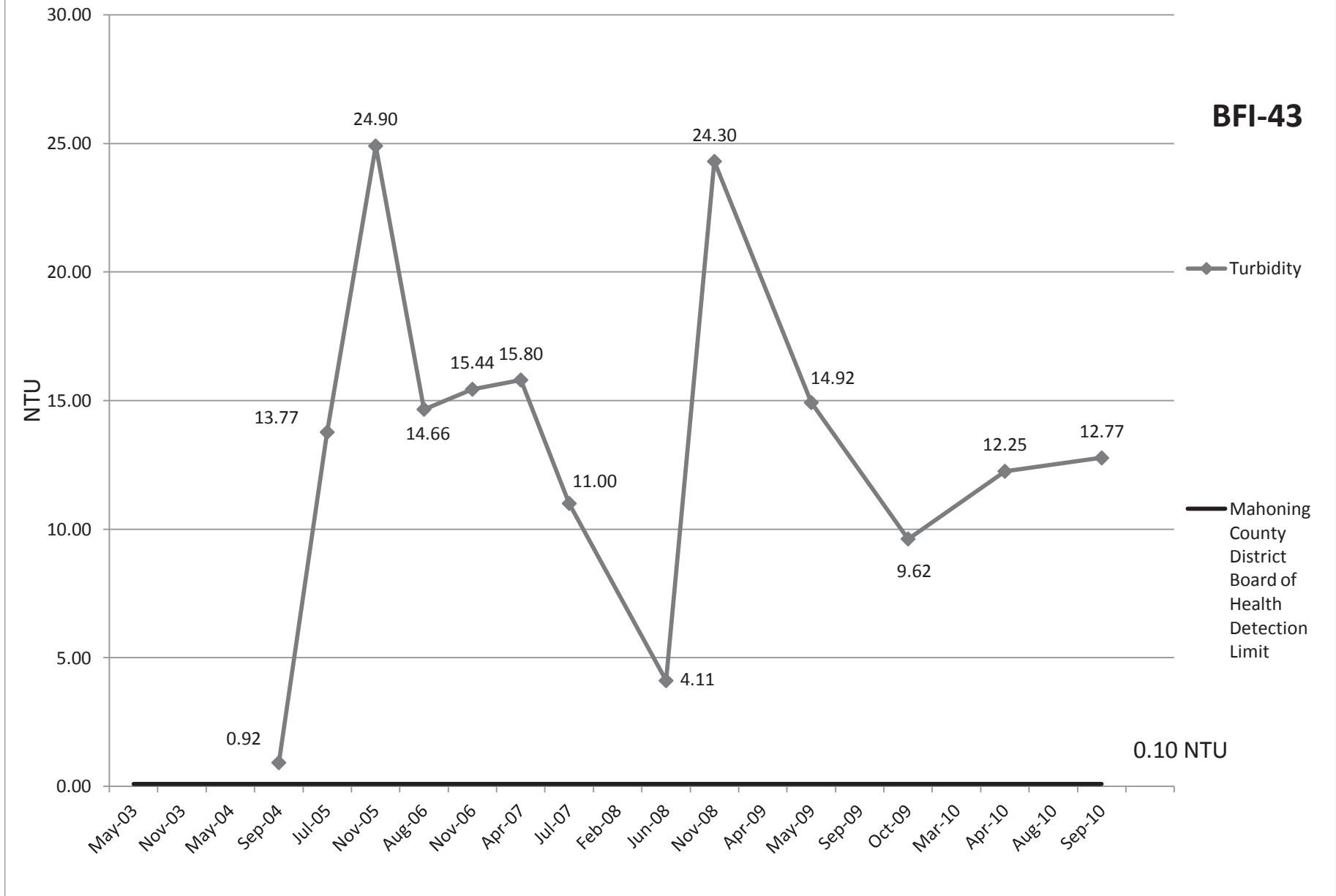
0.00

0.00

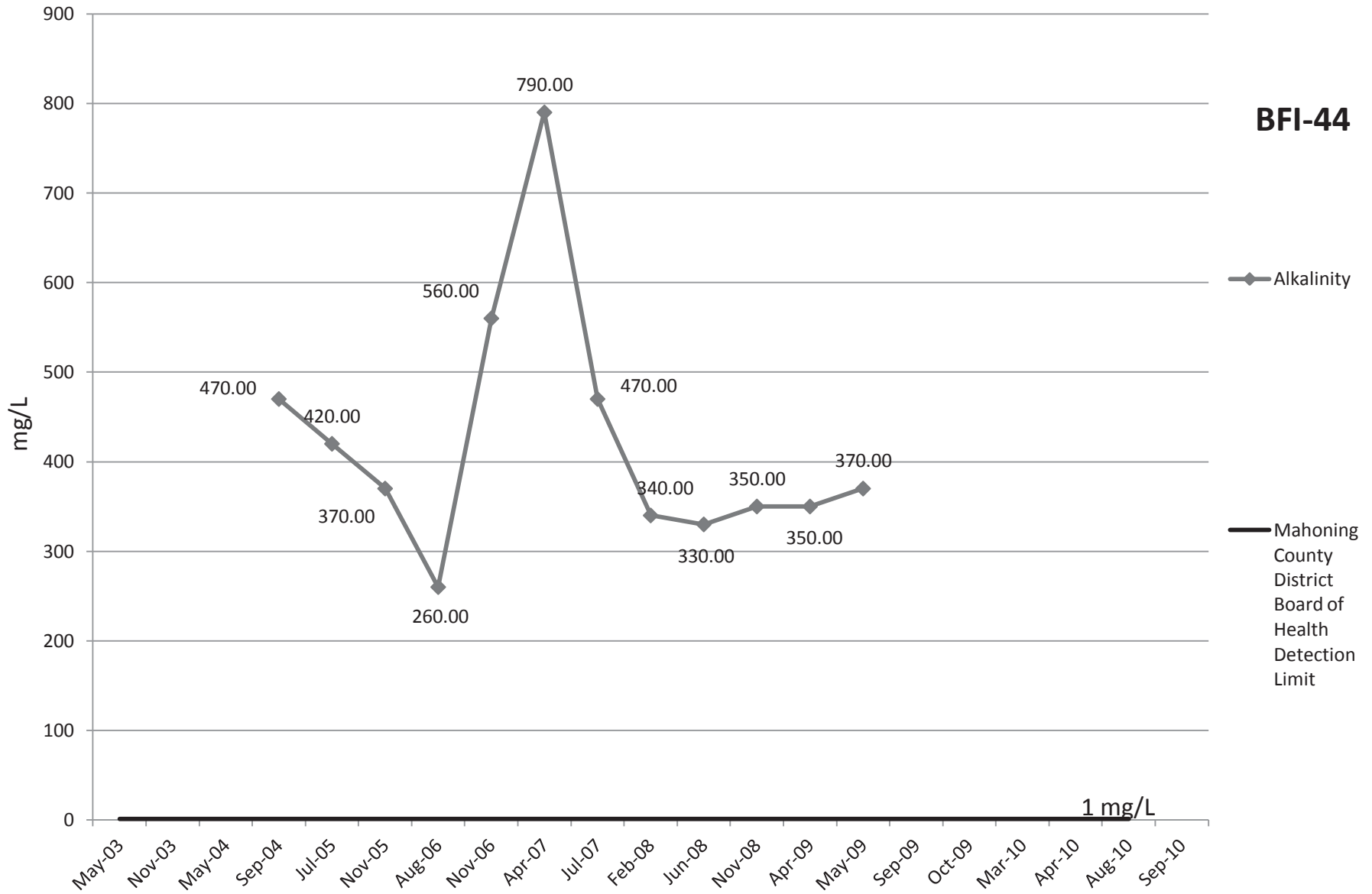
May-03  
Nov-03  
May-04  
Sep-04  
Jul-05  
Nov-05  
Aug-06  
Nov-06  
Apr-07  
Jul-07  
Feb-08  
Jun-08  
Nov-08  
Apr-09  
May-09  
Sep-09  
Oct-09  
Mar-10  
Apr-10  
Aug-10  
Sep-10



# Turbidity

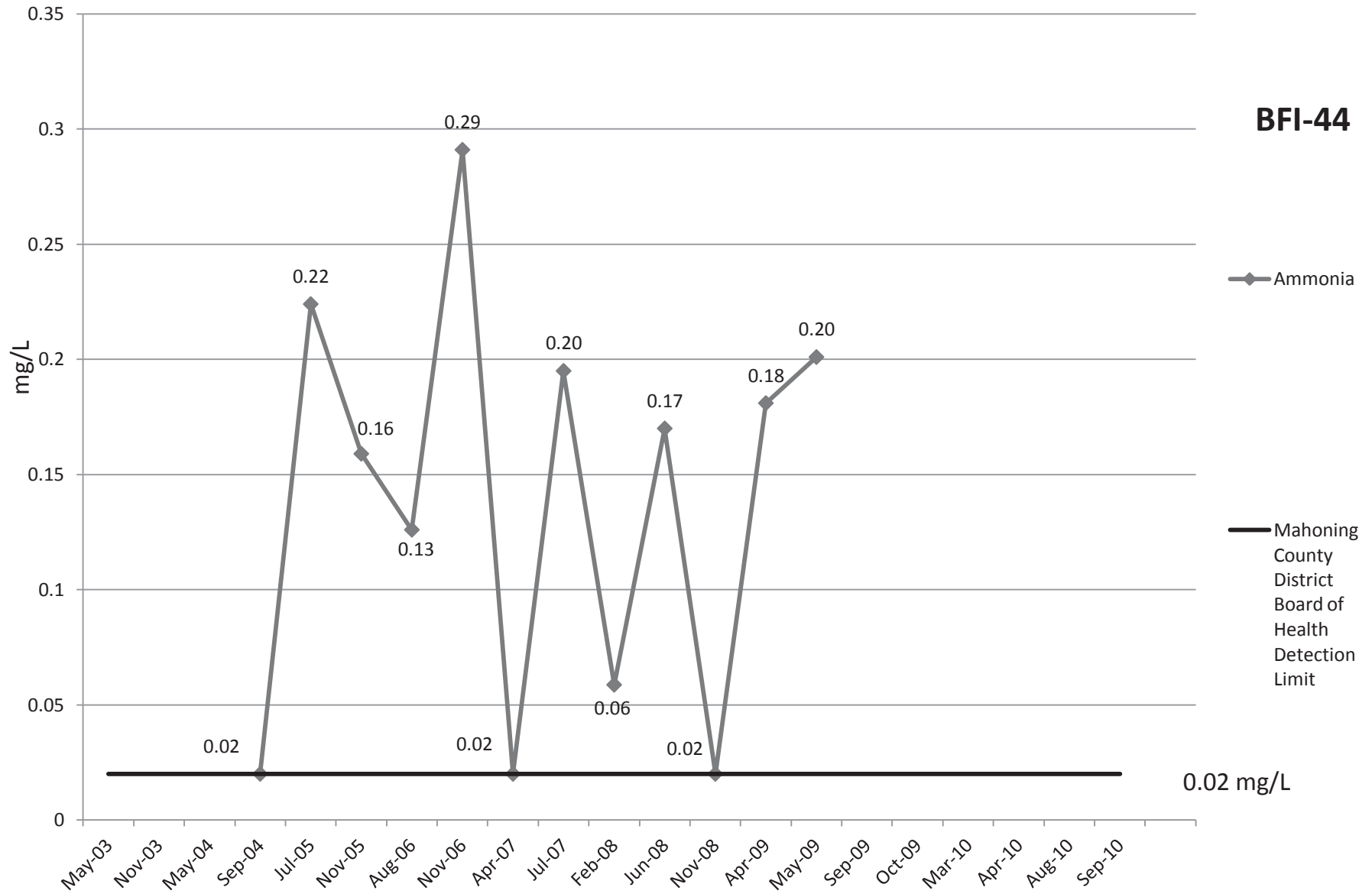


# Alkalinity

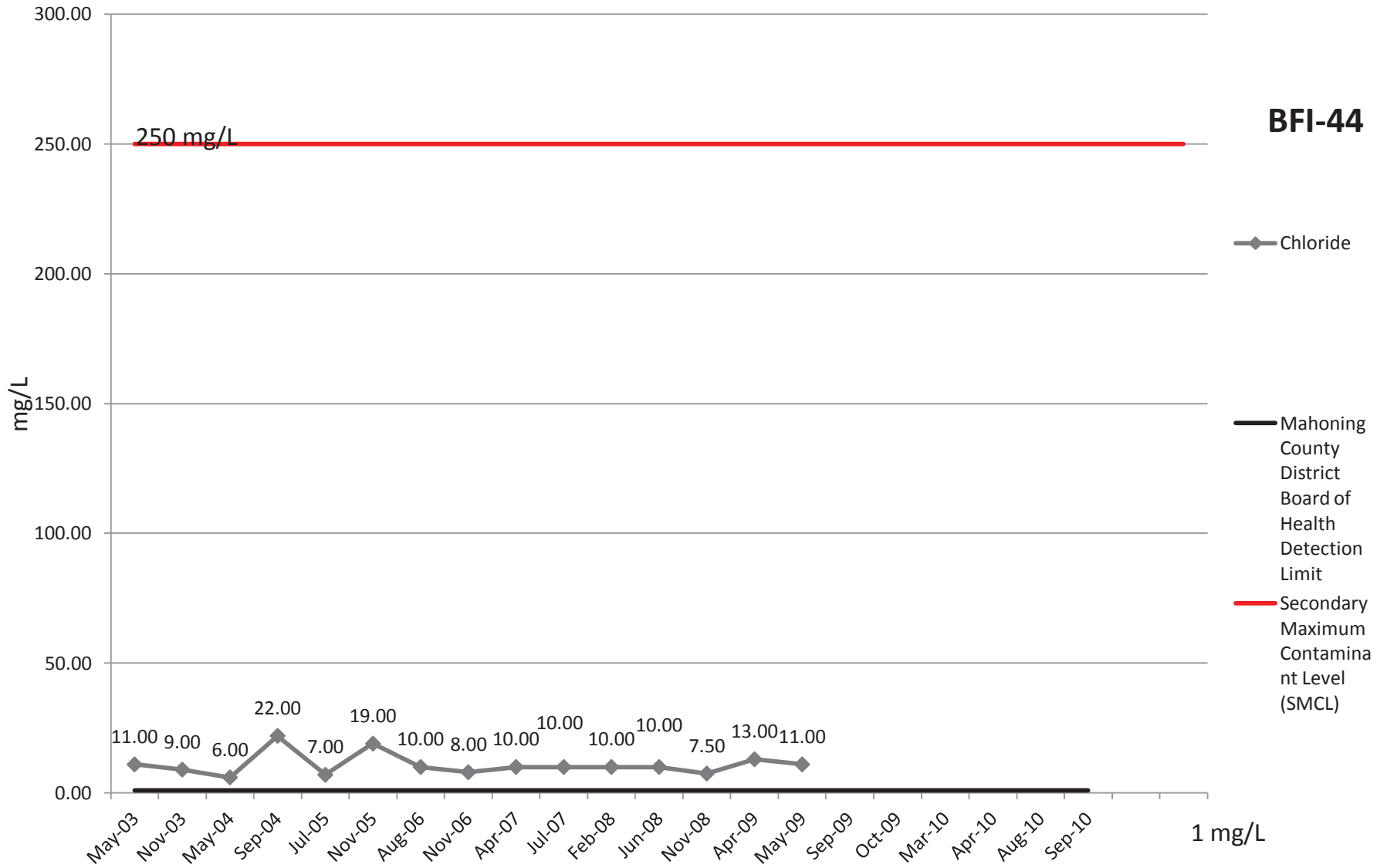


# Ammonia

**BFI-44**

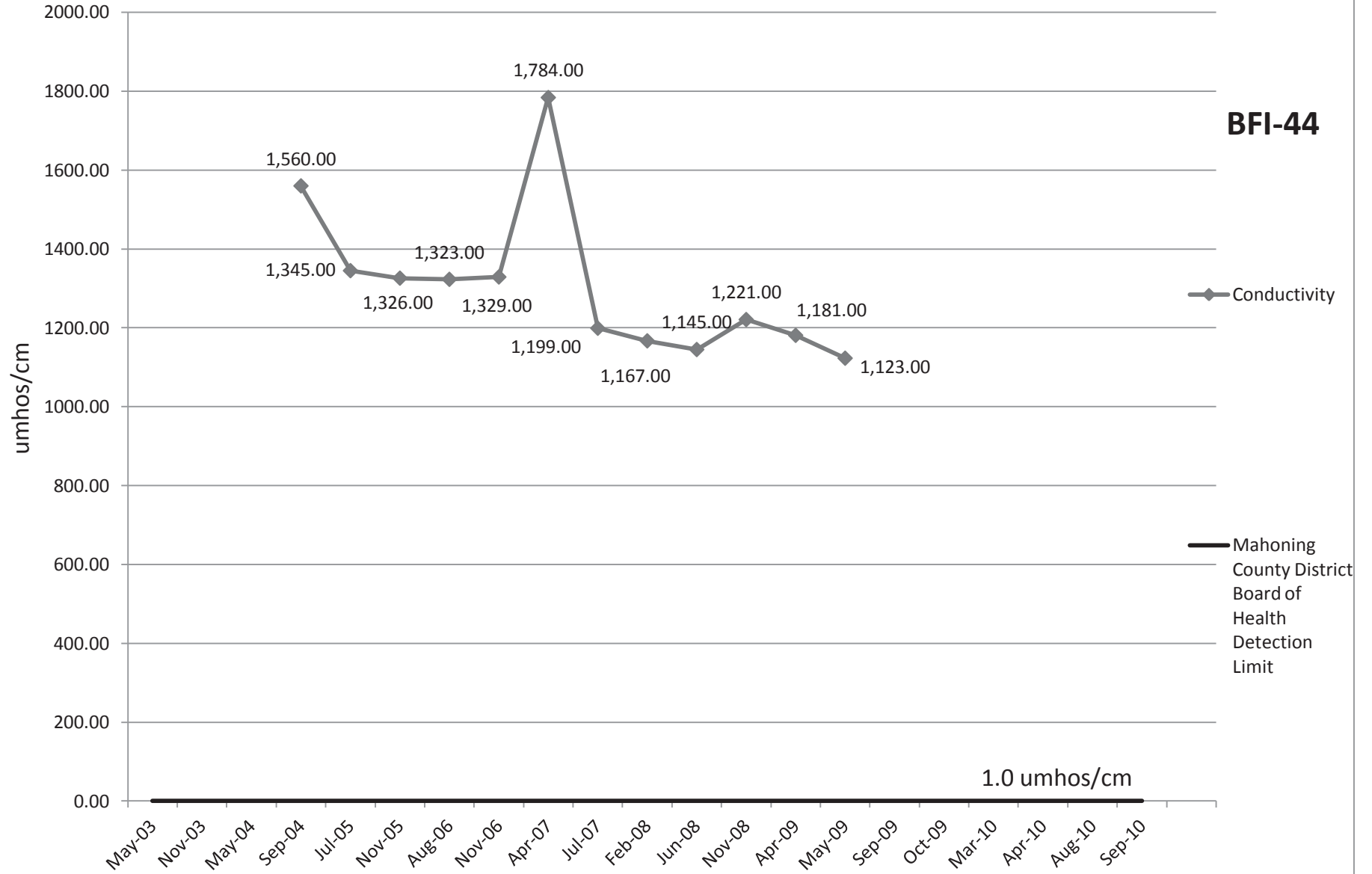


# Chloride



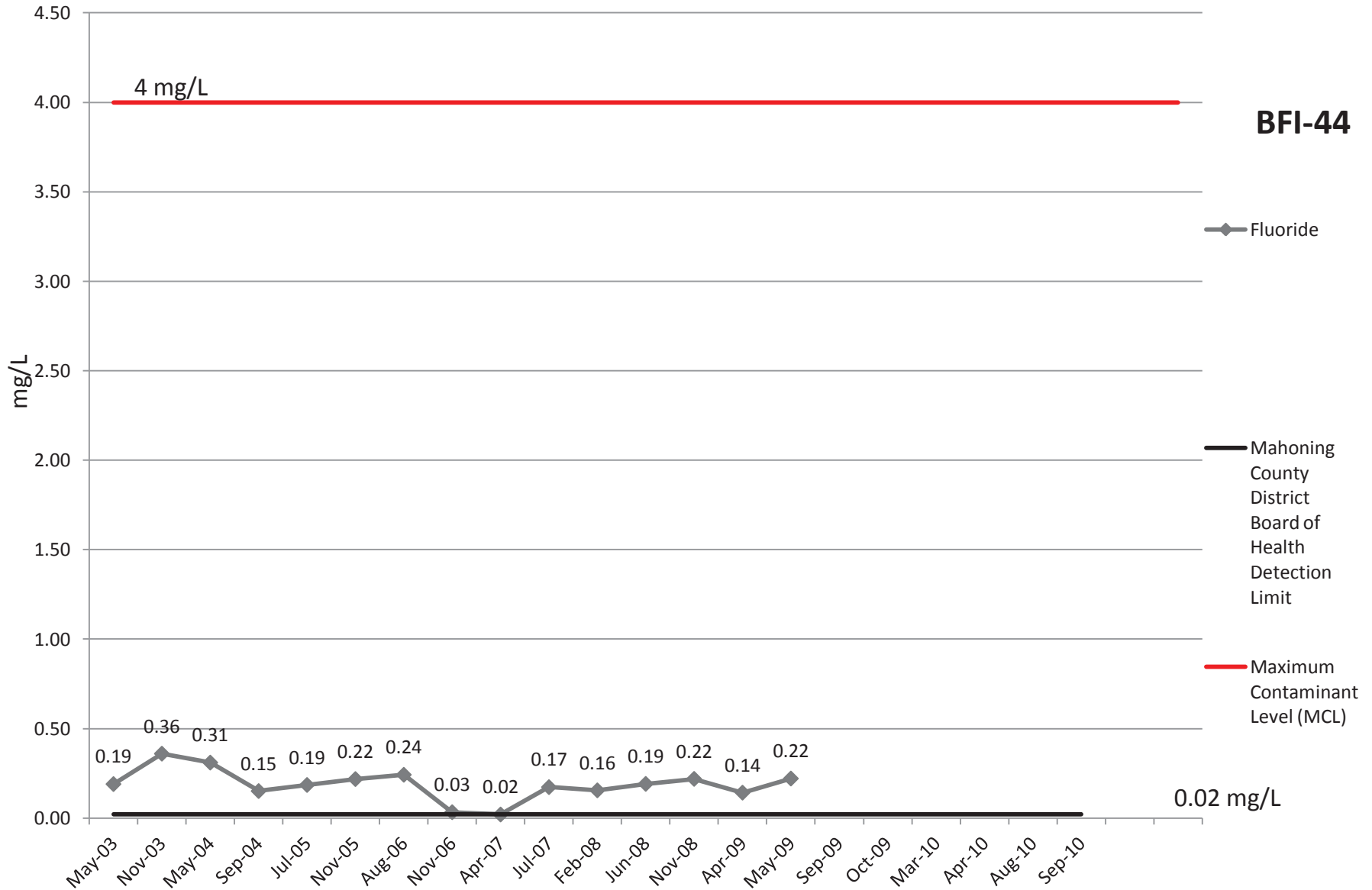
# Conductivity

**BFI-44**



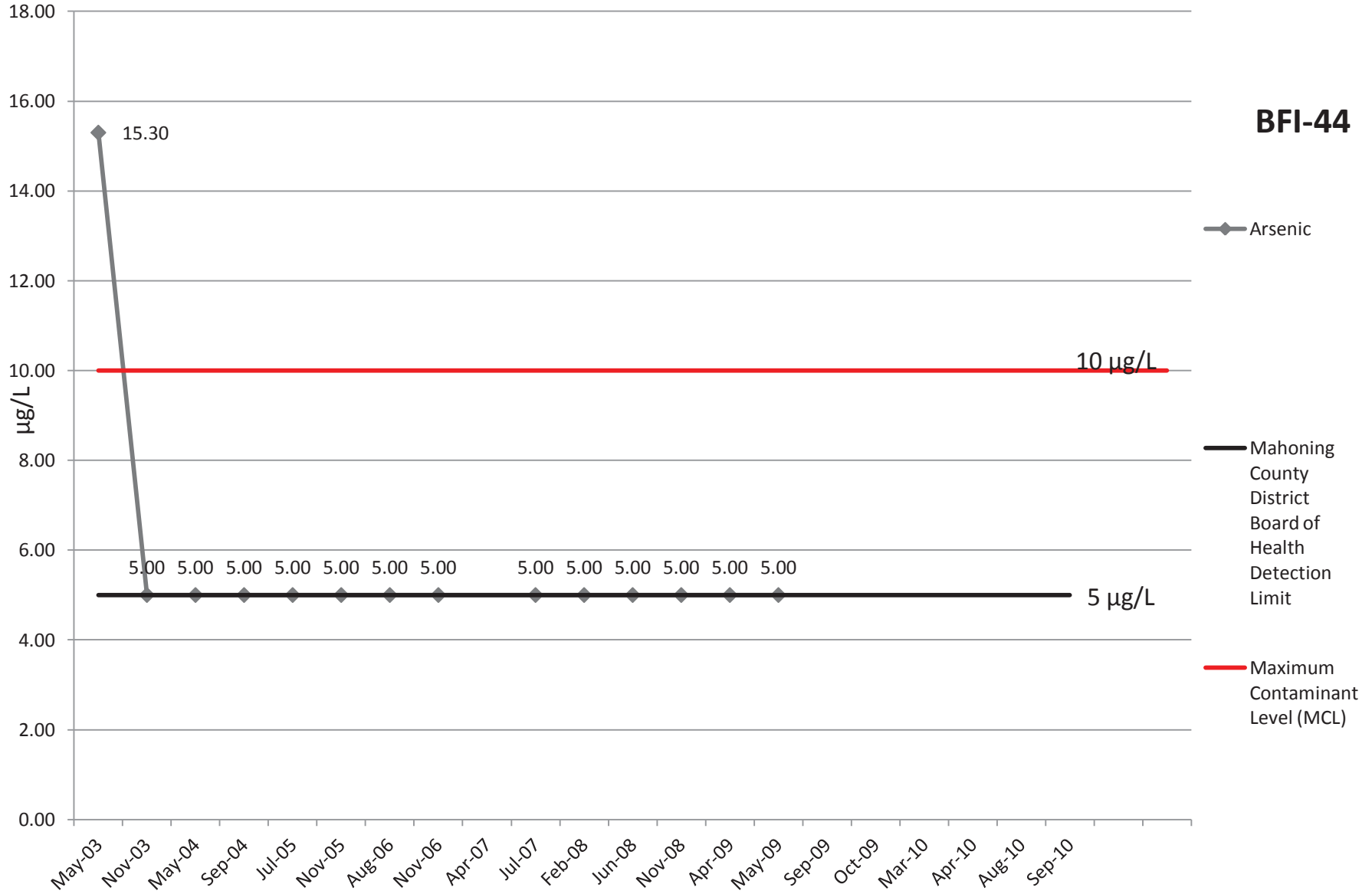


# Fluoride



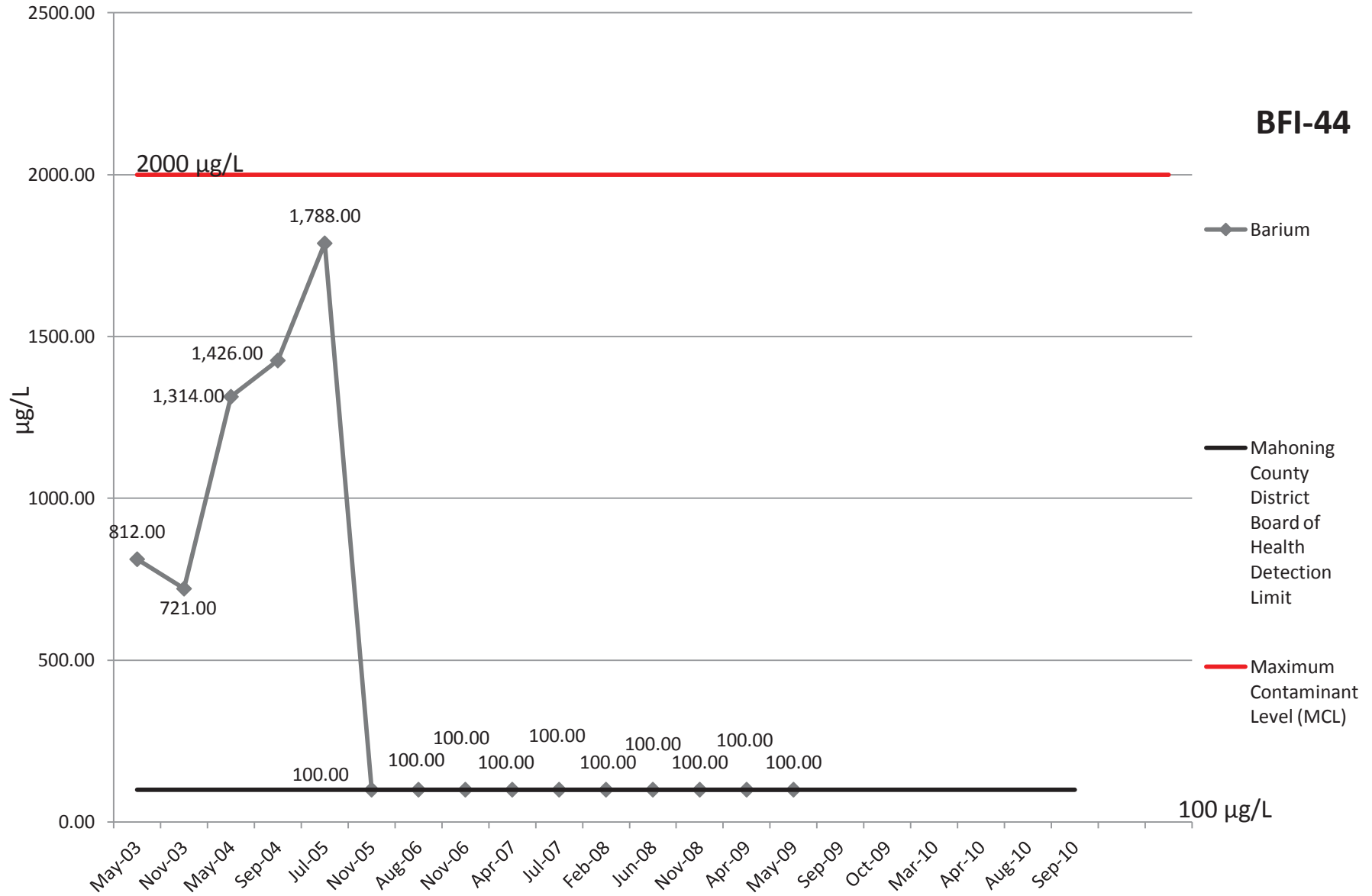
# Arsenic

**BFI-44**



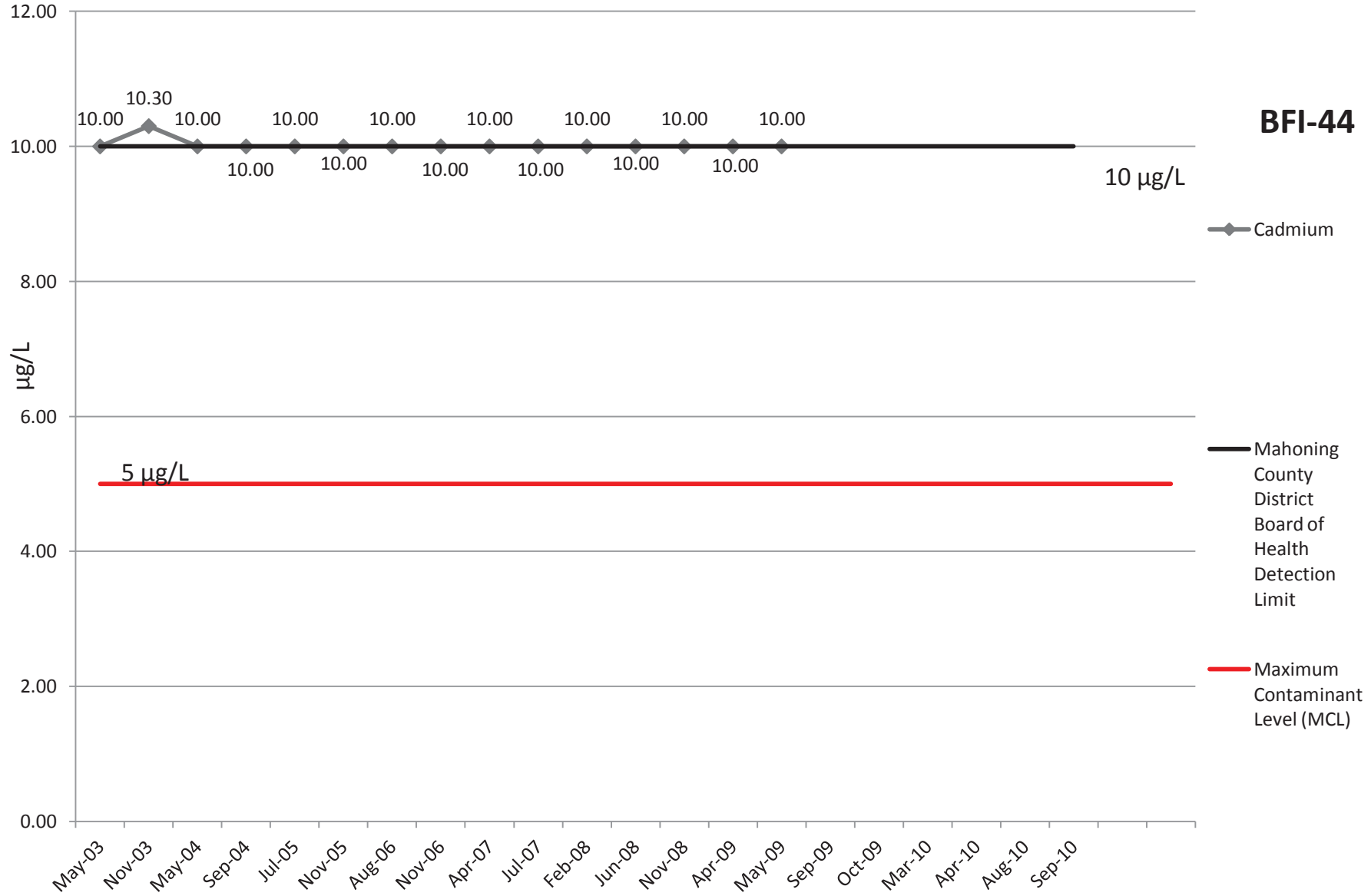
# Barium

**BFI-44**

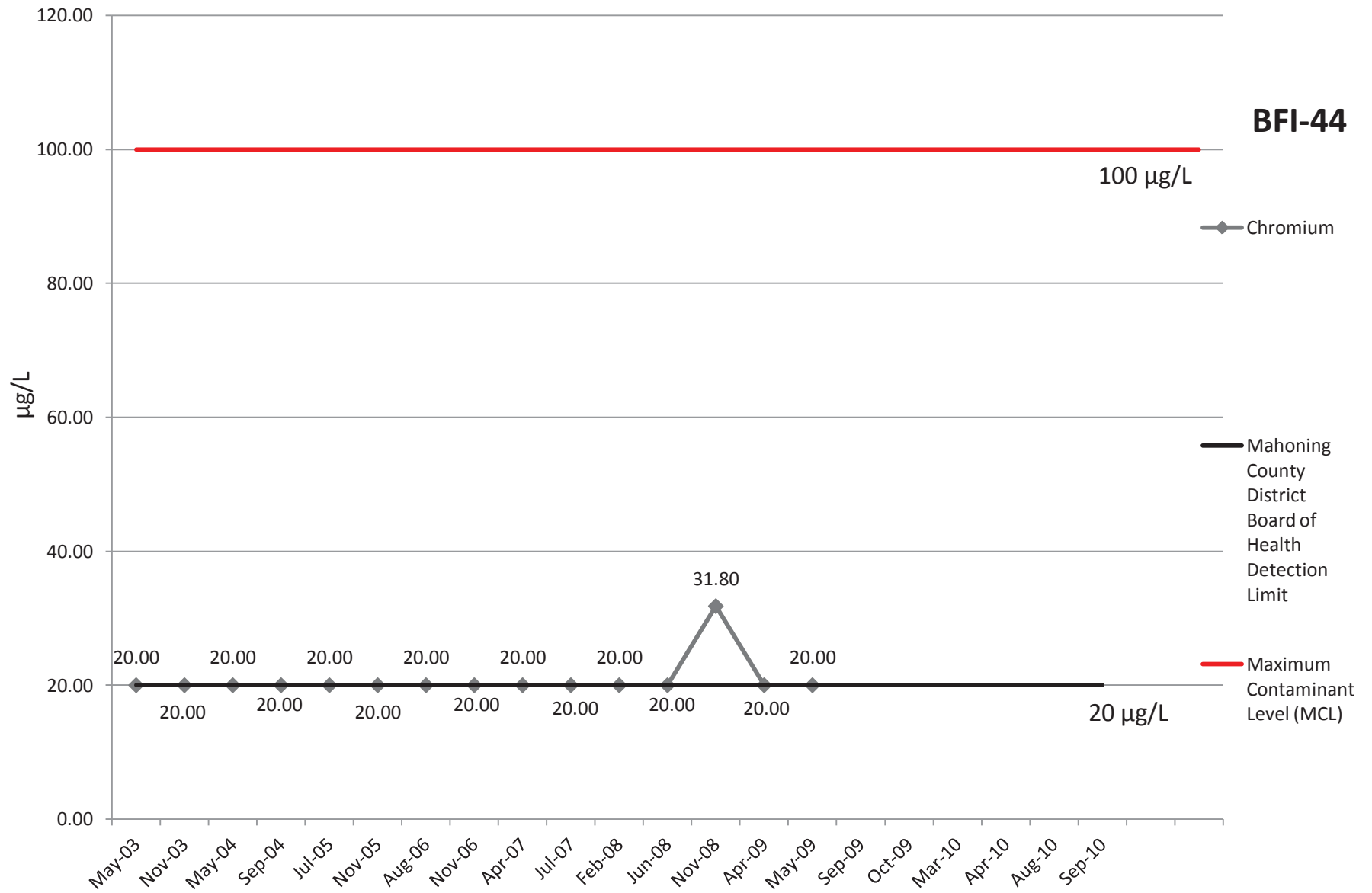


# Cadmium

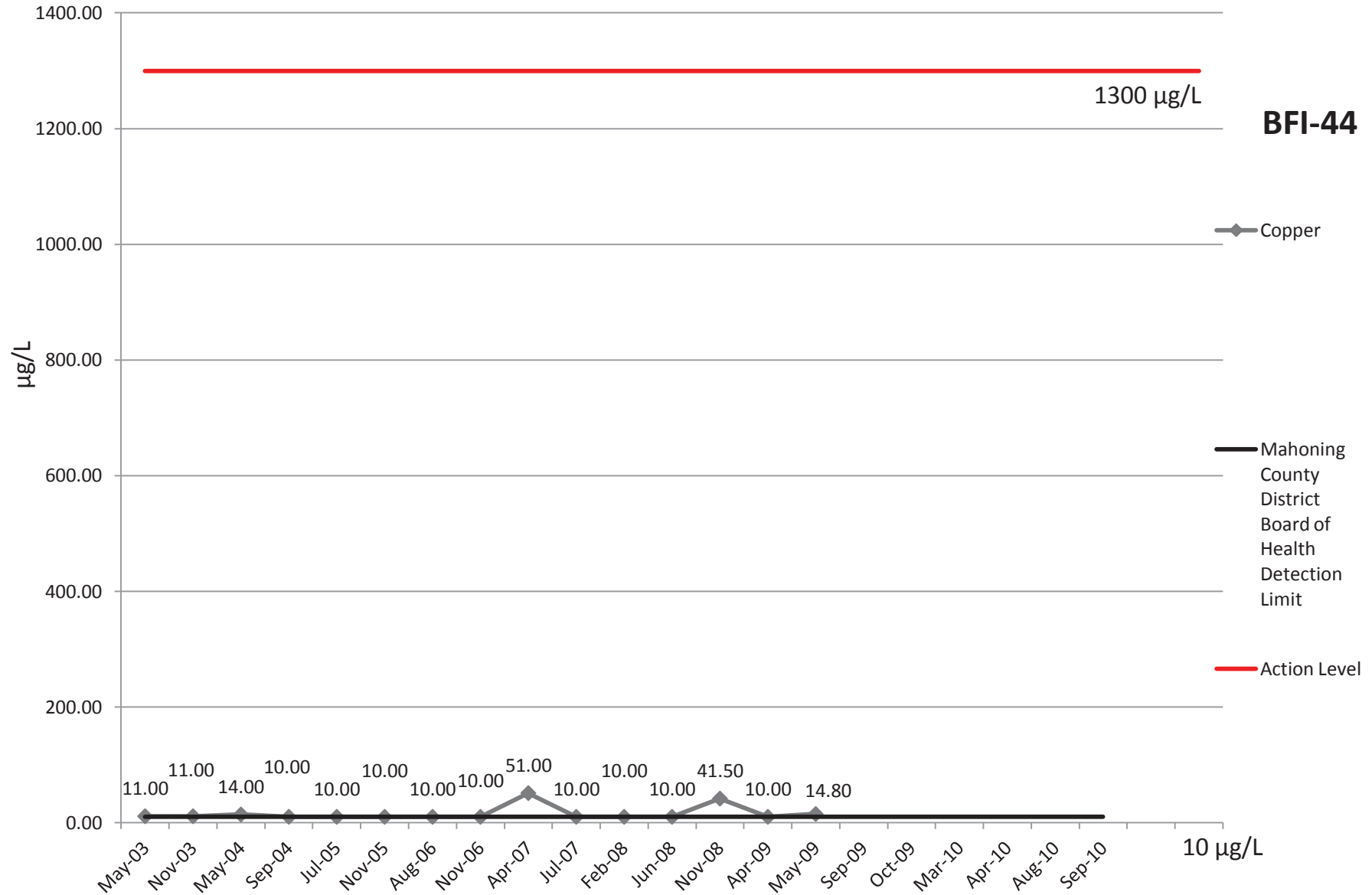
**BFI-44**



# Chromium

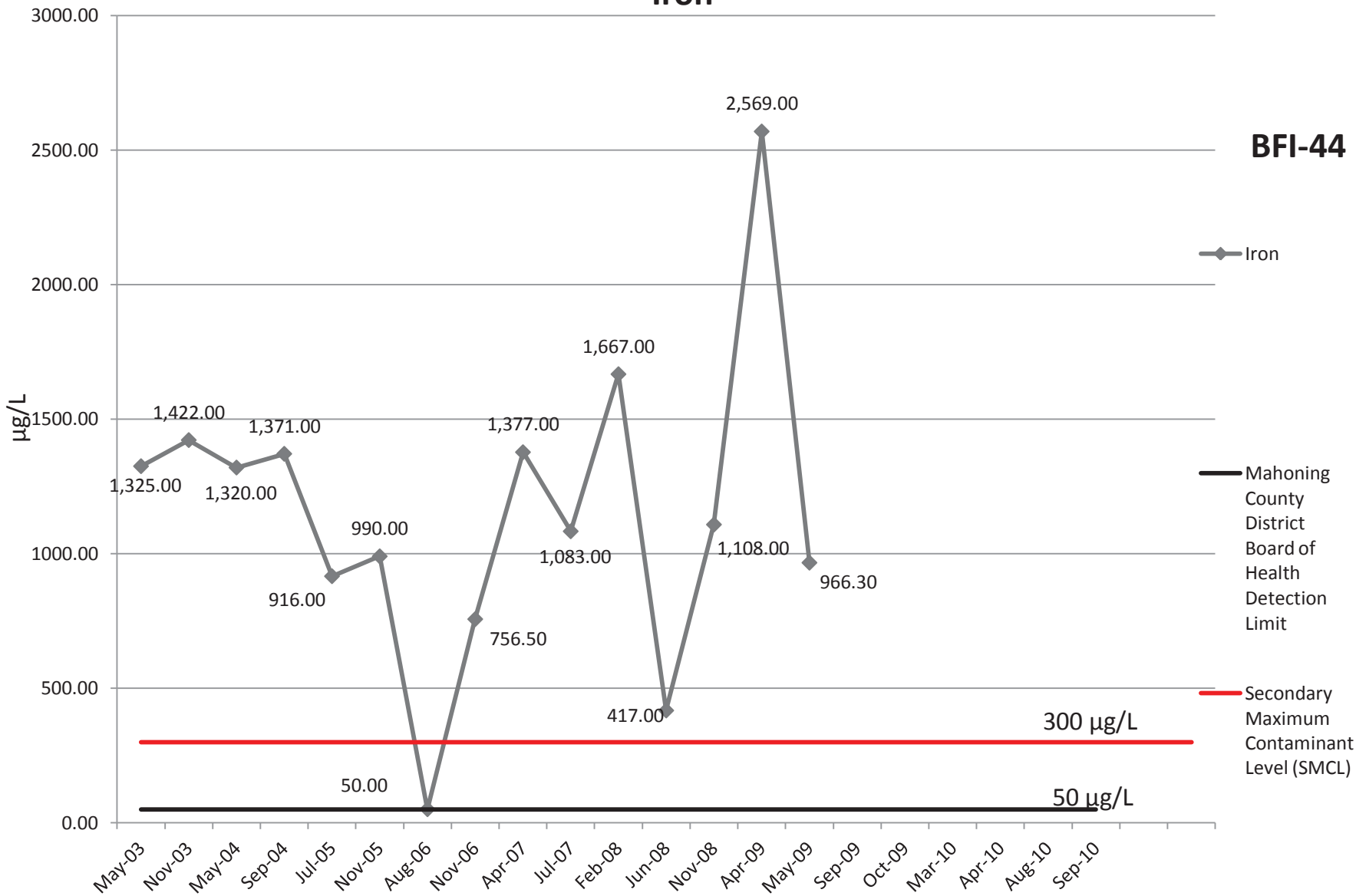


# Copper



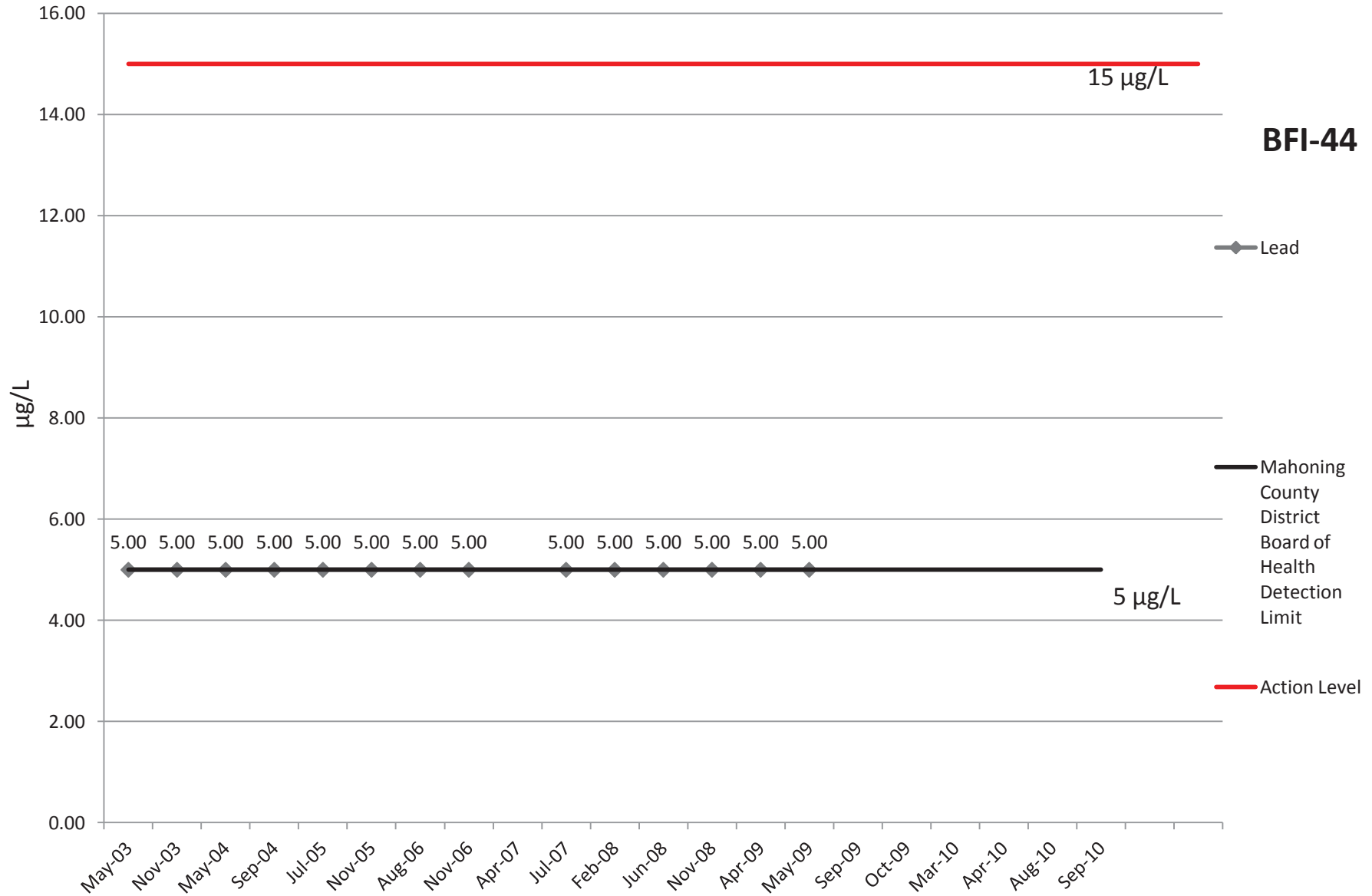
# Iron

**BFI-44**



# Lead

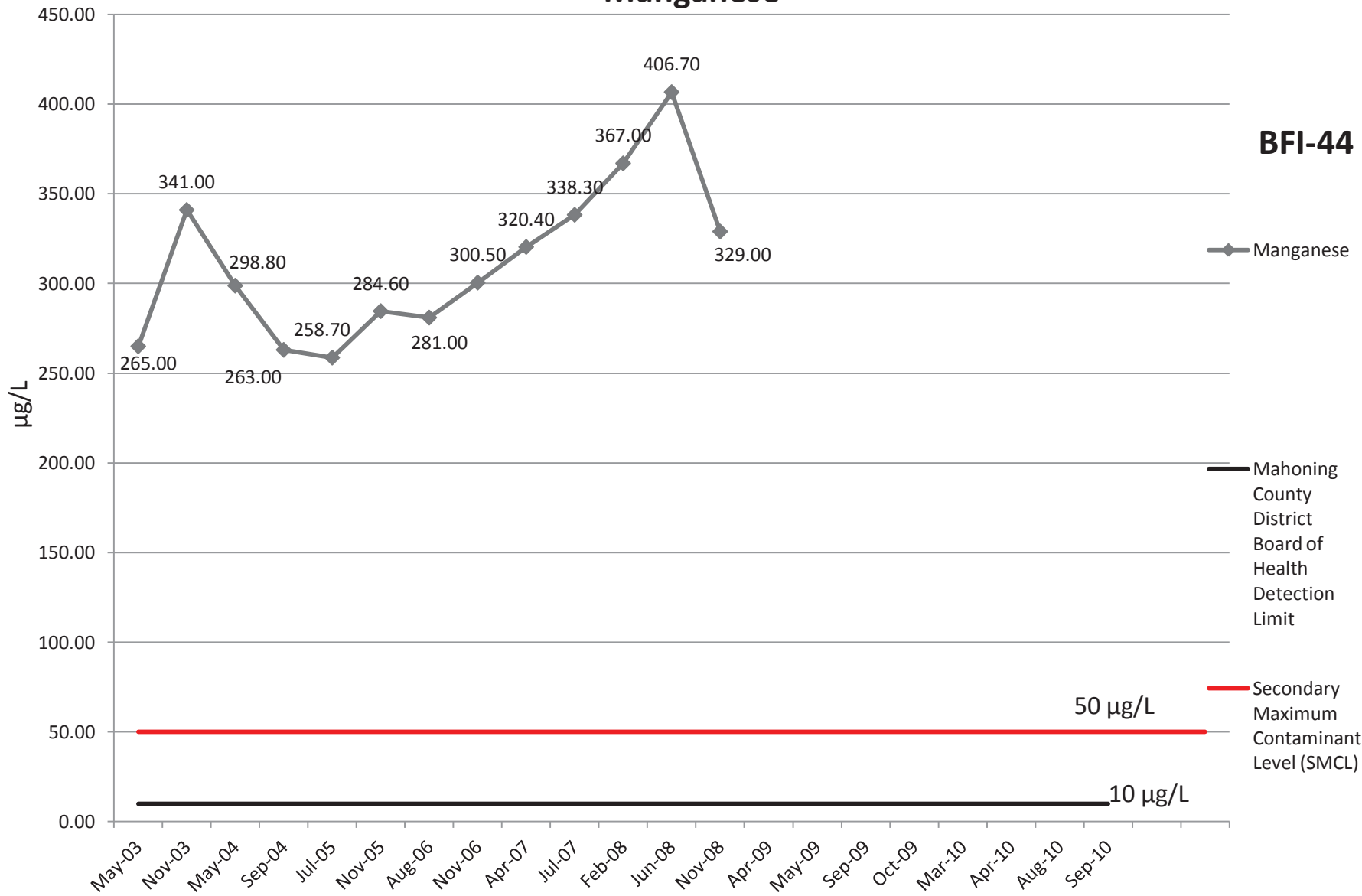
**BFI-44**





# Manganese

**BFI-44**



# Mercury

**BFI-44**

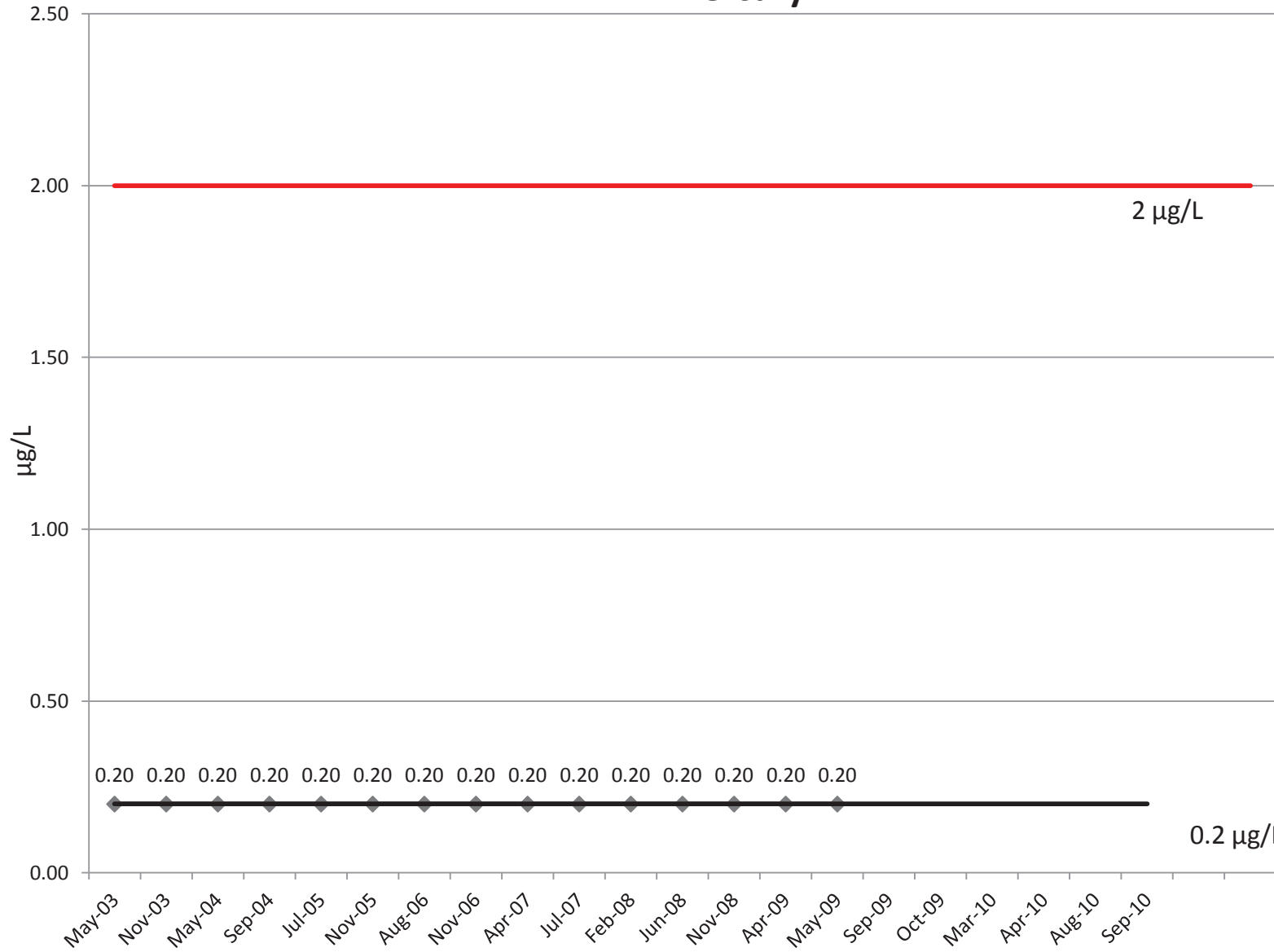
2 µg/L

Mercury

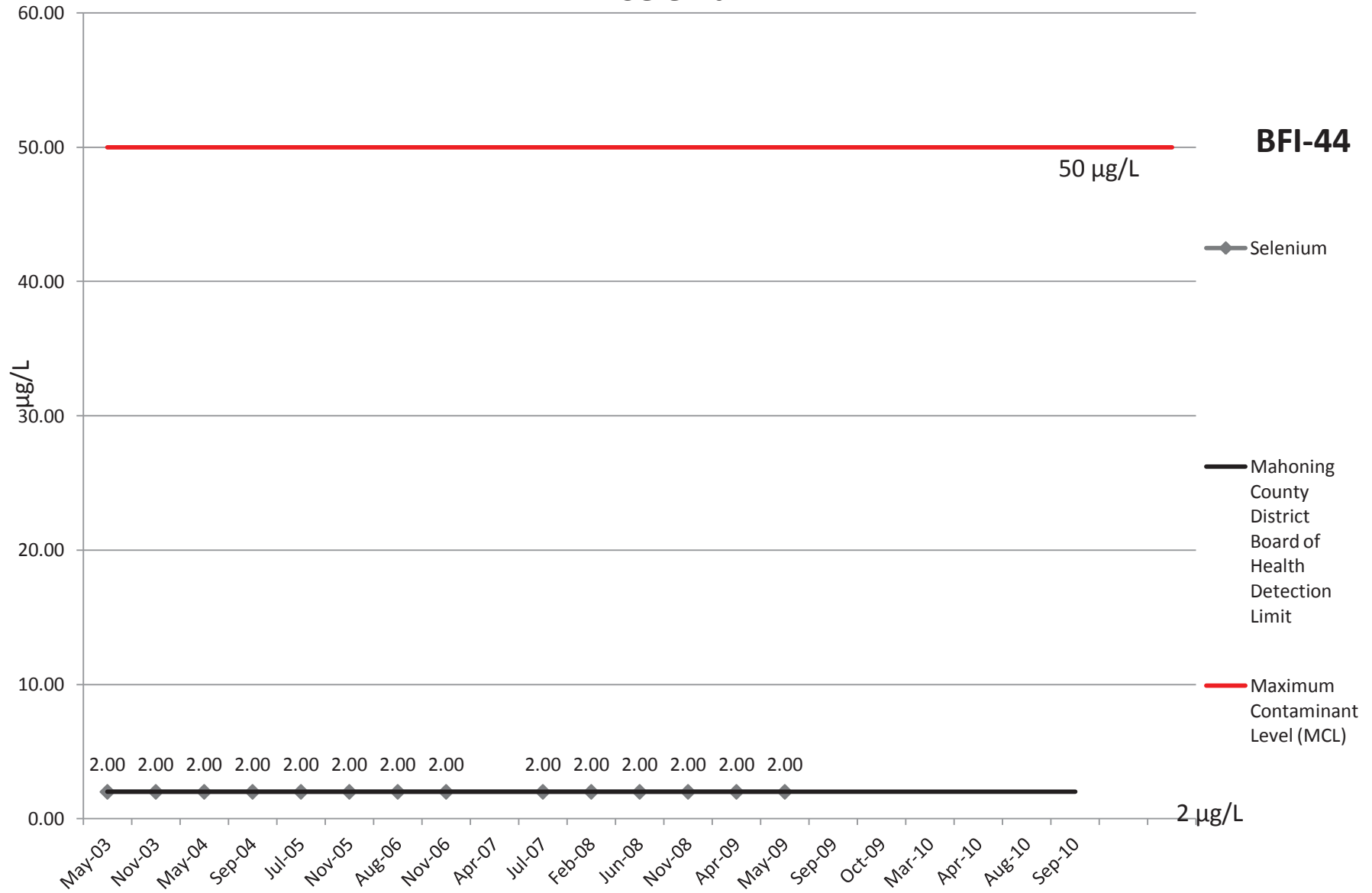
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

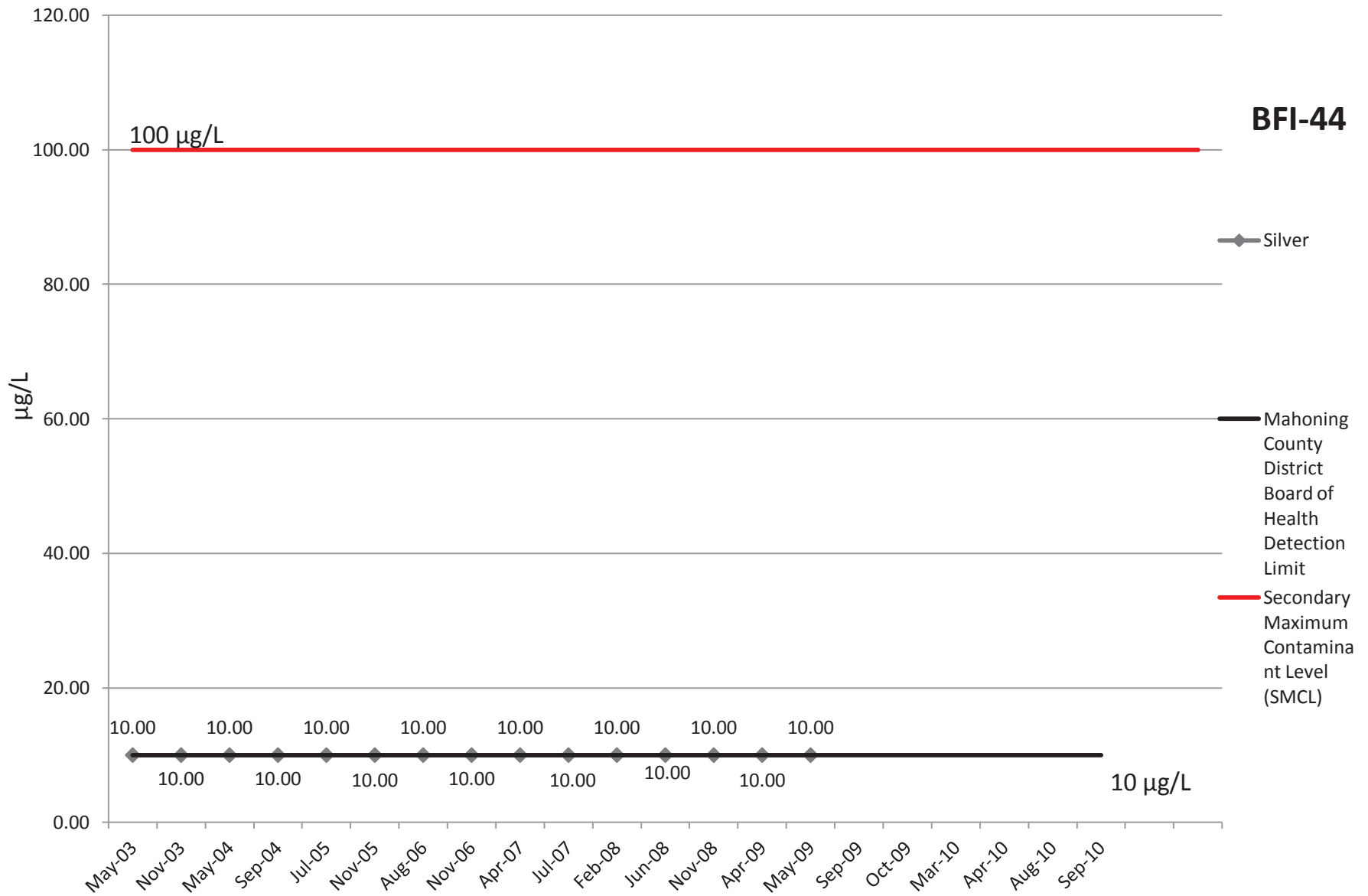
0.2 µg/L



# Selenium



# Silver



**BFI-44**

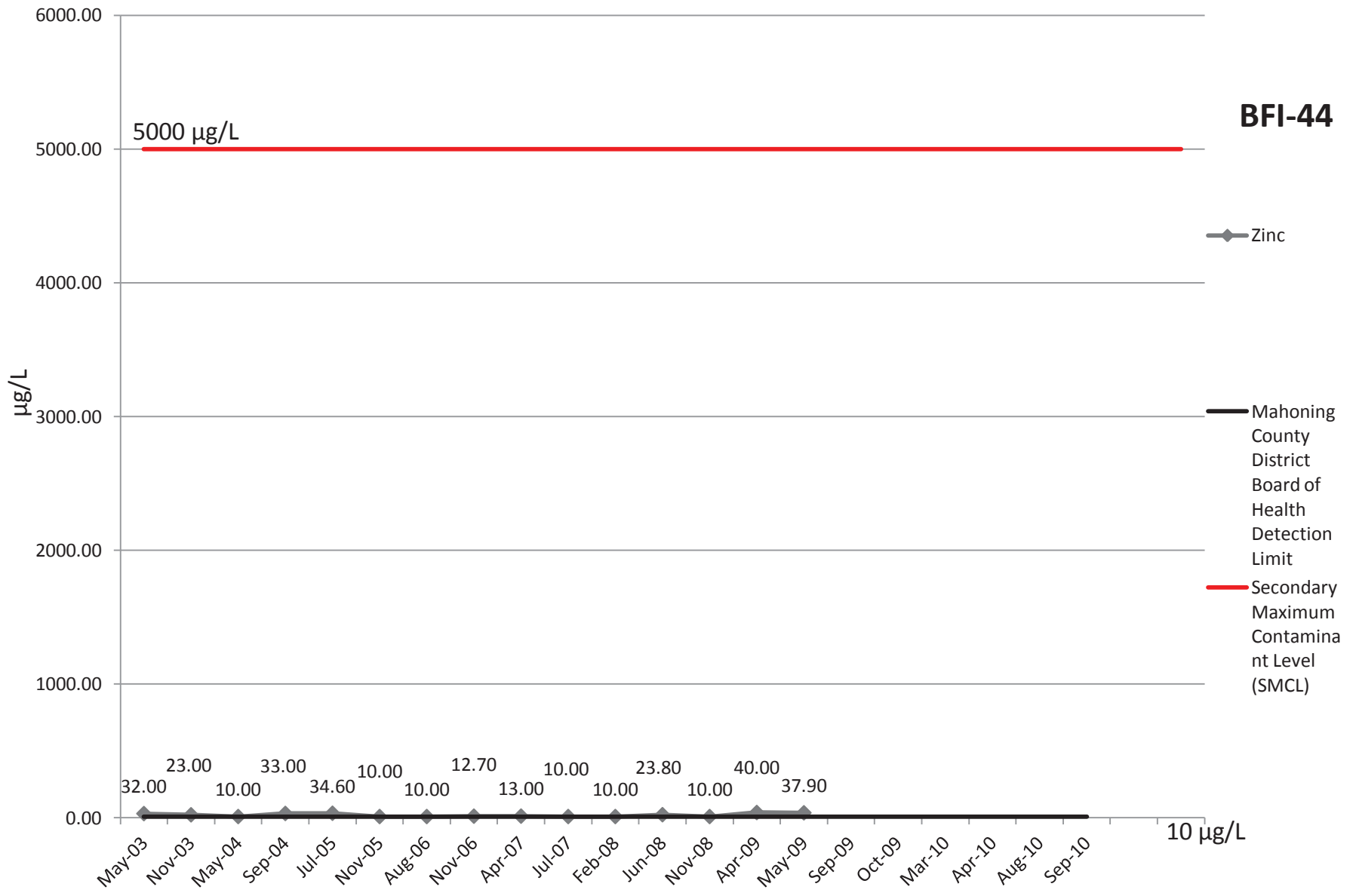
◆ Silver

— Mahoning County District Board of Health Detection Limit

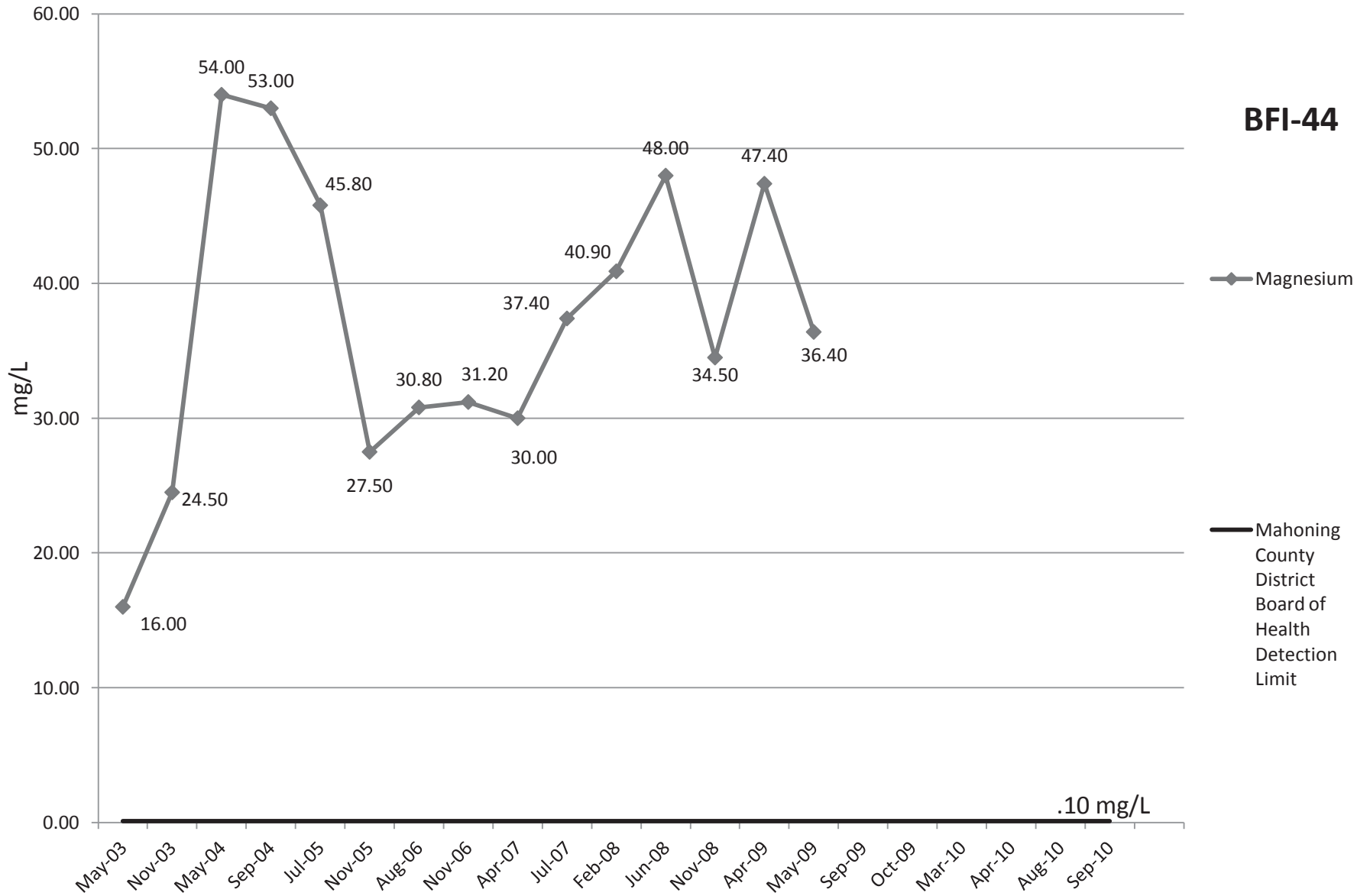
— Secondary Maximum Contaminant Level (SMCL)

10 µg/L

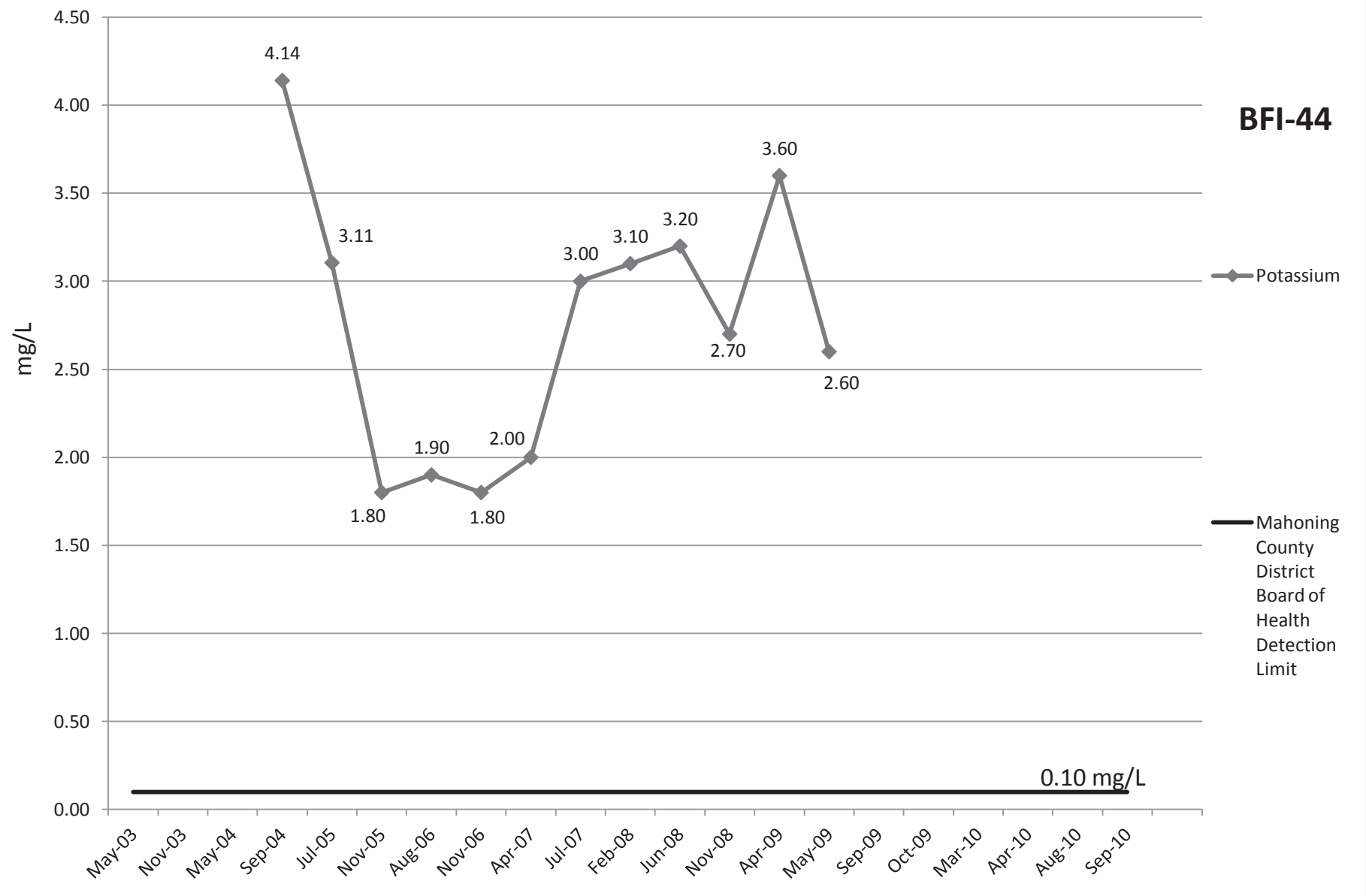
# Zinc



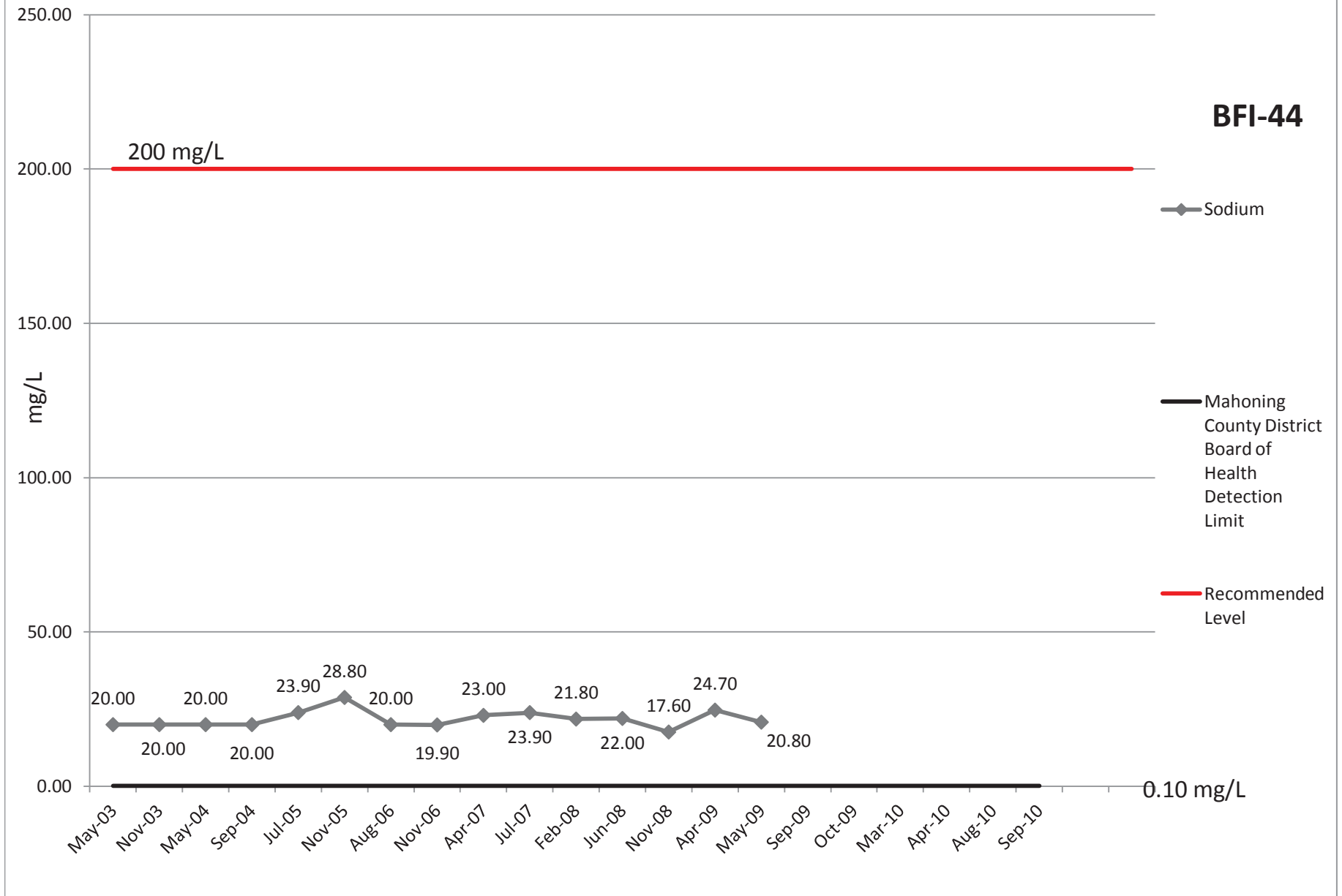
# Magnesium



# Potassium

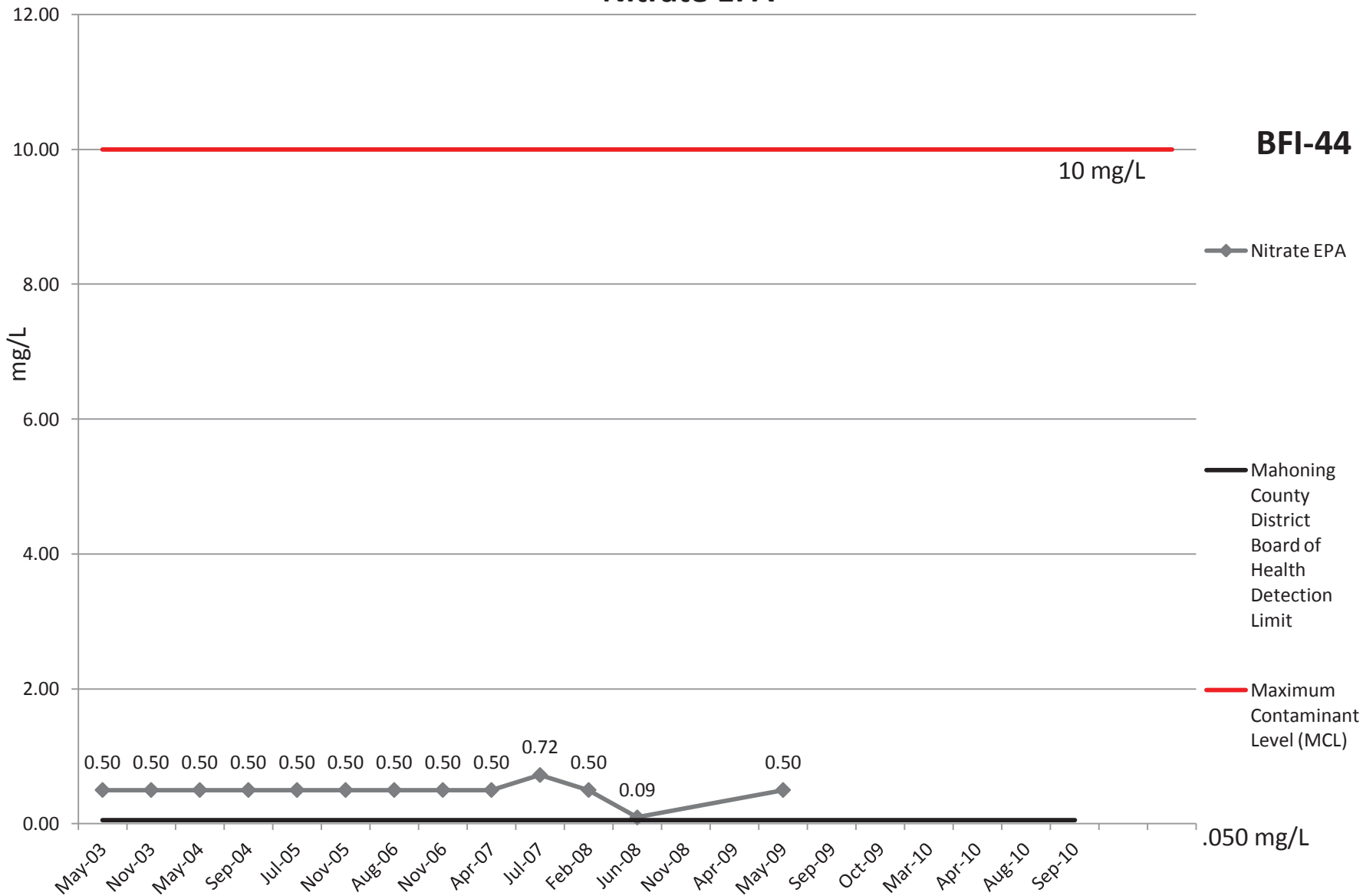


# Sodium



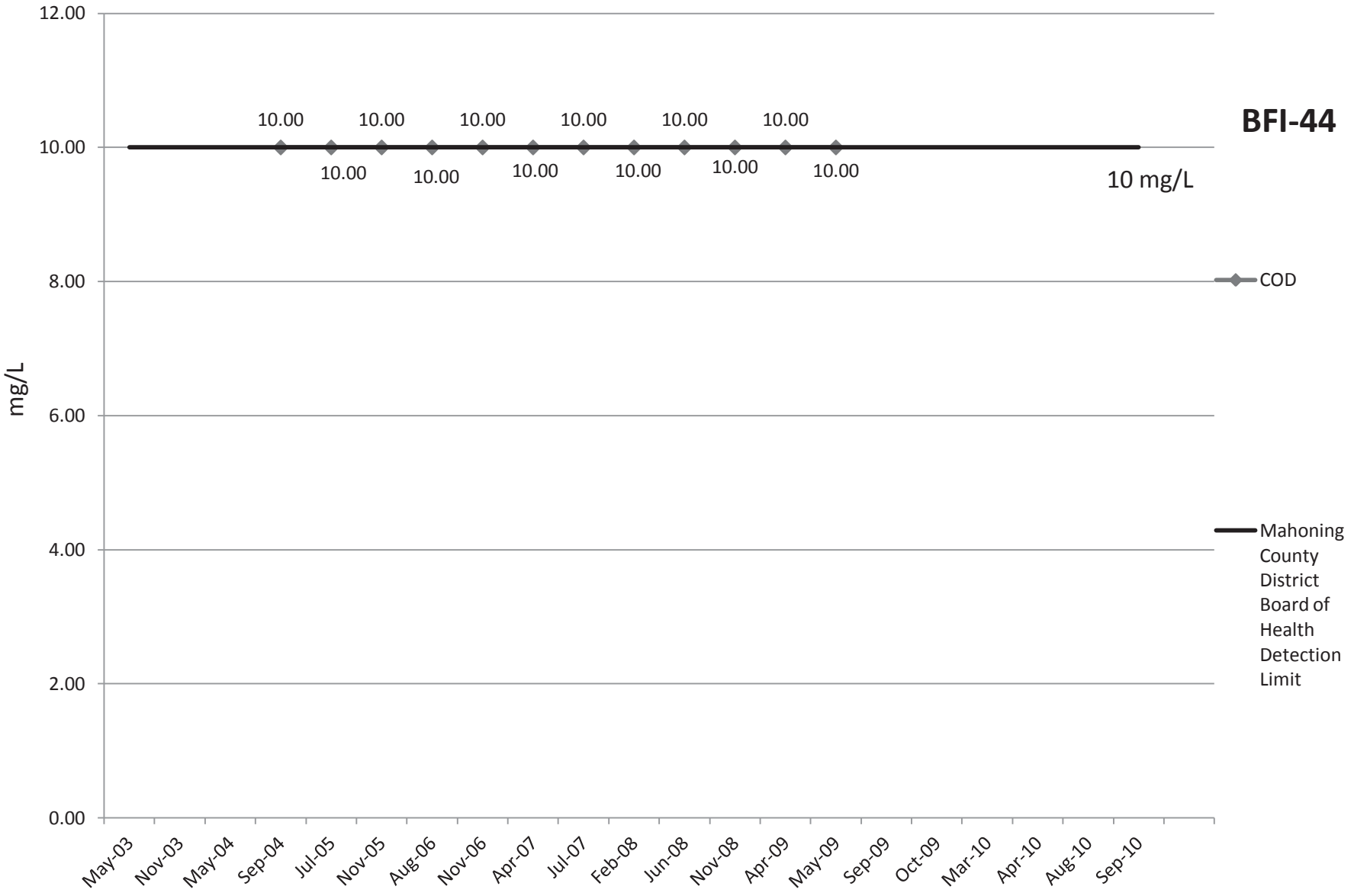


# Nitrate EPA

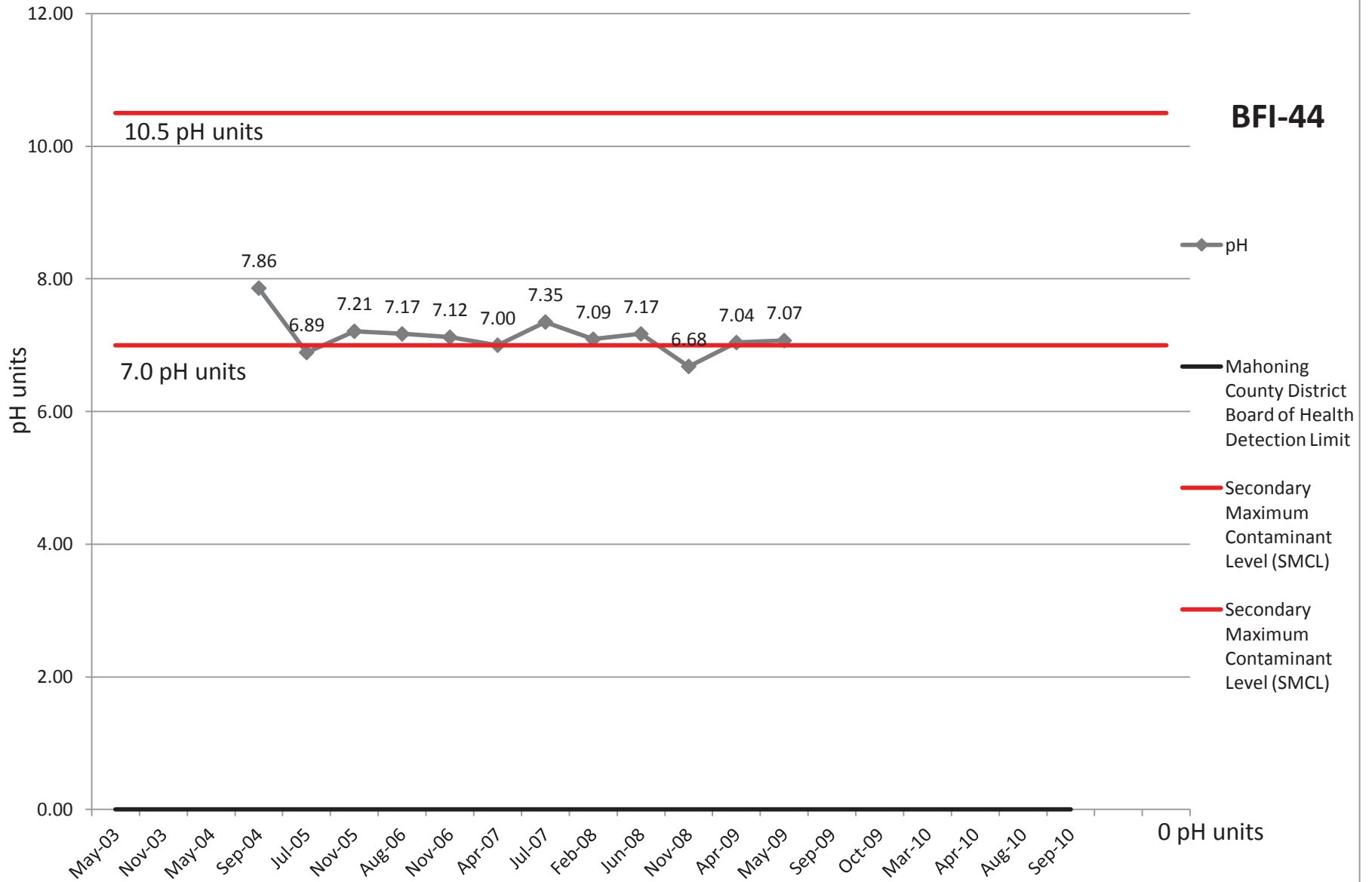


# COD

**BFI-44**

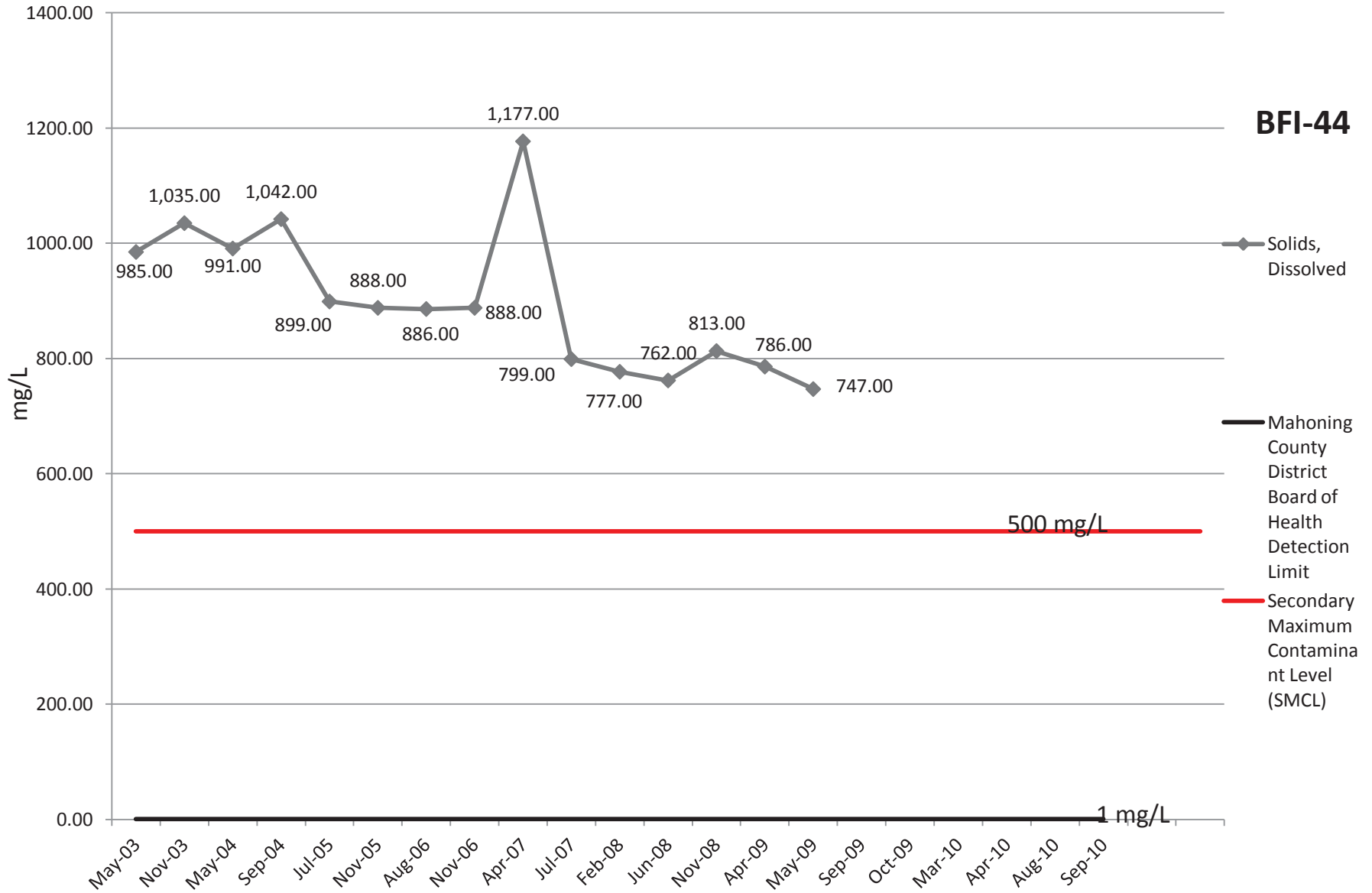


# pH



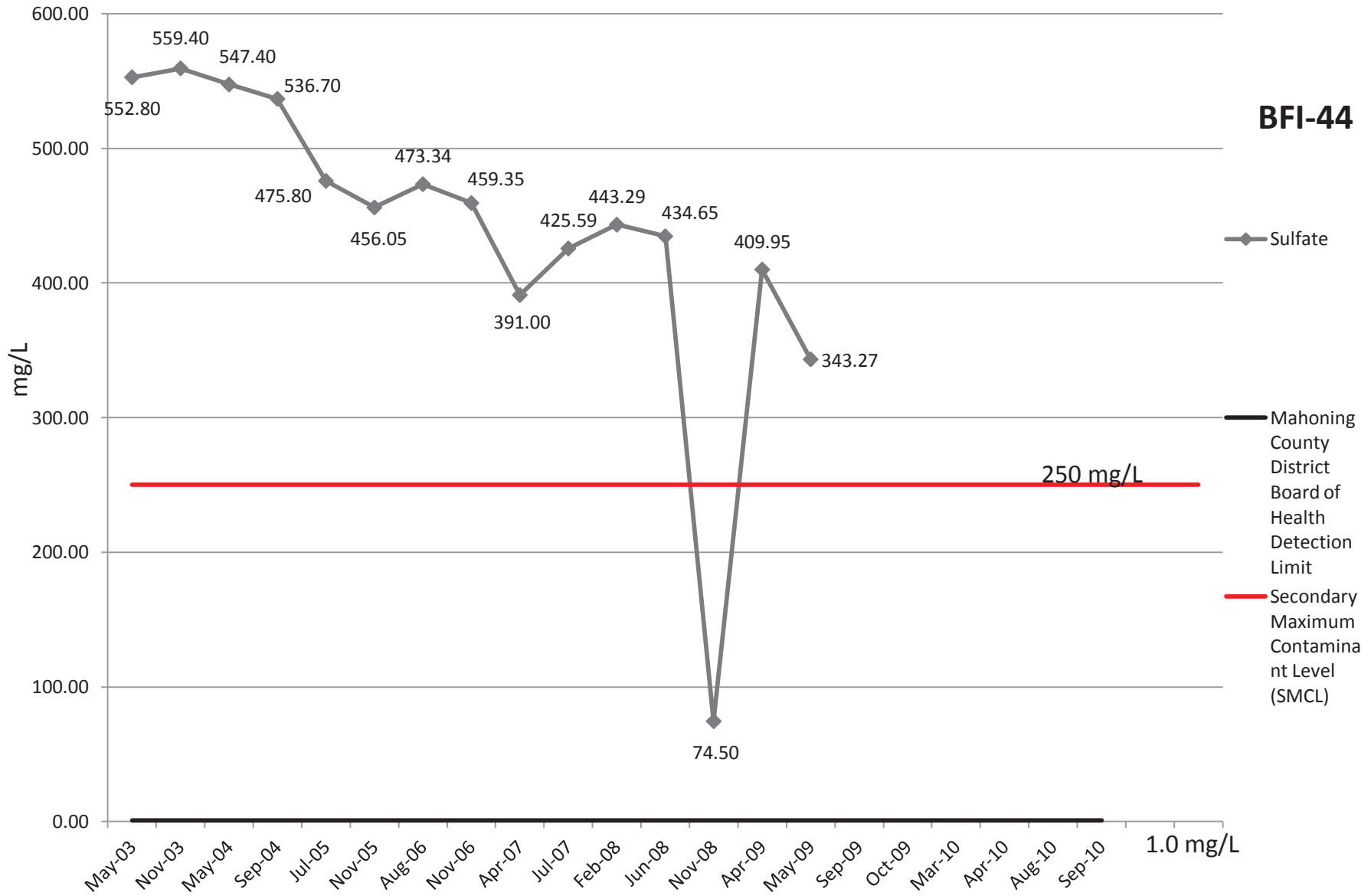
# Solids, Dissolved

**BFI-44**



# Sulfate

**BFI-44**



# Bacteria

## BFI-44

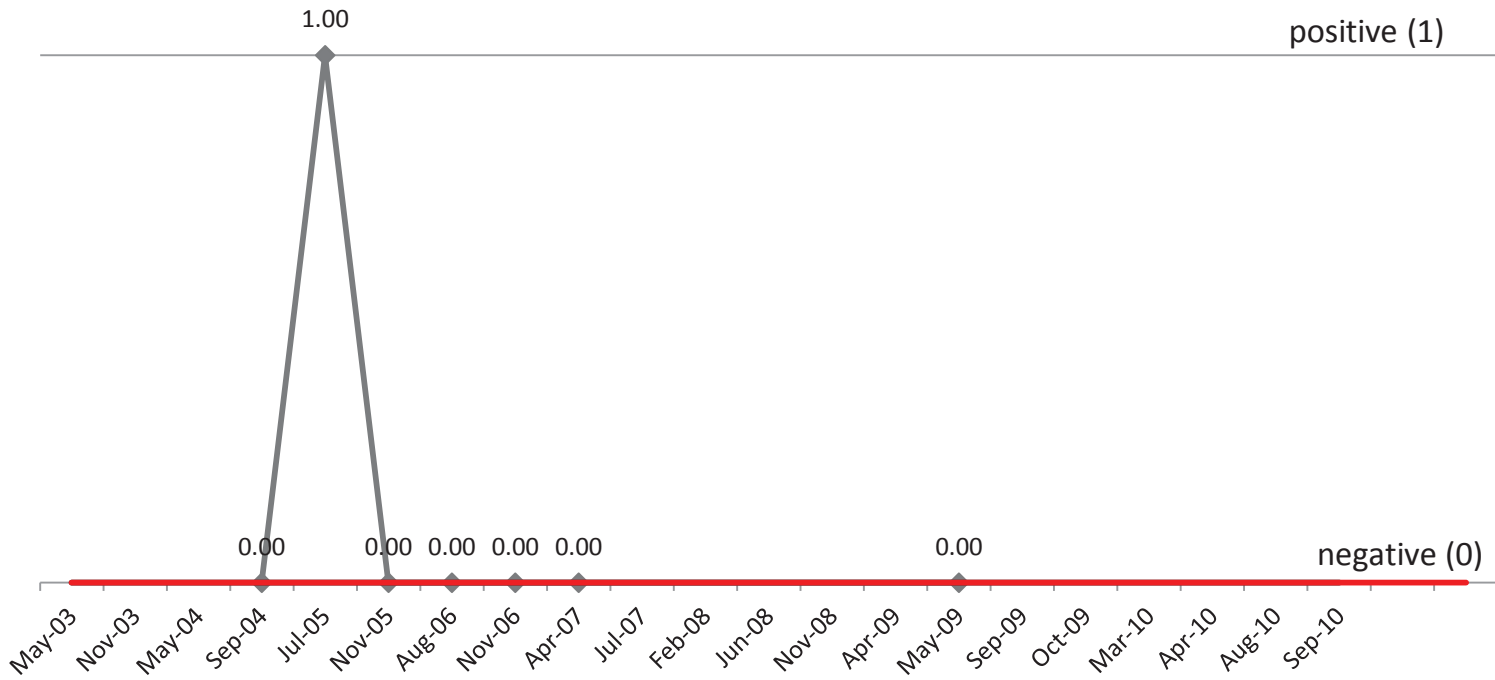
Positive/Negative

◆ Bacteria

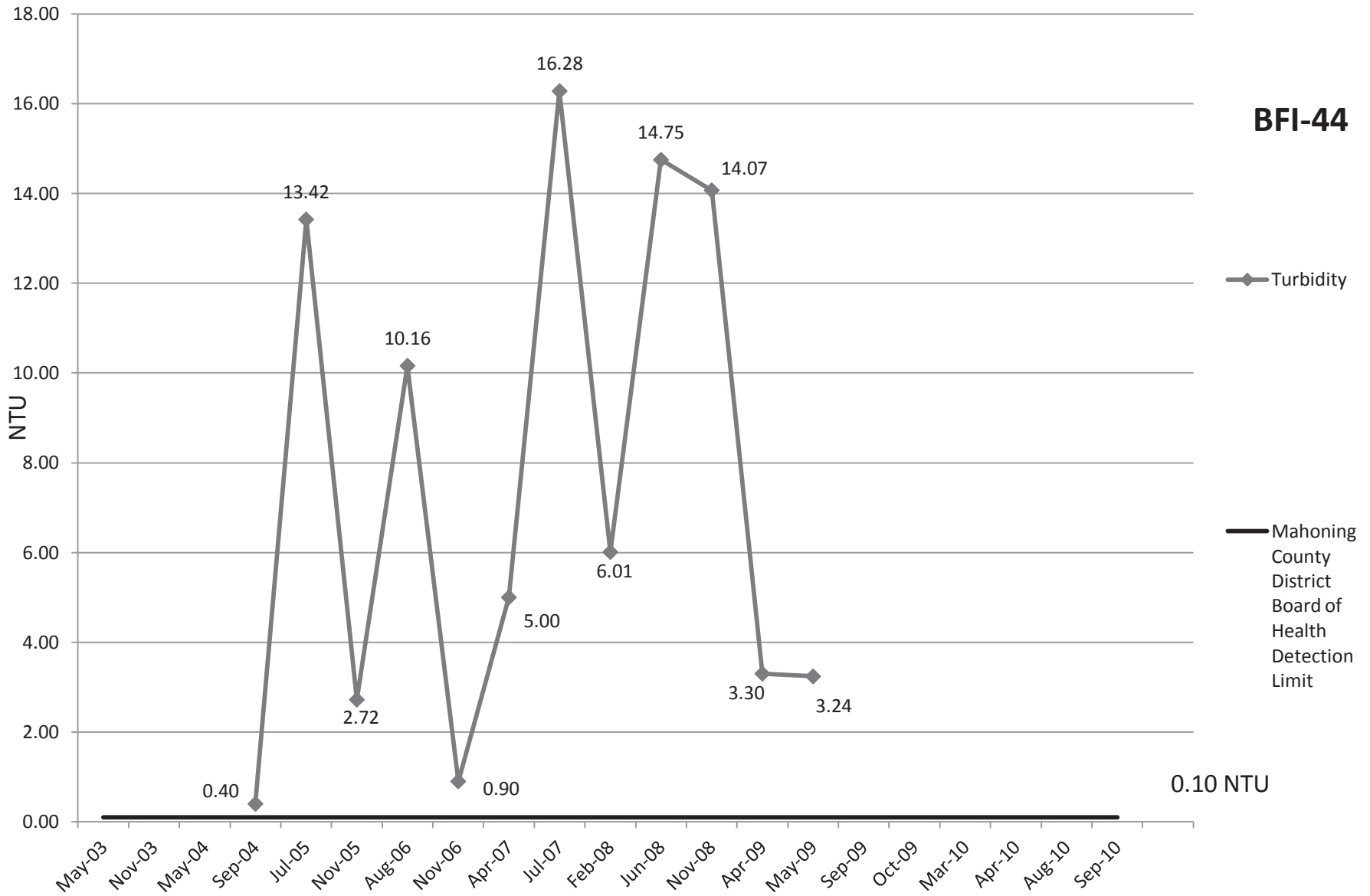
positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

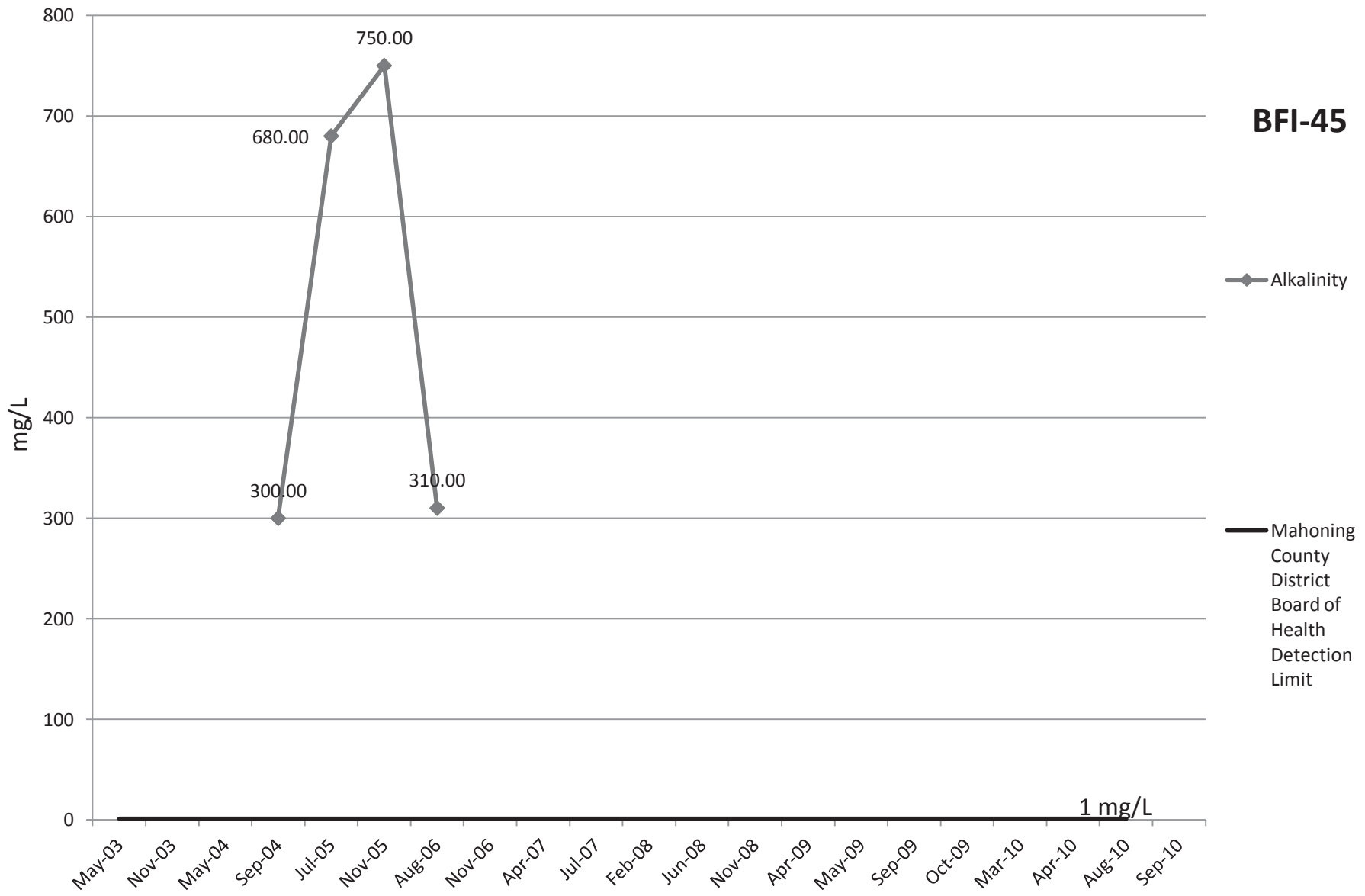
— Maximum  
Contaminant  
Level (MCL)



# Turbidity

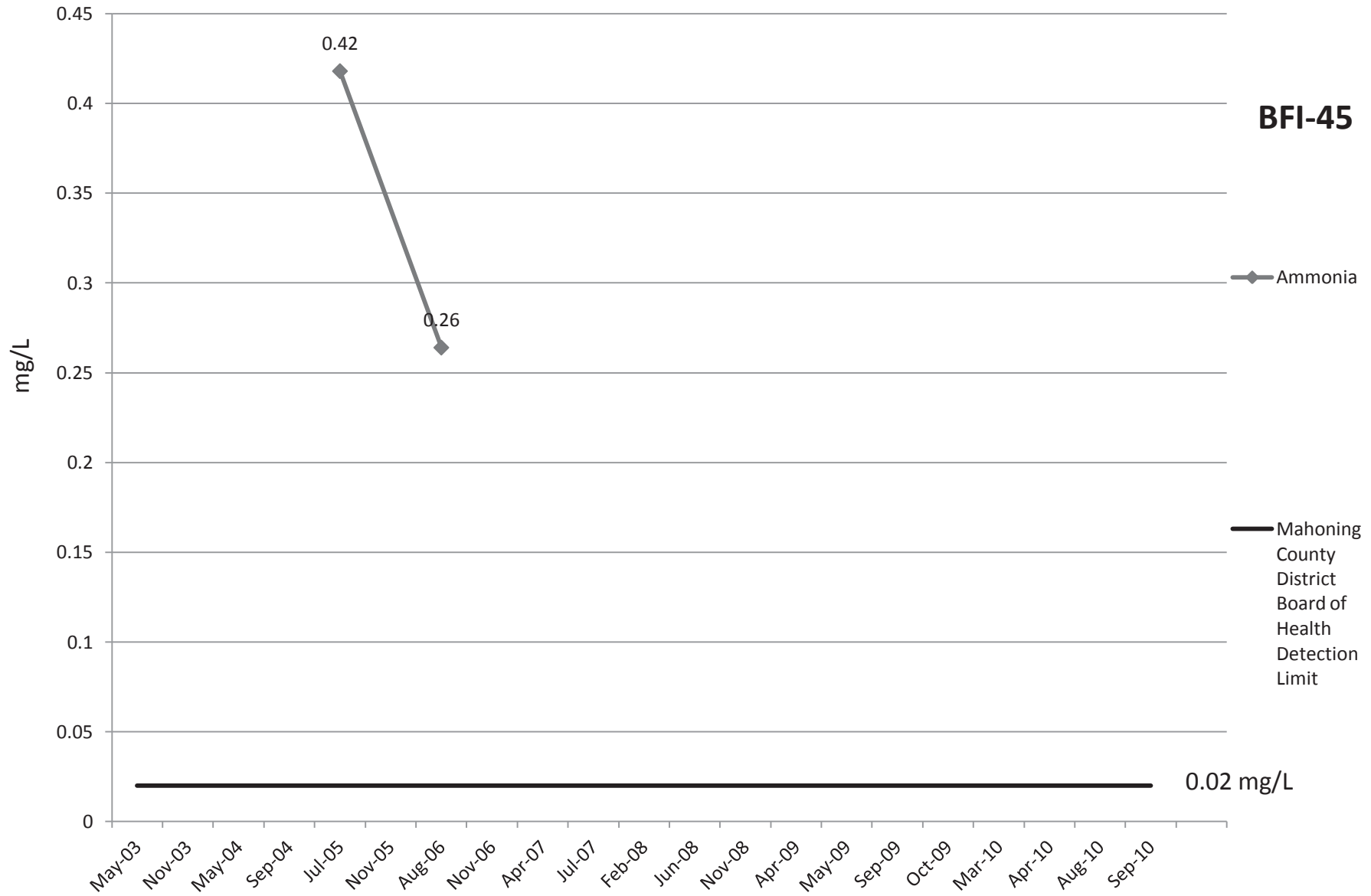


# Alkalinity

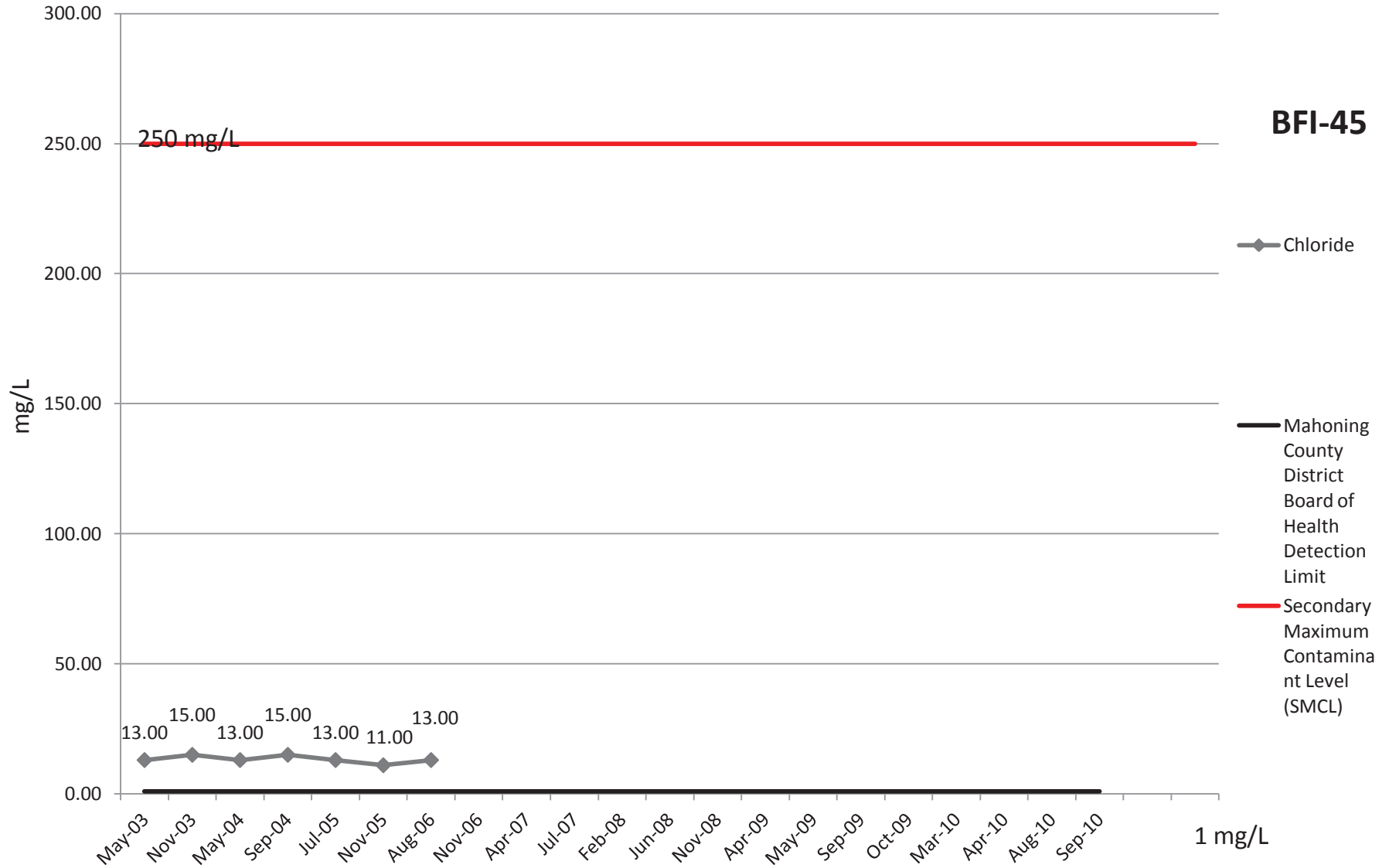




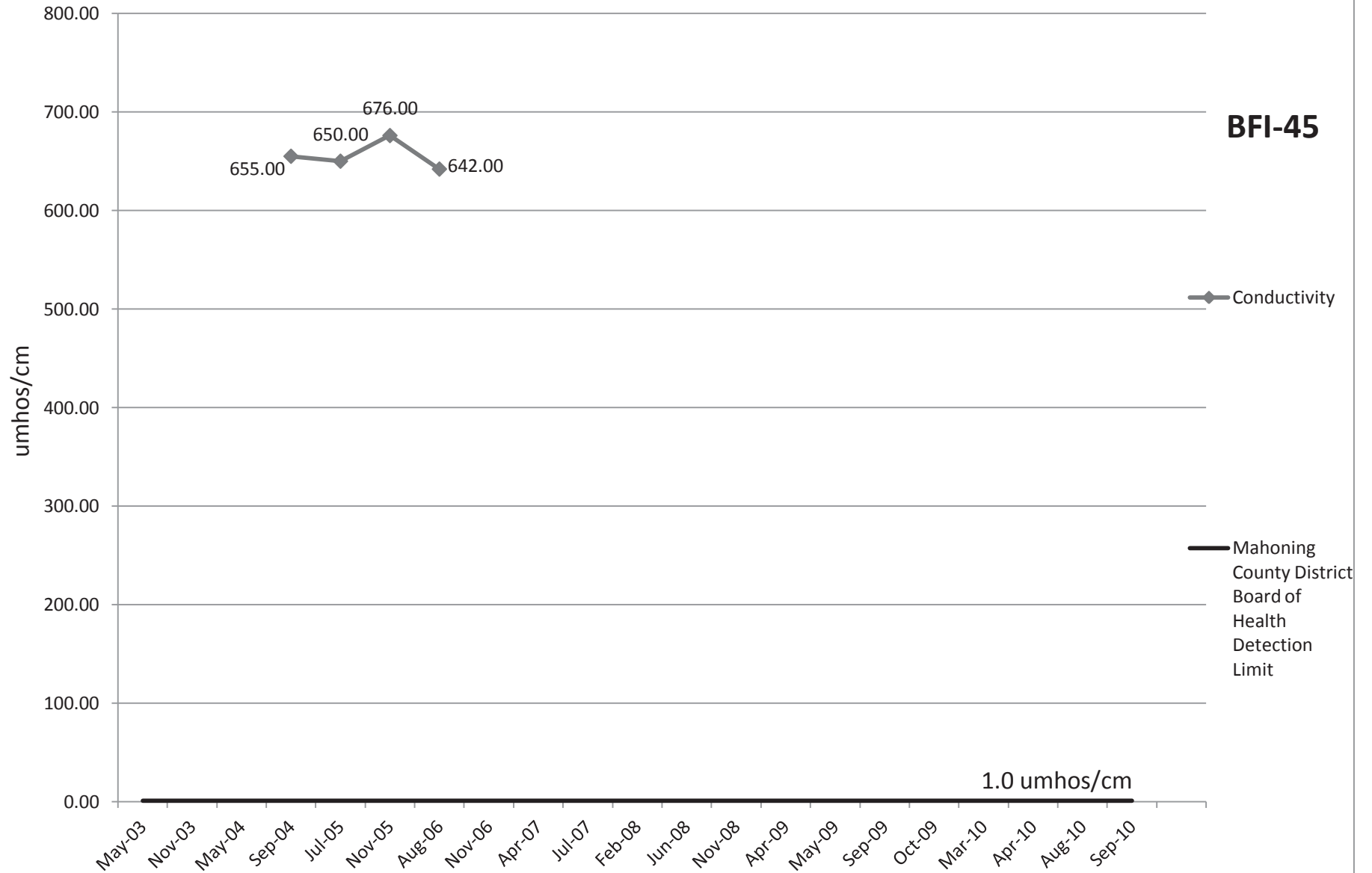
# Ammonia



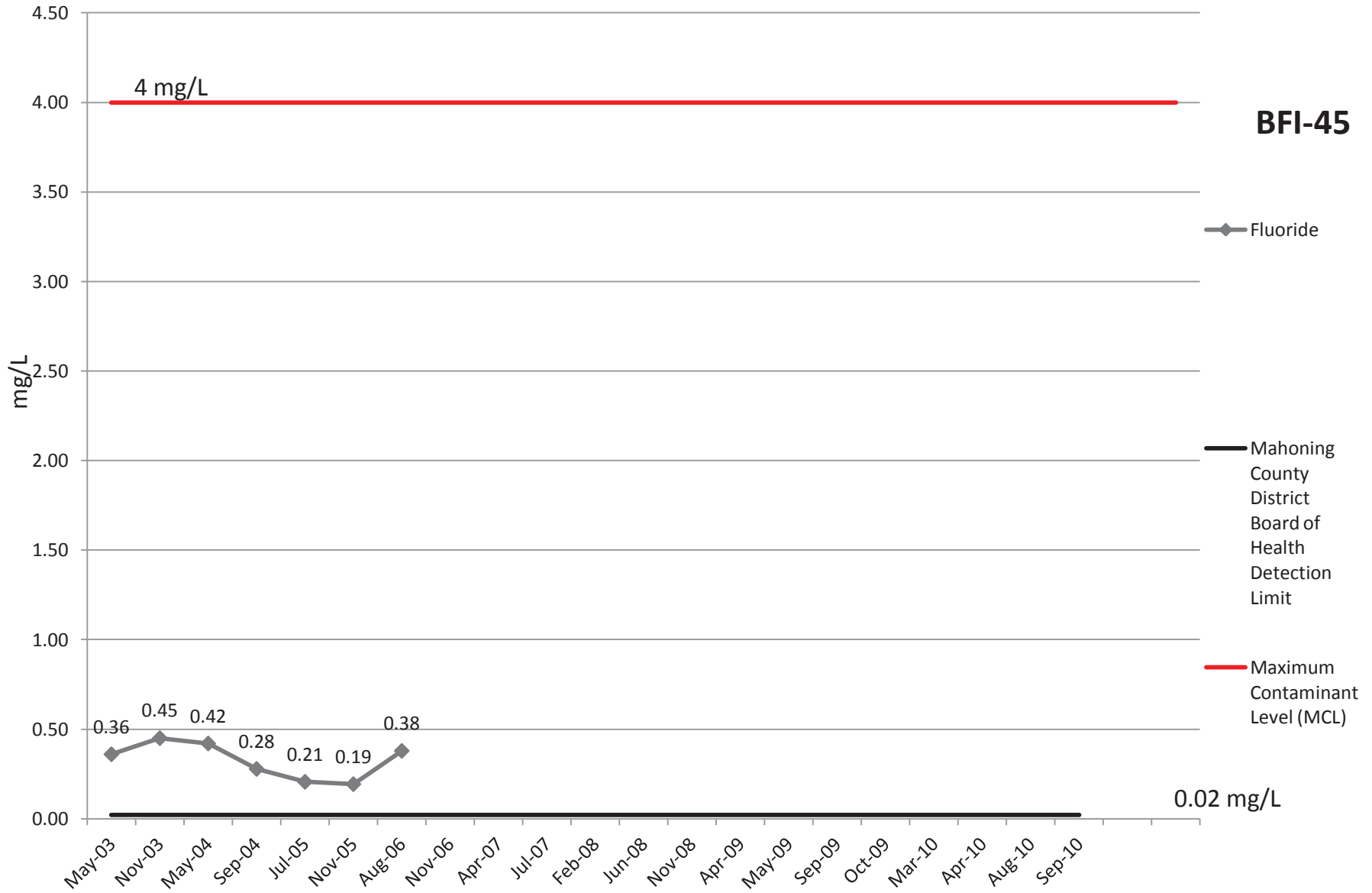
# Chloride



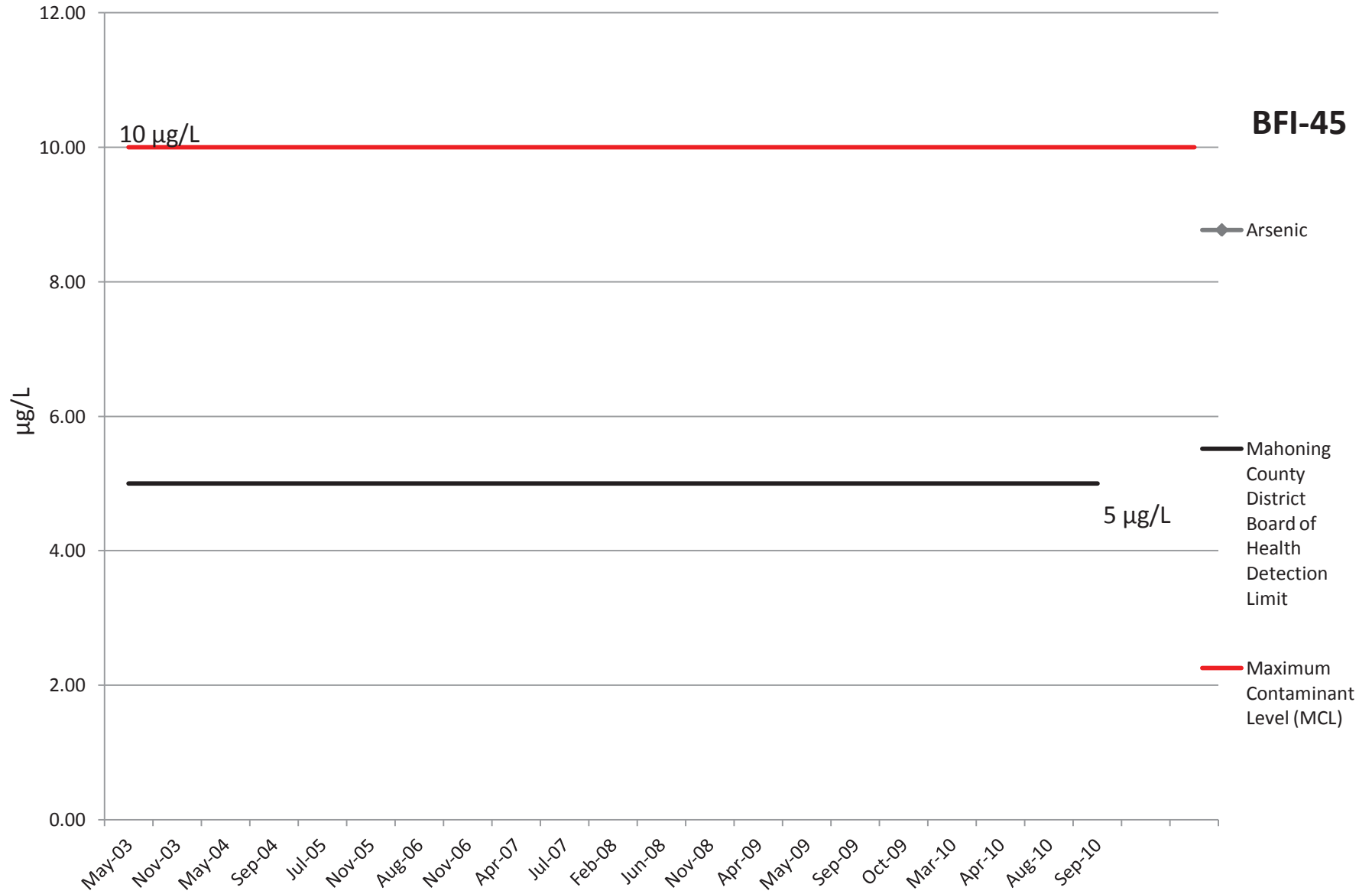
# Conductivity



# Fluoride

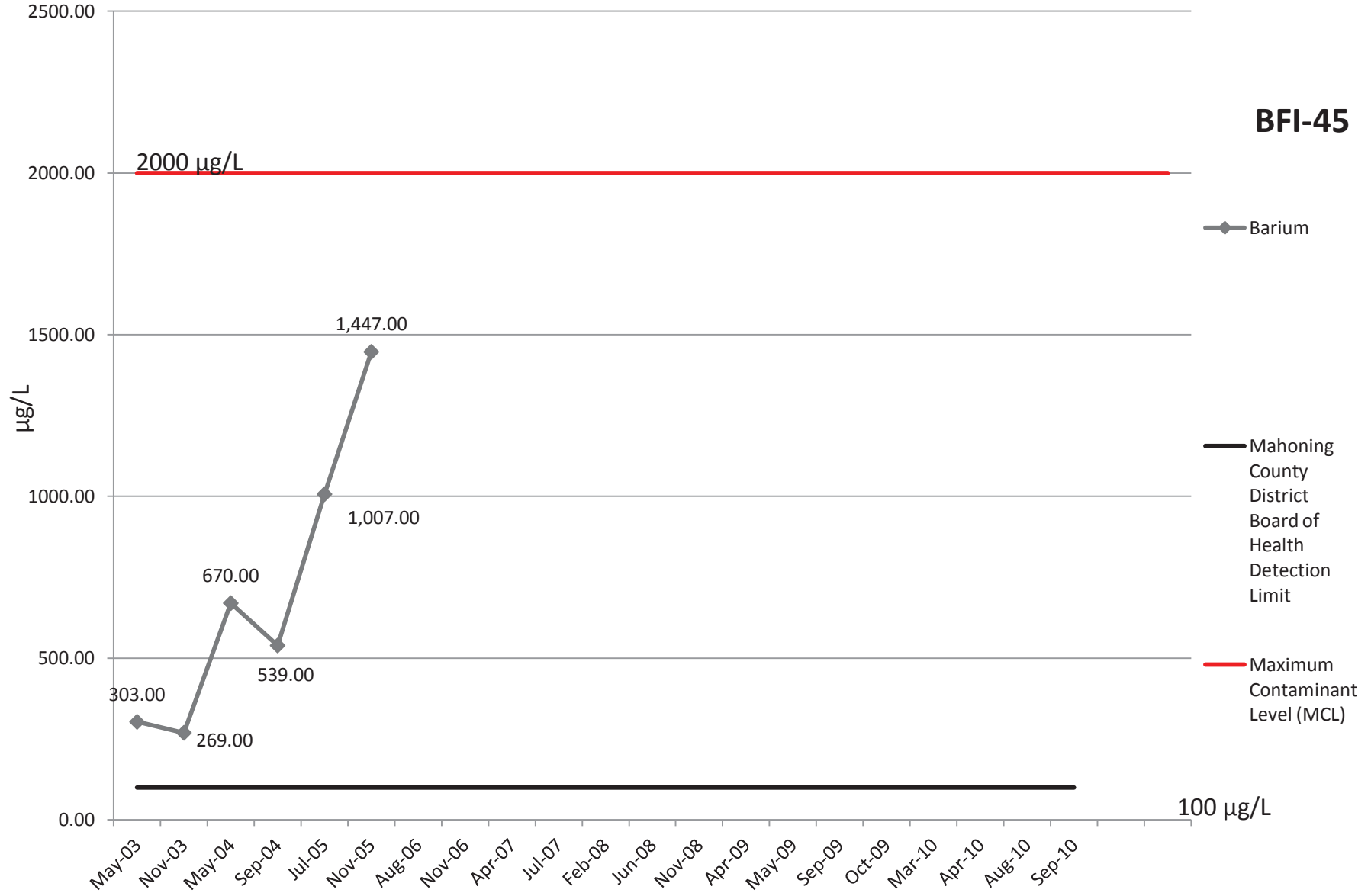


# Arsenic

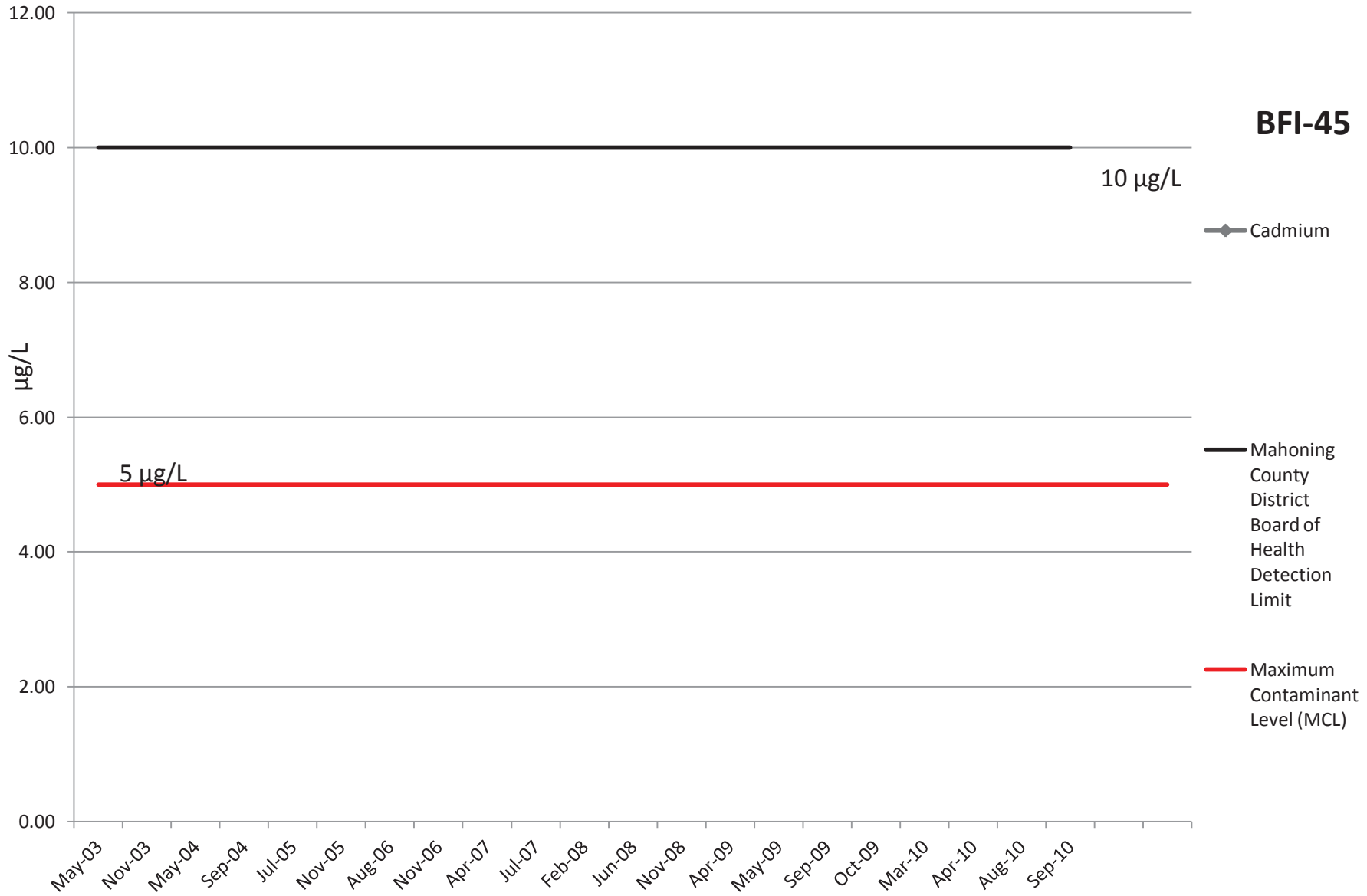


# Barium

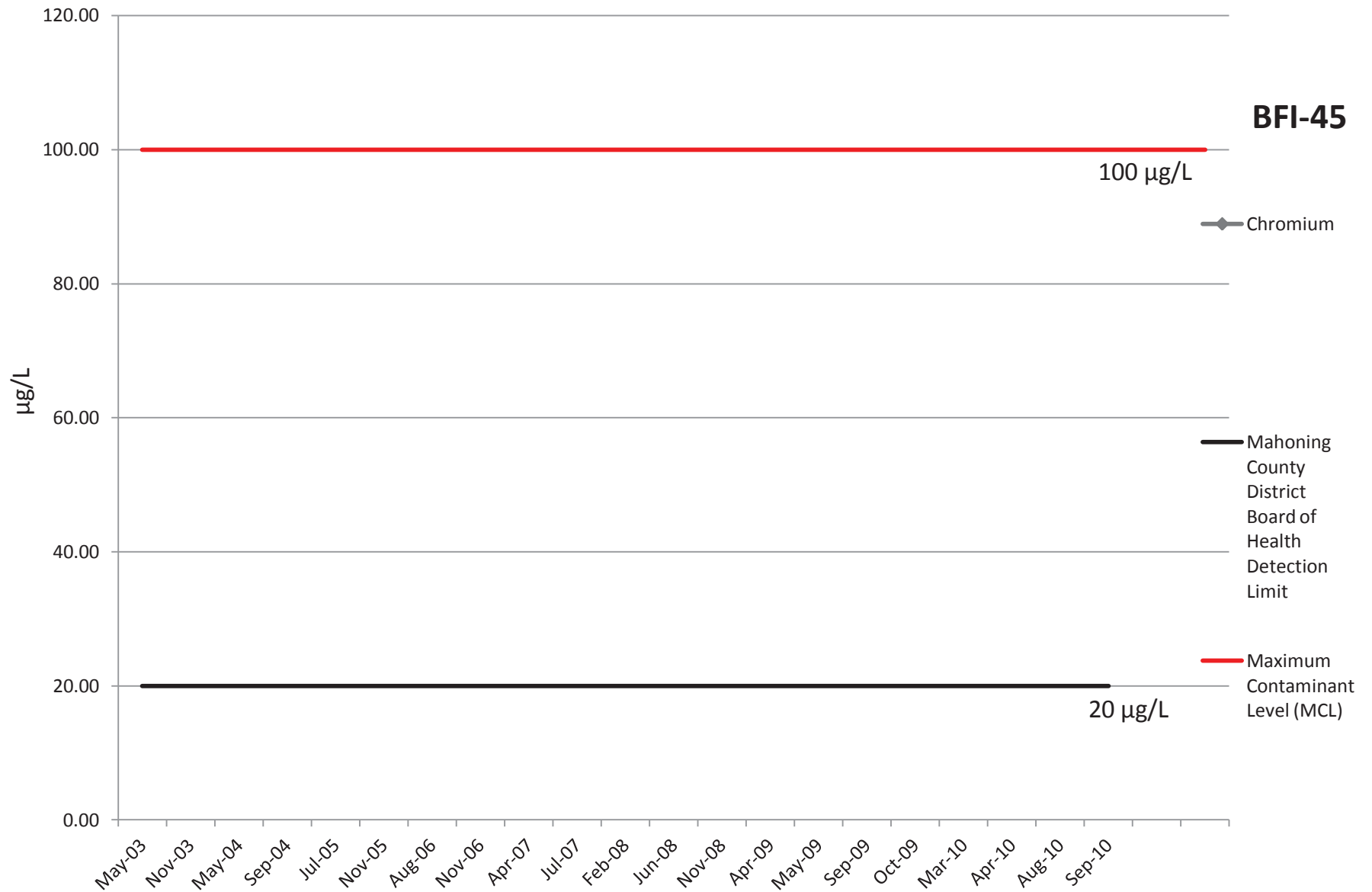
**BFI-45**



# Cadmium

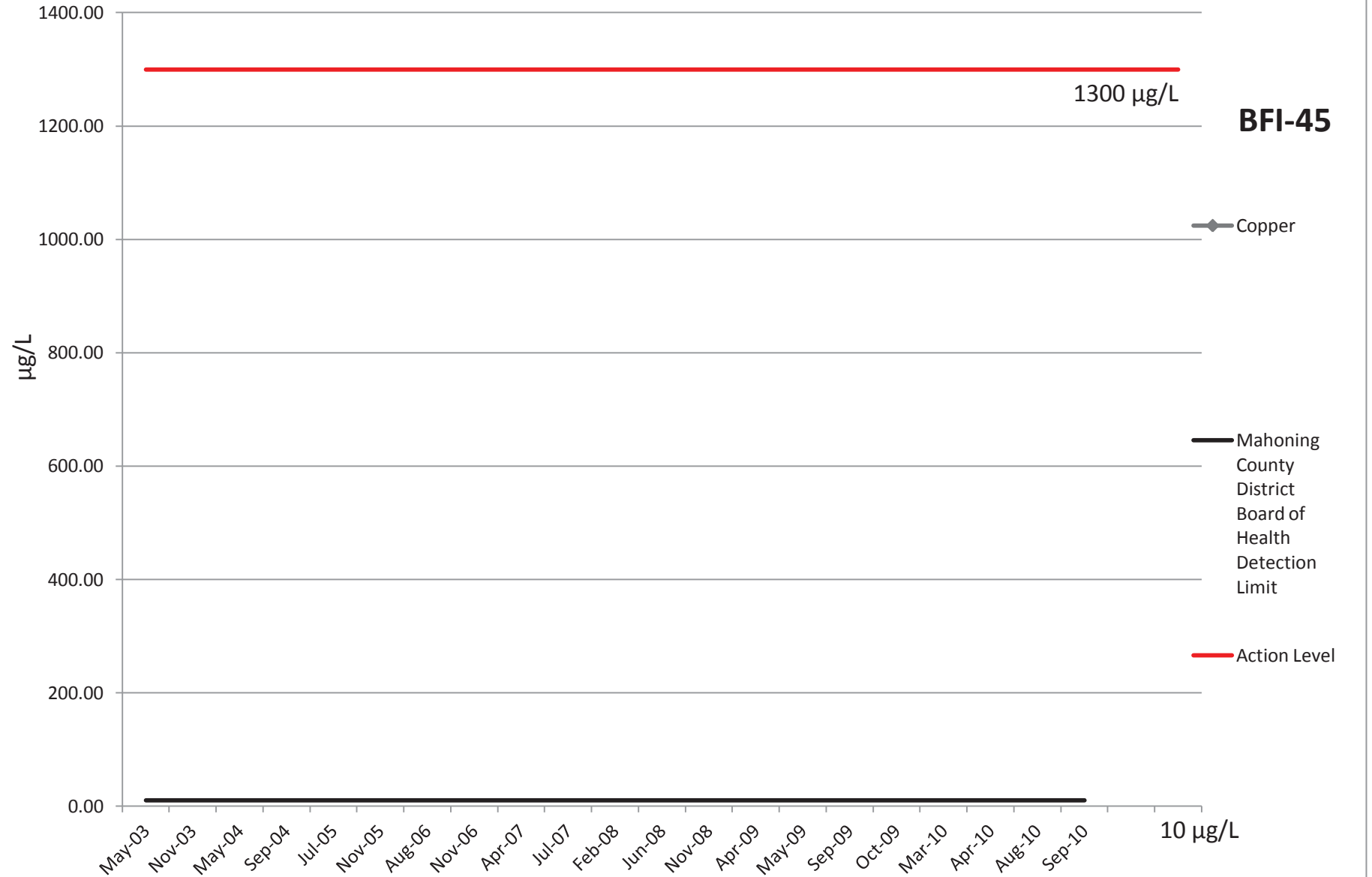


# Chromium

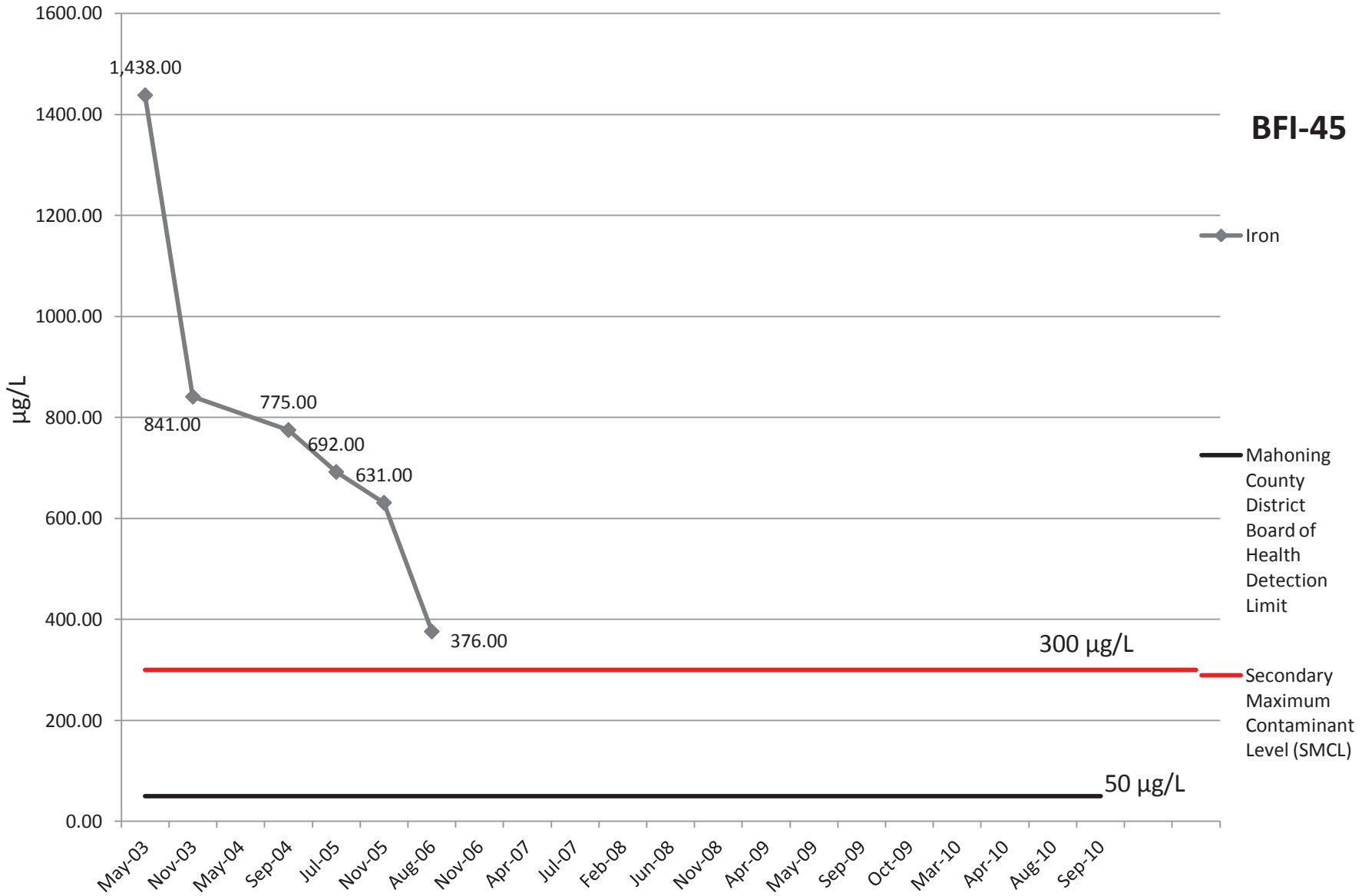




# Copper



# Iron



**BFI-45**

Iron

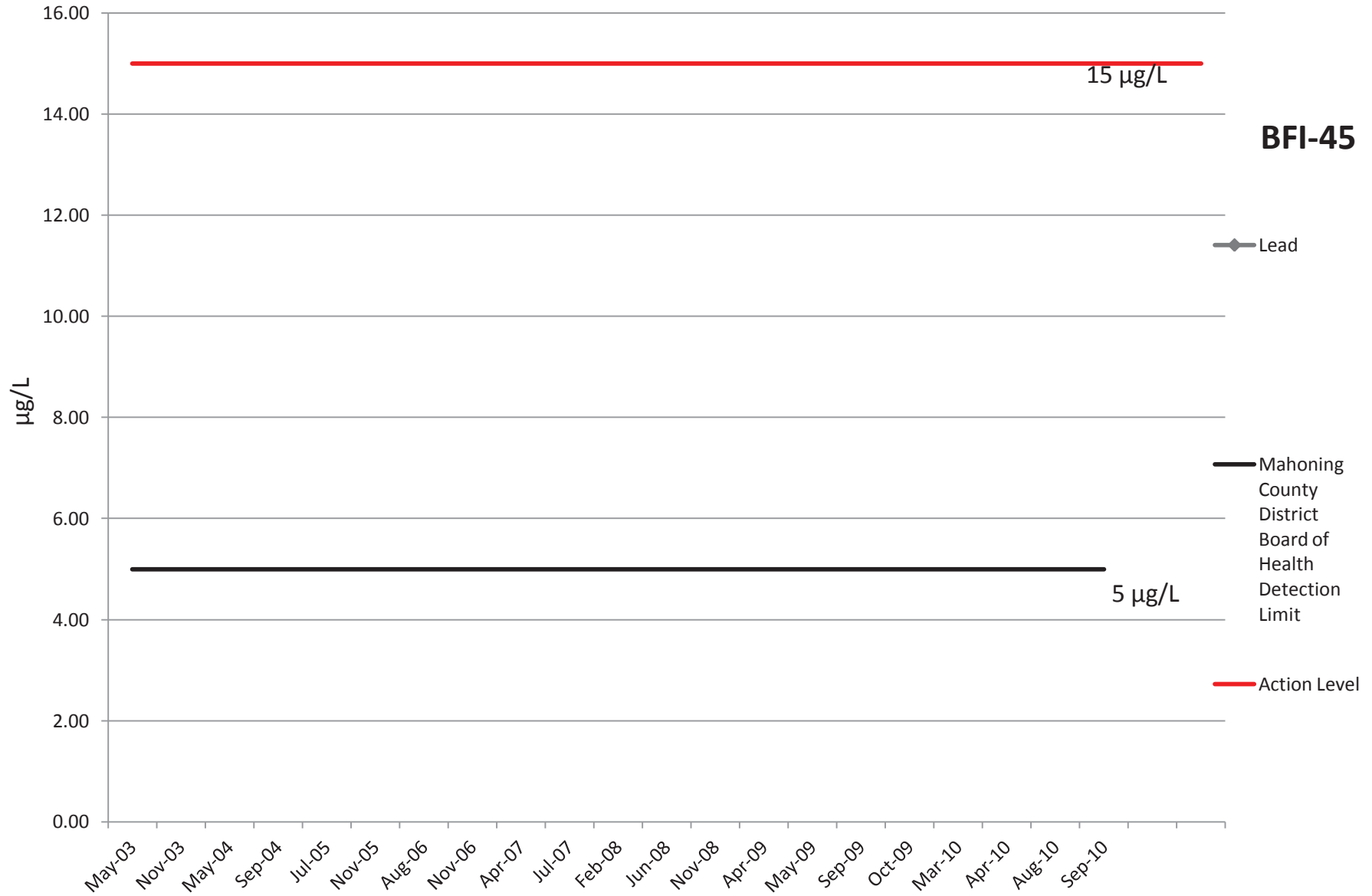
Mahoning County District Board of Health Detection Limit

Secondary Maximum Contaminant Level (SMCL)

300 µg/L

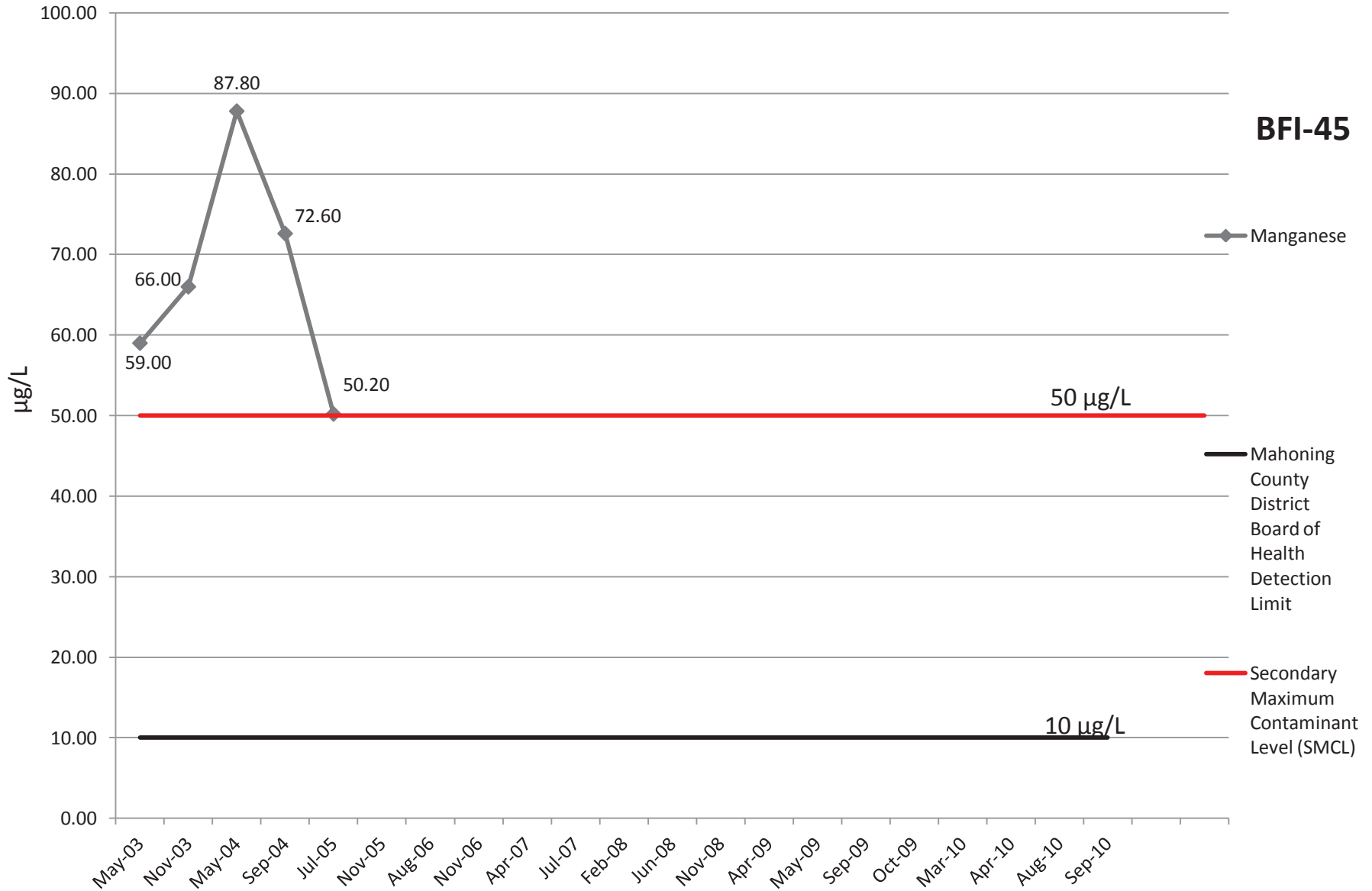
50 µg/L

# Lead



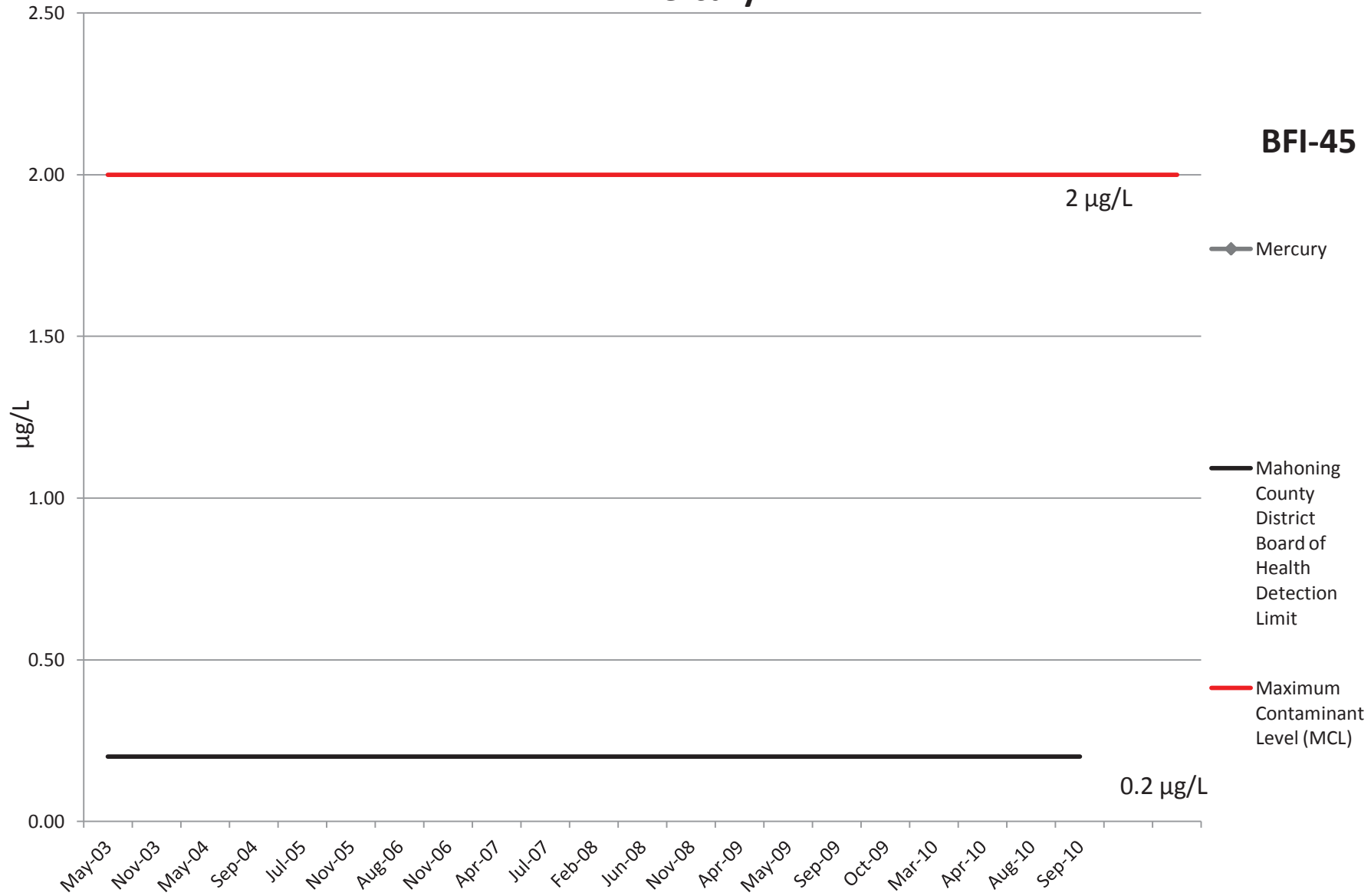
# Manganese

**BFI-45**

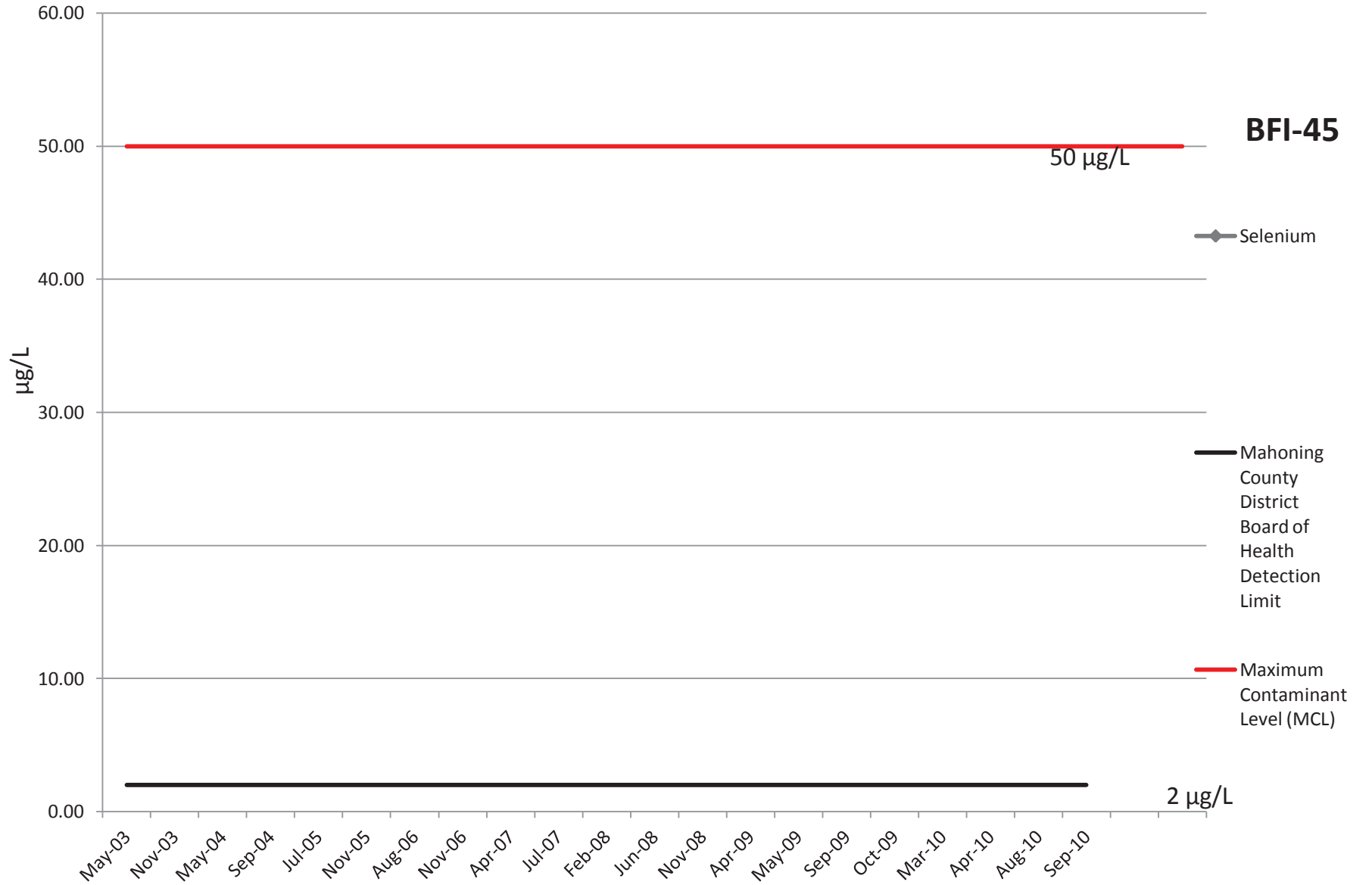


# Mercury

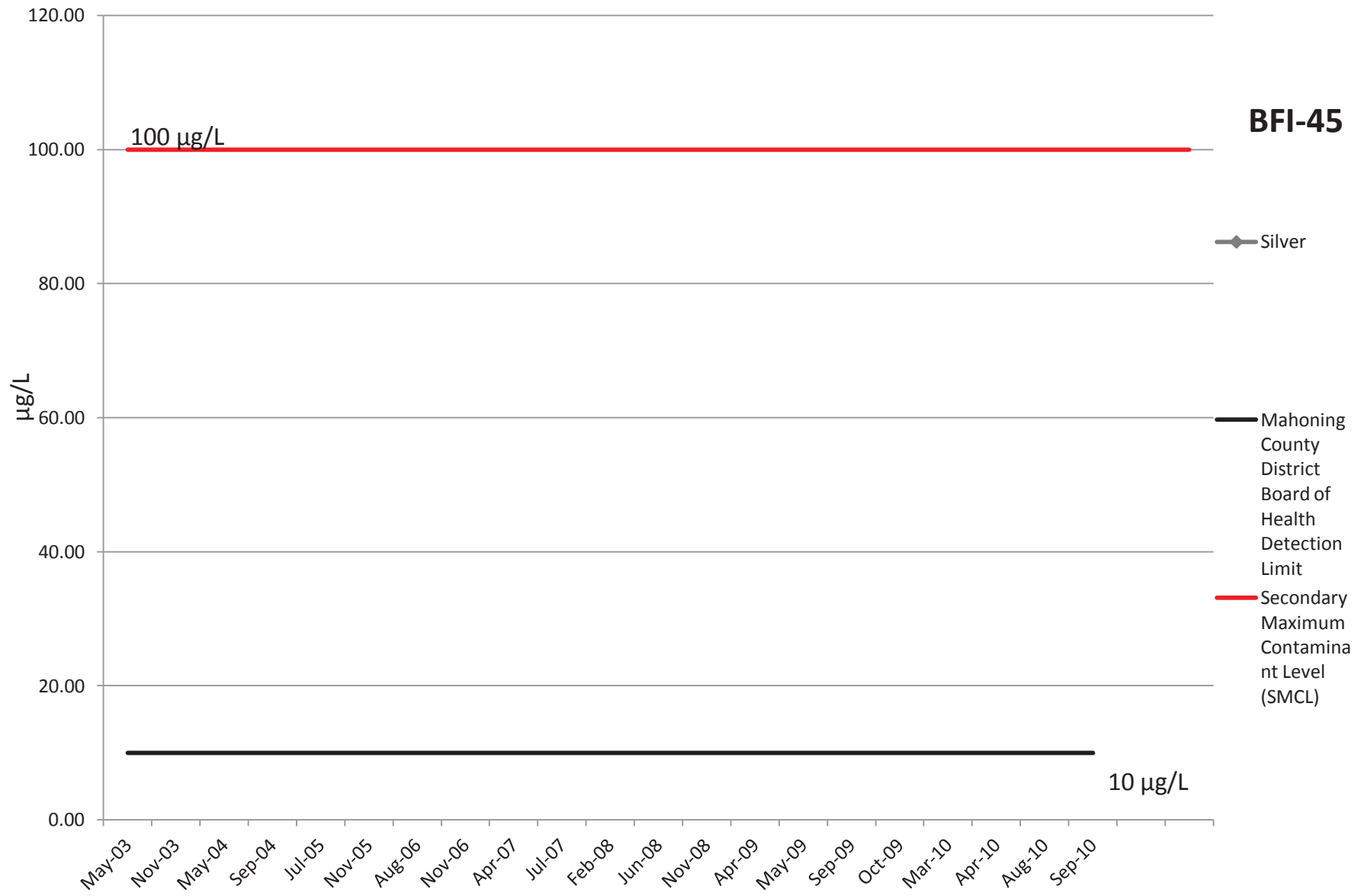
**BFI-45**



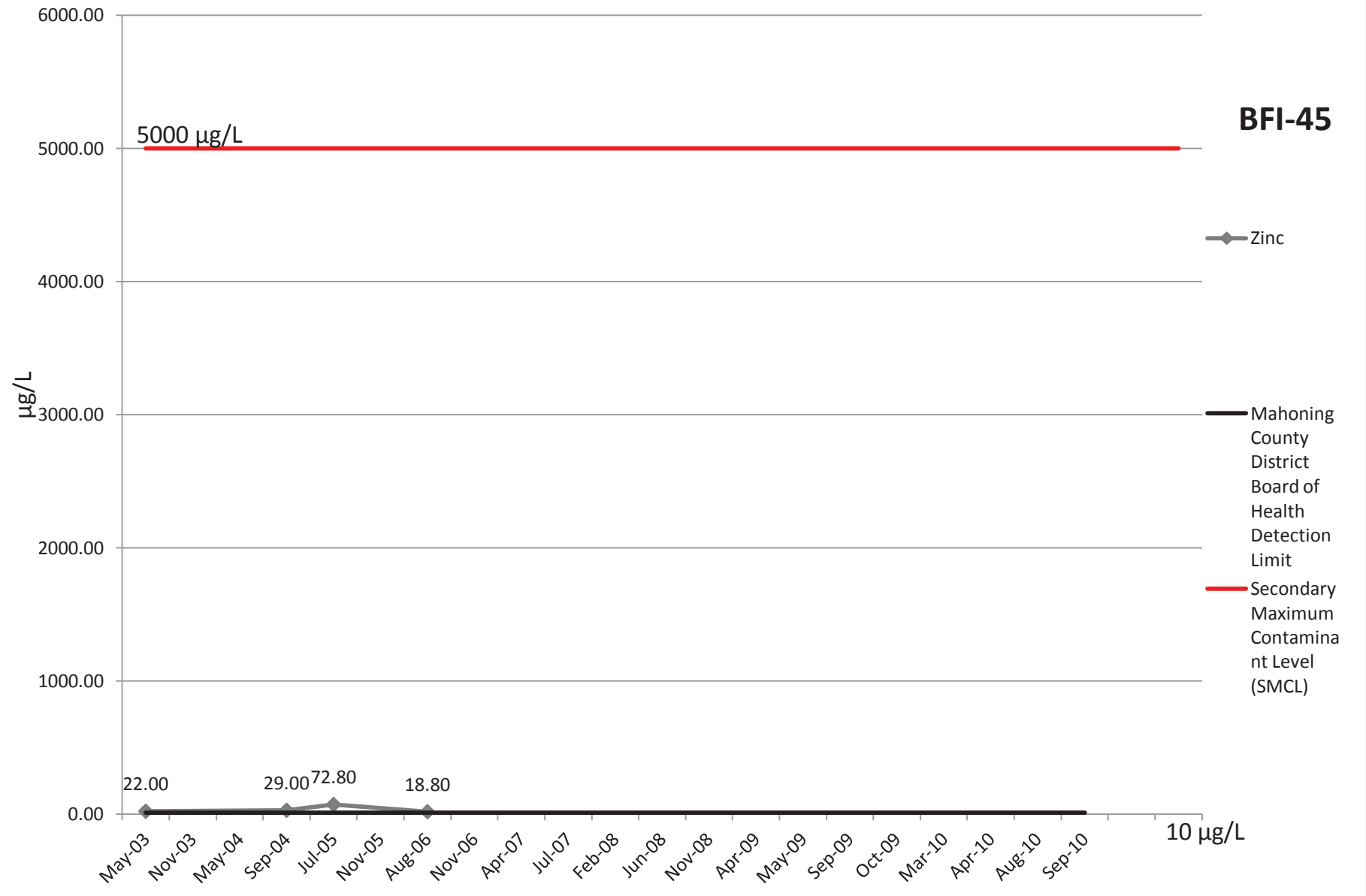
# Selenium



# Silver

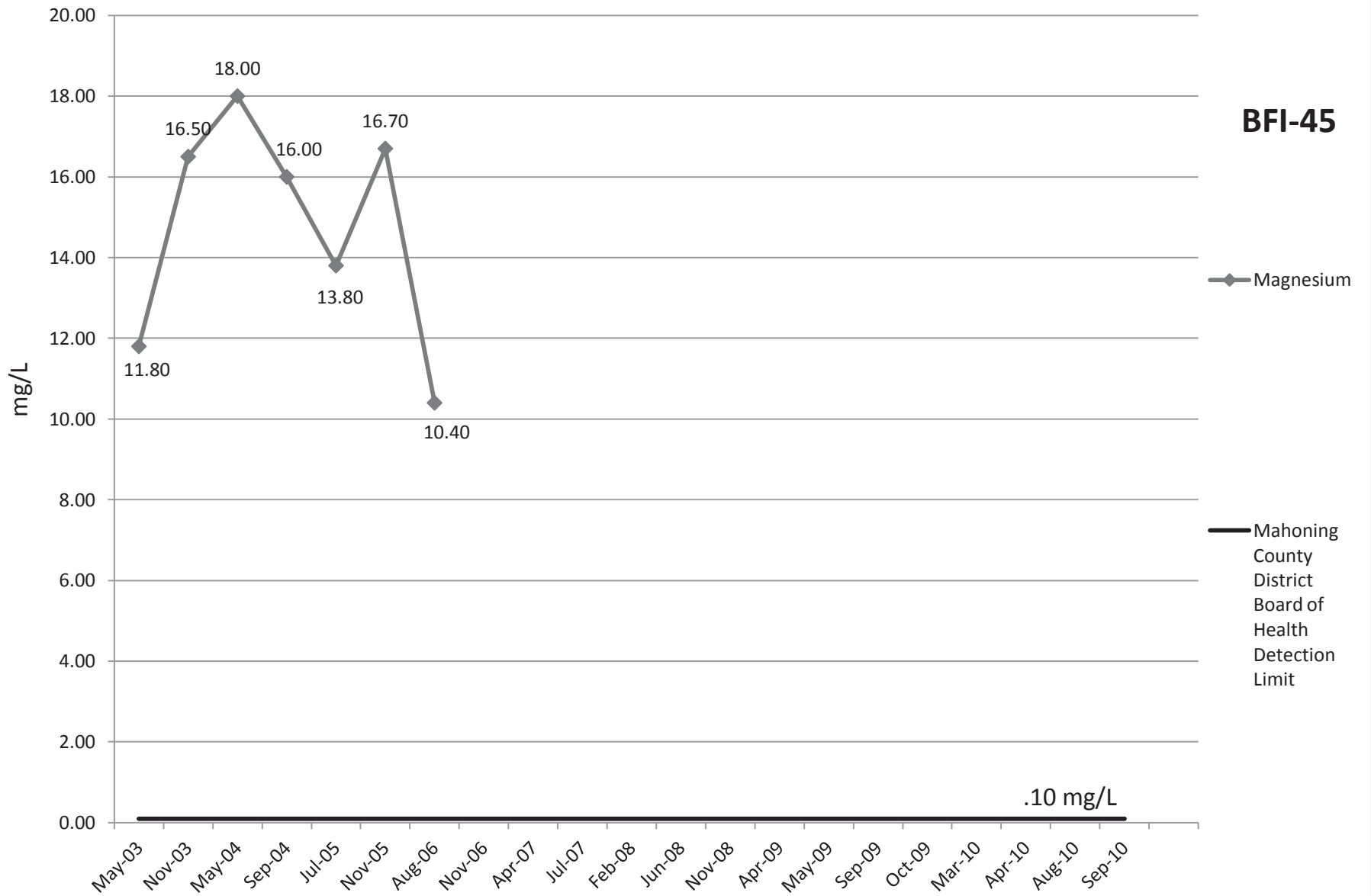


# Zinc

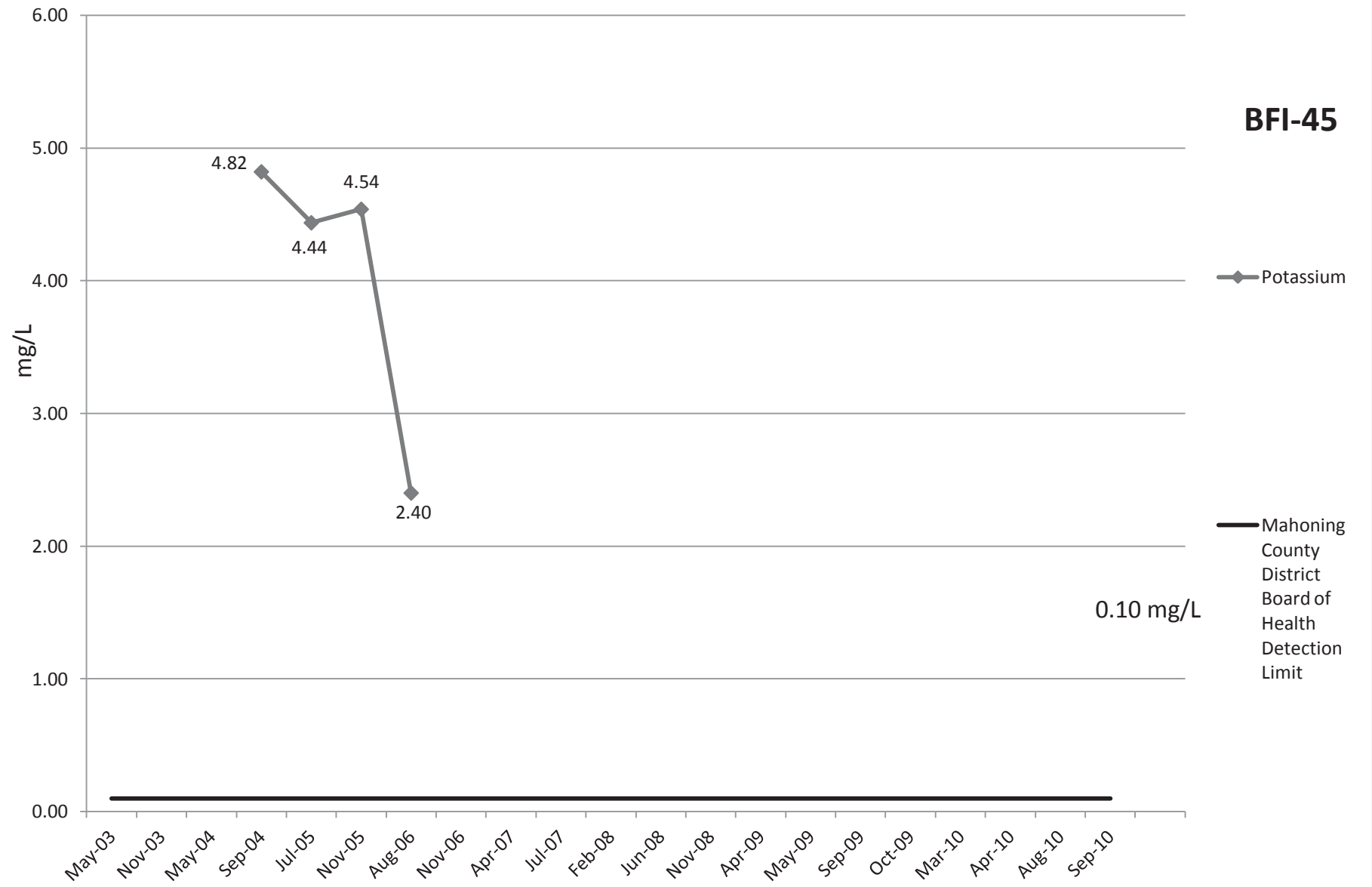




# Magnesium



# Potassium



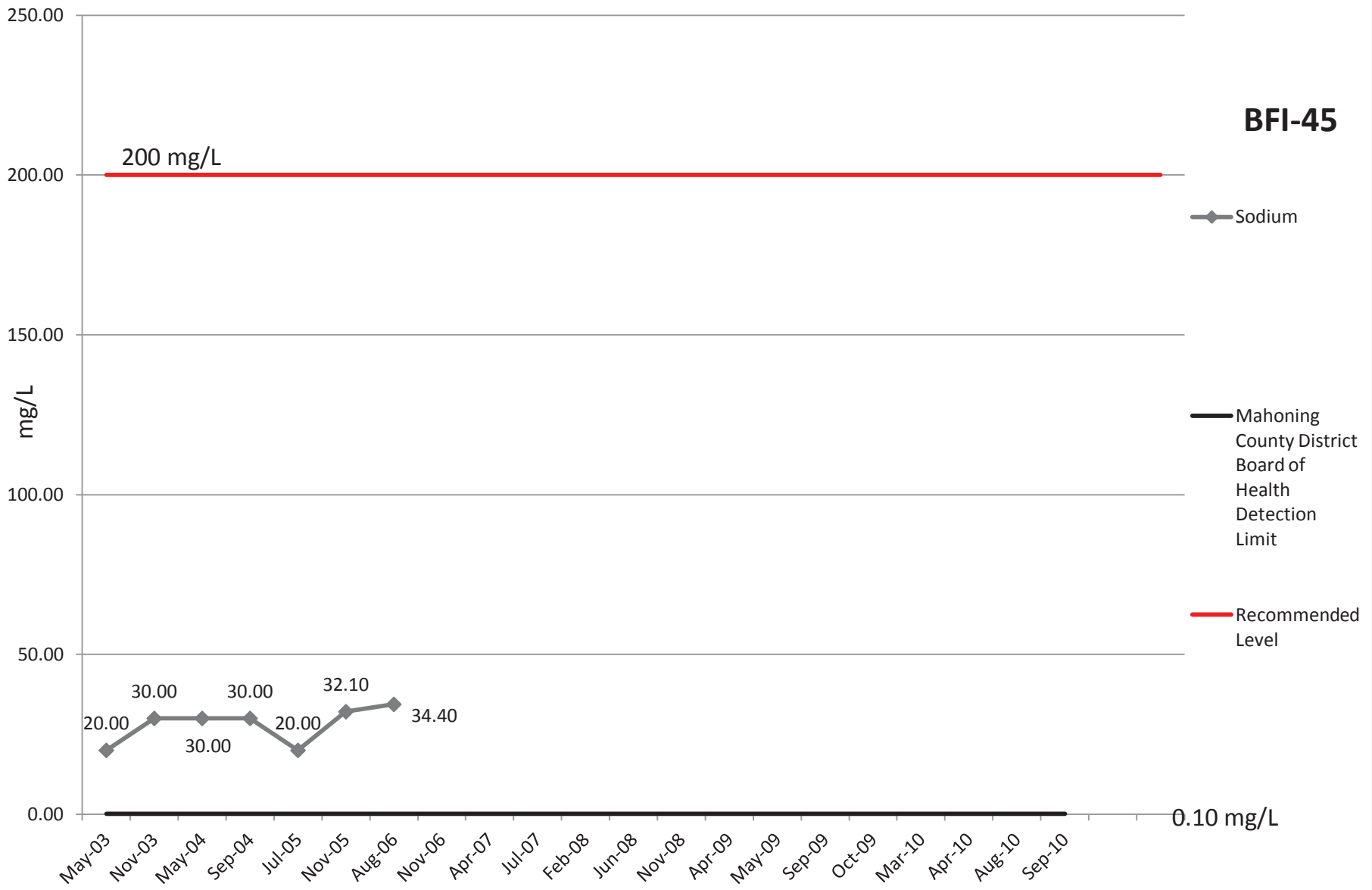
**BFI-45**

◆ Potassium

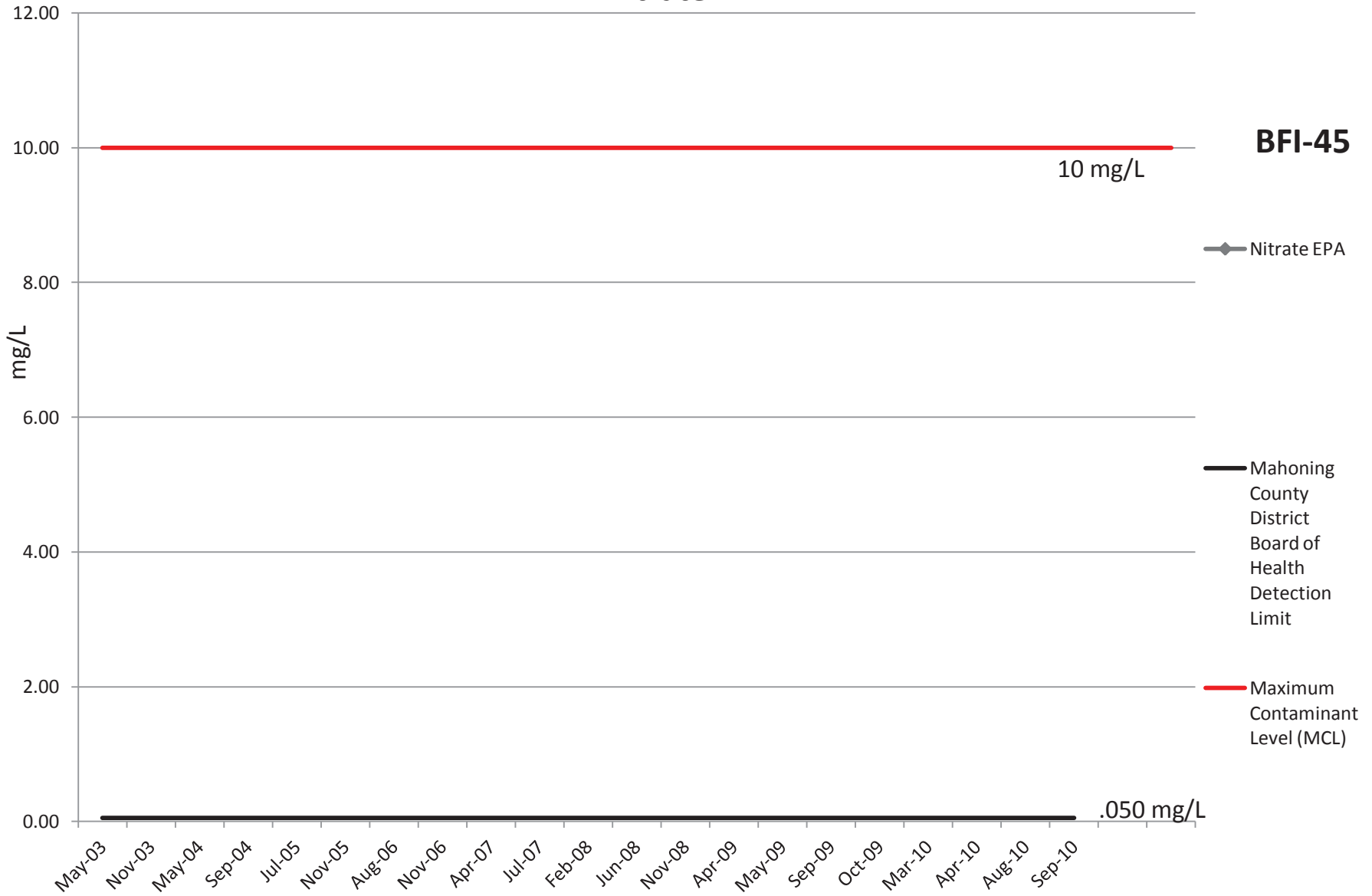
— Mahoning County District Board of Health Detection Limit

0.10 mg/L

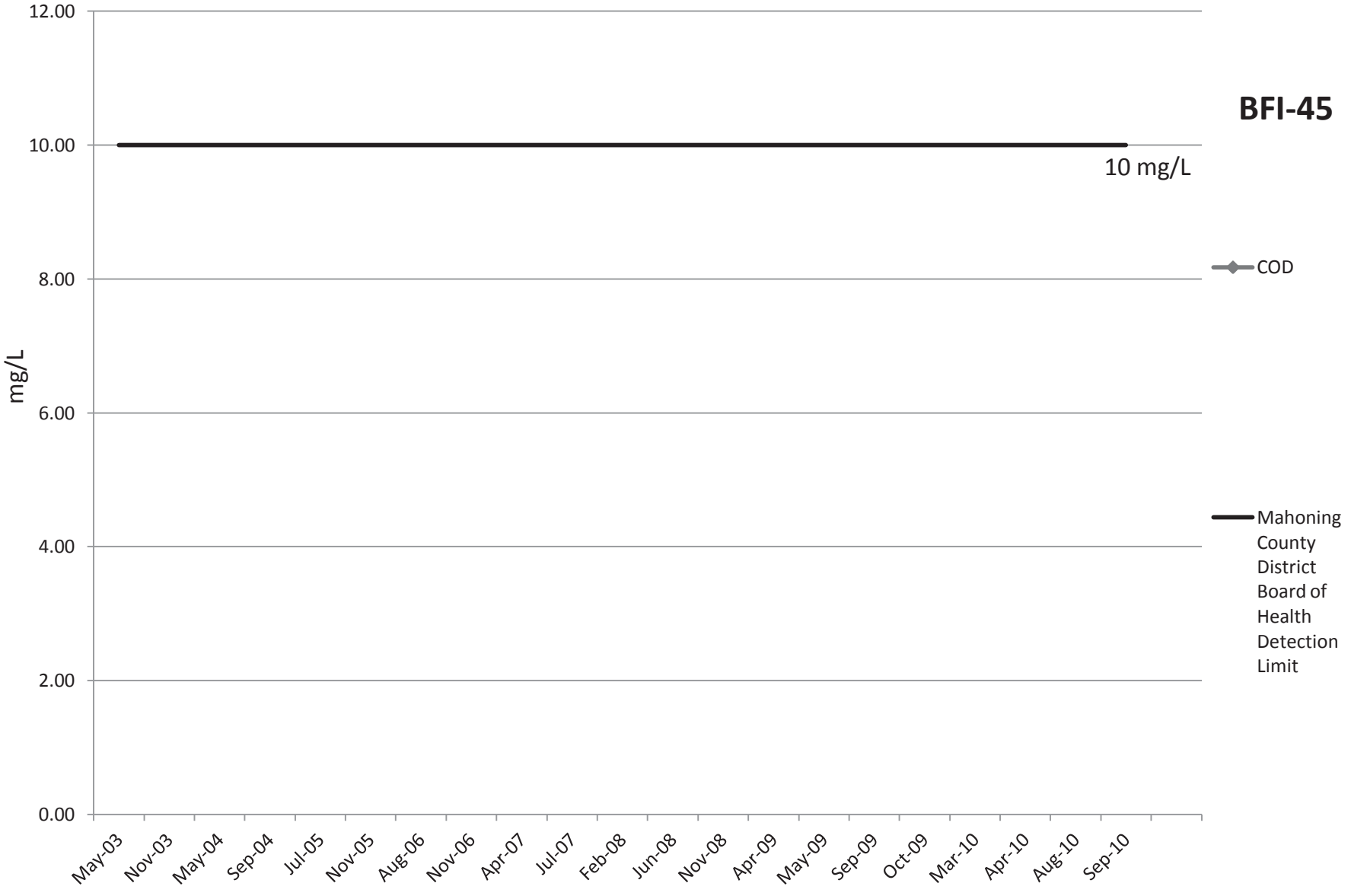
# Sodium



# Nitrate EPA



# COD



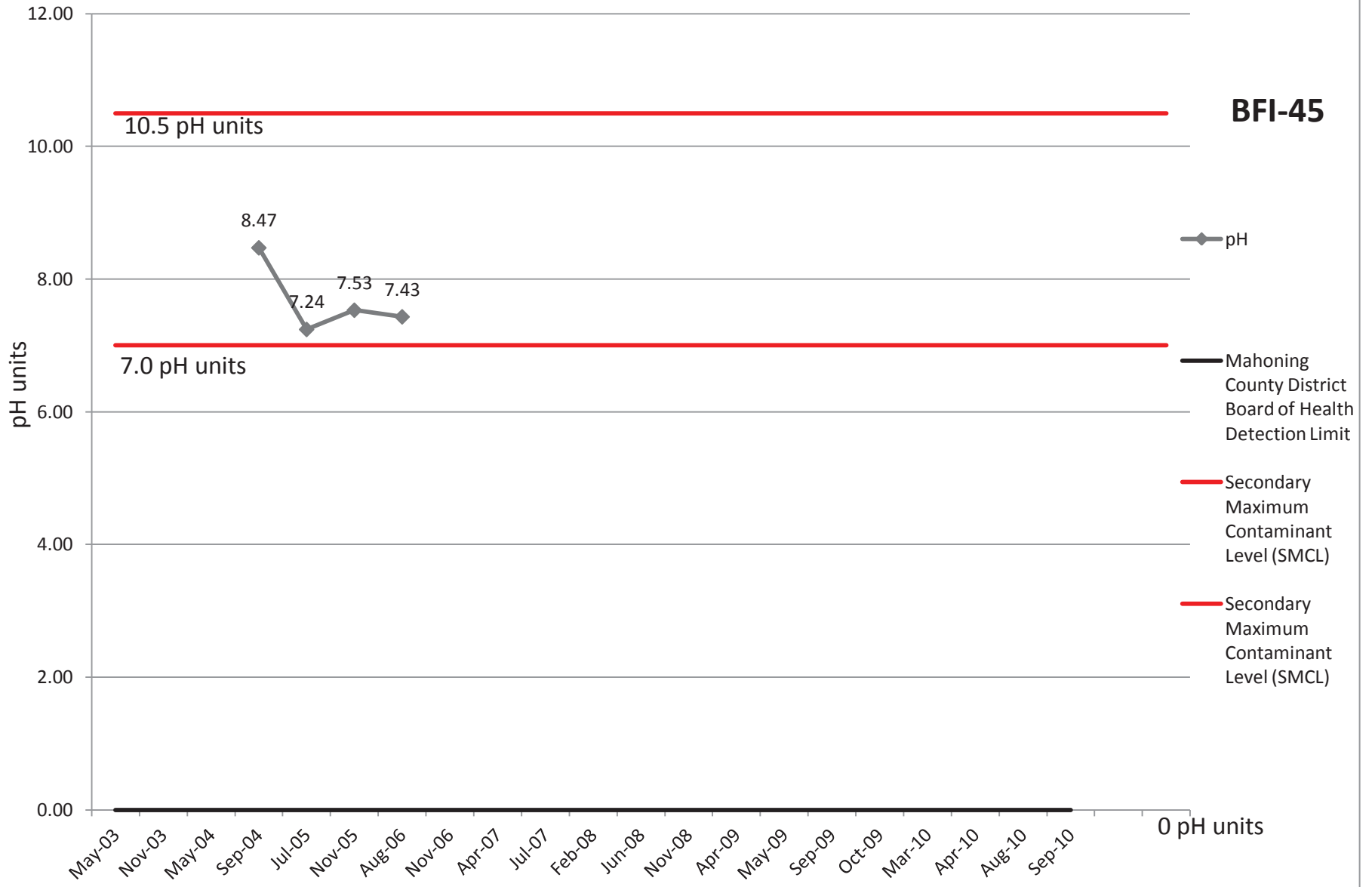
**BFI-45**

10 mg/L

◆ COD

— Mahoning County District Board of Health Detection Limit

# pH



**BFI-45**

—◆— pH

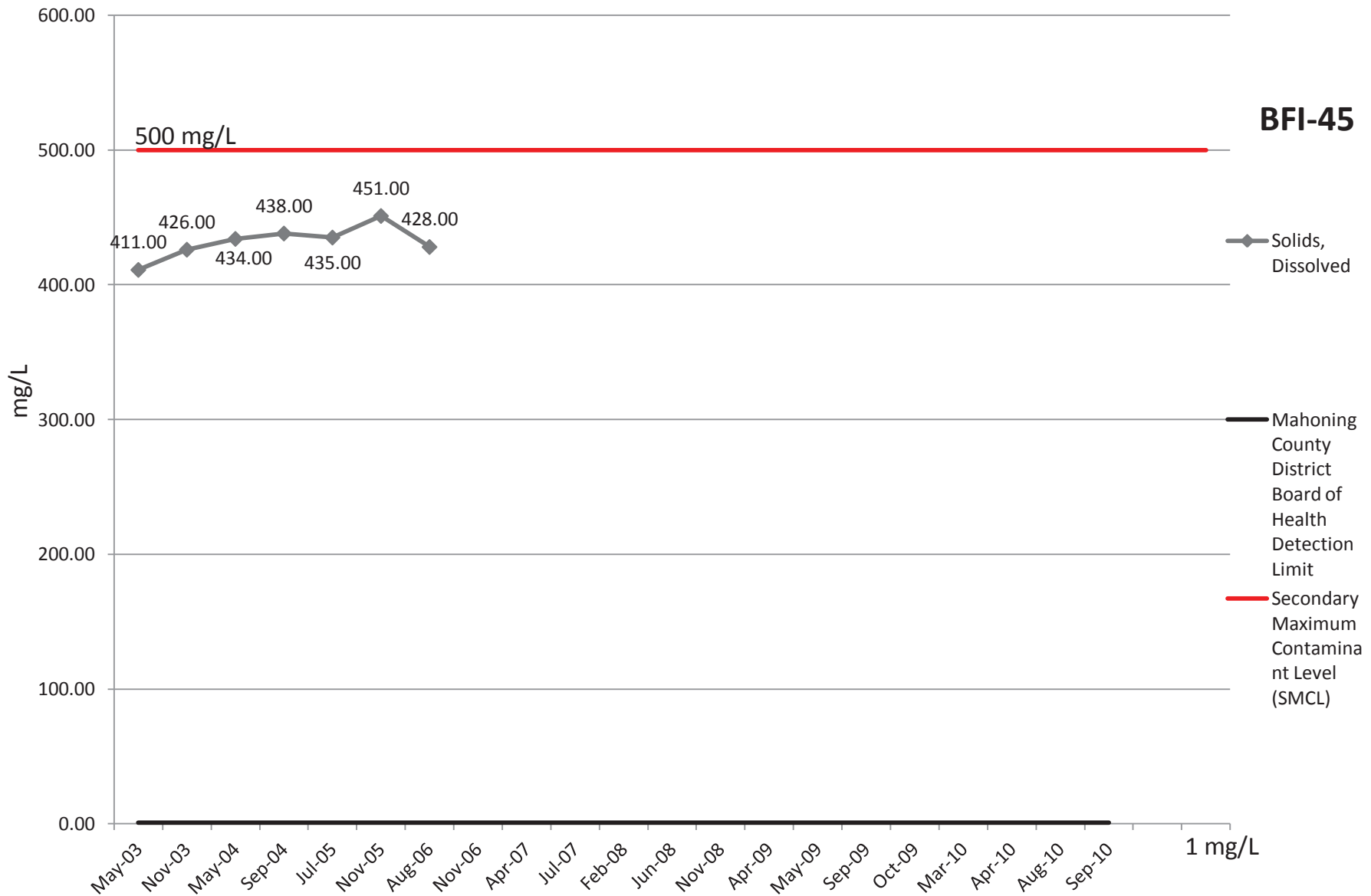
— Mahoning  
County District  
Board of Health  
Detection Limit

— Secondary  
Maximum  
Contaminant  
Level (SMCL)

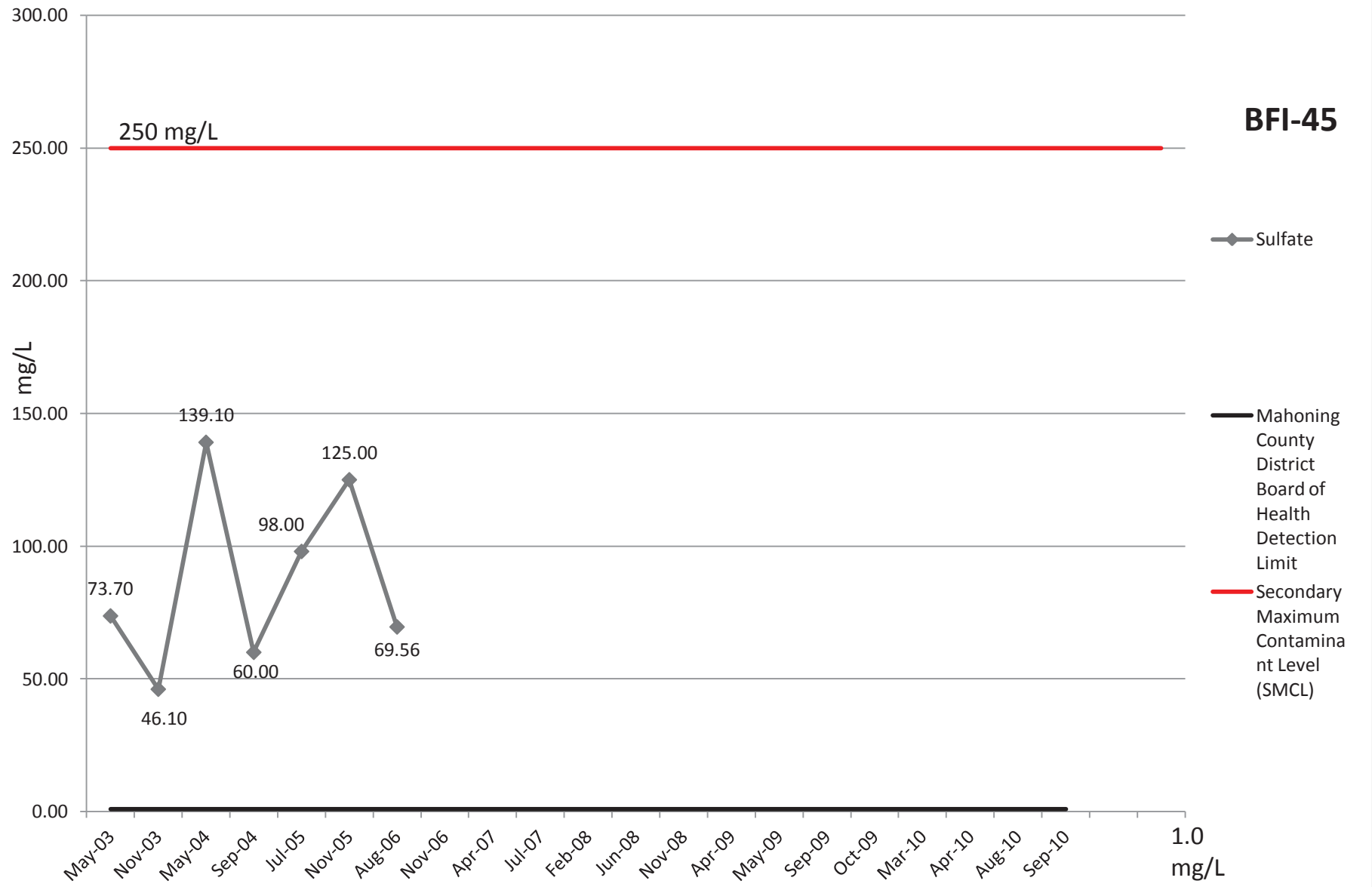
— Secondary  
Maximum  
Contaminant  
Level (SMCL)

0 pH units

# Solids, Dissolved



# Sulfate





# Bacteria

## BFI-45

Positive/Negative

◆ Bacteria

1.00

1.00

1.00

positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

0.00

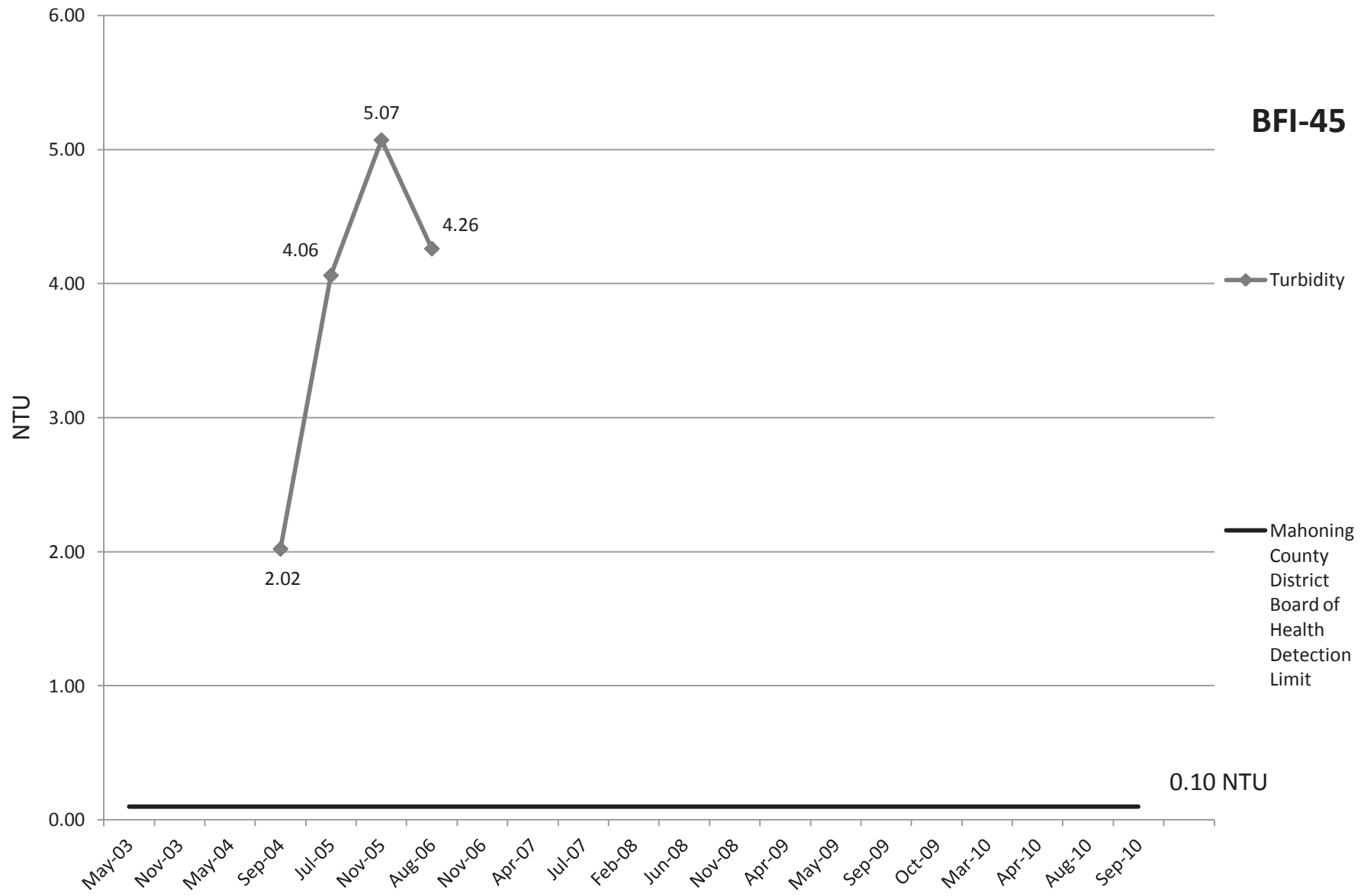
0.00

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

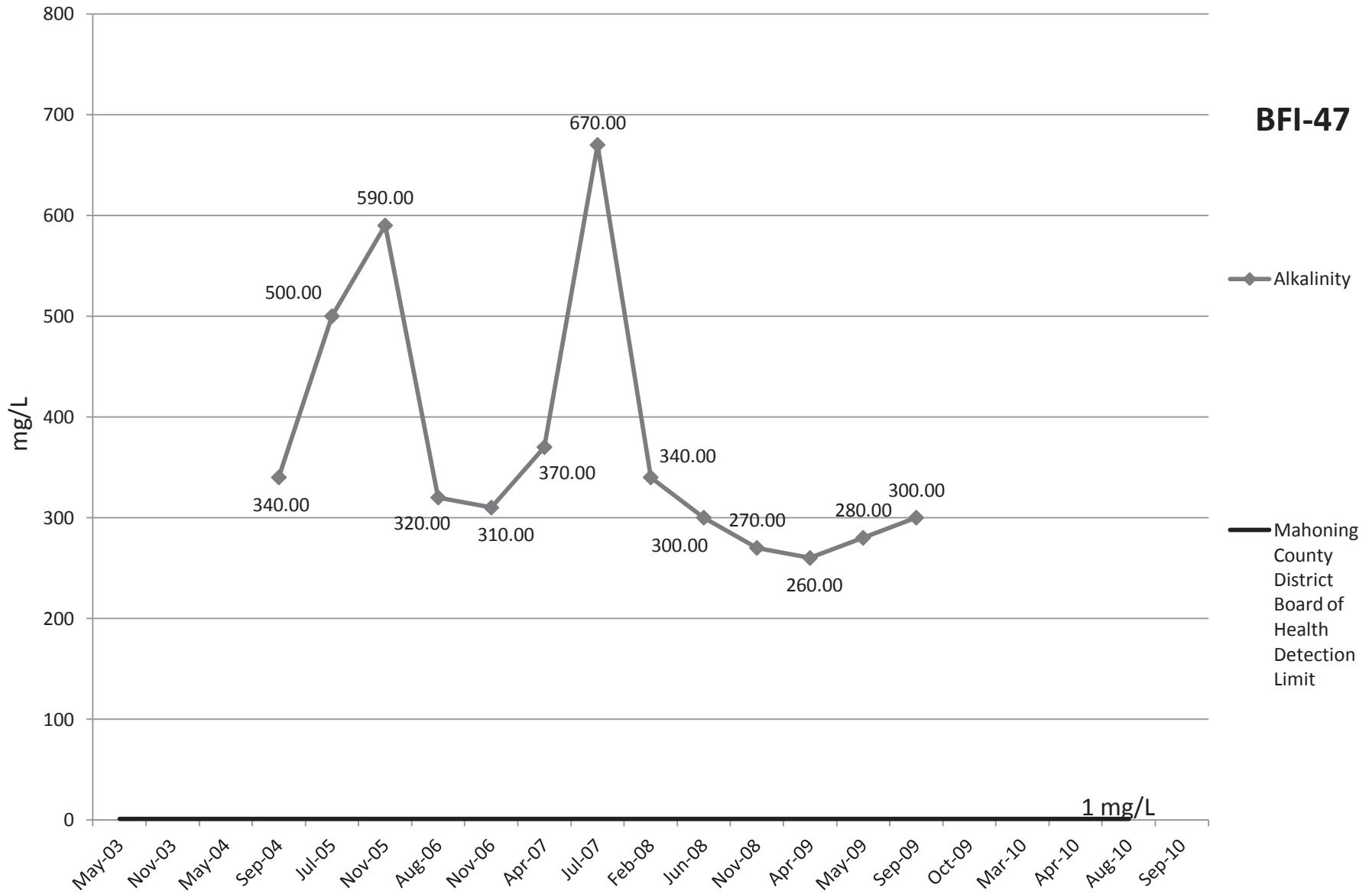


# Turbidity

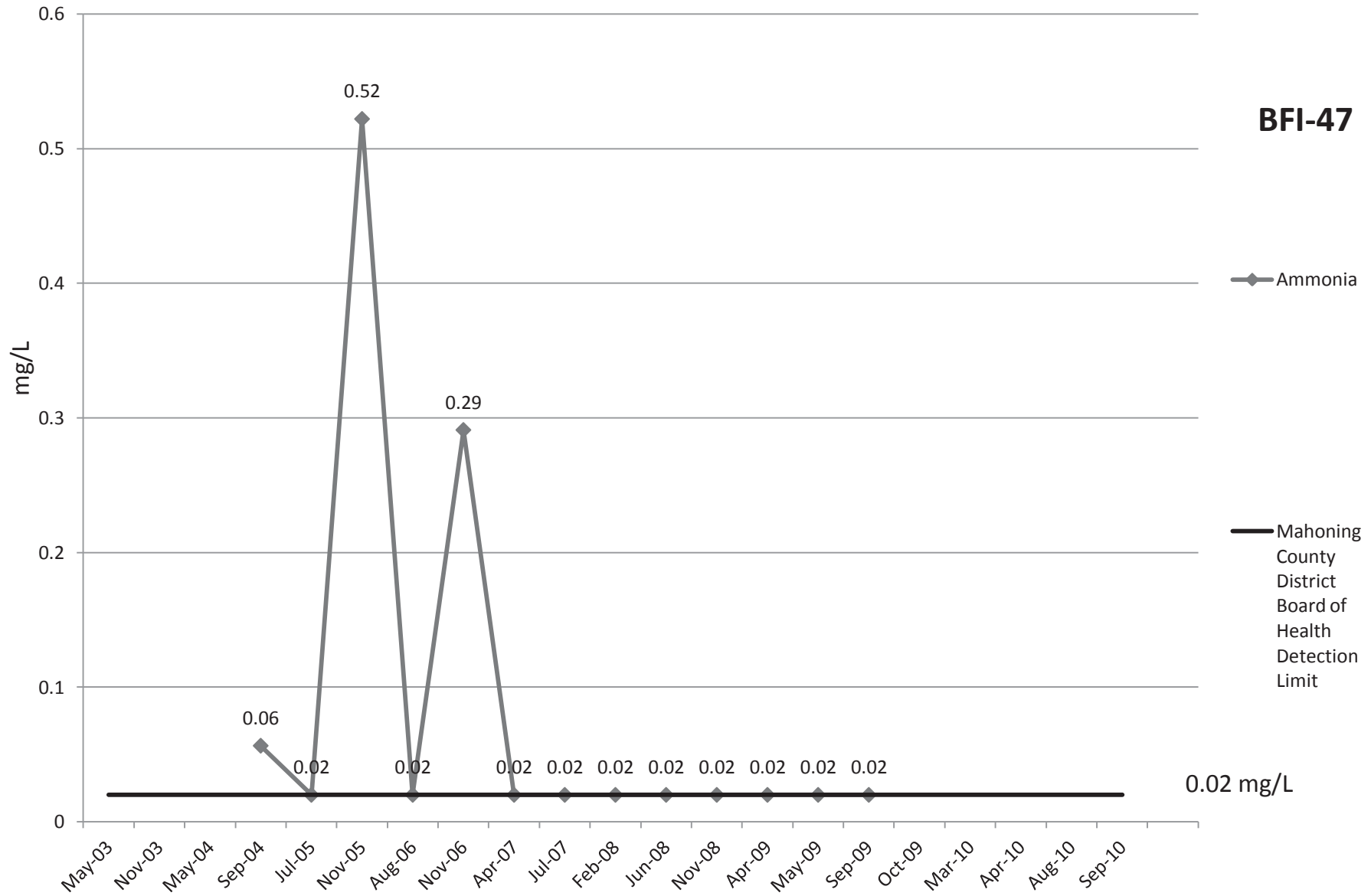


# Alkalinity

**BFI-47**

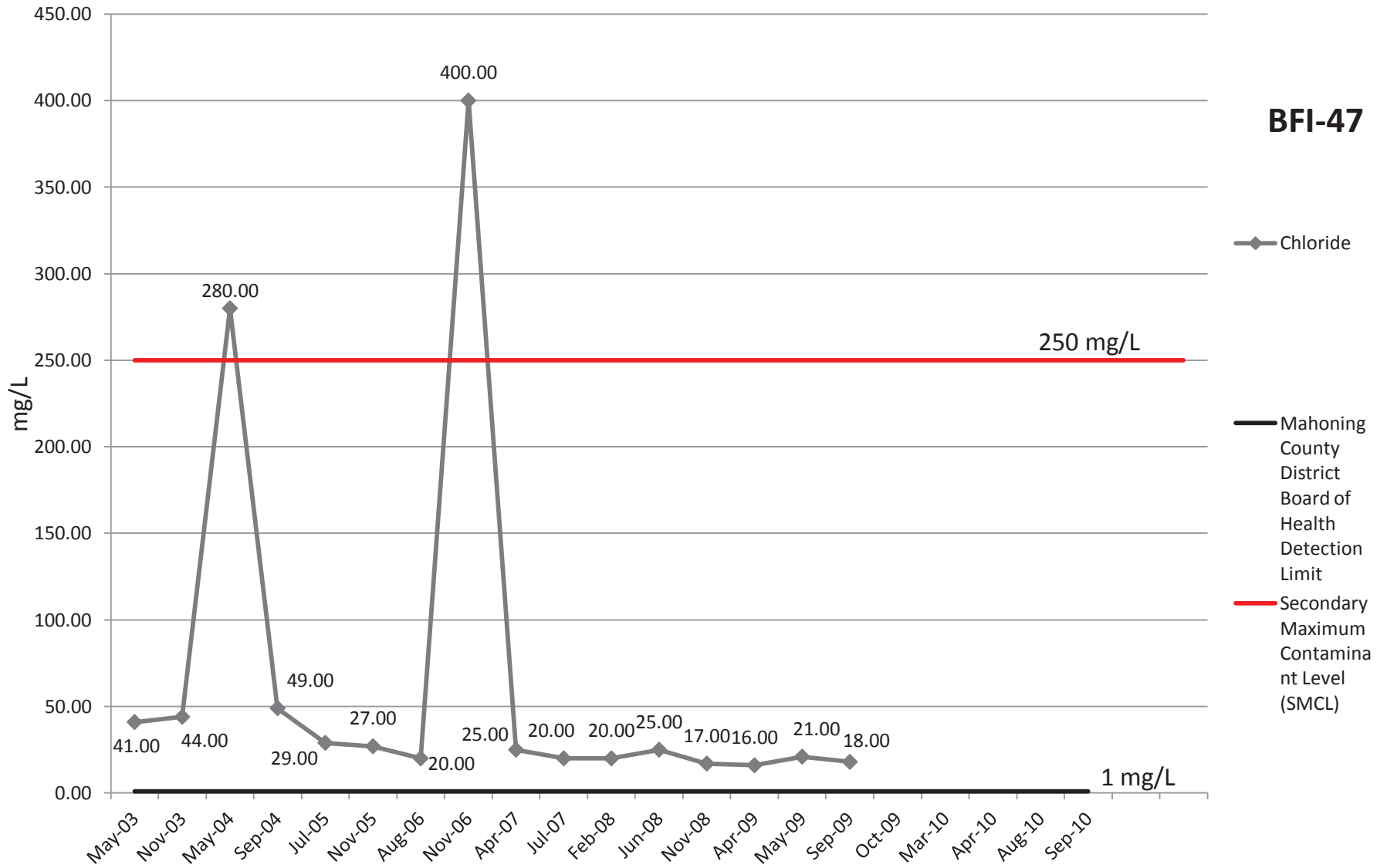


# Ammonia



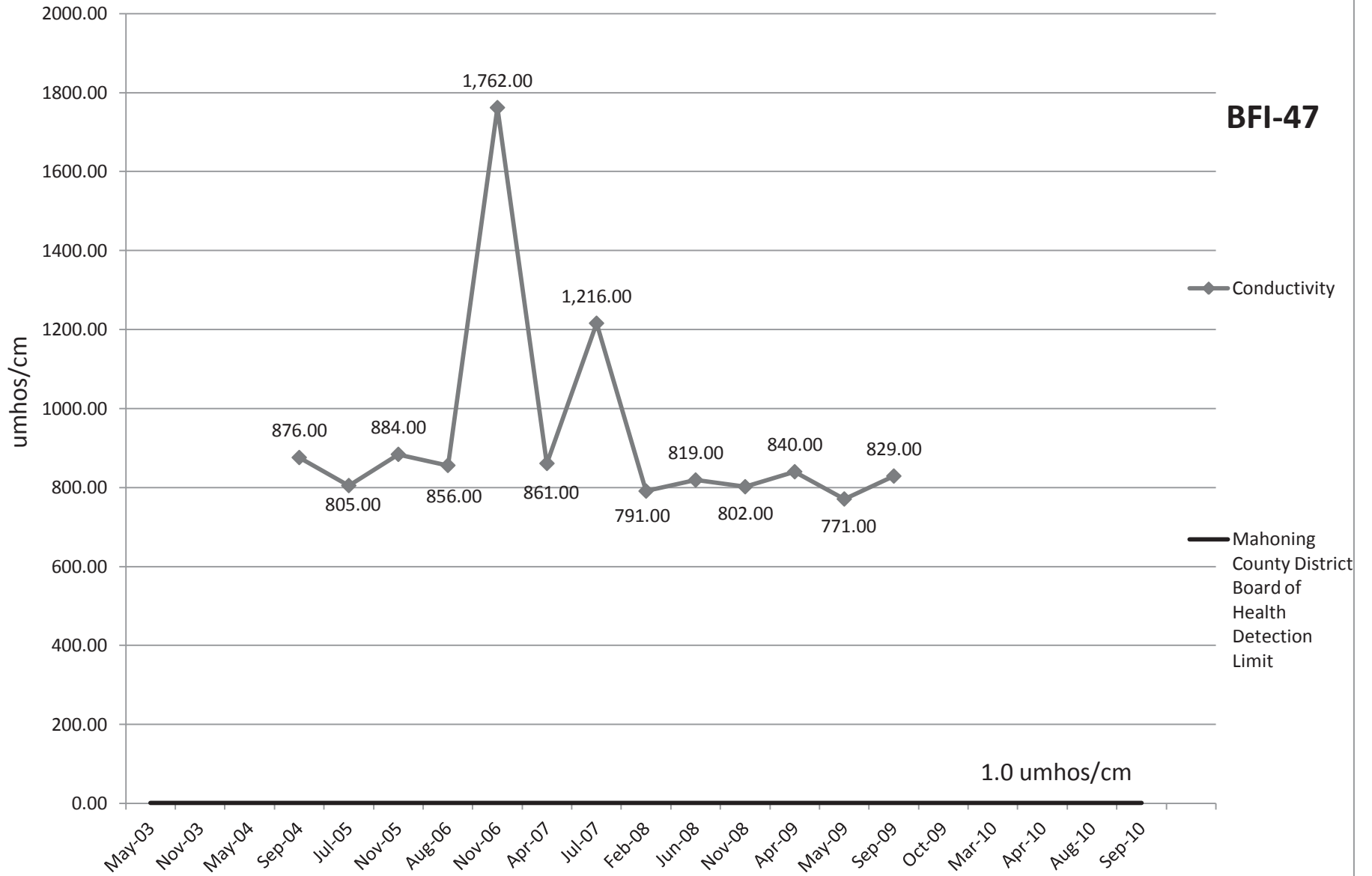
# Chloride

**BFI-47**

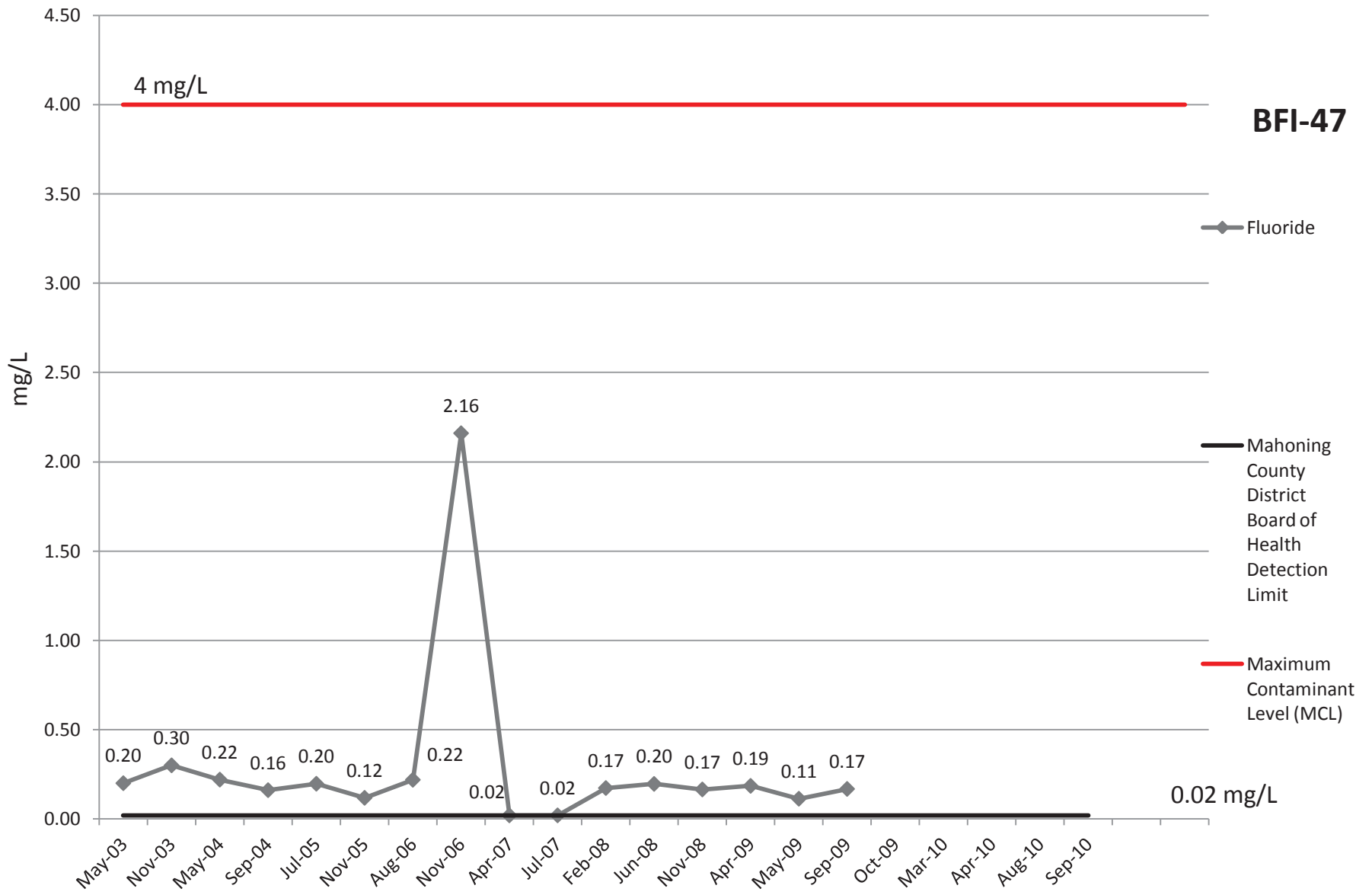


# Conductivity

**BFI-47**

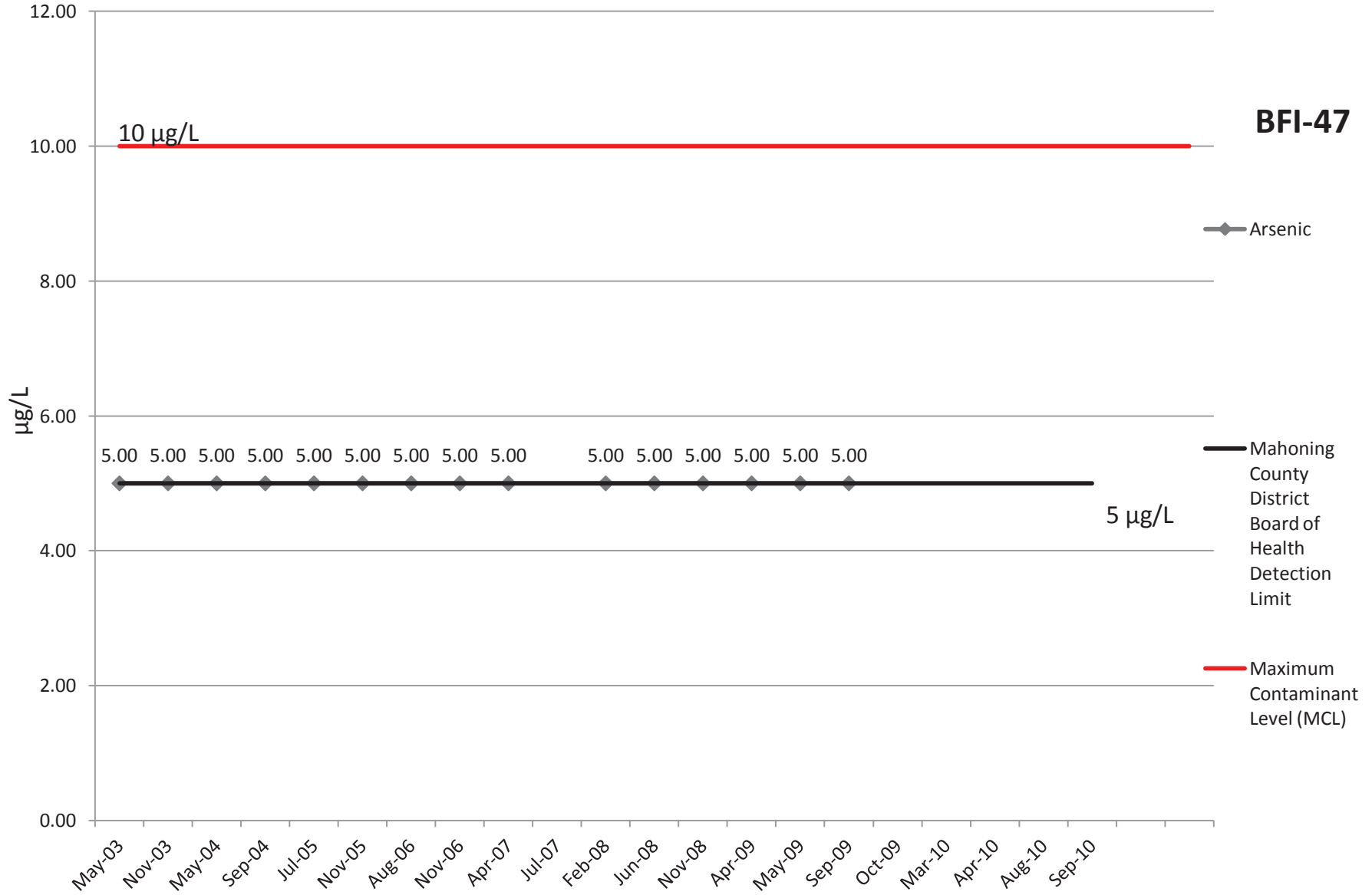


# Fluoride



# Arsenic

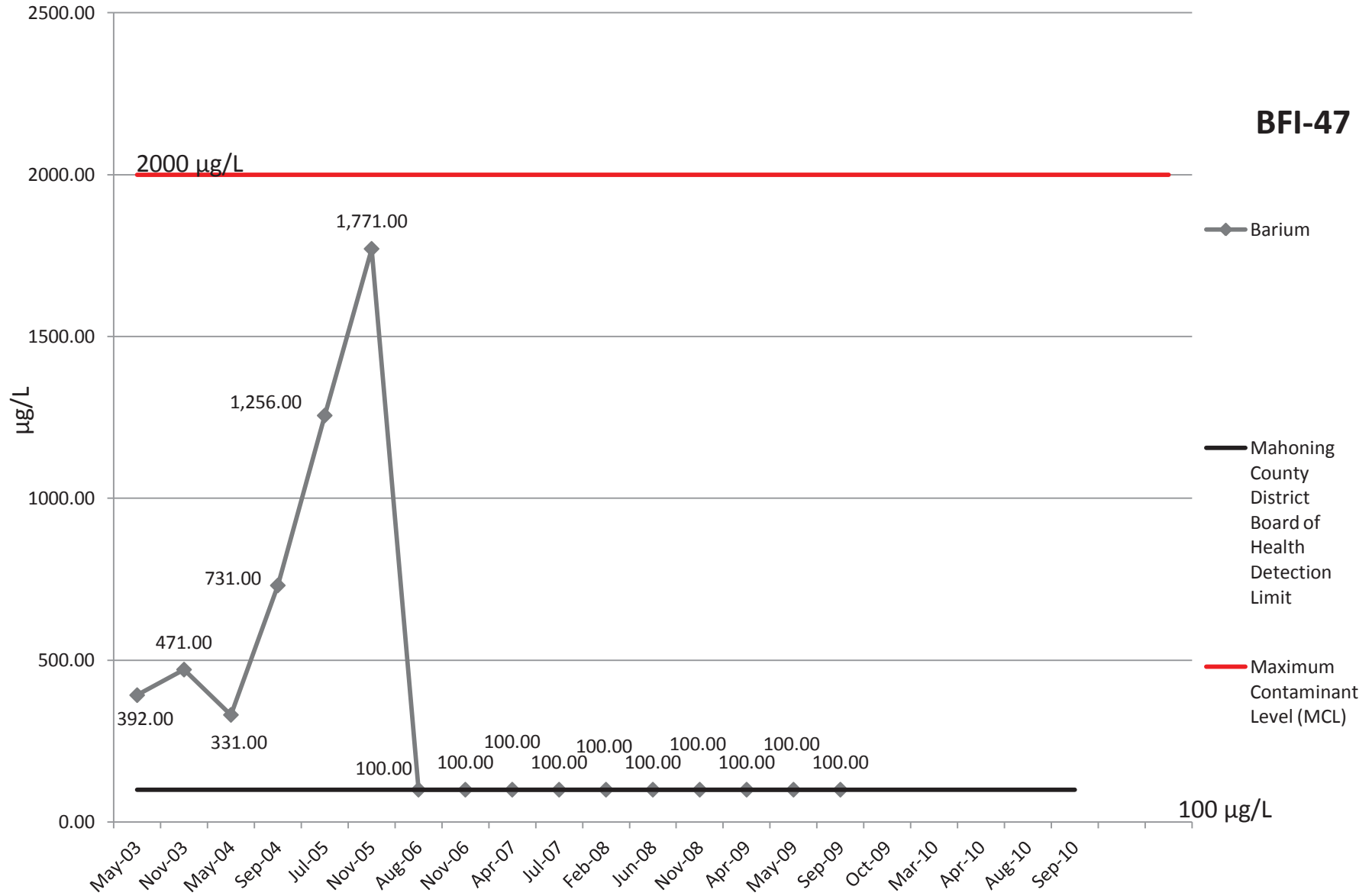
**BFI-47**





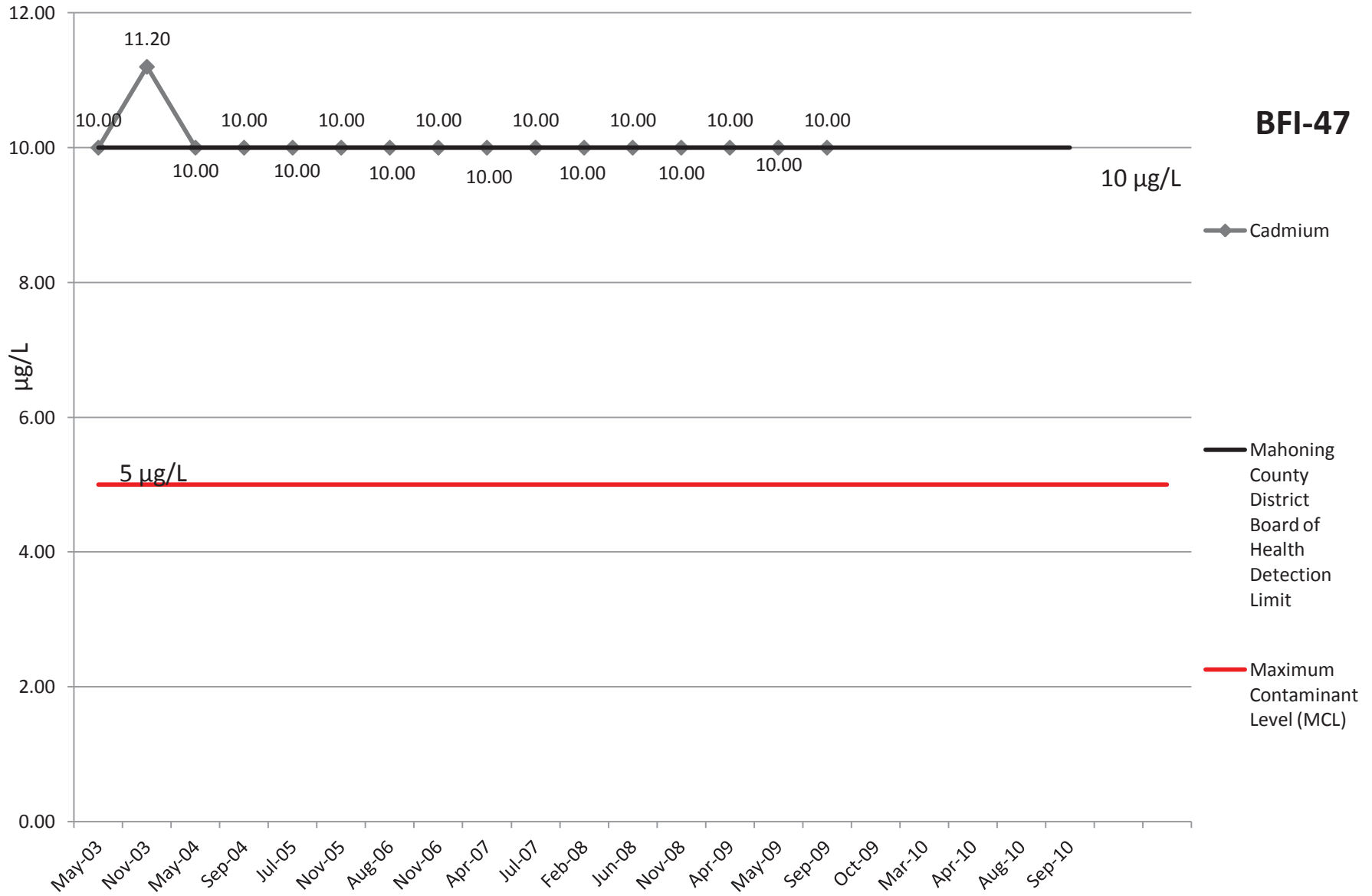
# Barium

**BFI-47**

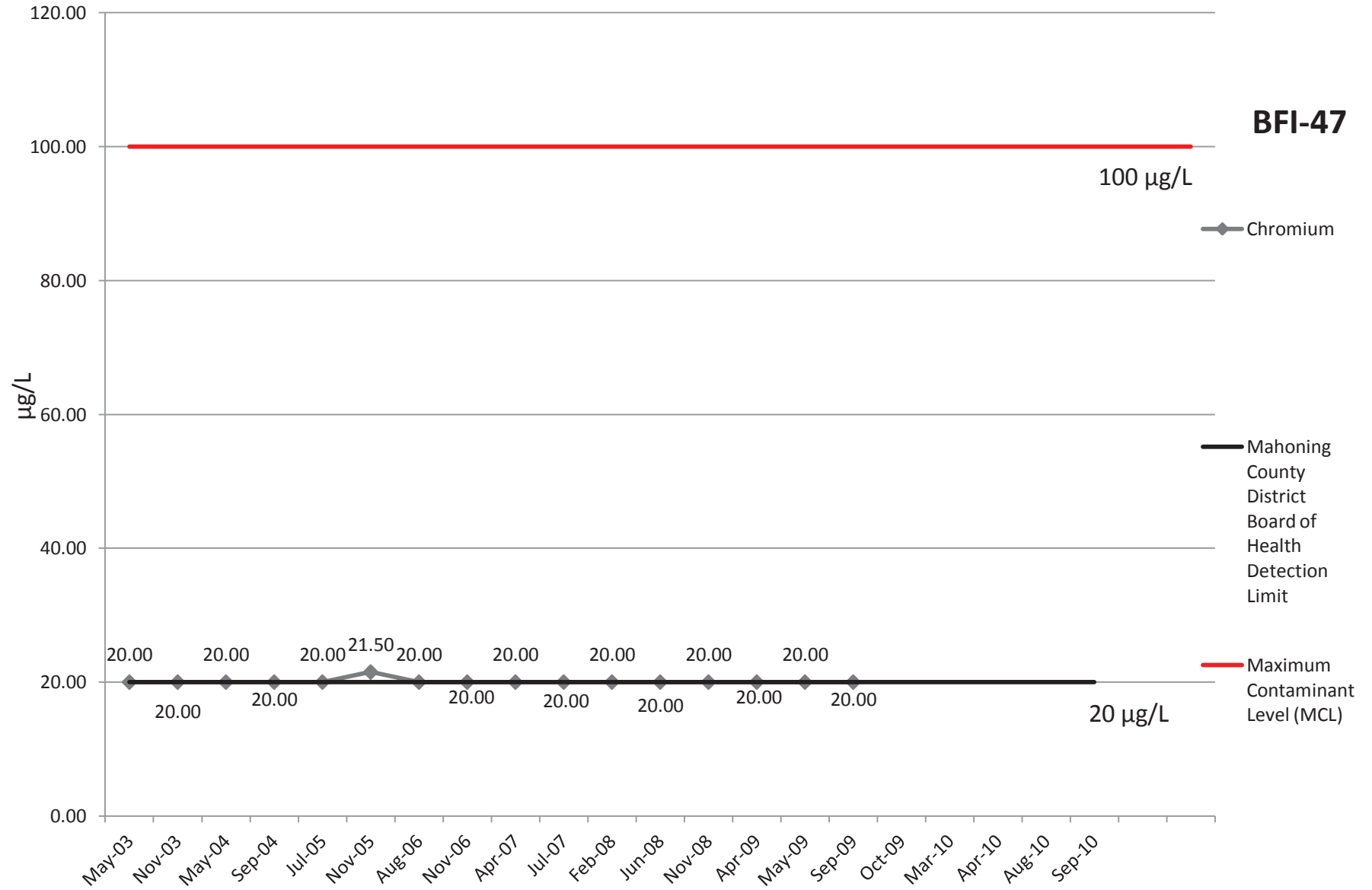


# Cadmium

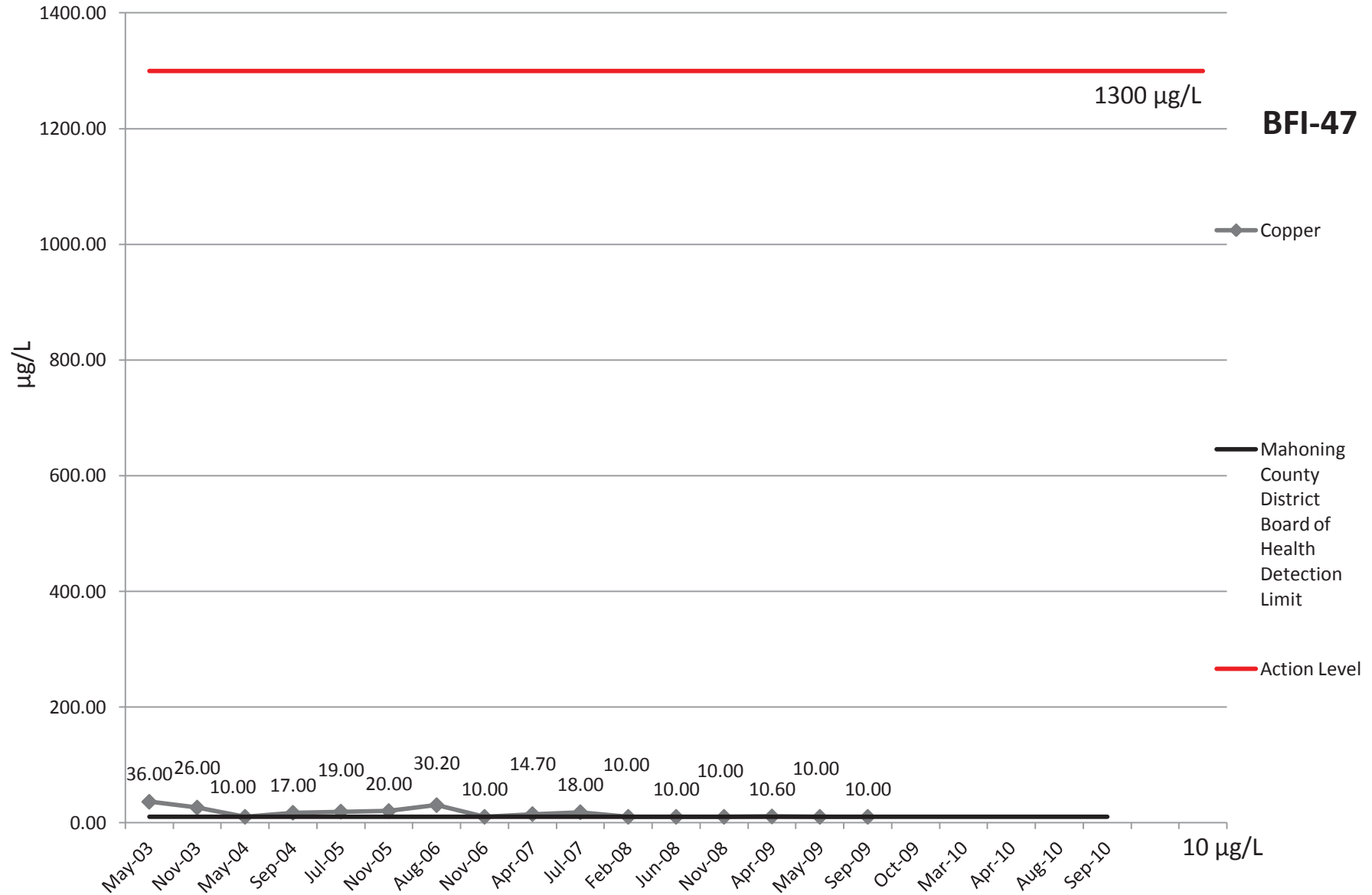
**BFI-47**



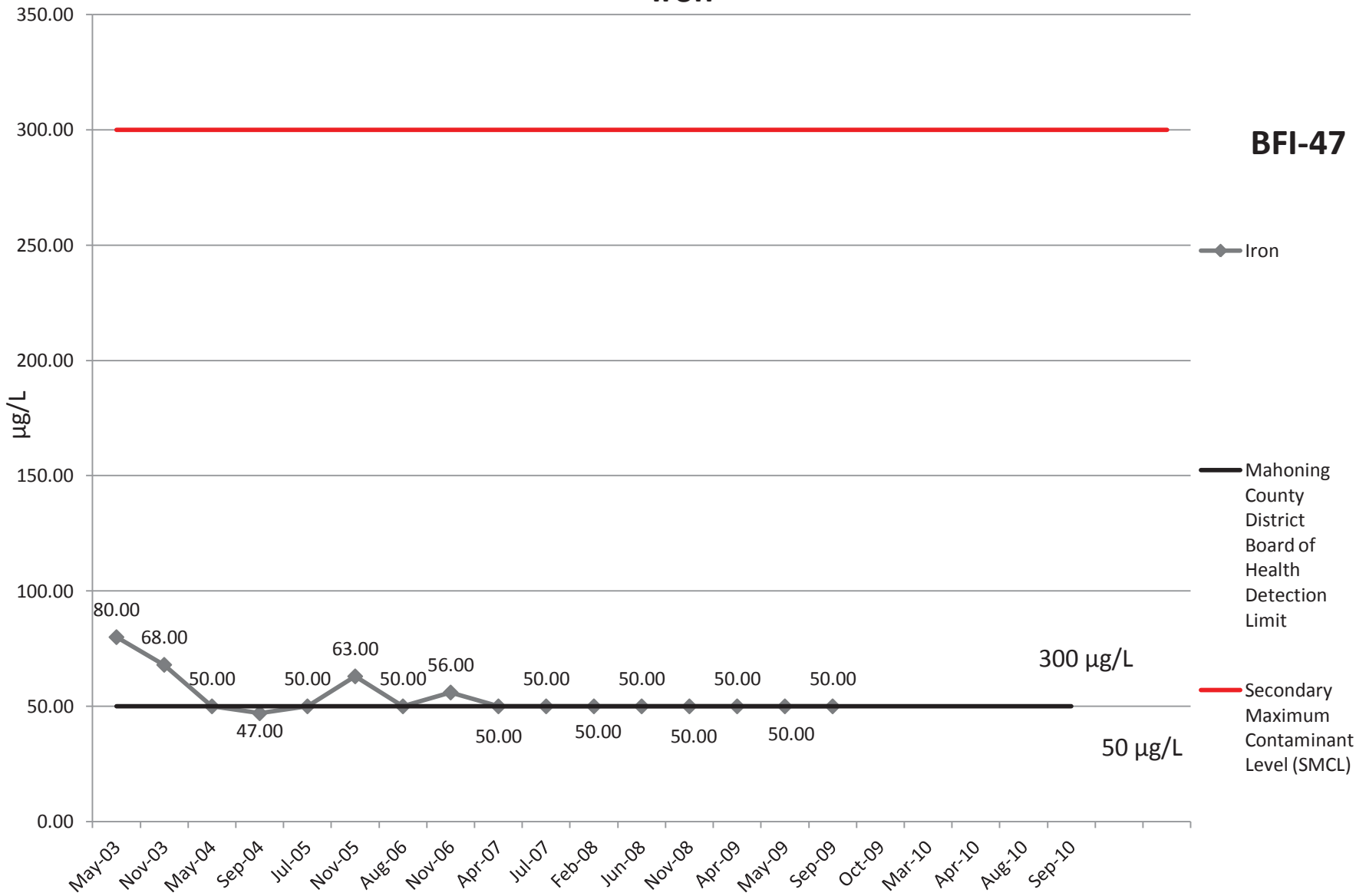
# Chromium



# Copper

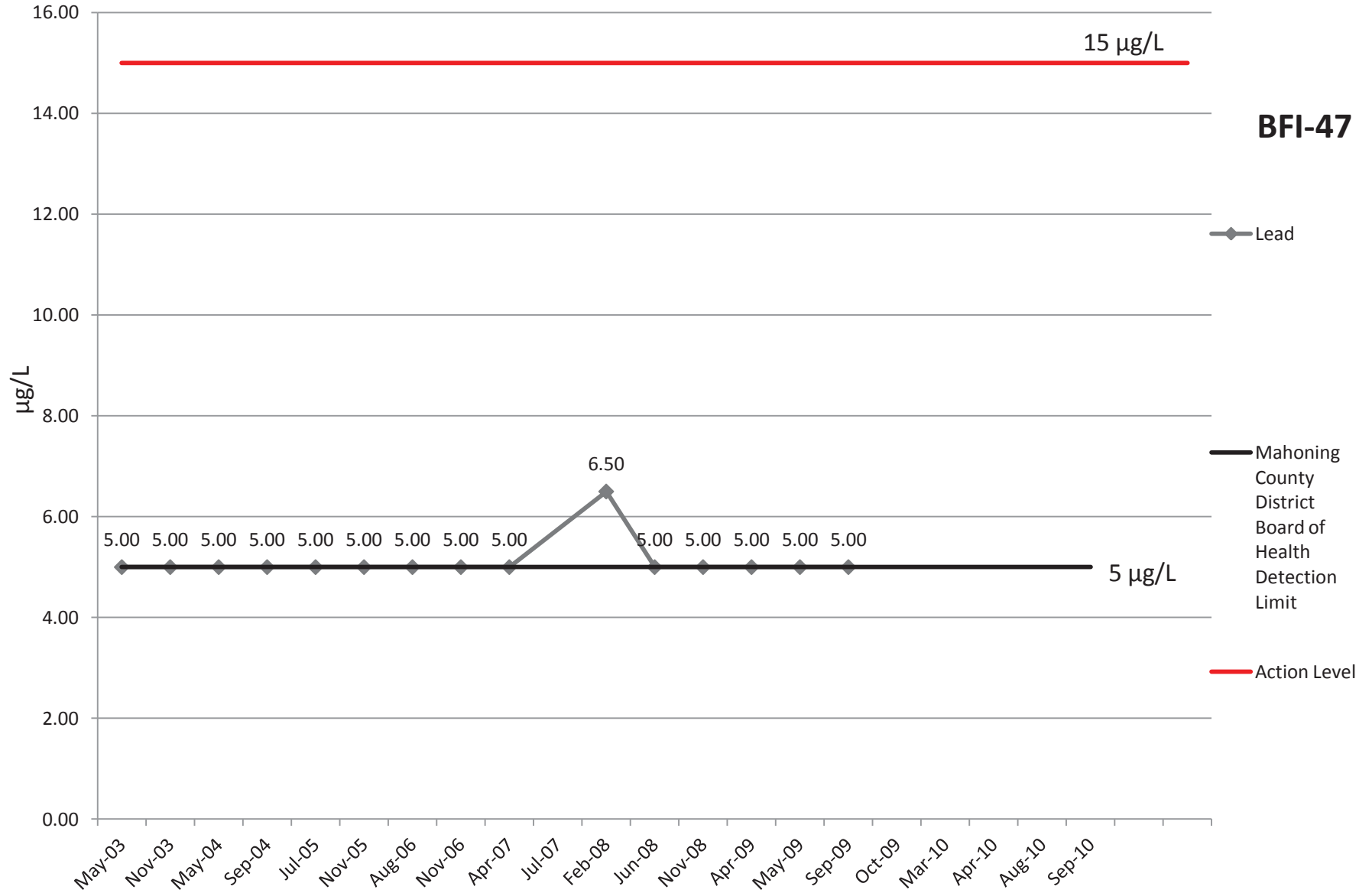


# Iron



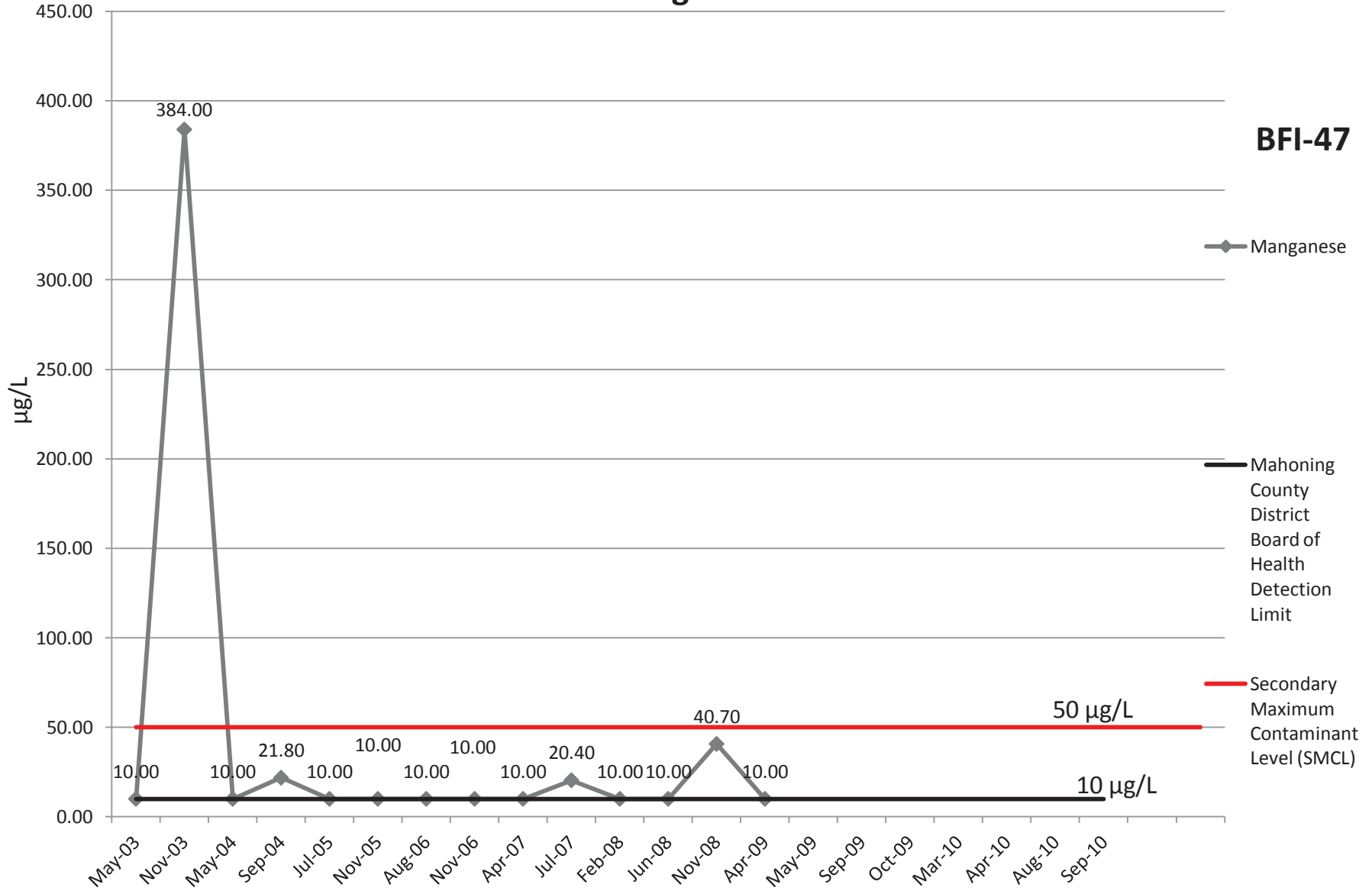
# Lead

**BFI-47**



# Manganese

**BFI-47**



# Mercury

**BFI-47**

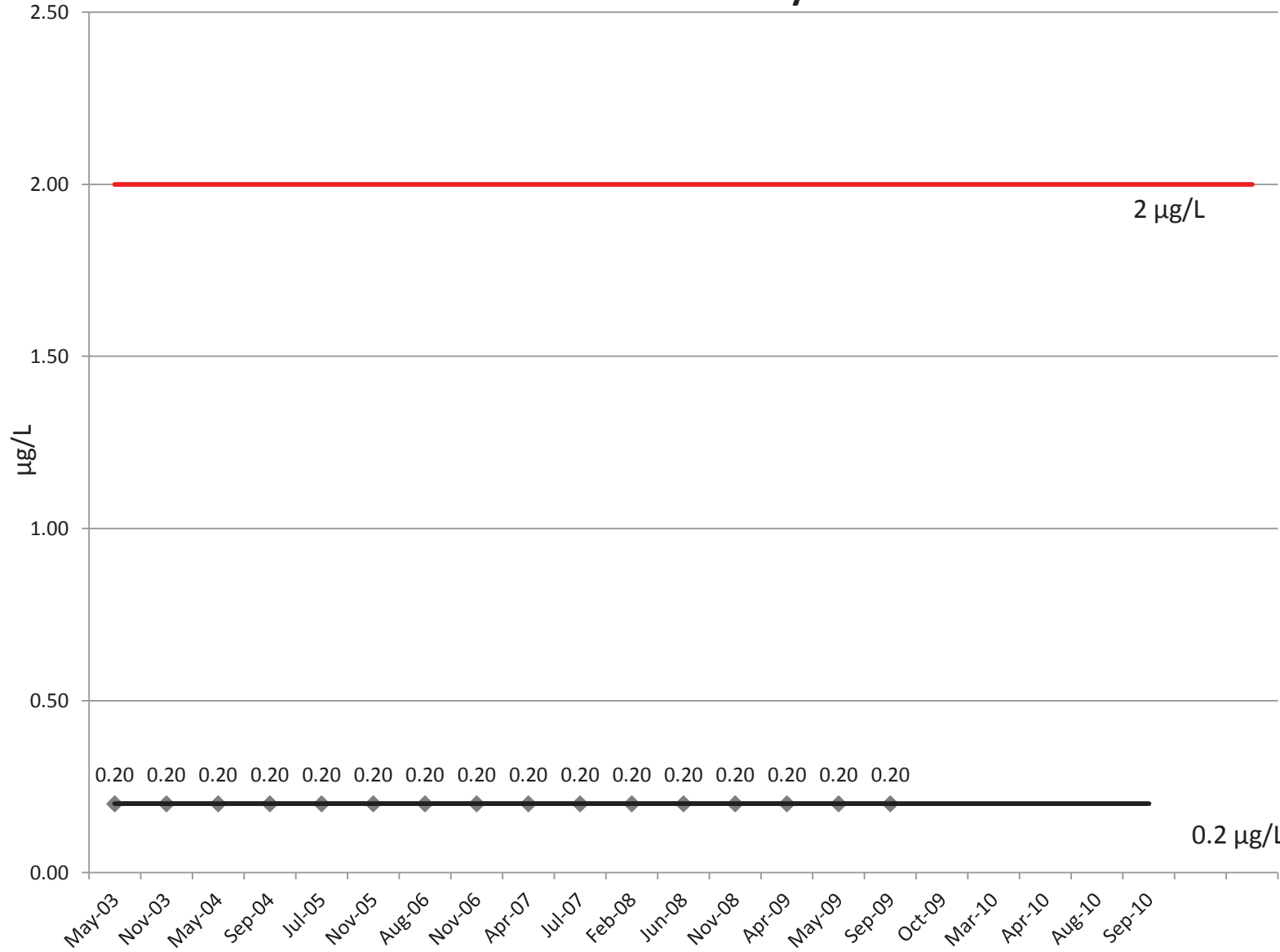
2 µg/L

Mercury

Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

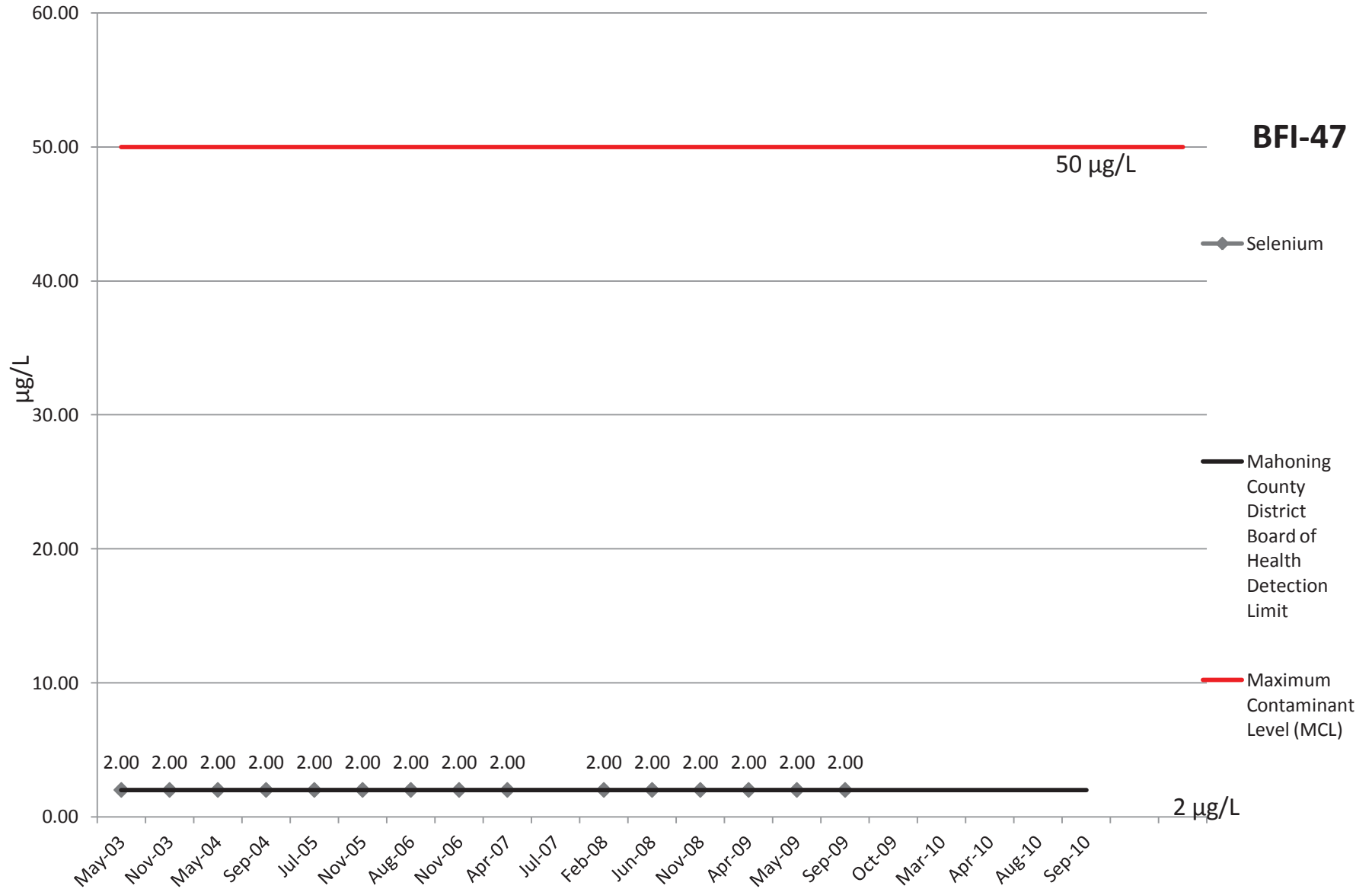
Maximum  
Contaminant  
Level (MCL)

0.2 µg/L



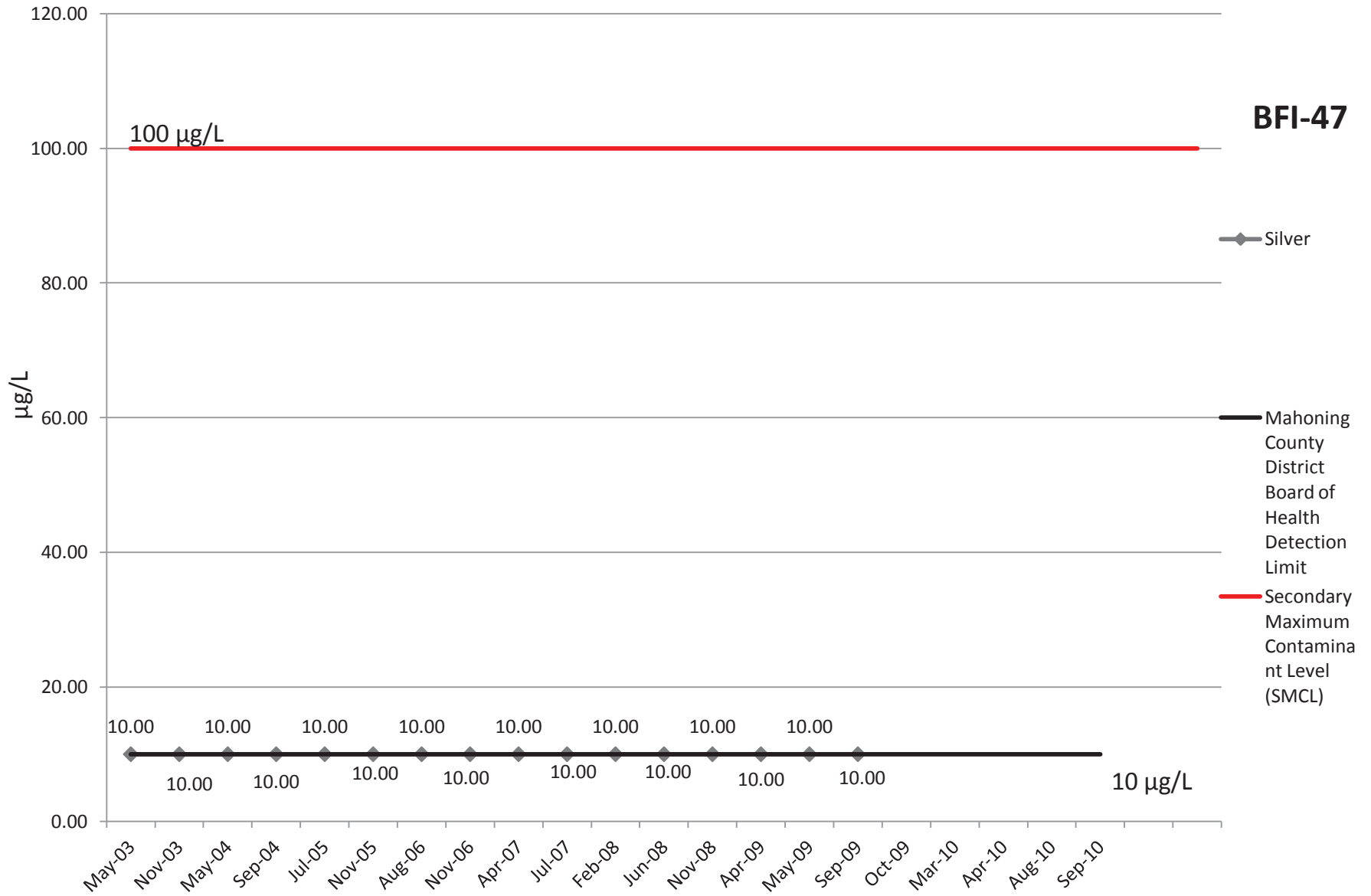


# Selenium

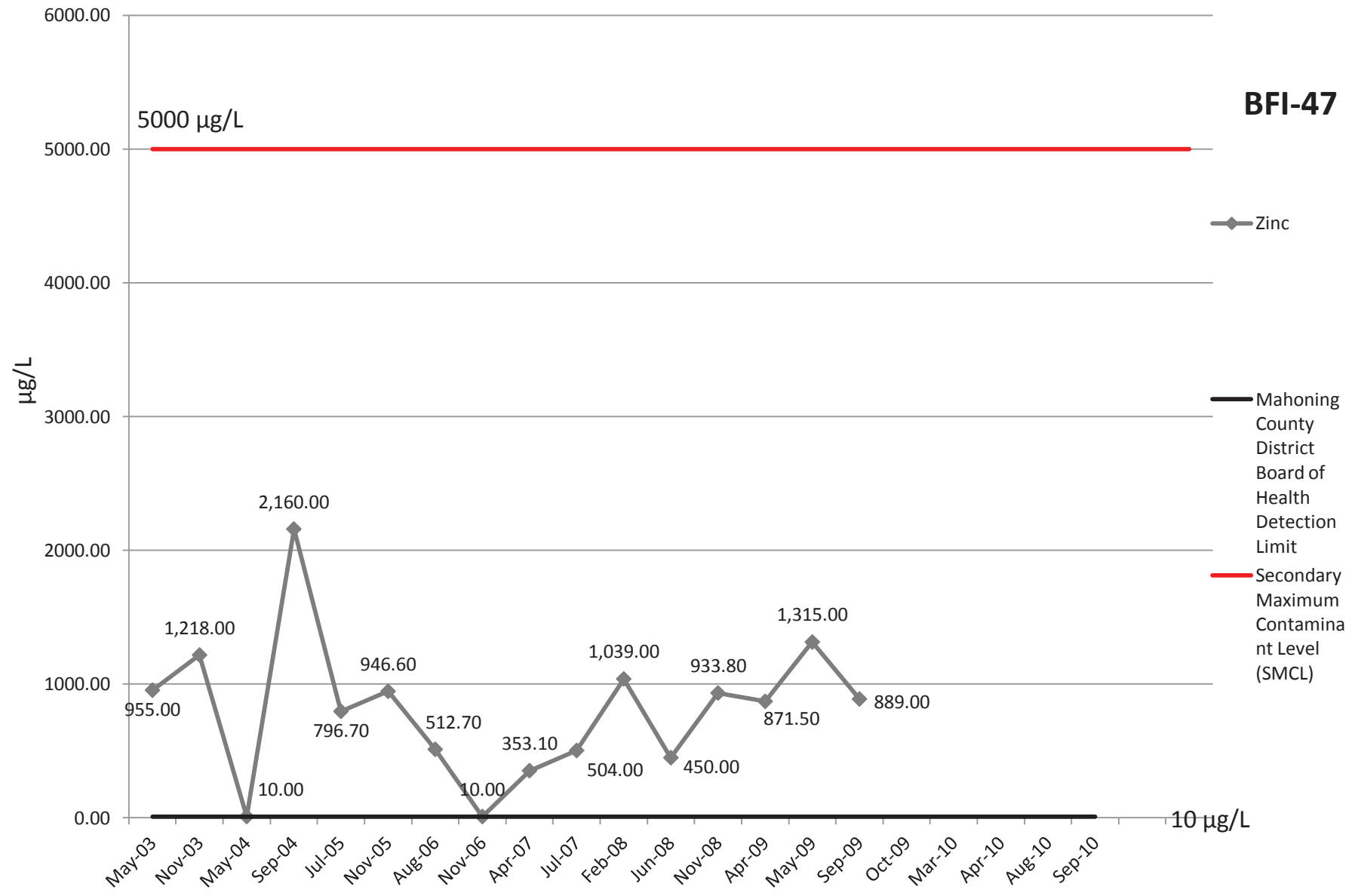


# Silver

**BFI-47**

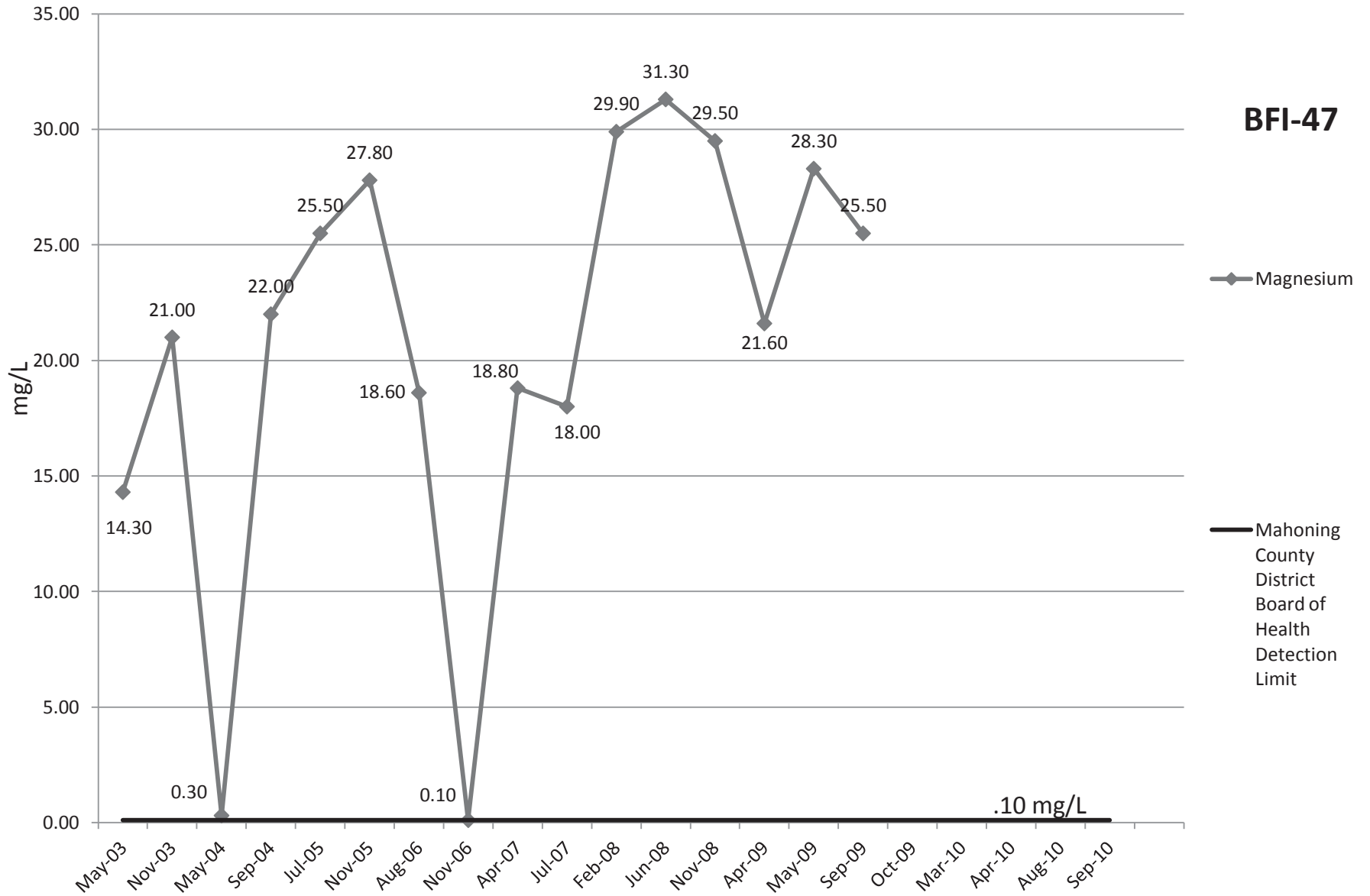


# Zinc

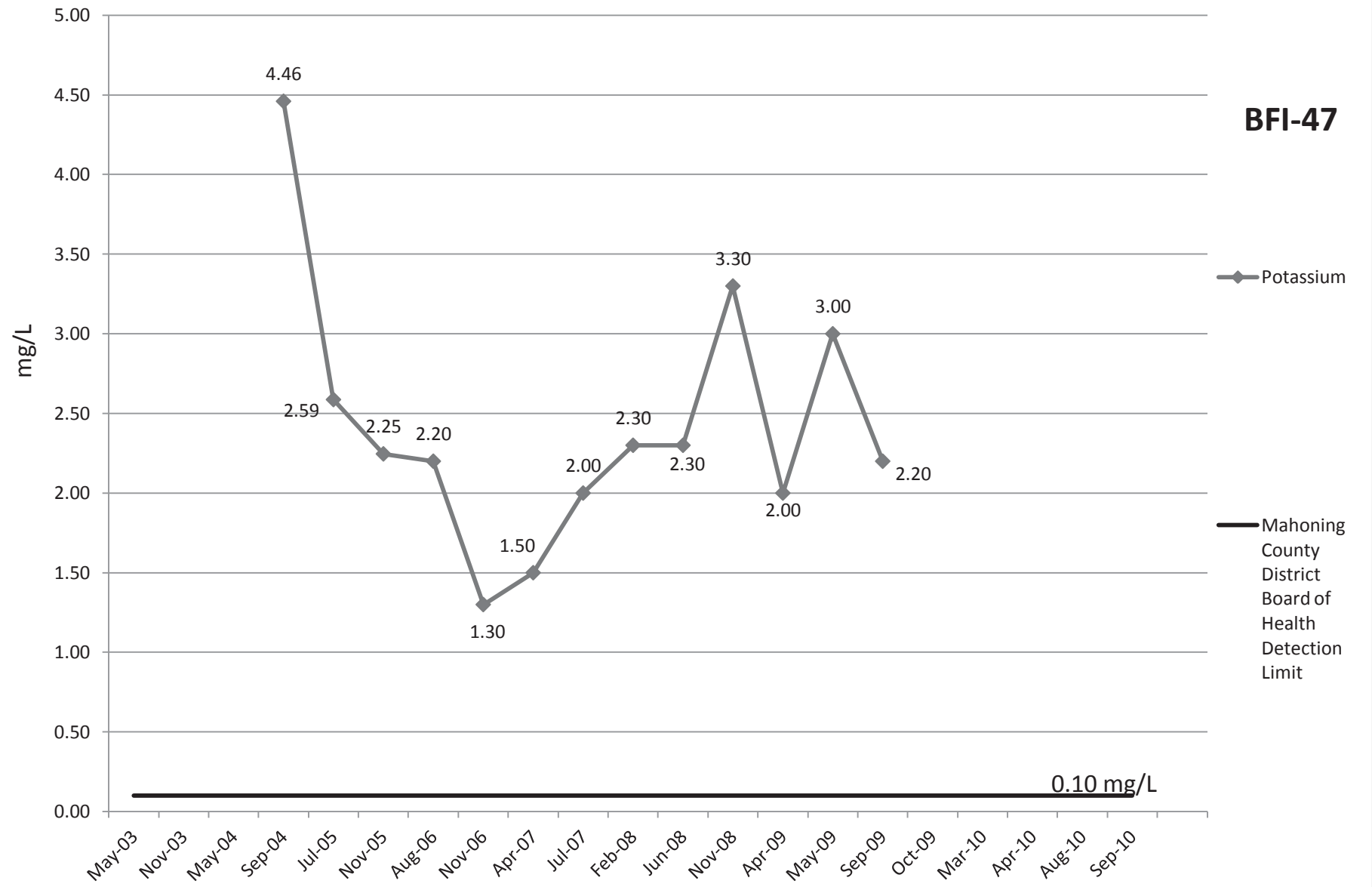


# Magnesium

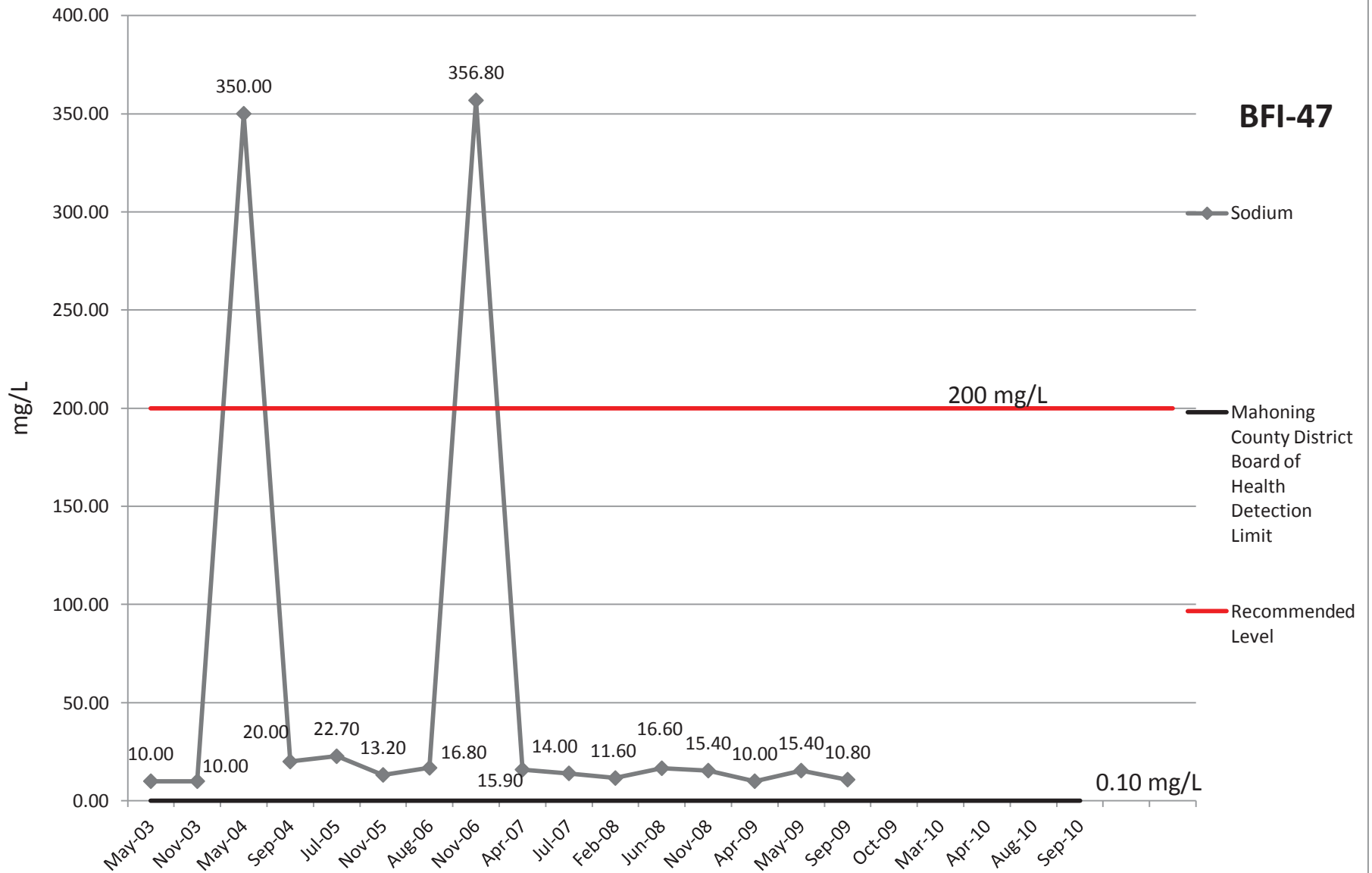
**BFI-47**



# Potassium

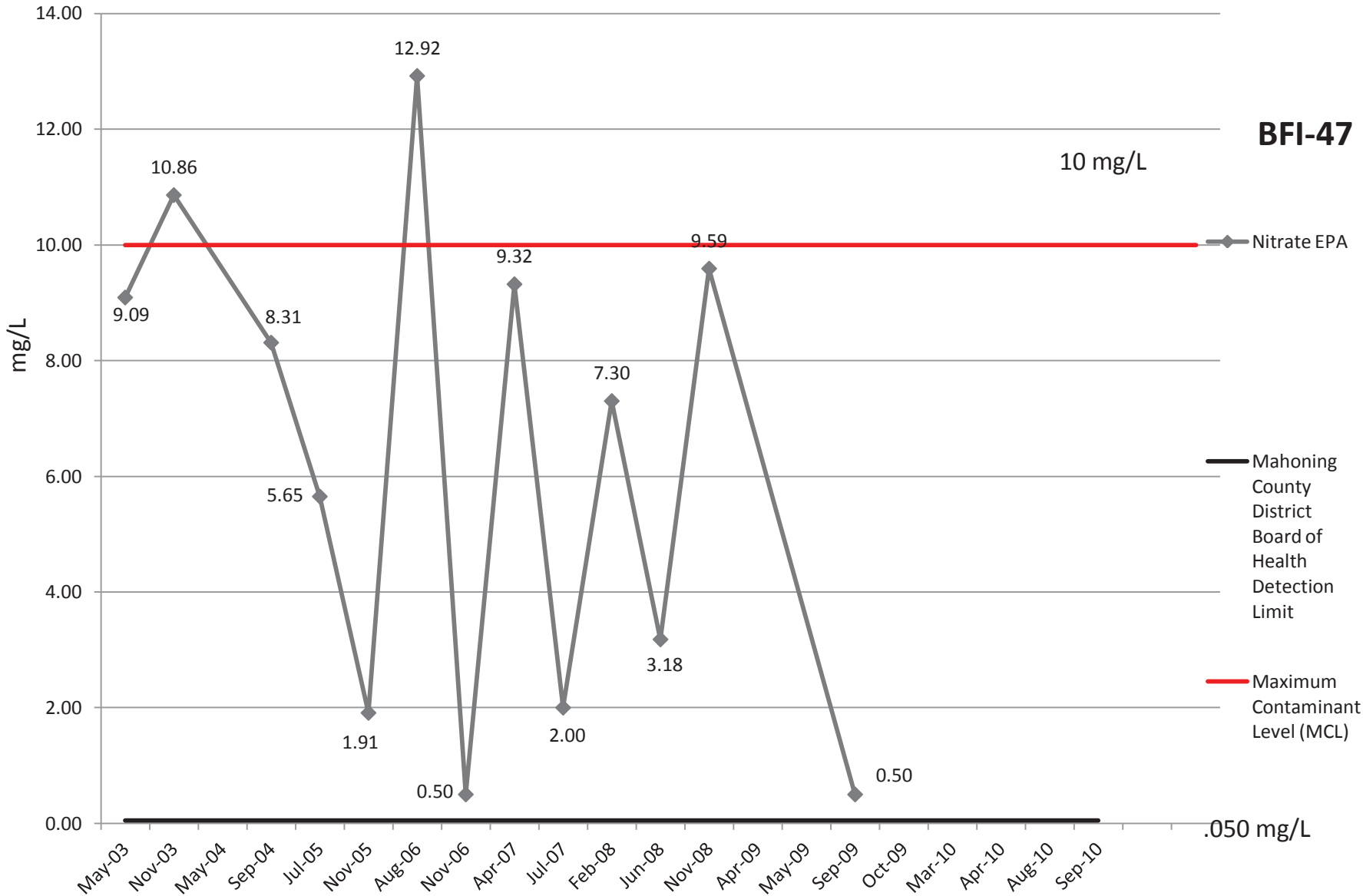


# Sodium



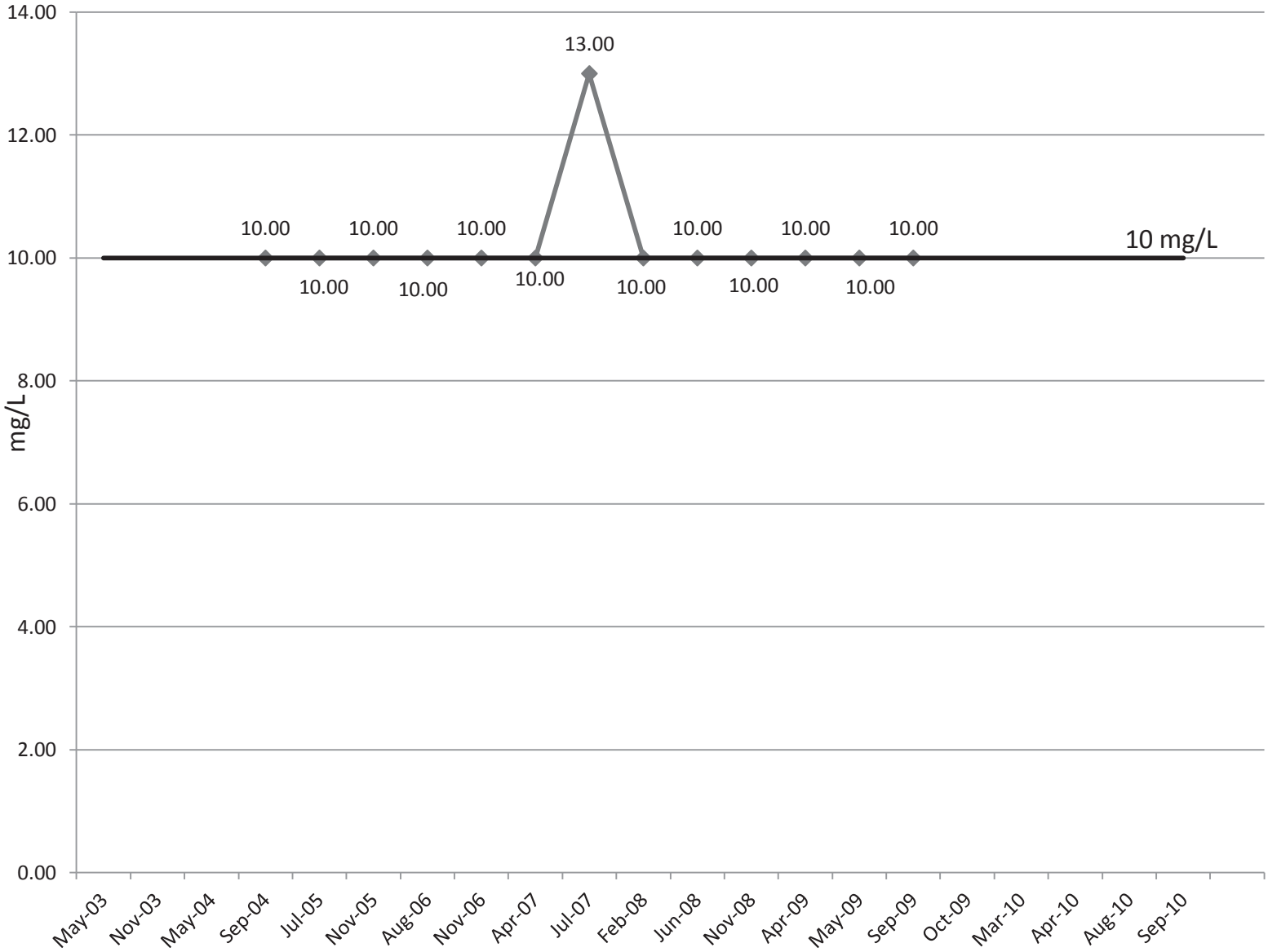
# Nitrate EPA

**BFI-47**



# COD

**BFI-47**



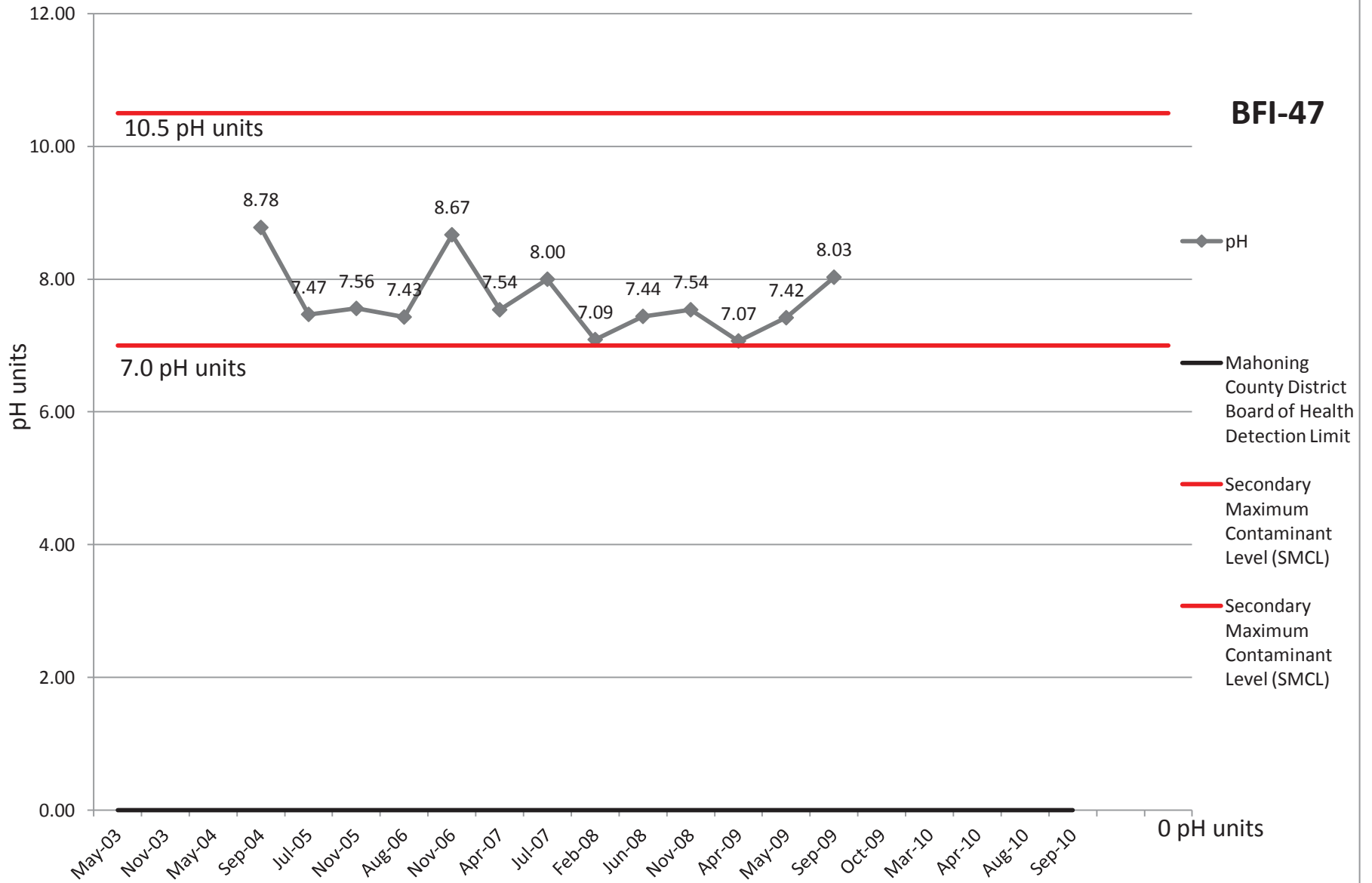
◆ COD

— Mahoning County District Board of Health Detection Limit

10 mg/L

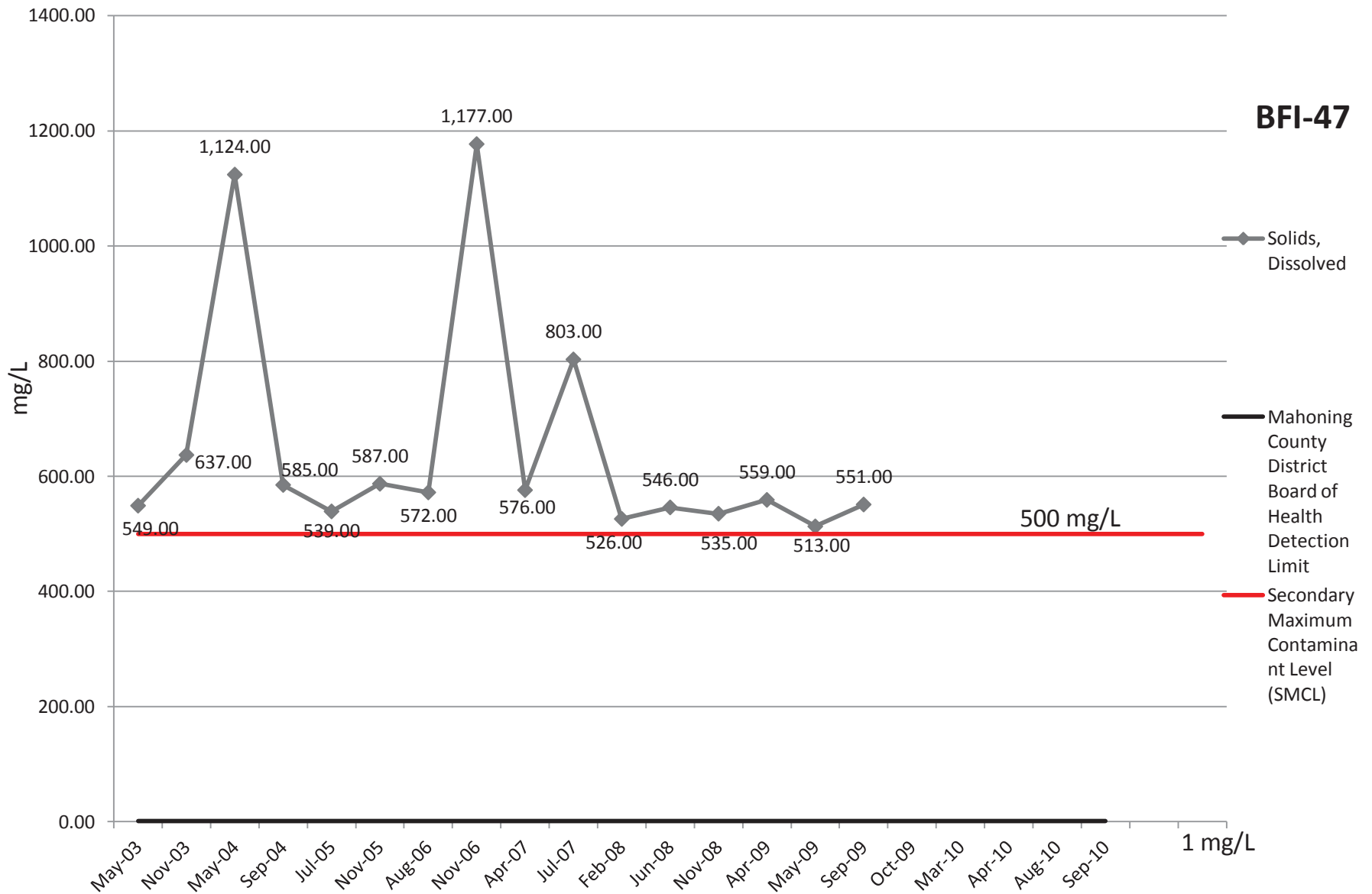


# pH

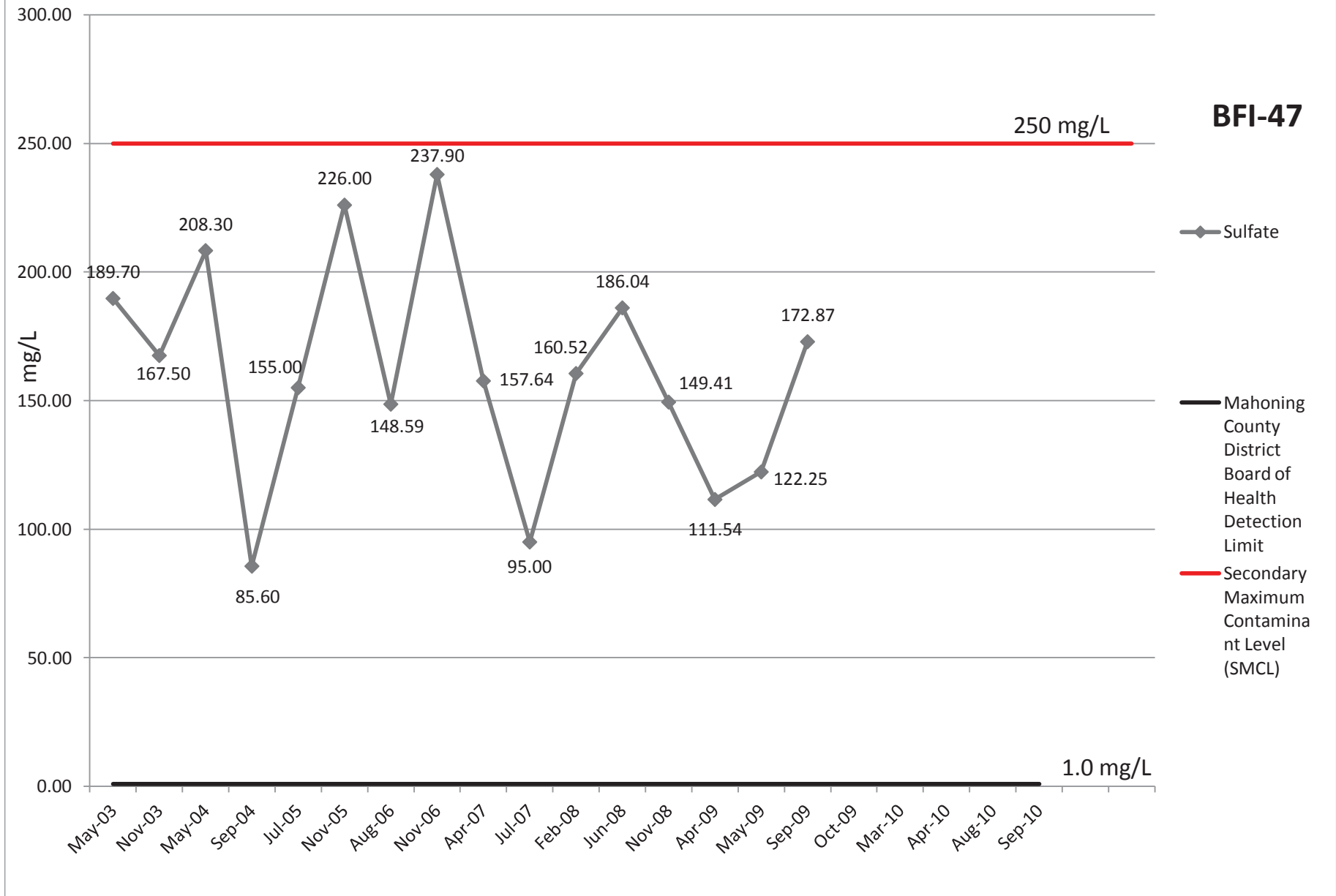


# Solids, Dissolved

**BFI-47**



# Sulfate



# Bacteria

## BFI-47

Positive/Negative

◆ Bacteria

positive (1)

1.00 1.00

1.00 1.00

1.00 1.00 1.00 1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

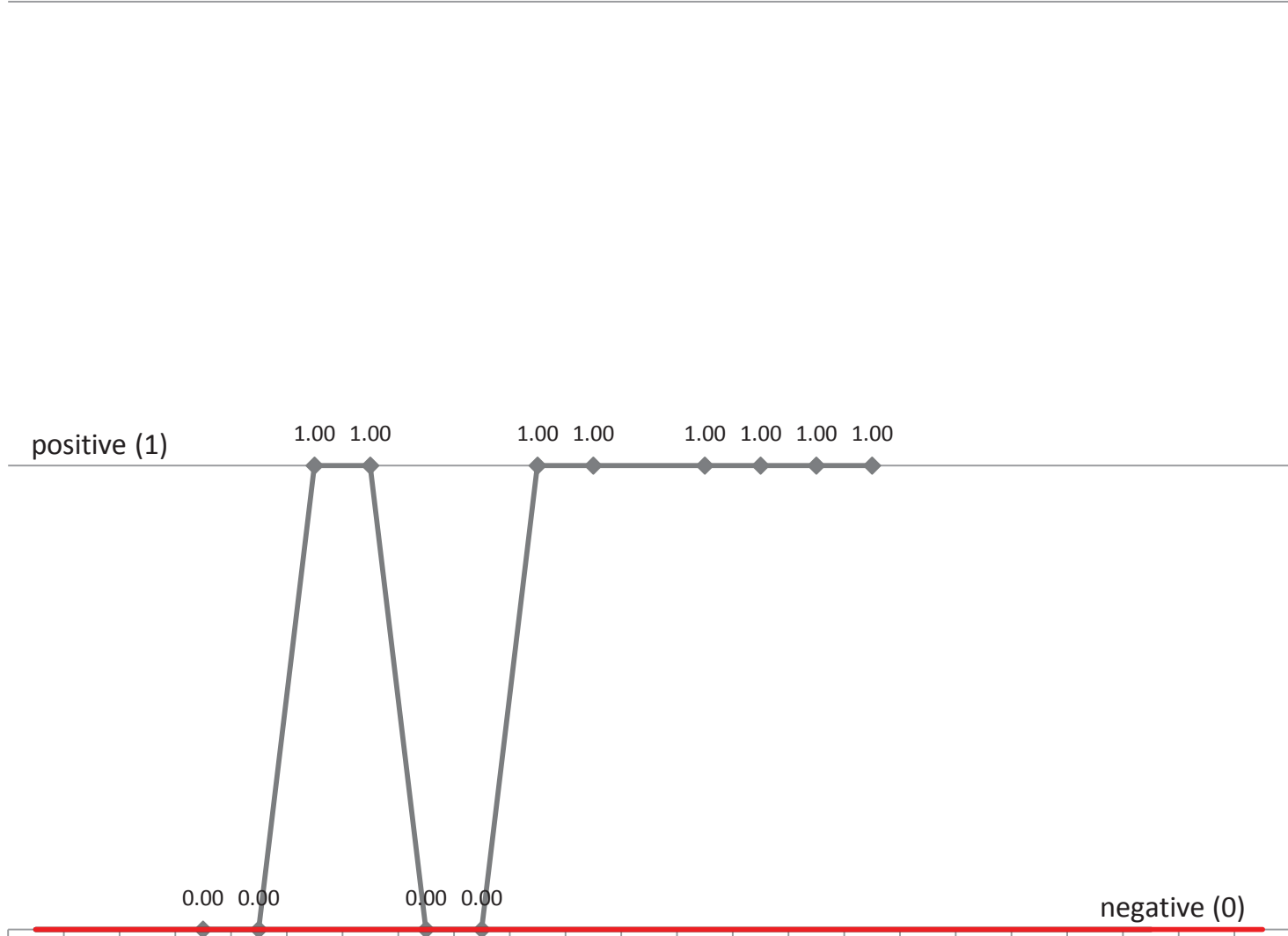
— Maximum  
Contaminant  
Level (MCL)

0.00 0.00

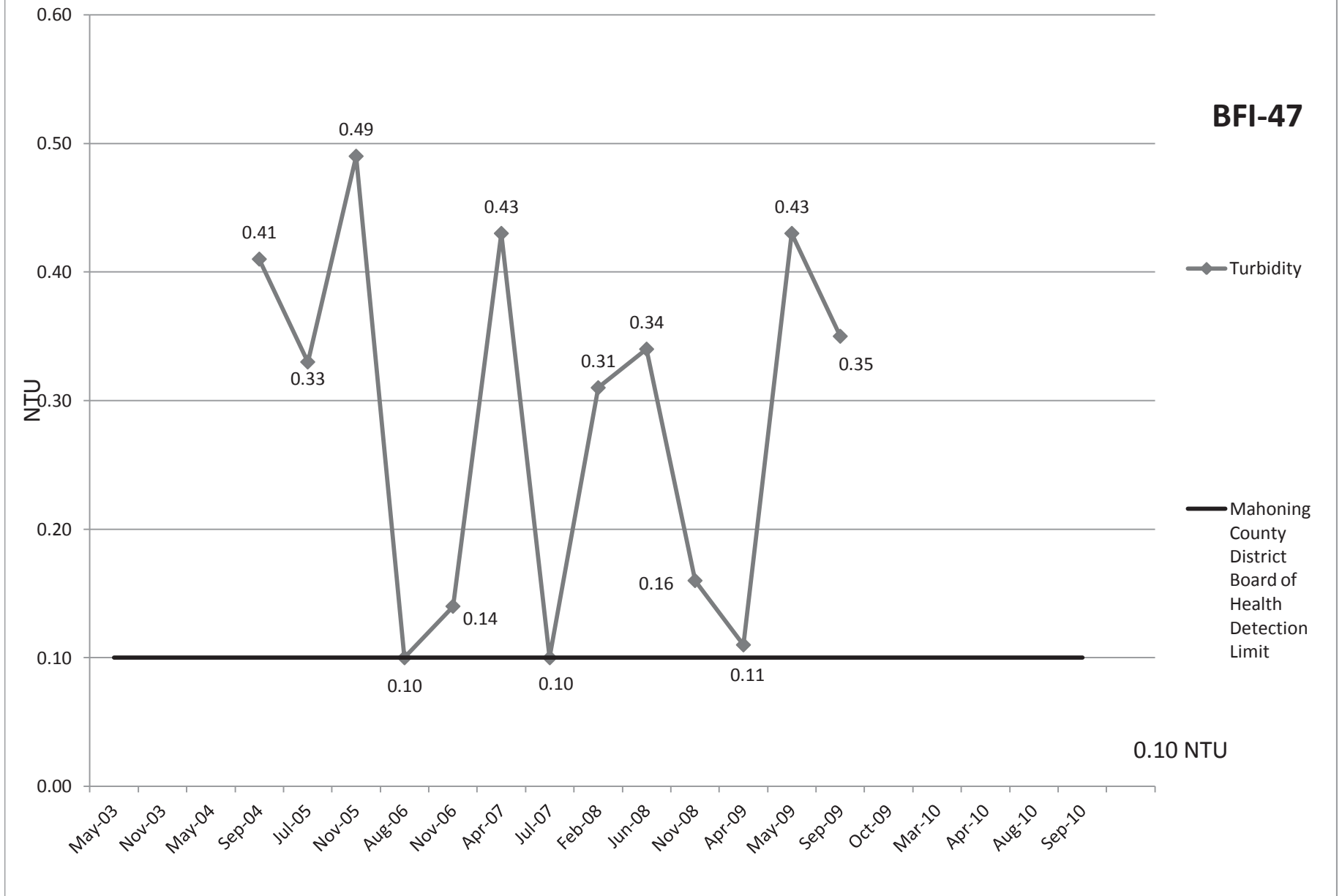
0.00 0.00

negative (0)

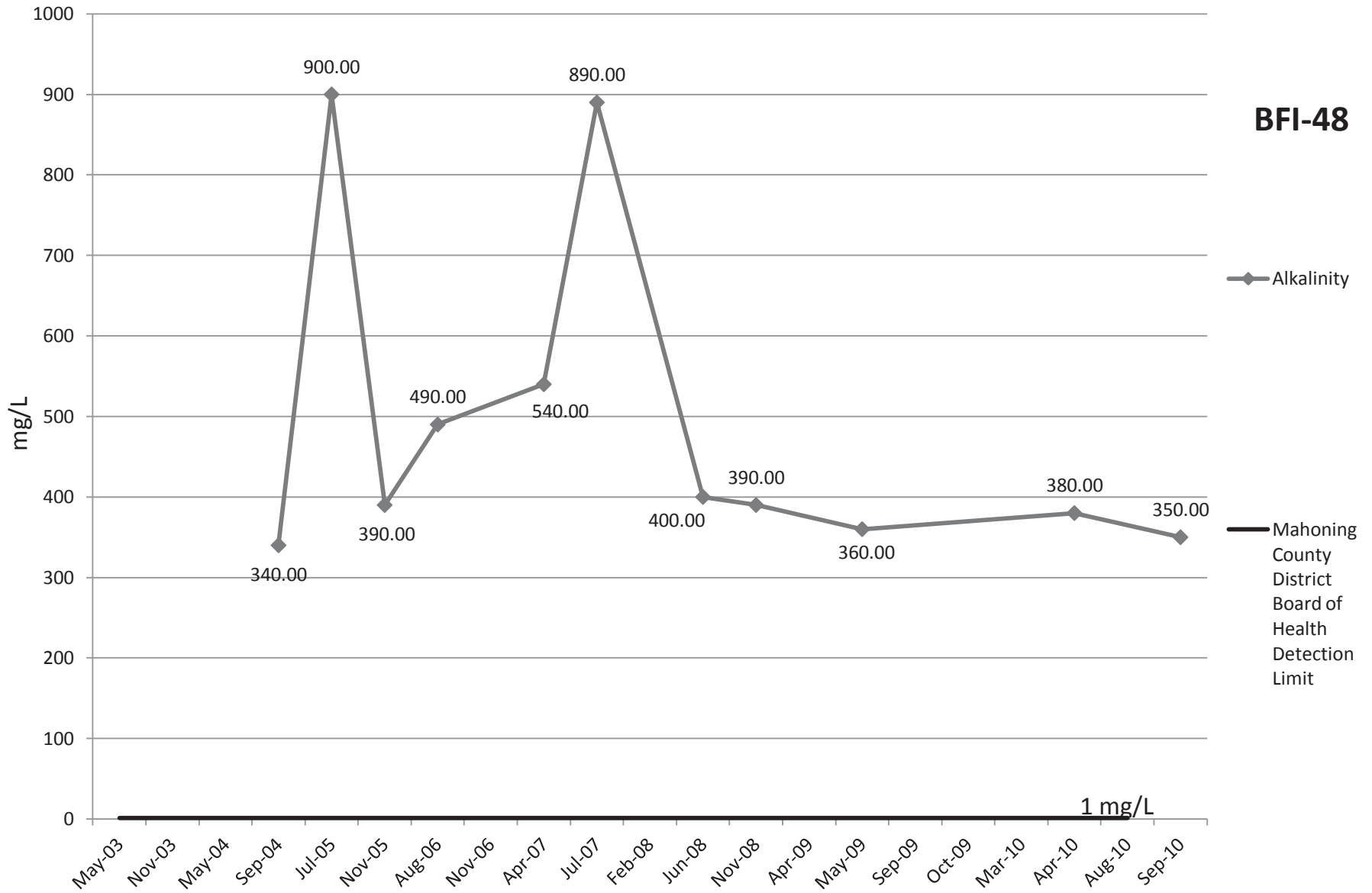
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



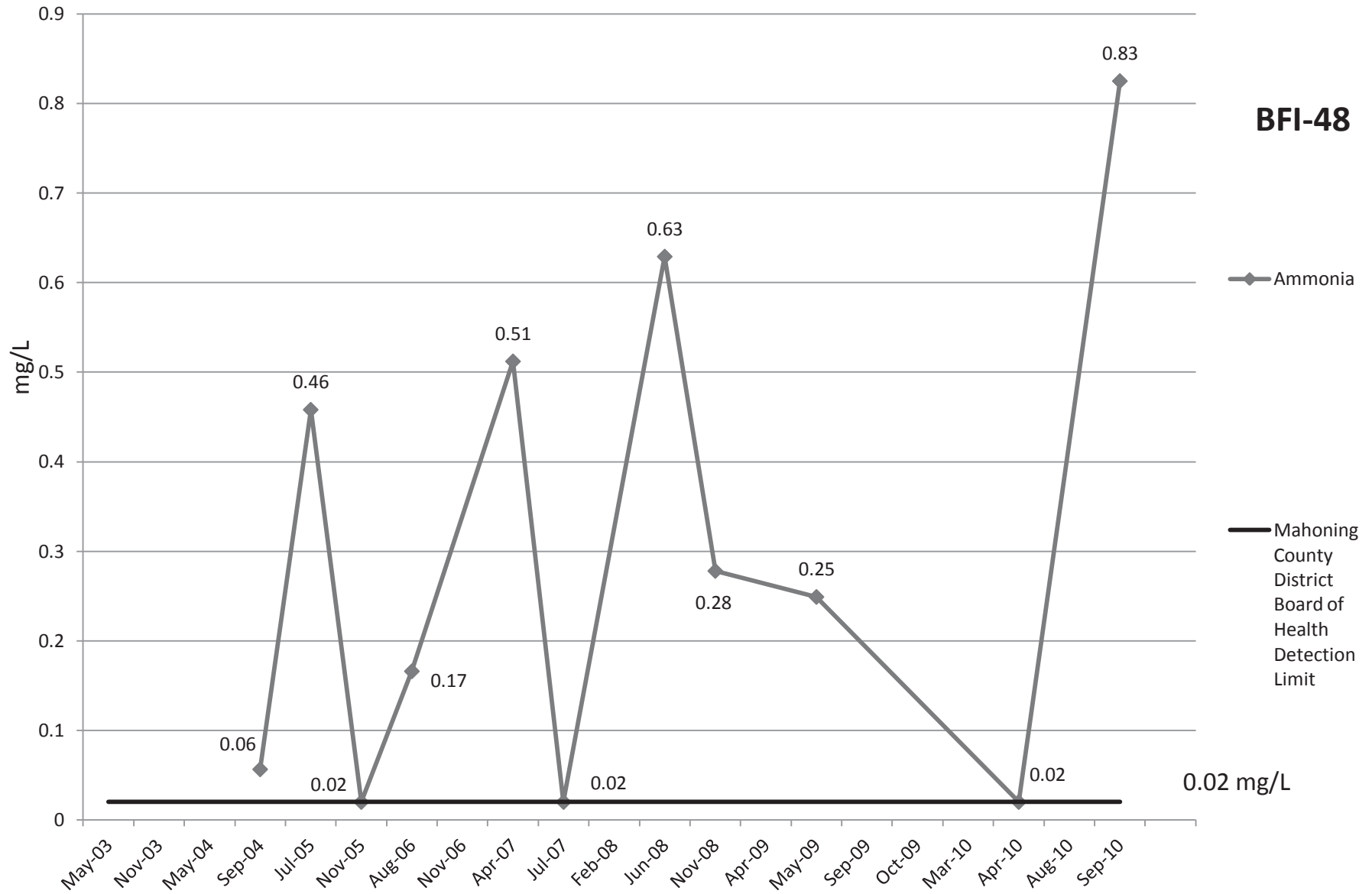
# Turbidity



# Alkalinity

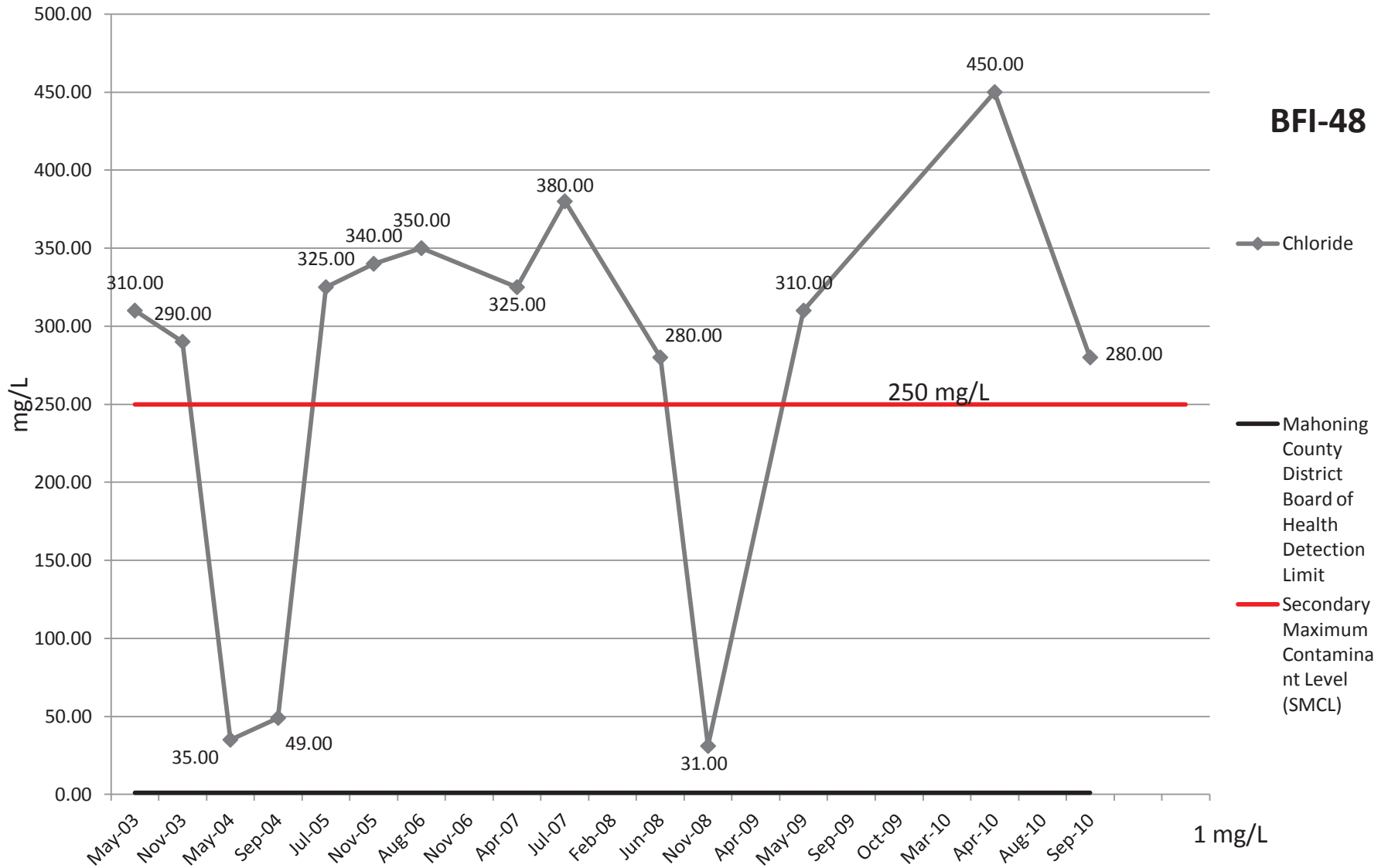


# Ammonia



# Chloride

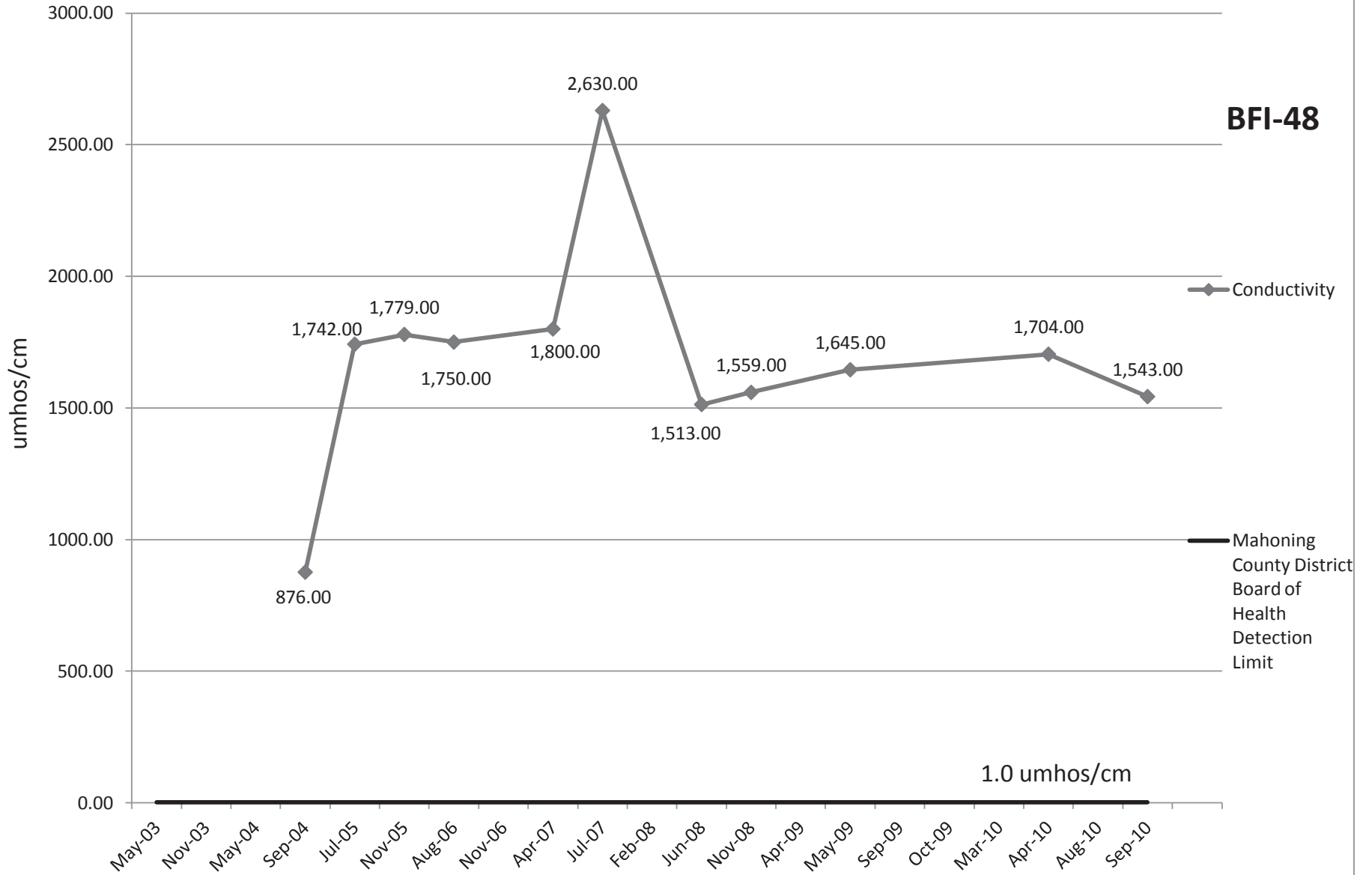
**BFI-48**



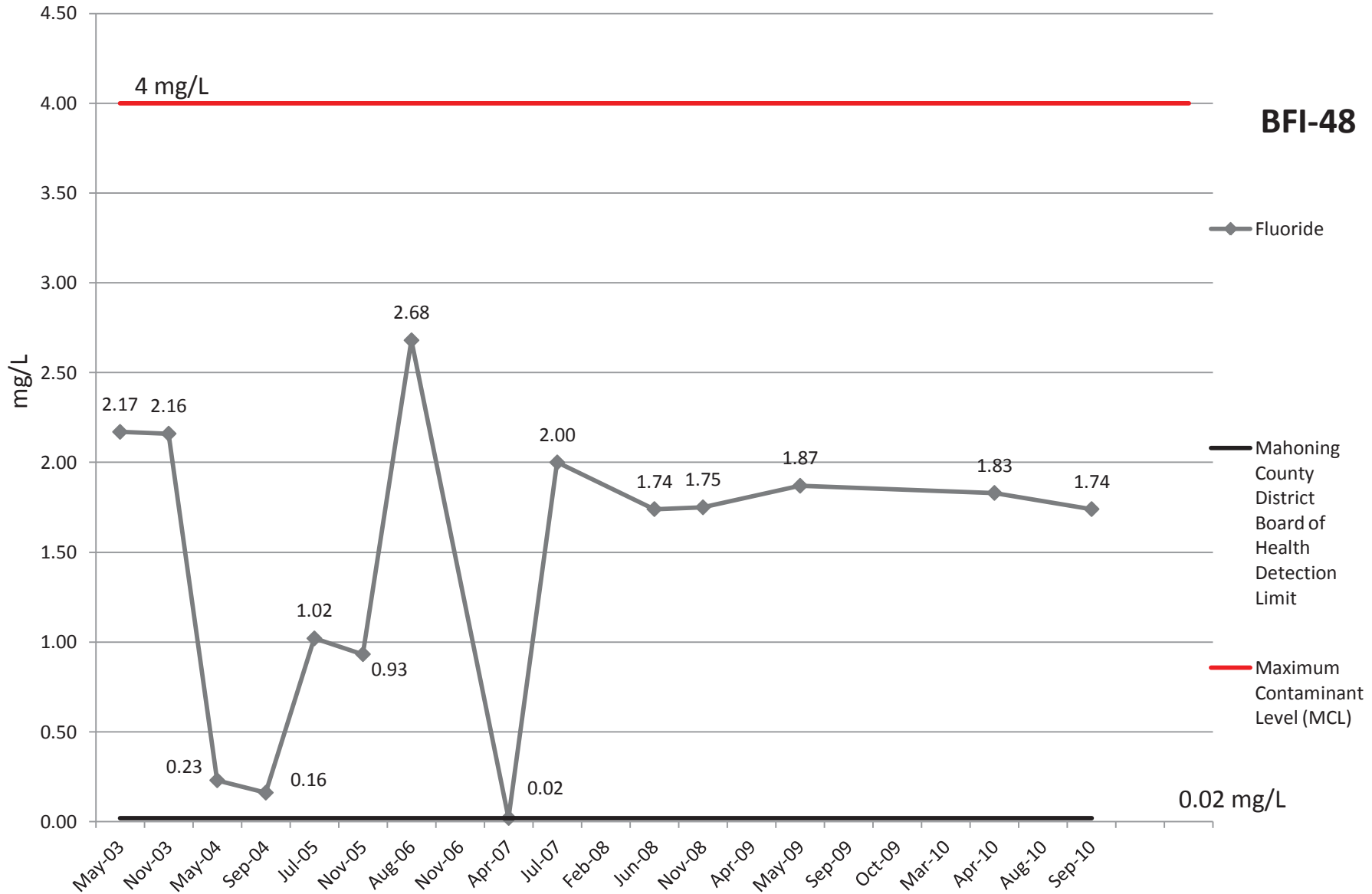


# Conductivity

**BFI-48**



# Fluoride



**BFI-48**

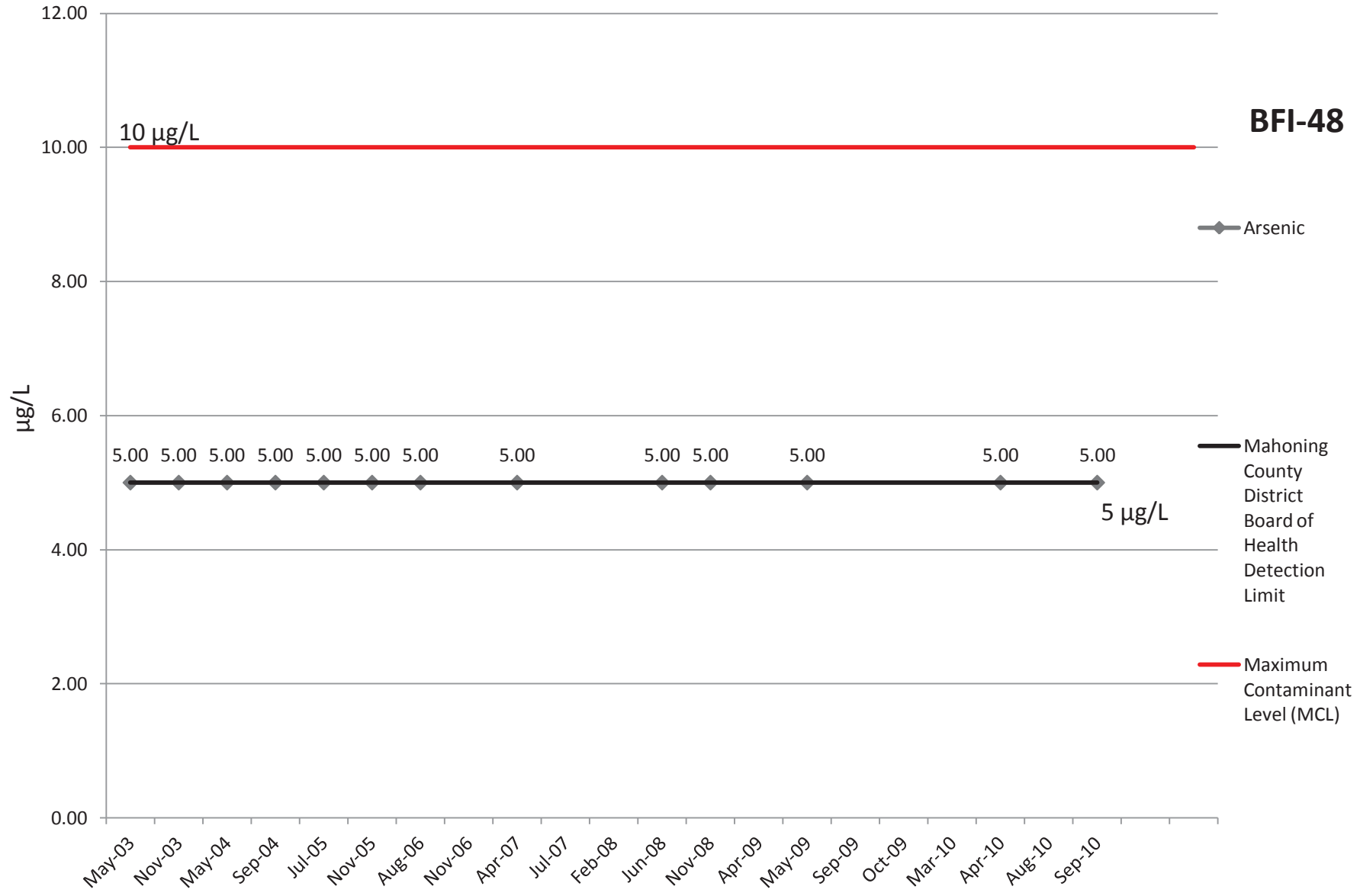
◆ Fluoride

— Mahoning County District Board of Health Detection Limit

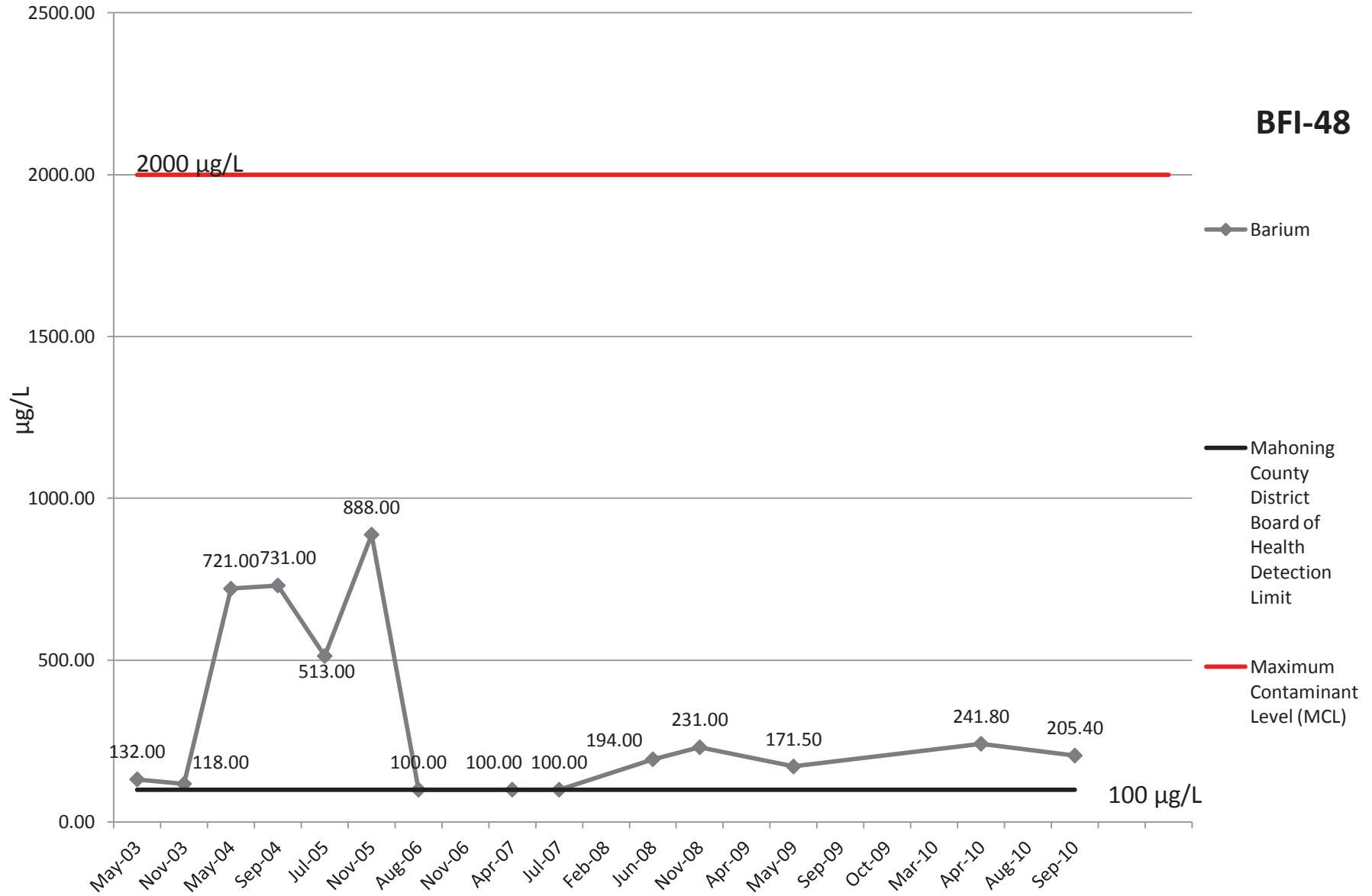
— Maximum Contaminant Level (MCL)

0.02 mg/L

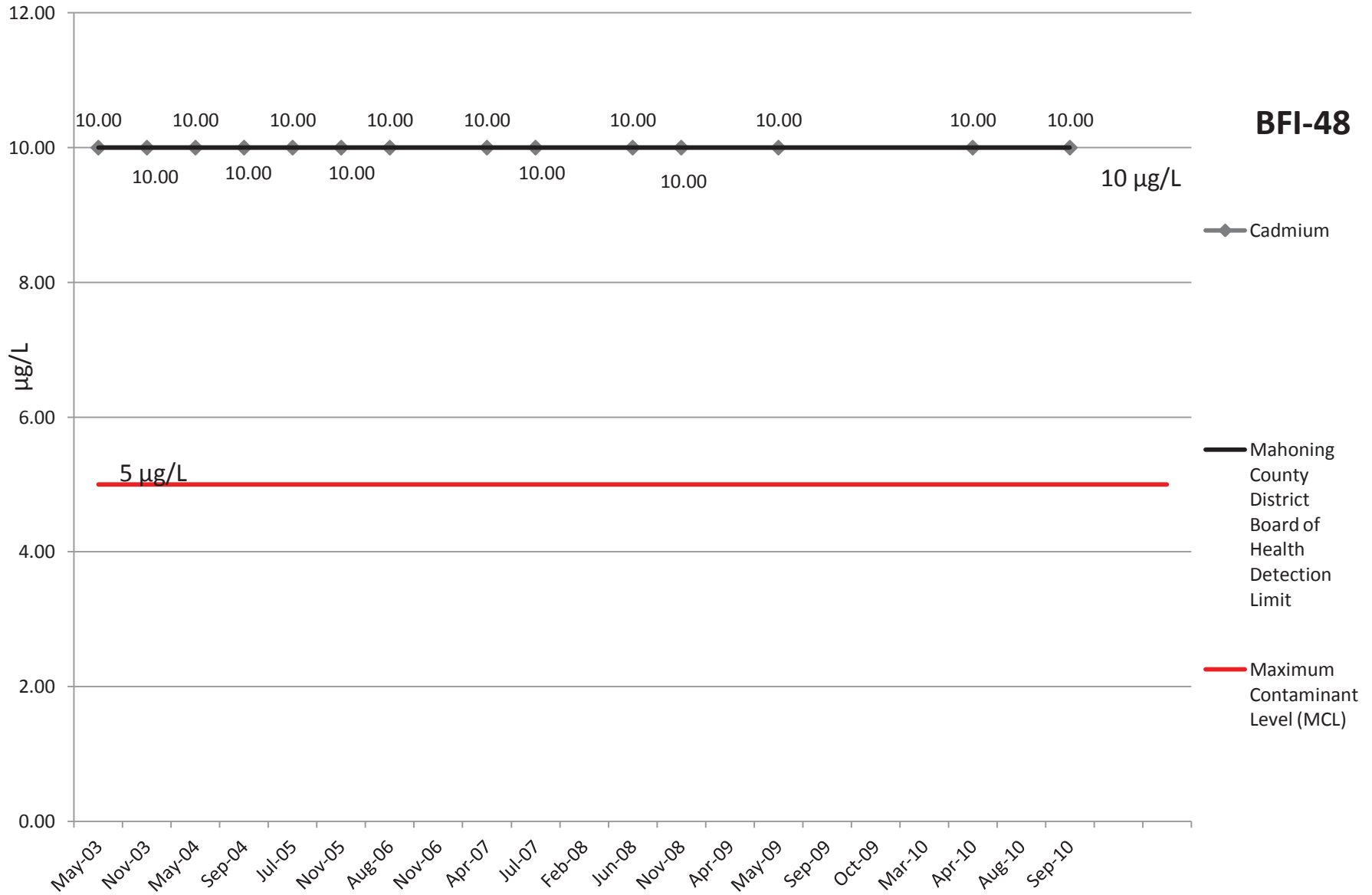
# Arsenic



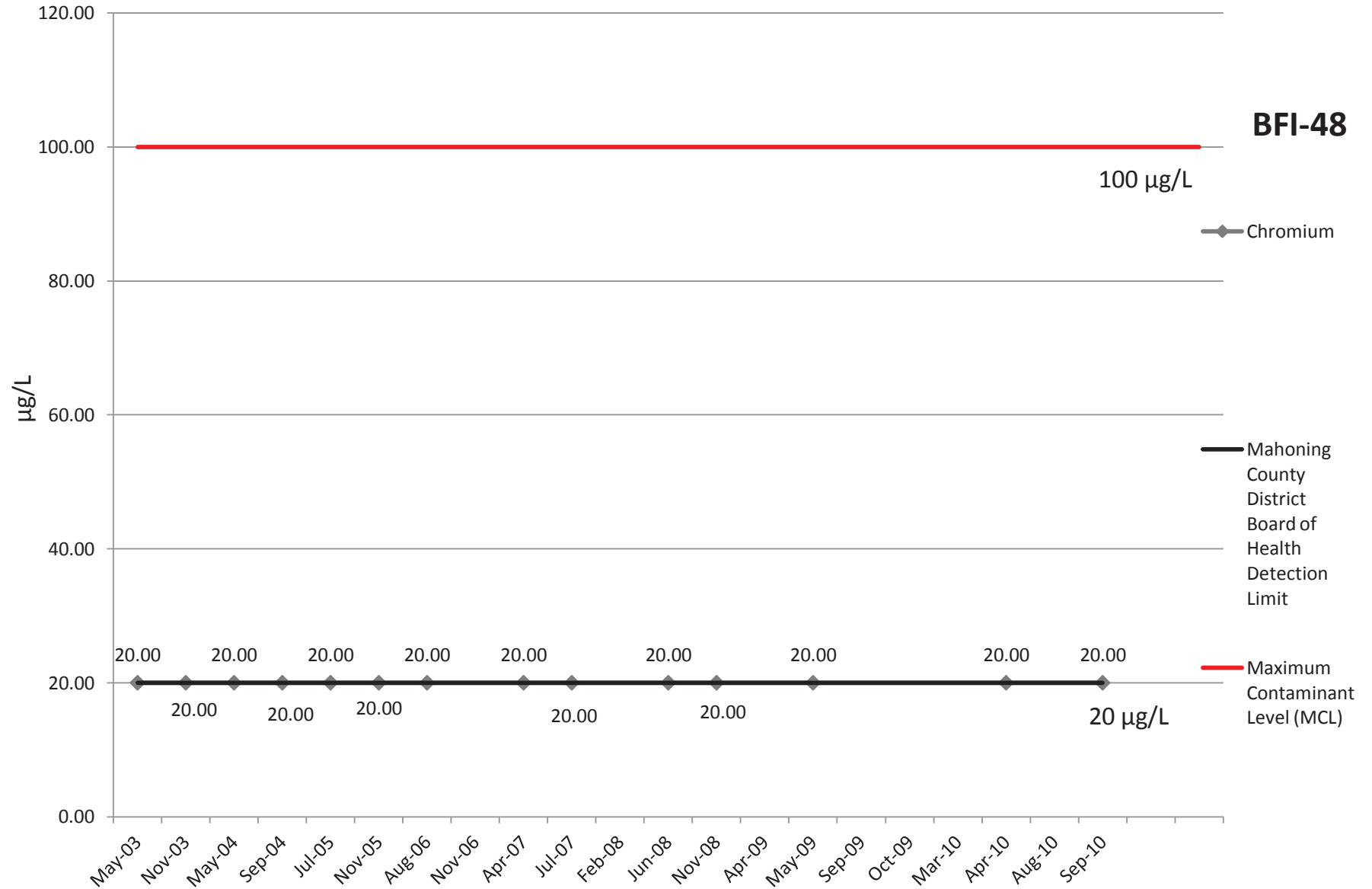
# Barium



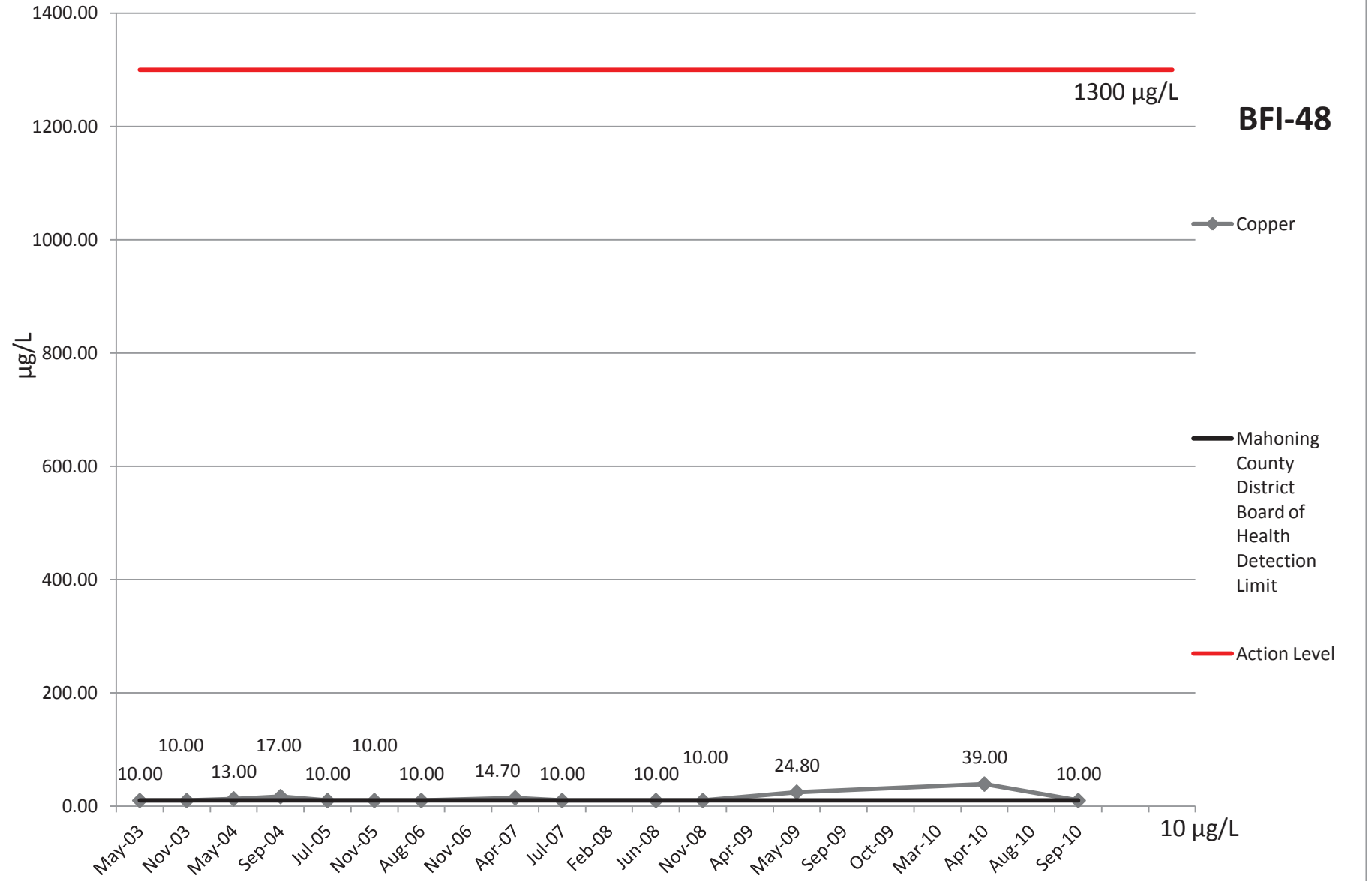
# Cadmium



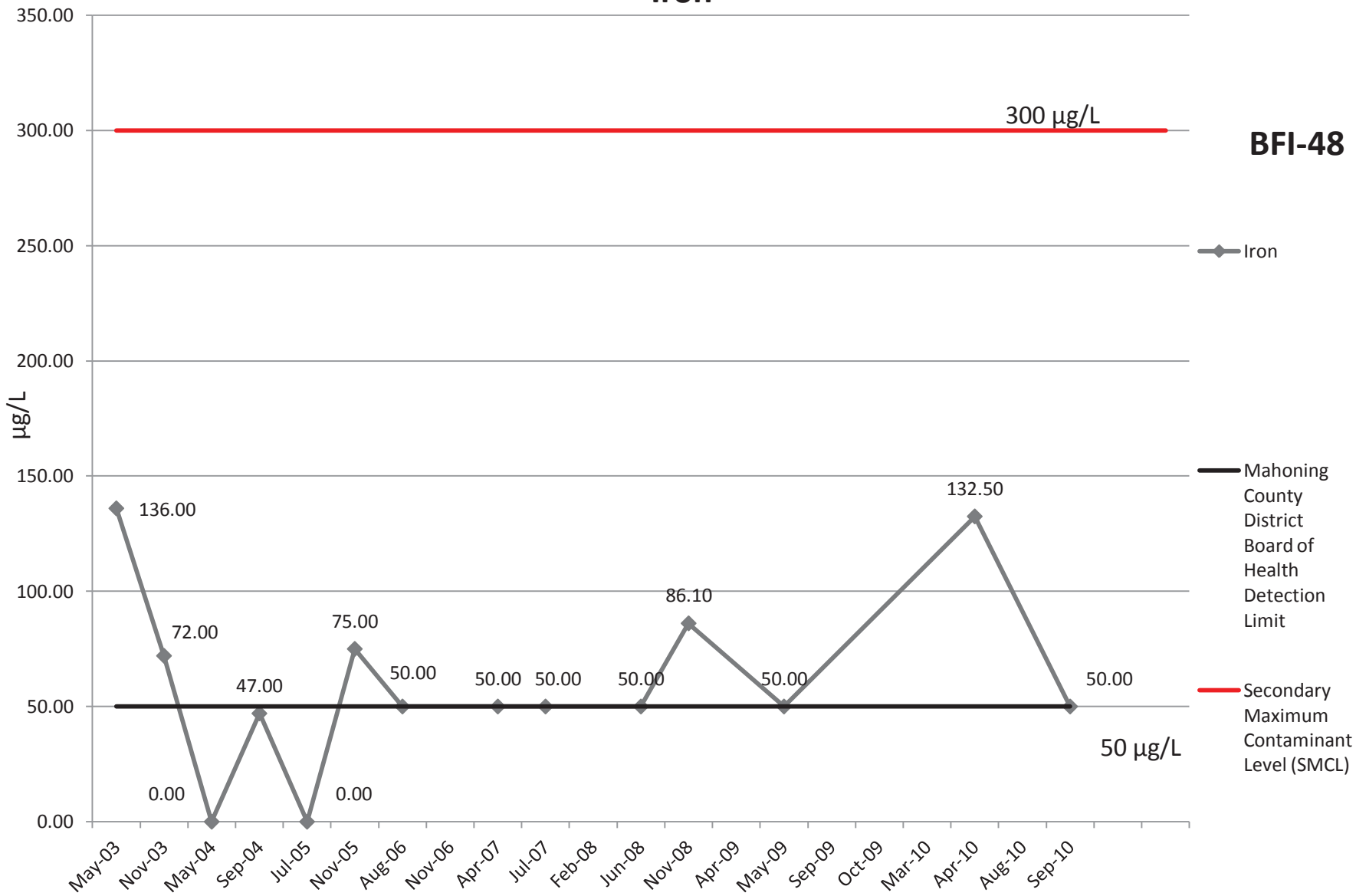
# Chromium



# Copper



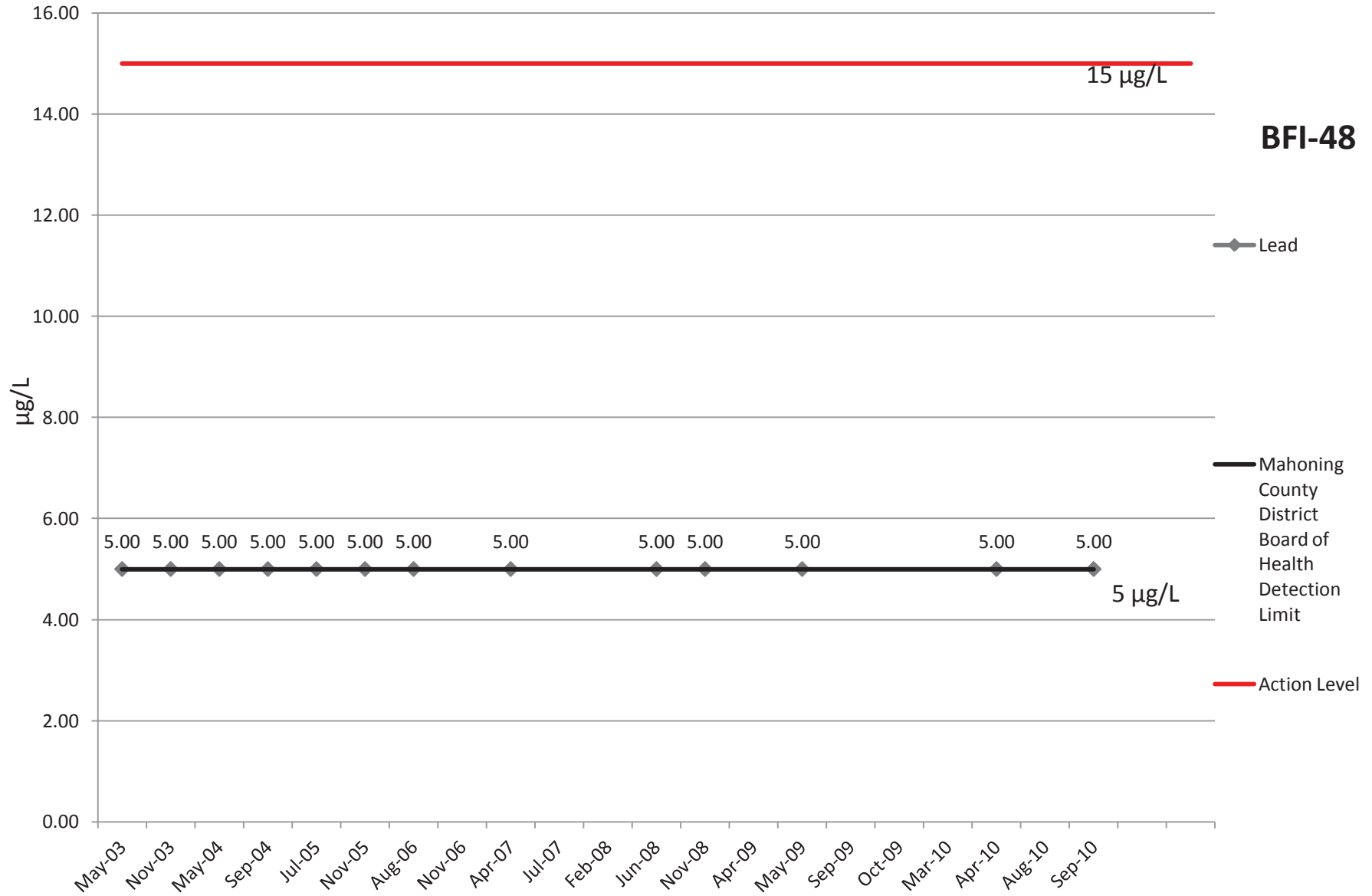
# Iron





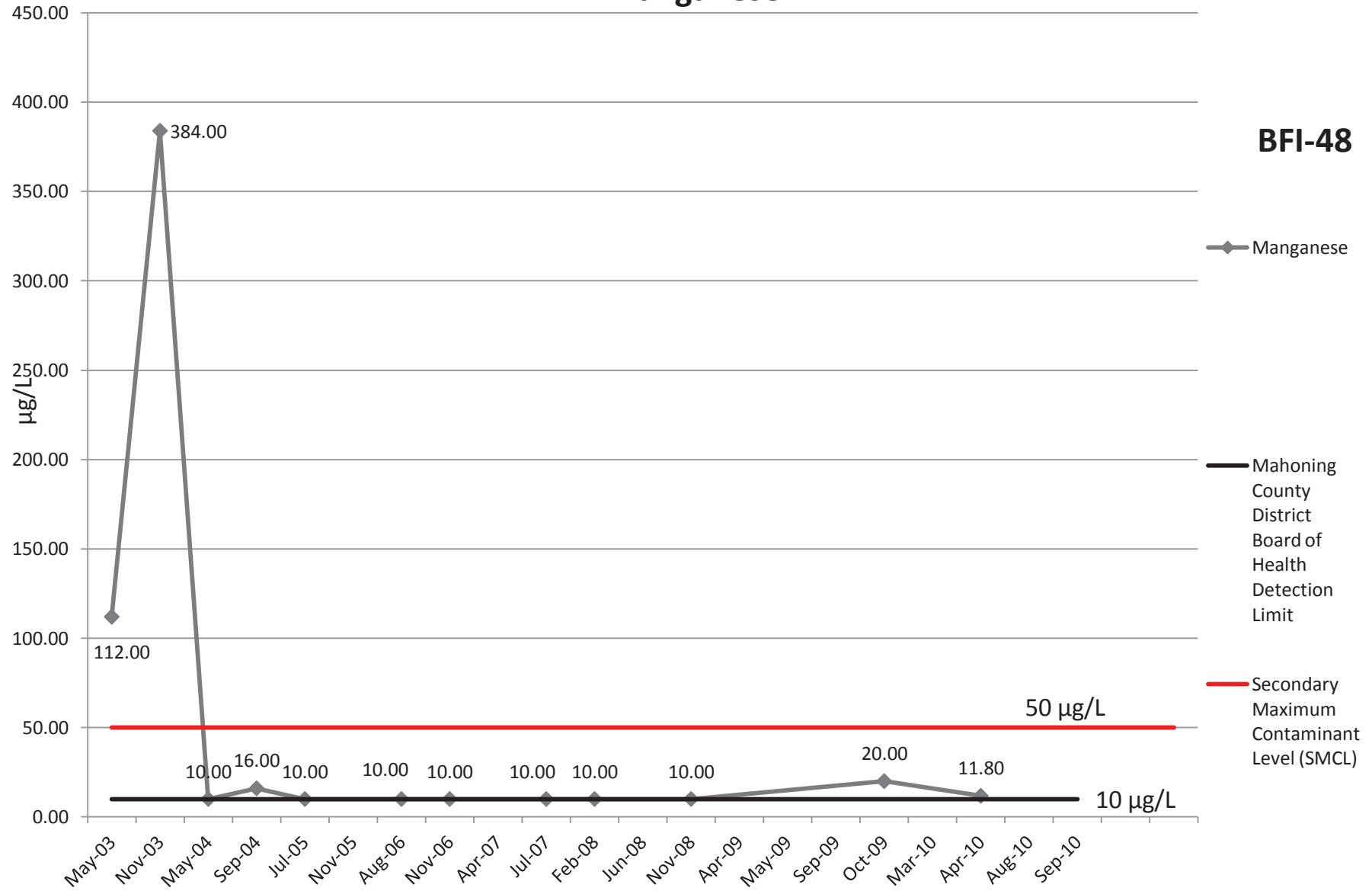
# Lead

**BFI-48**



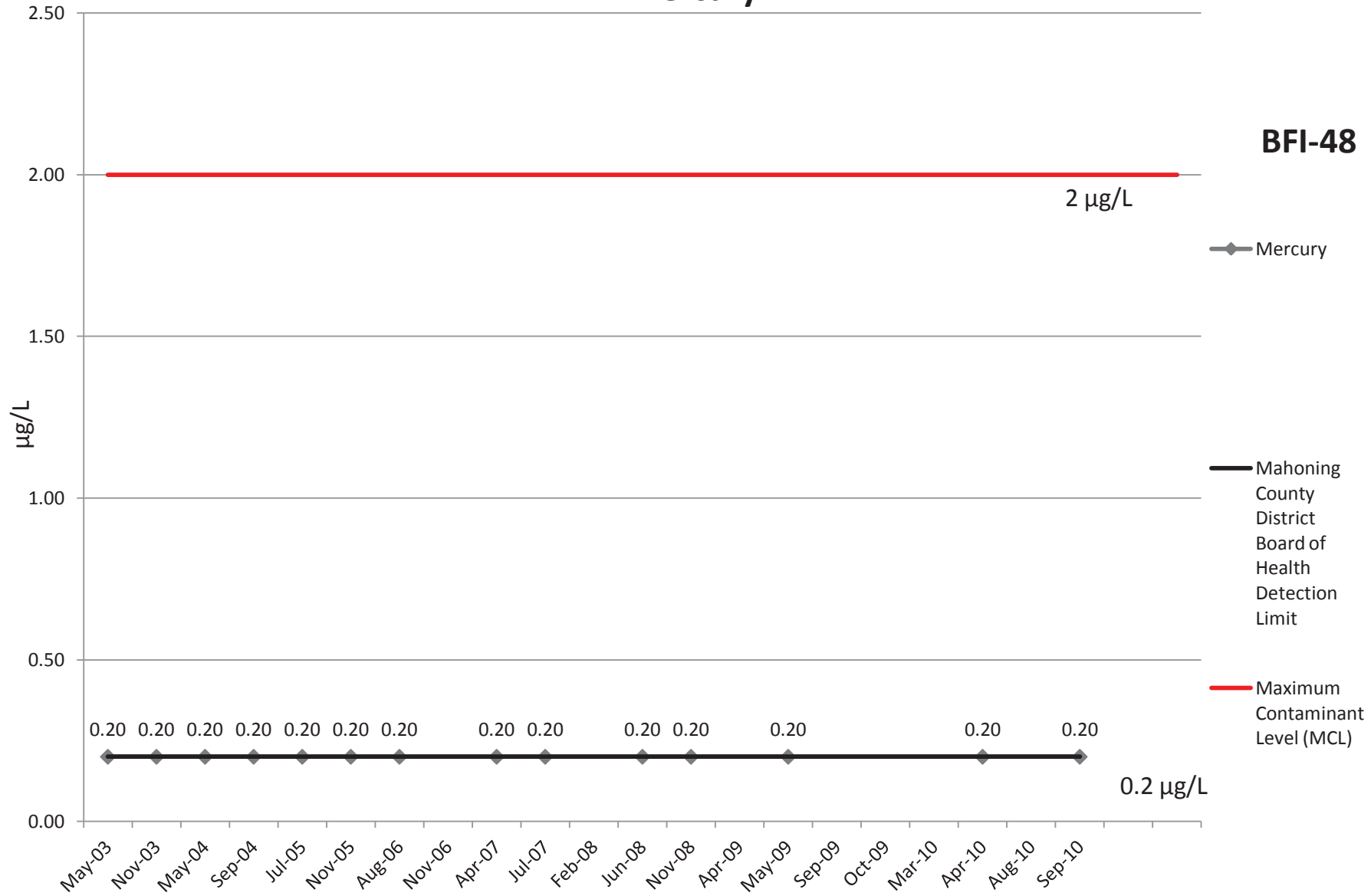
# Manganese

**BFI-48**

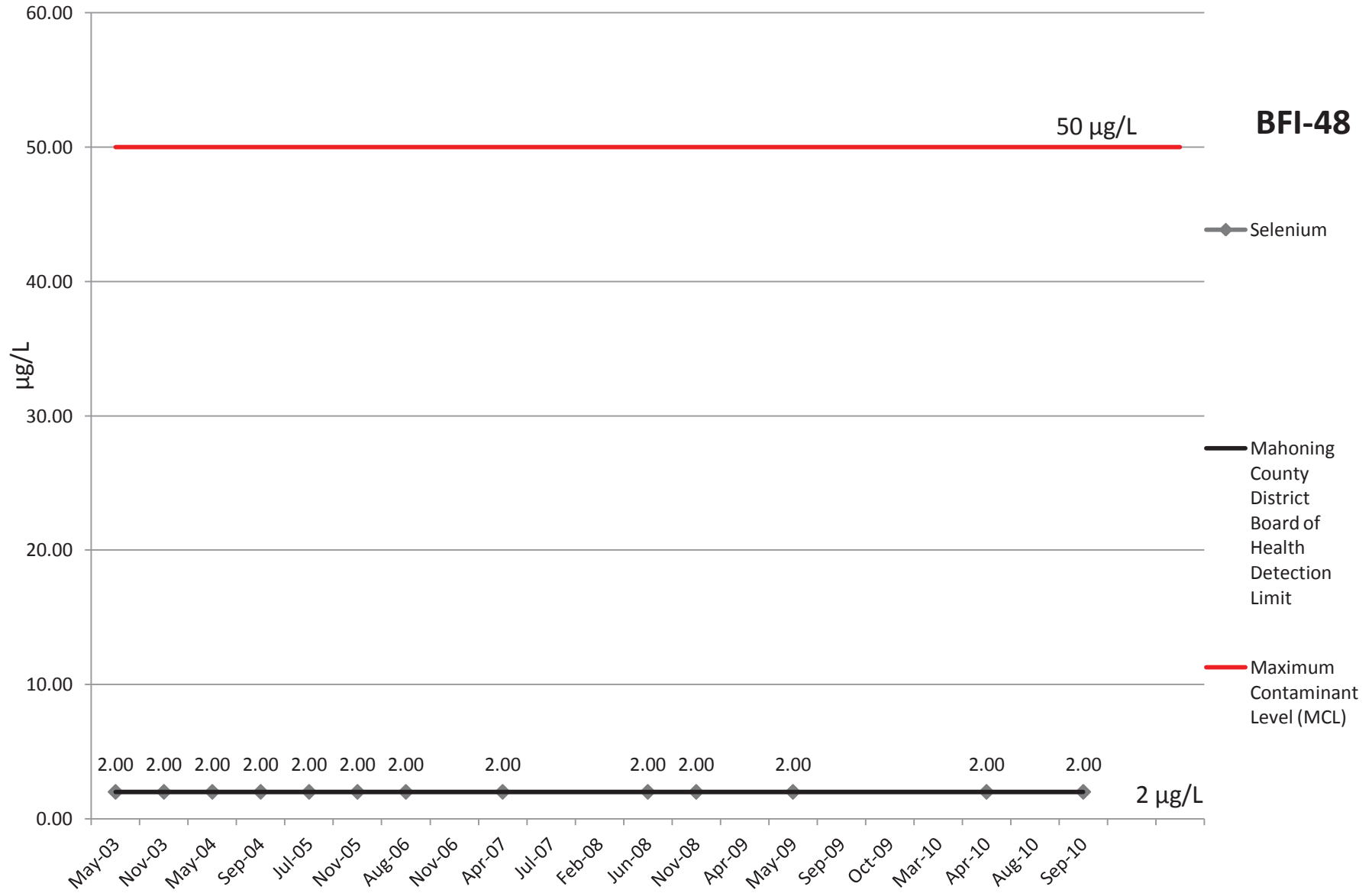


# Mercury

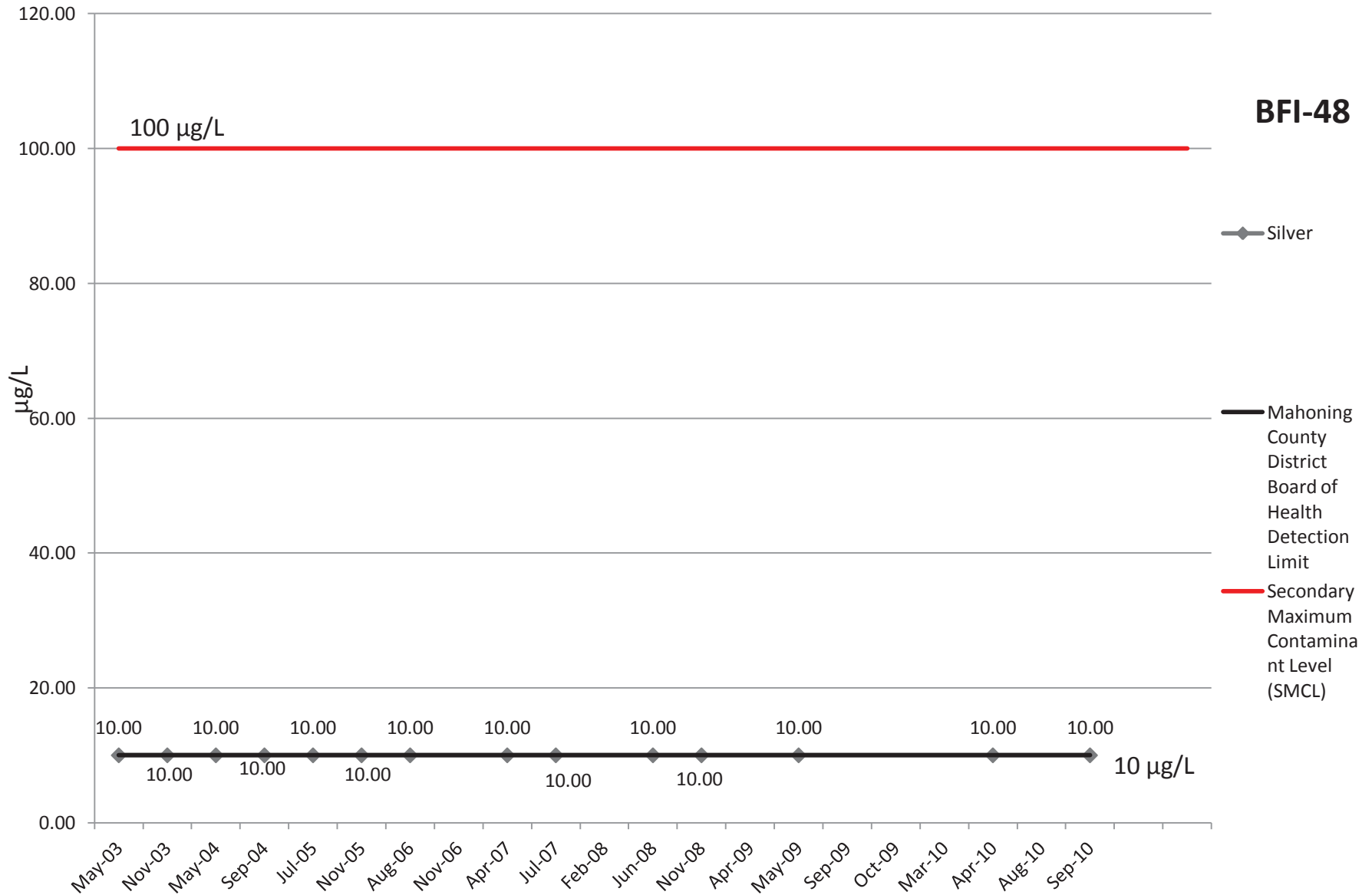
**BFI-48**



# Selenium



# Silver



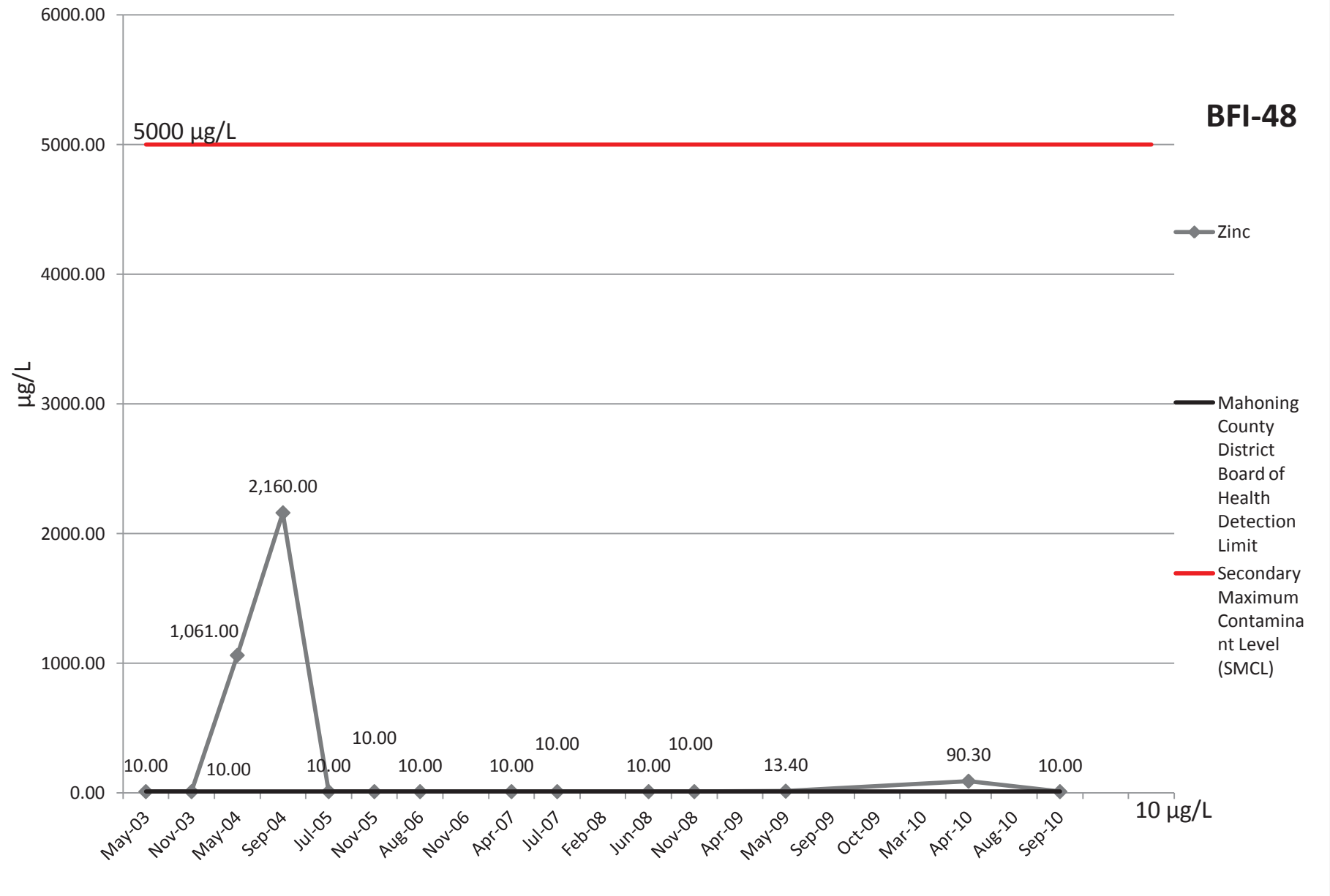
**BFI-48**

◆ Silver

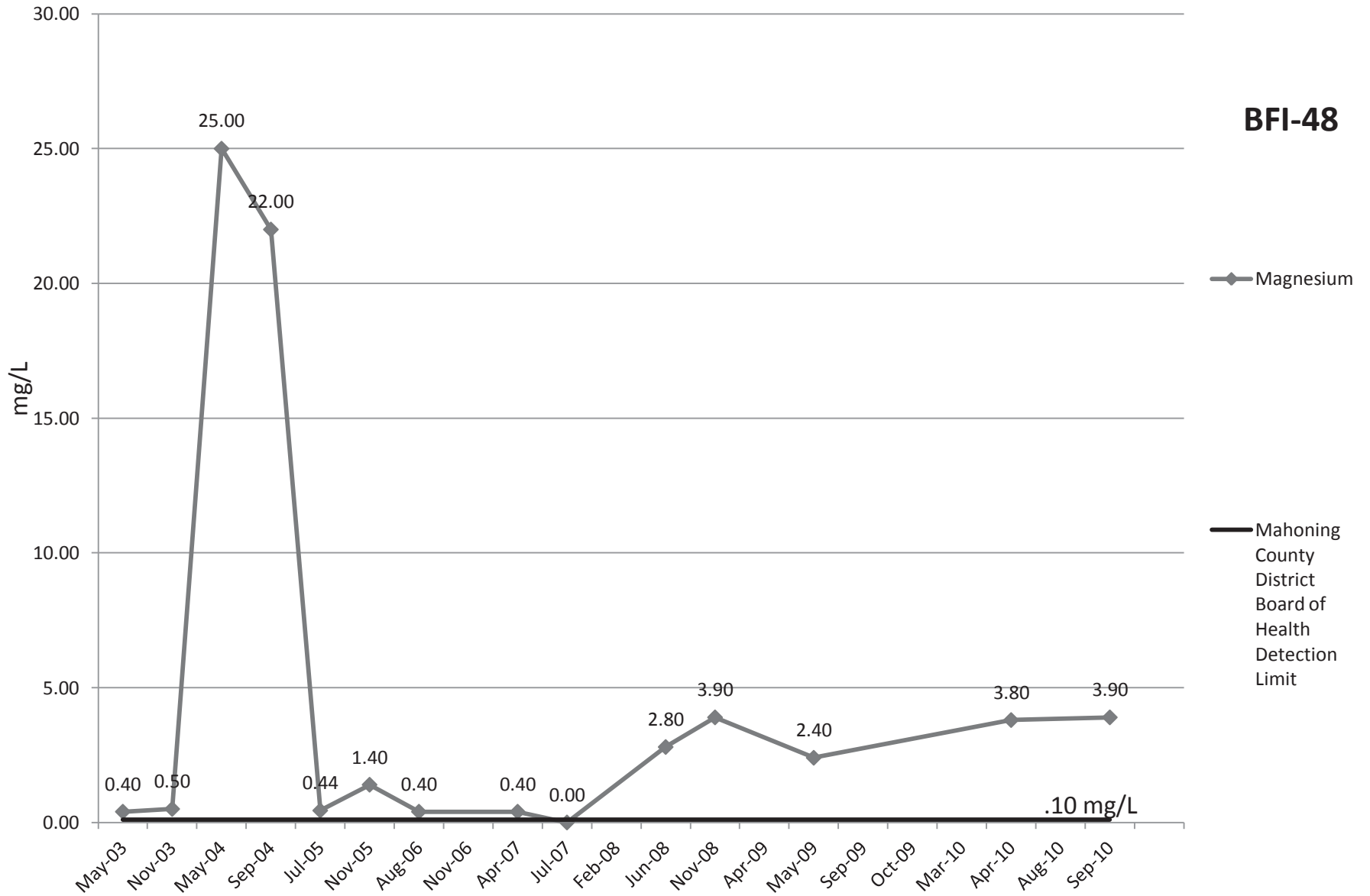
— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

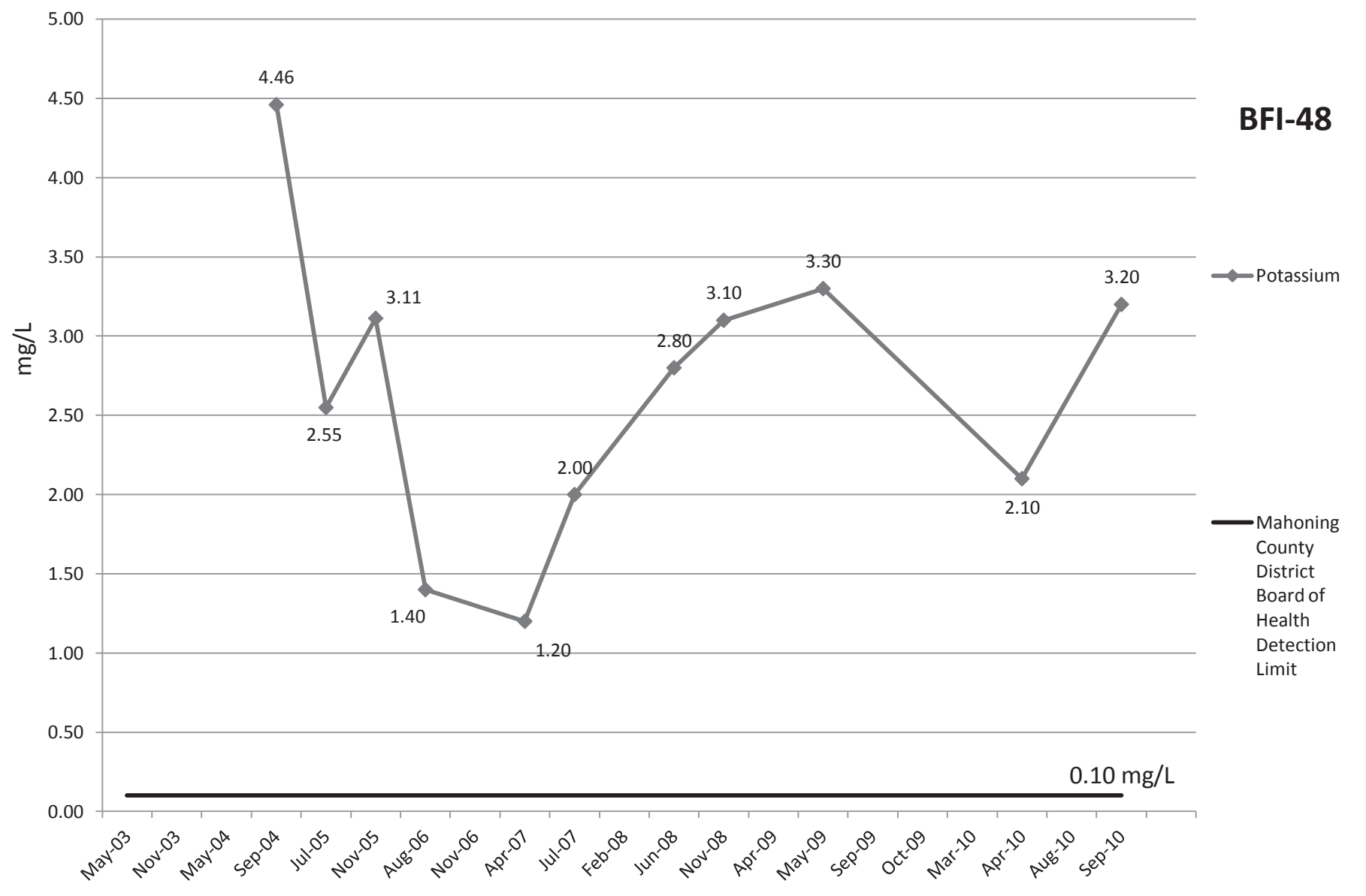
# Zinc



# Magnesium

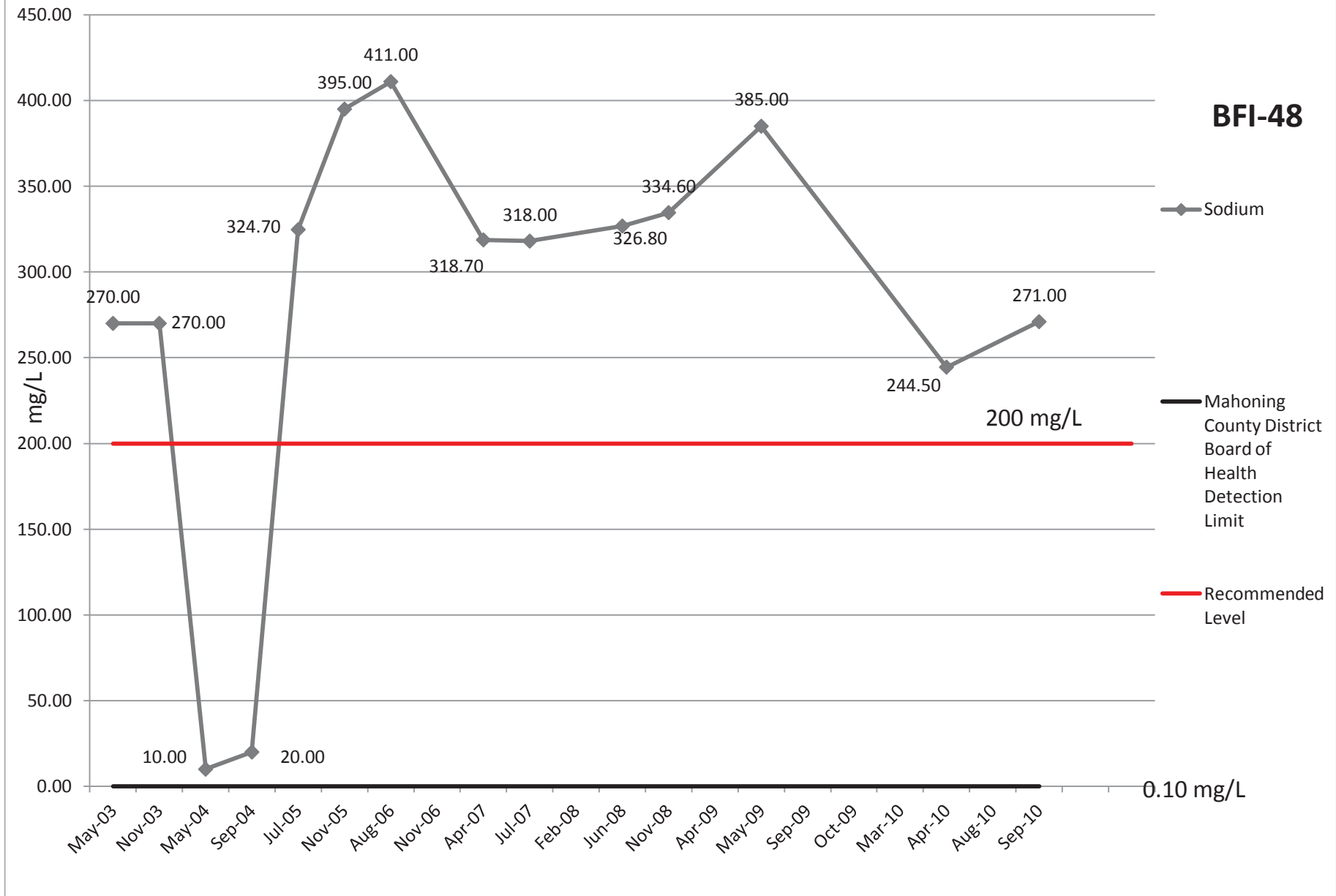


# Potassium

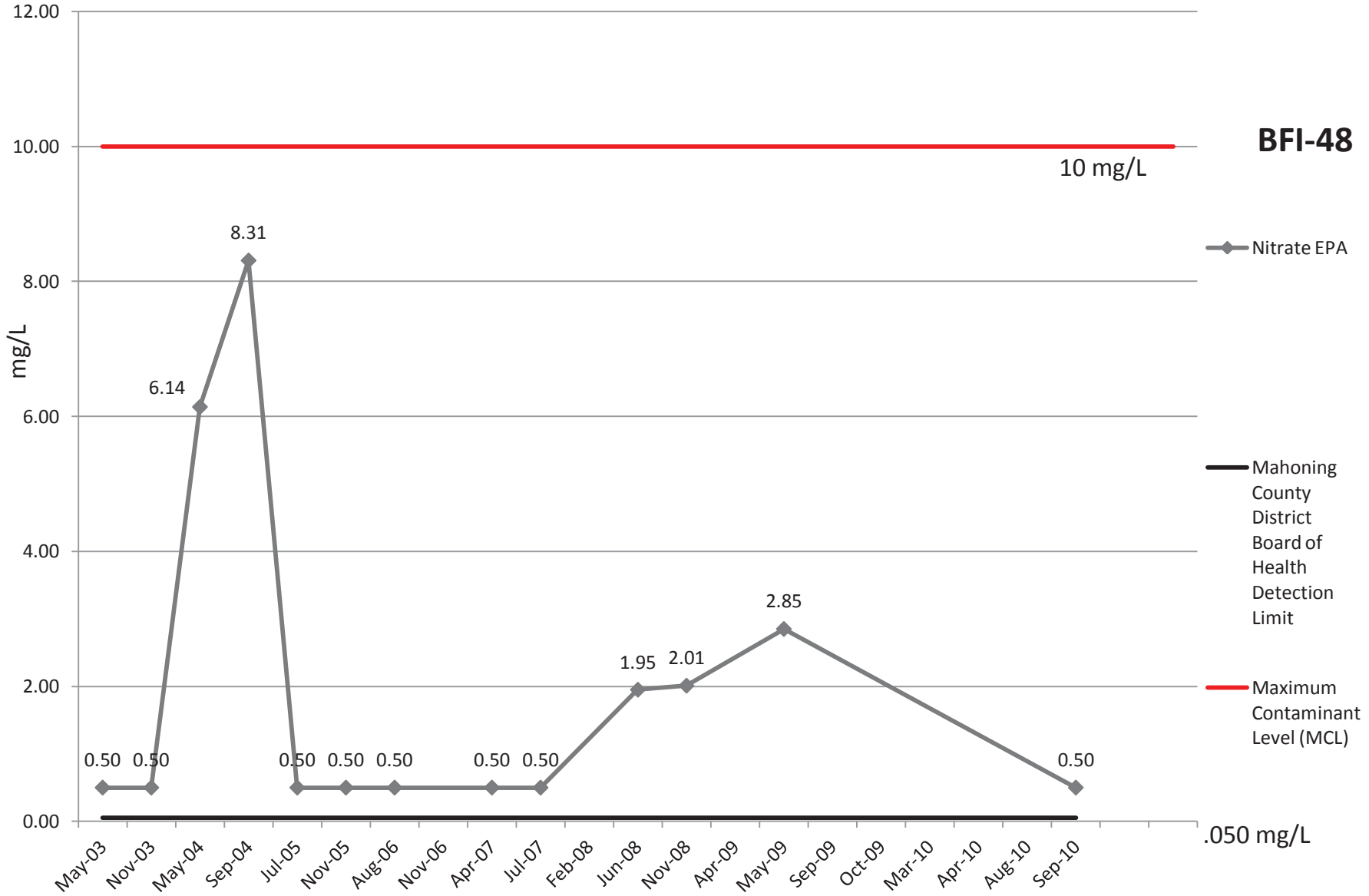




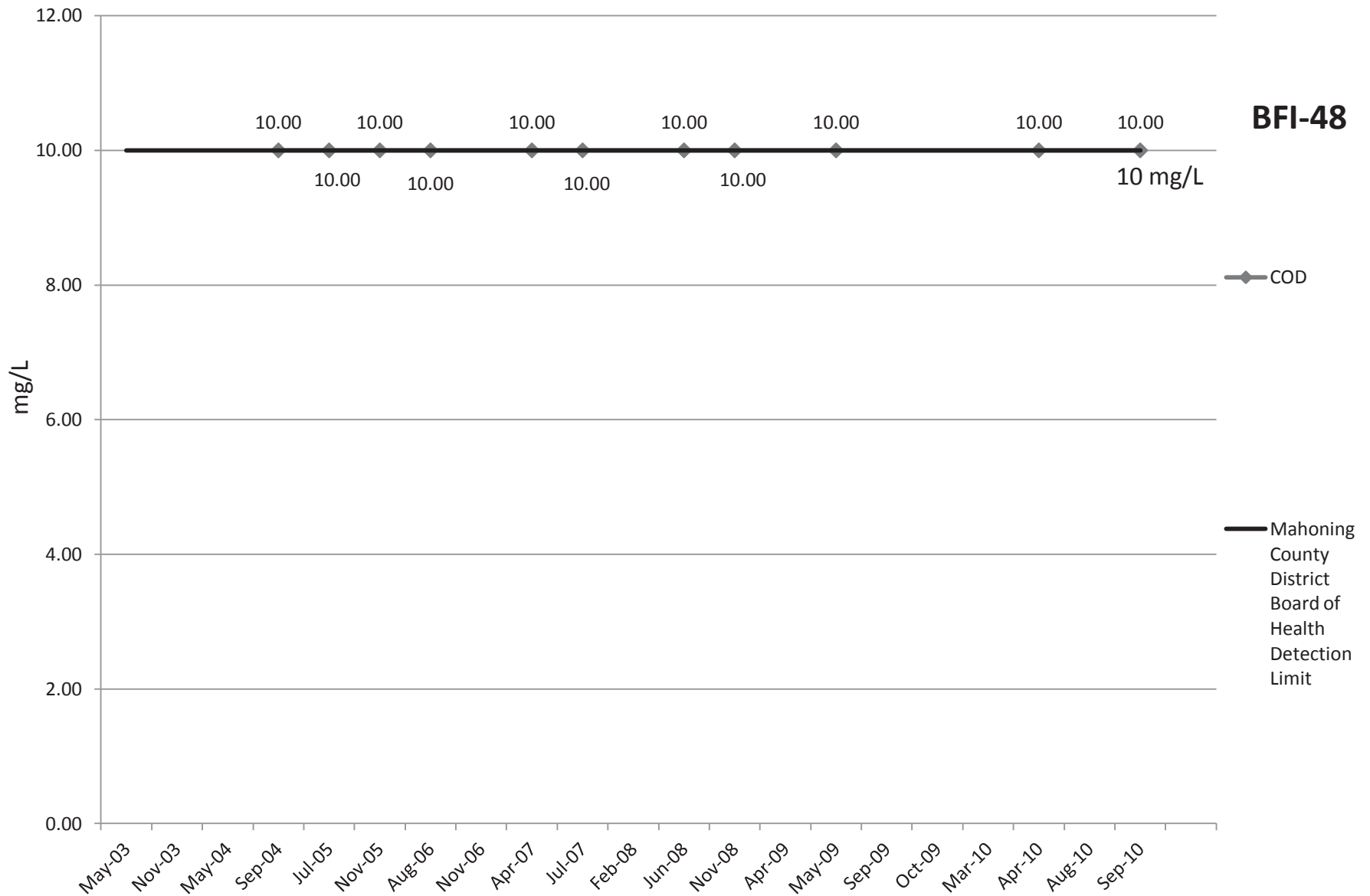
# Sodium



# Nitrate EPA



# COD

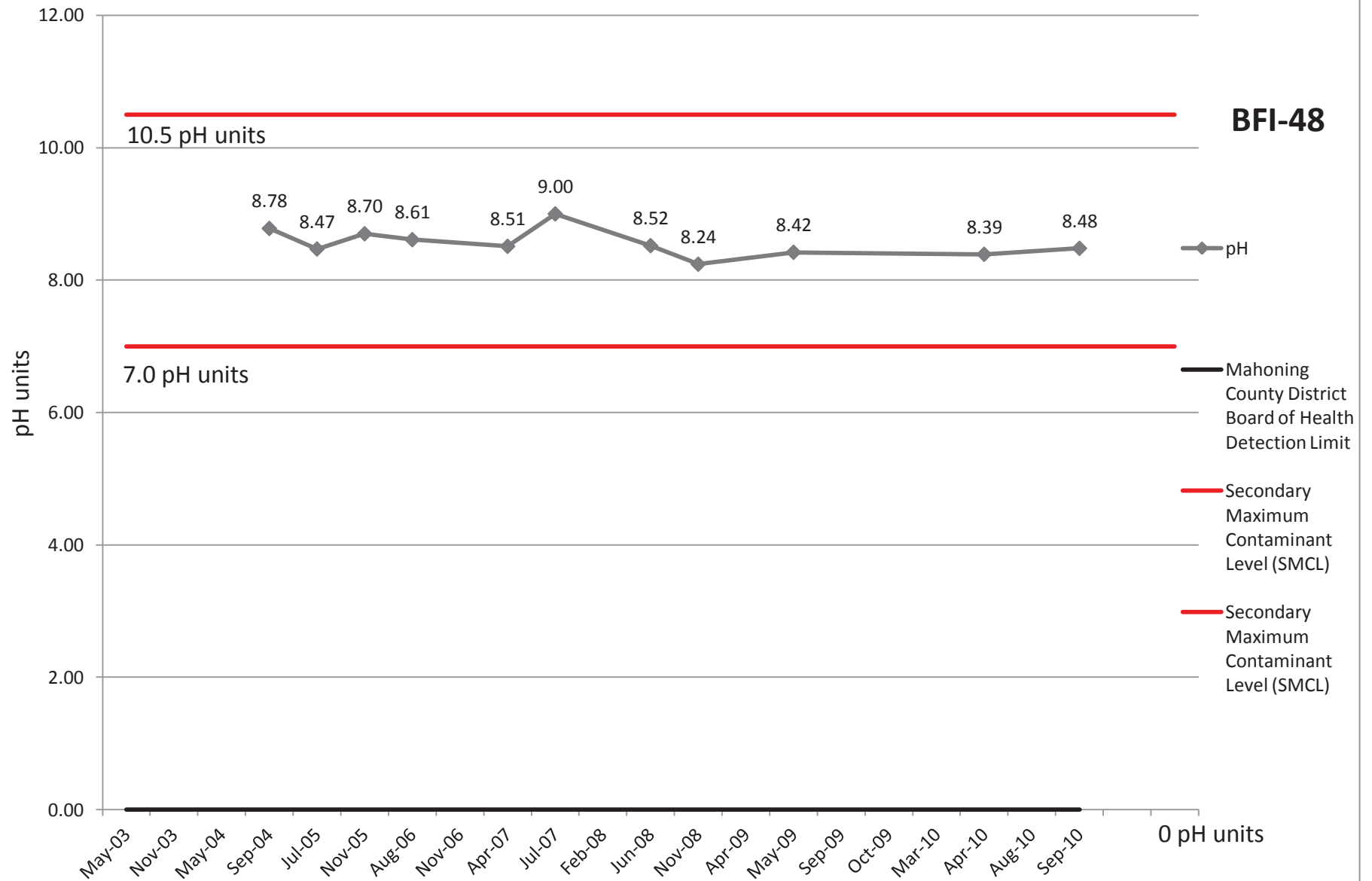


**BFI-48**

—◆— COD

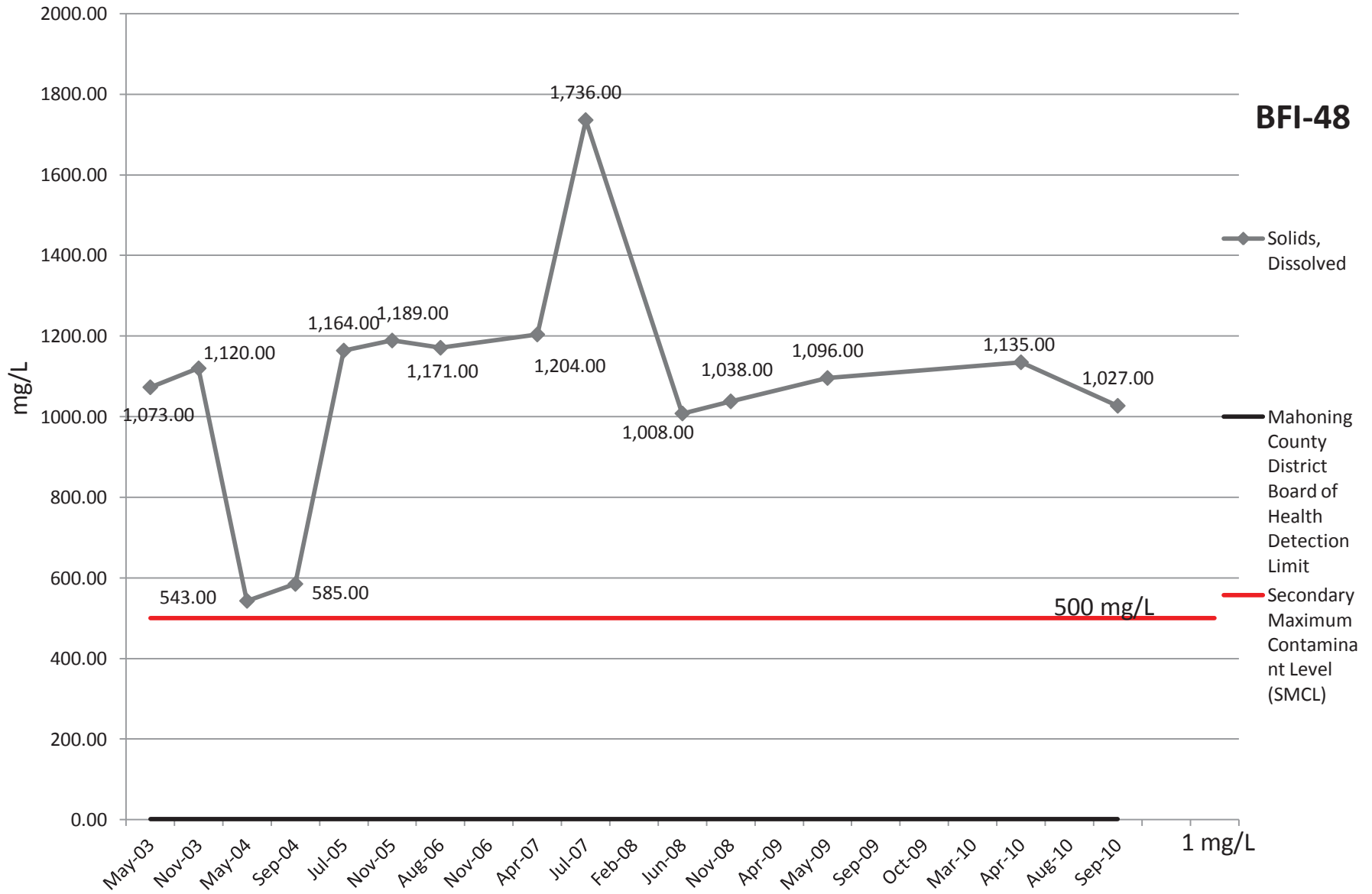
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

# pH

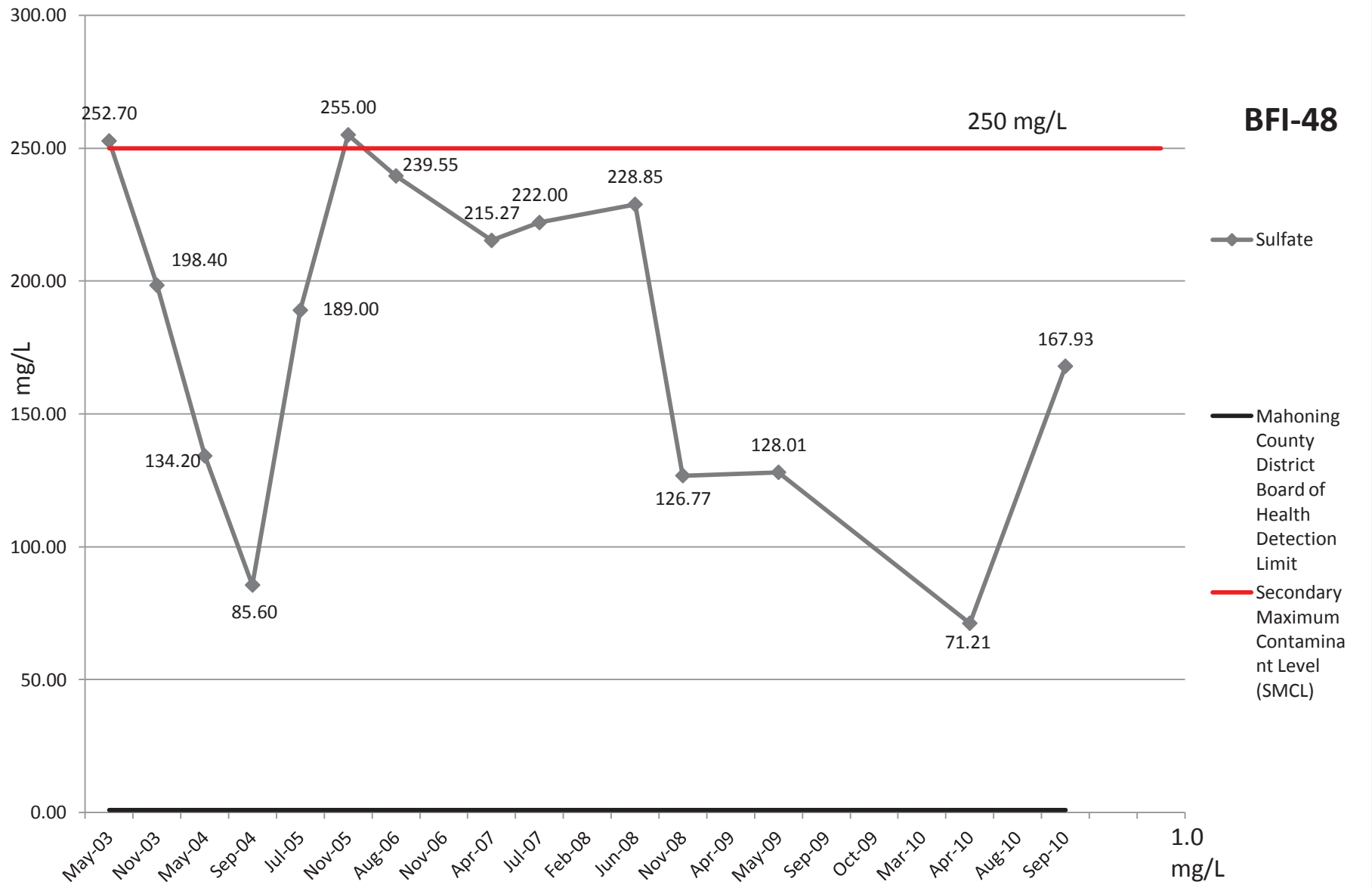


# Solids, Dissolved

**BFI-48**



# Sulfate



**BFI-48**

◆ Sulfate

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

1.0 mg/L

# Bacteria

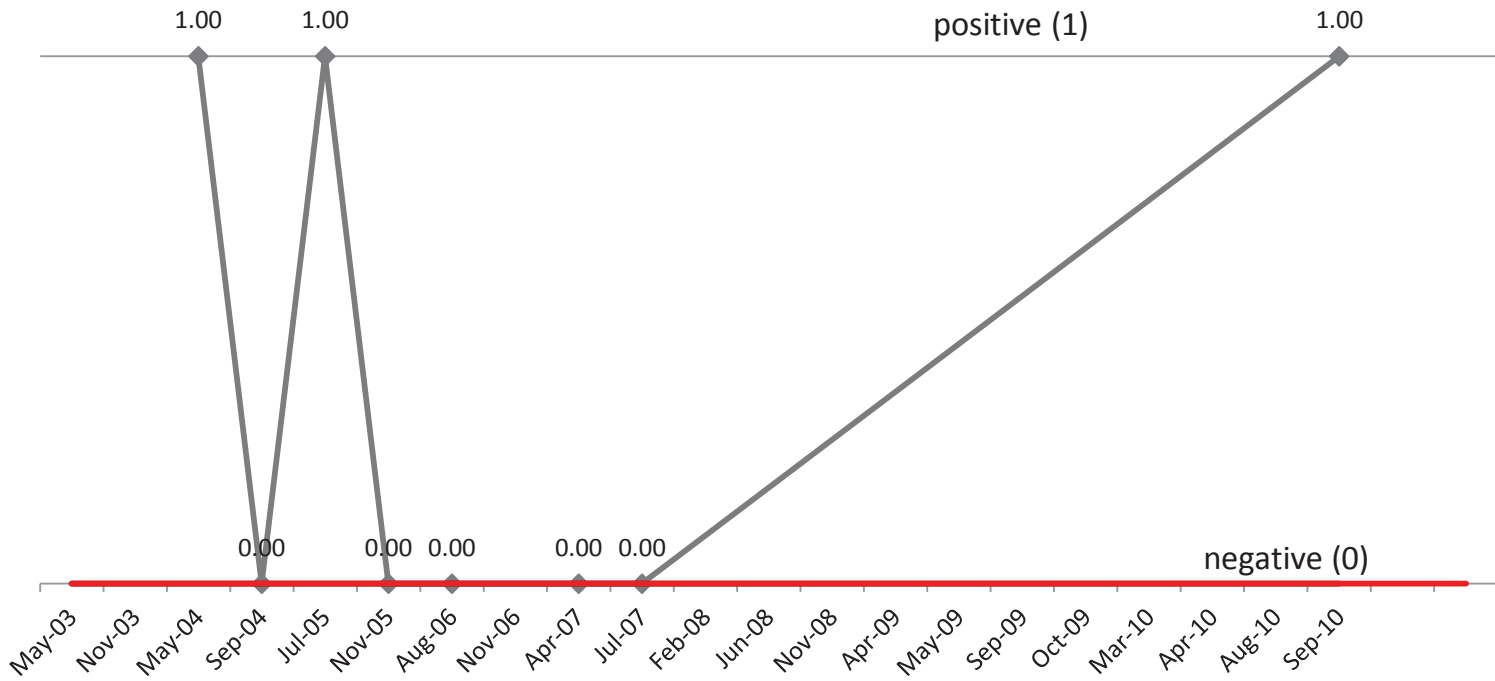
## BFI-48

Positive/Negative

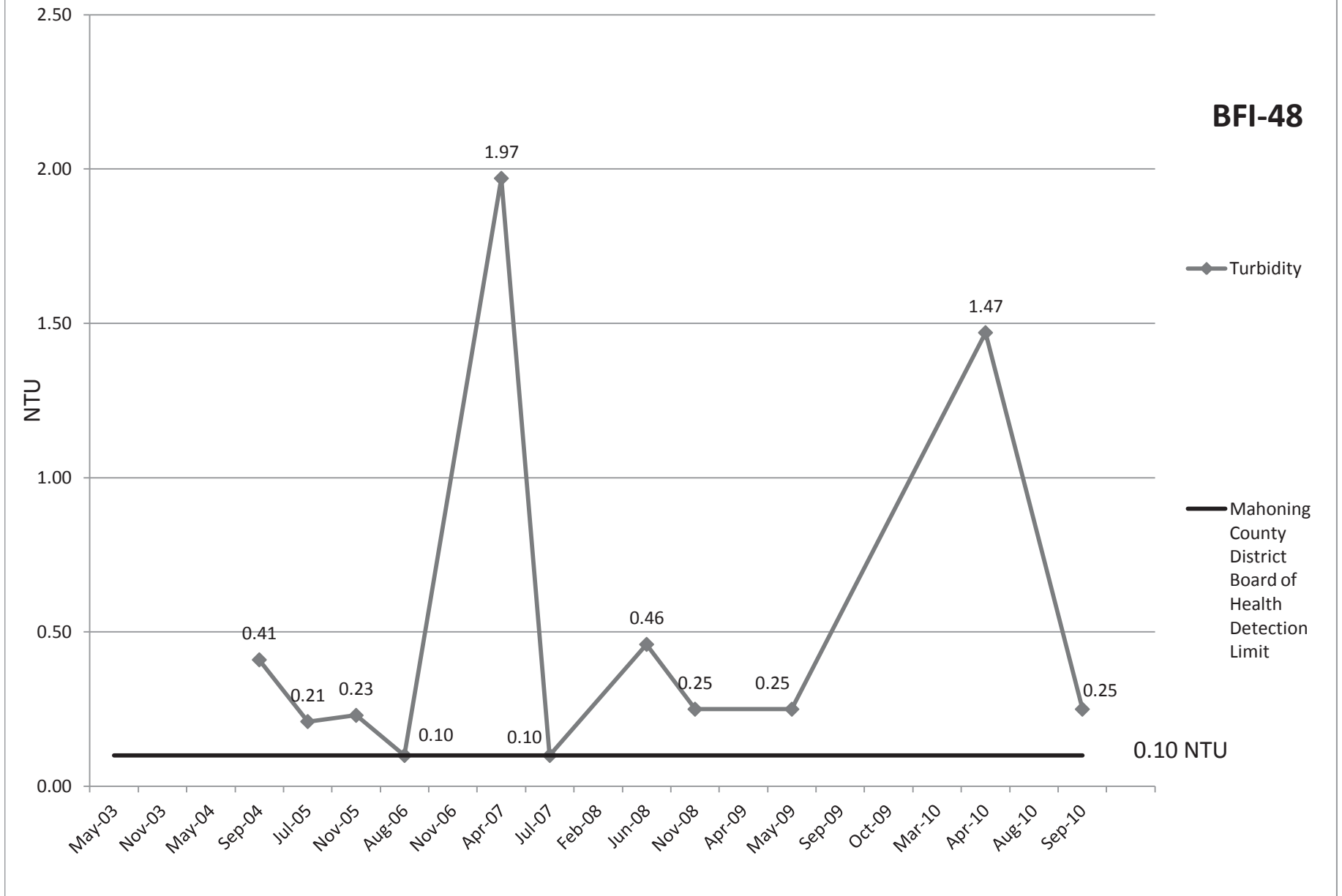
◆ Bacteria

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

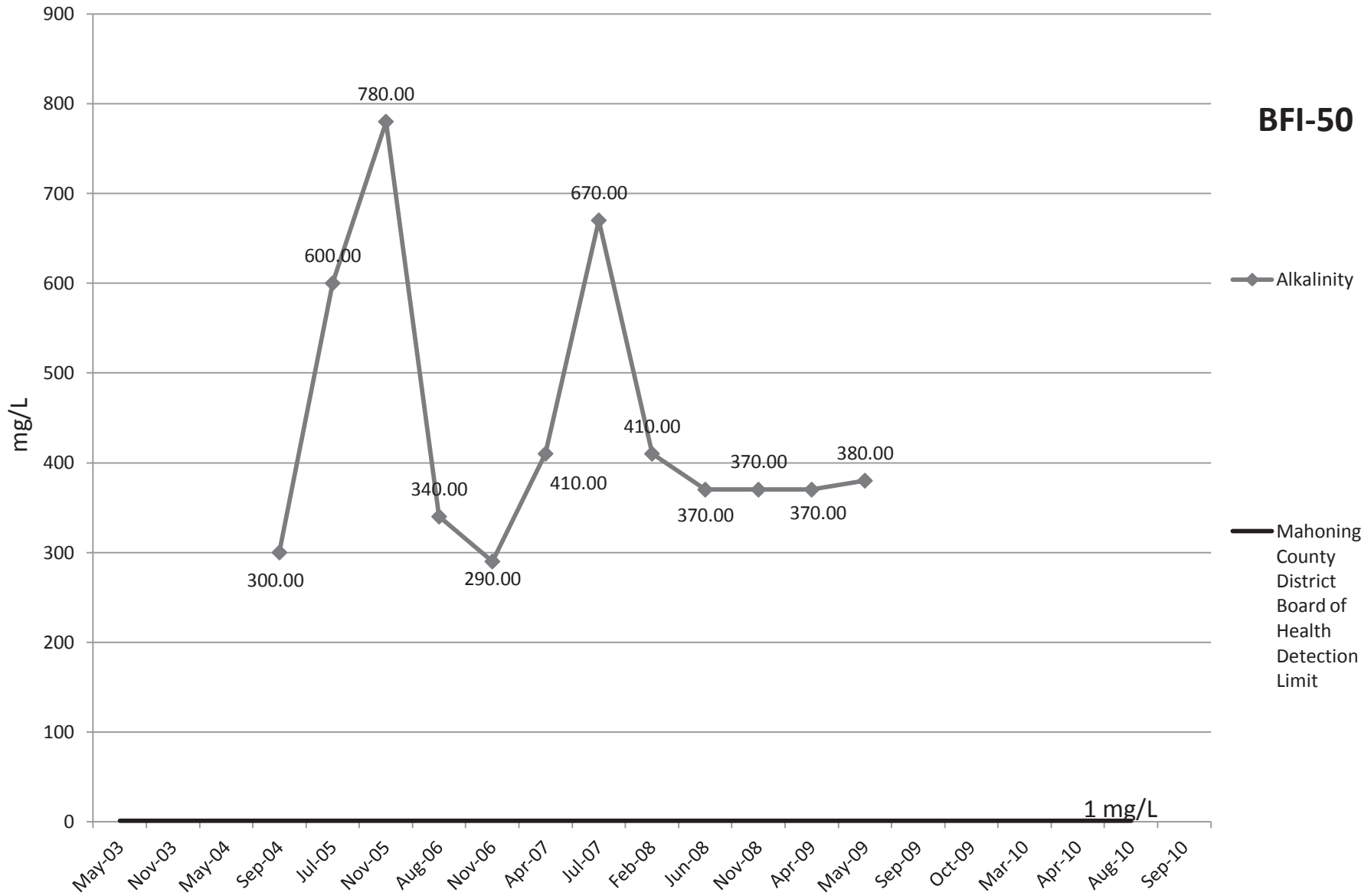


# Turbidity

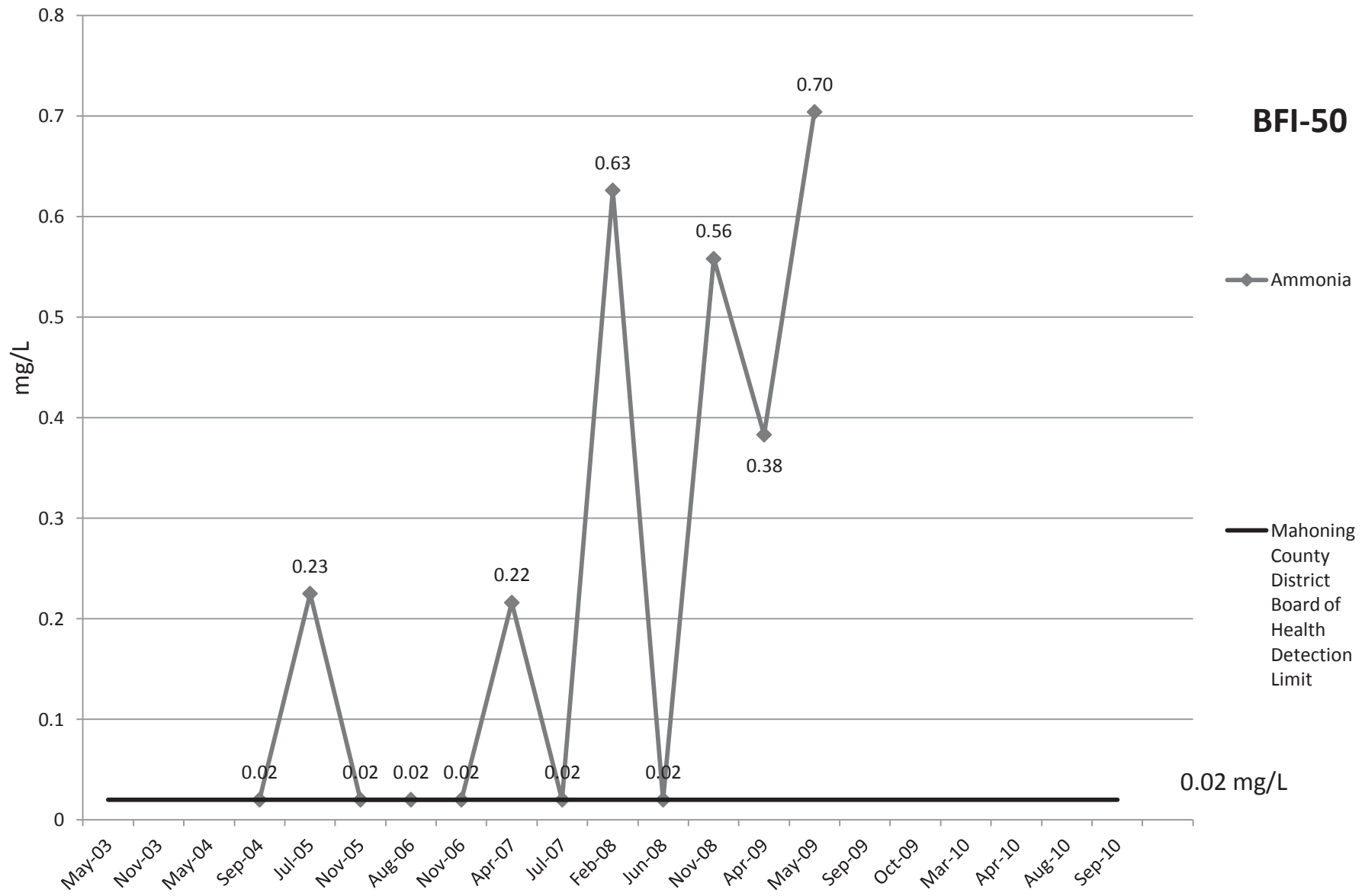




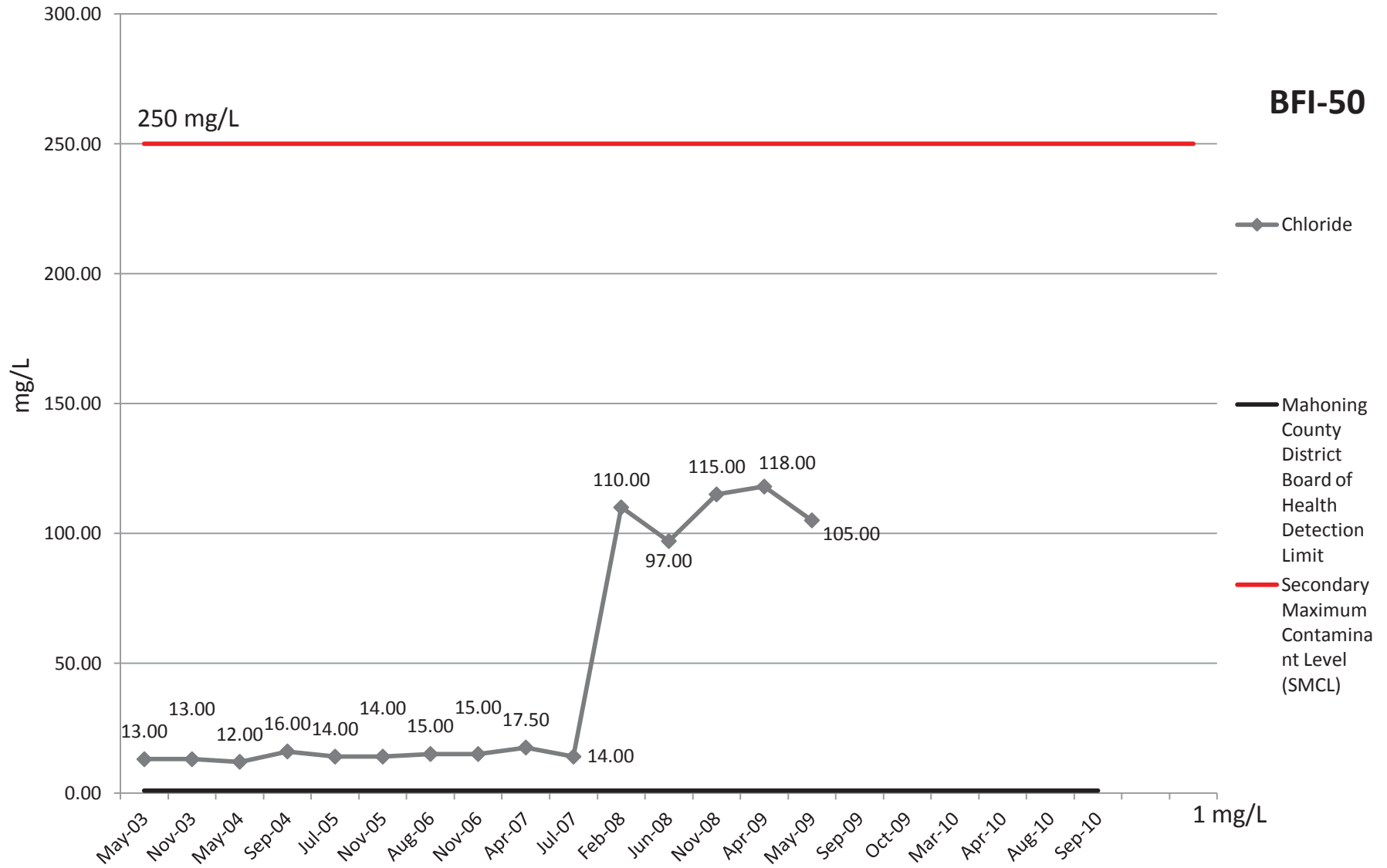
# Alkalinity



# Ammonia

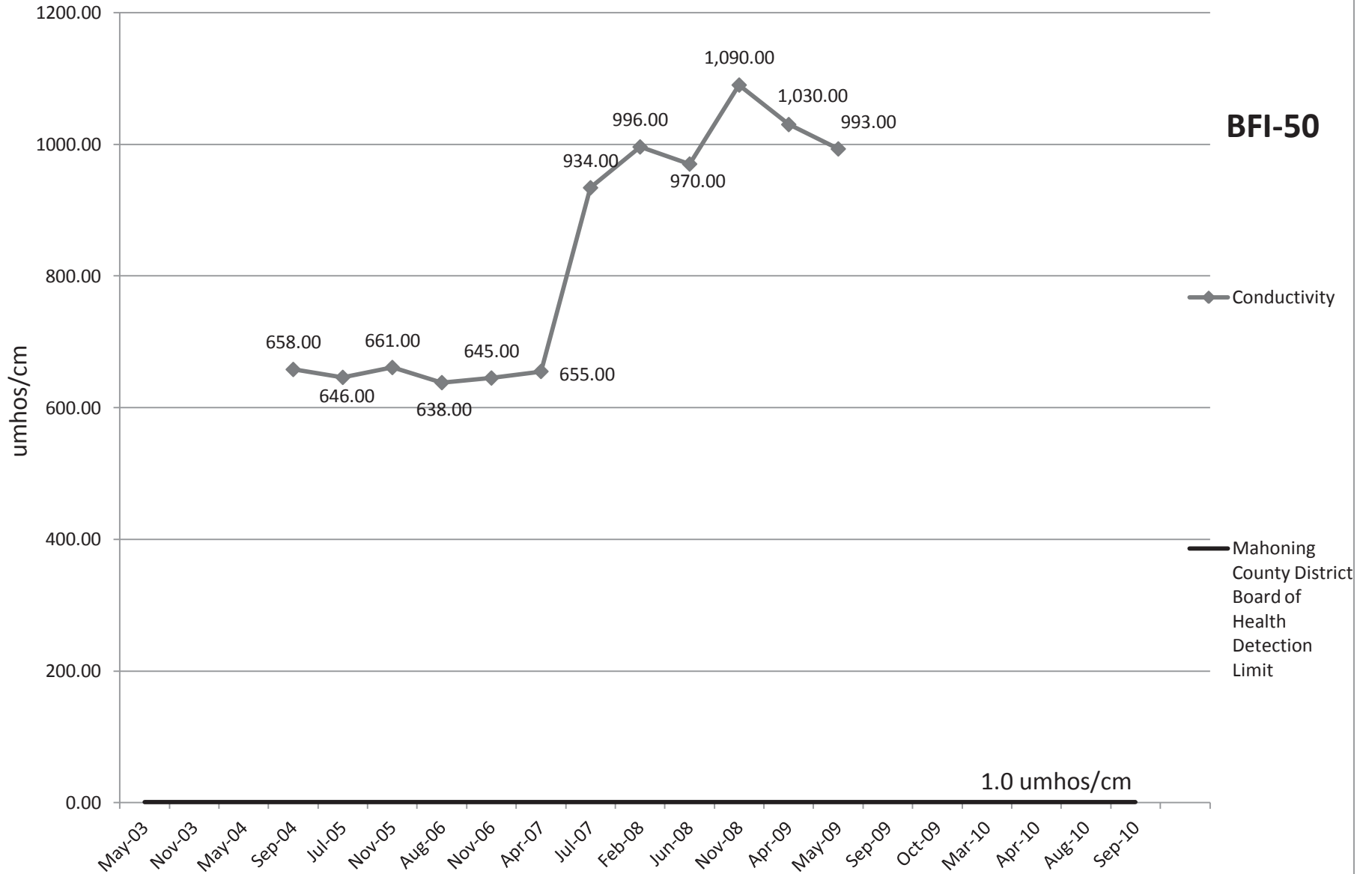


# Chloride

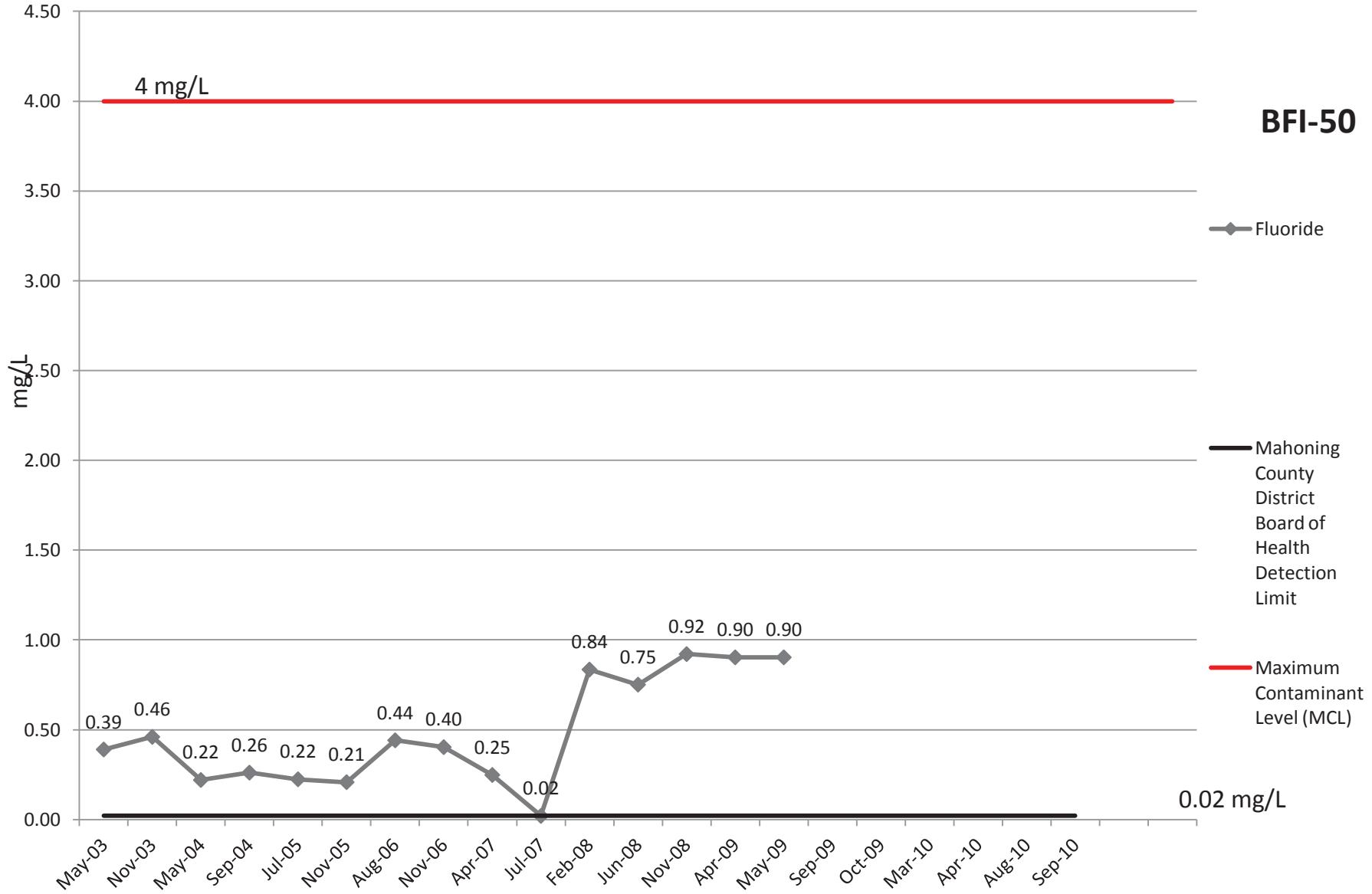


# Conductivity

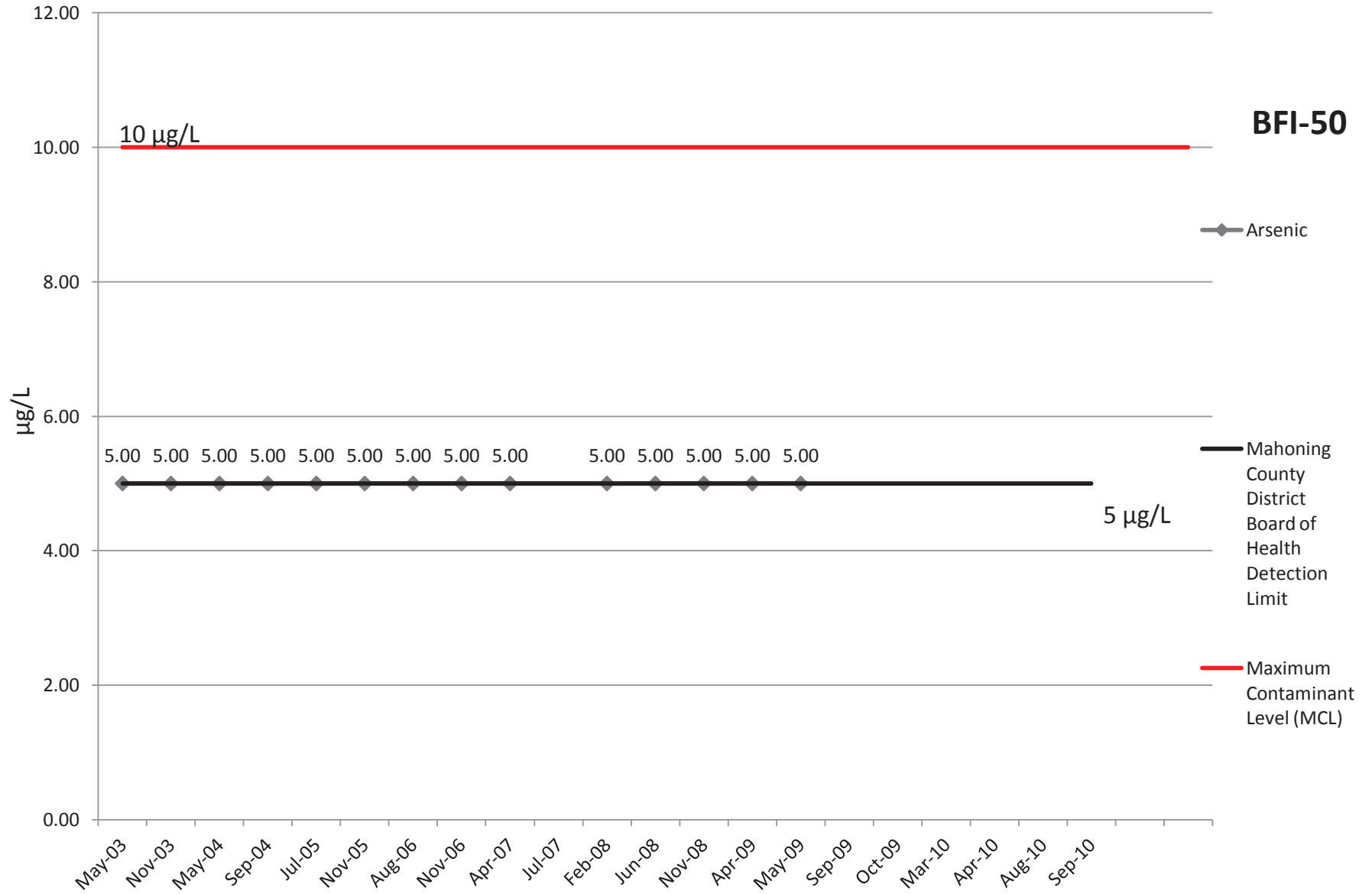
**BFI-50**



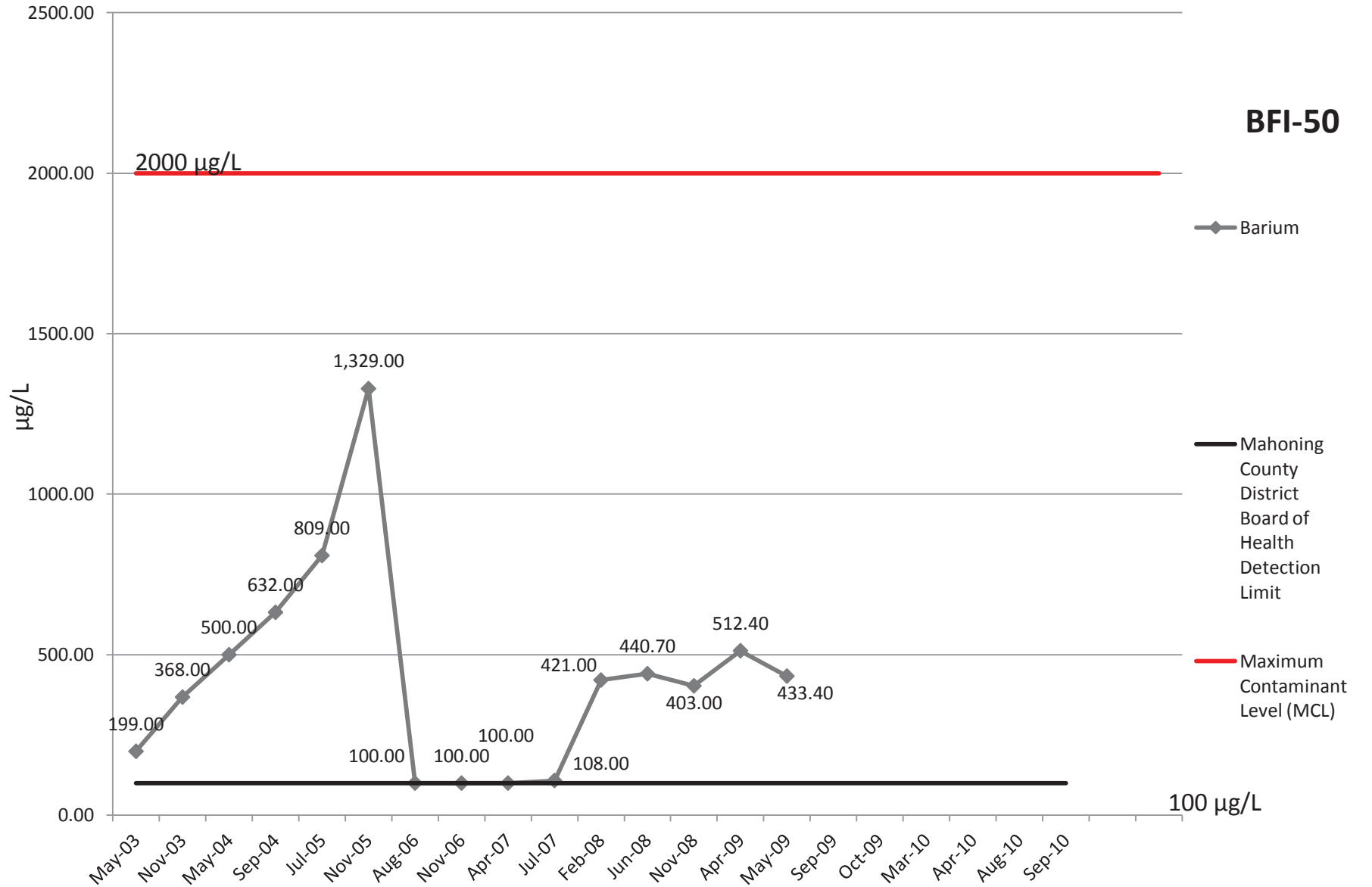
# Fluoride



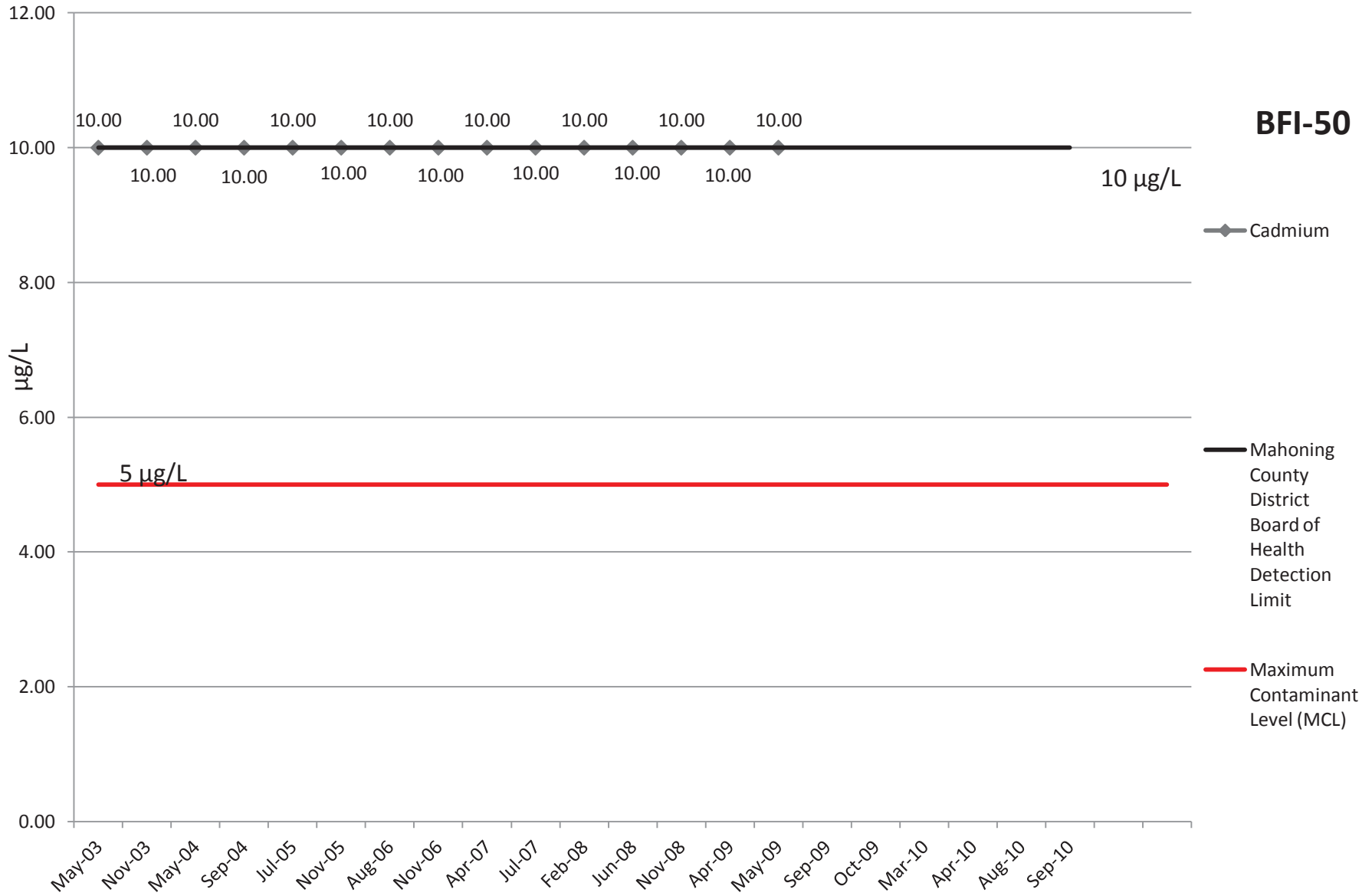
# Arsenic



# Barium

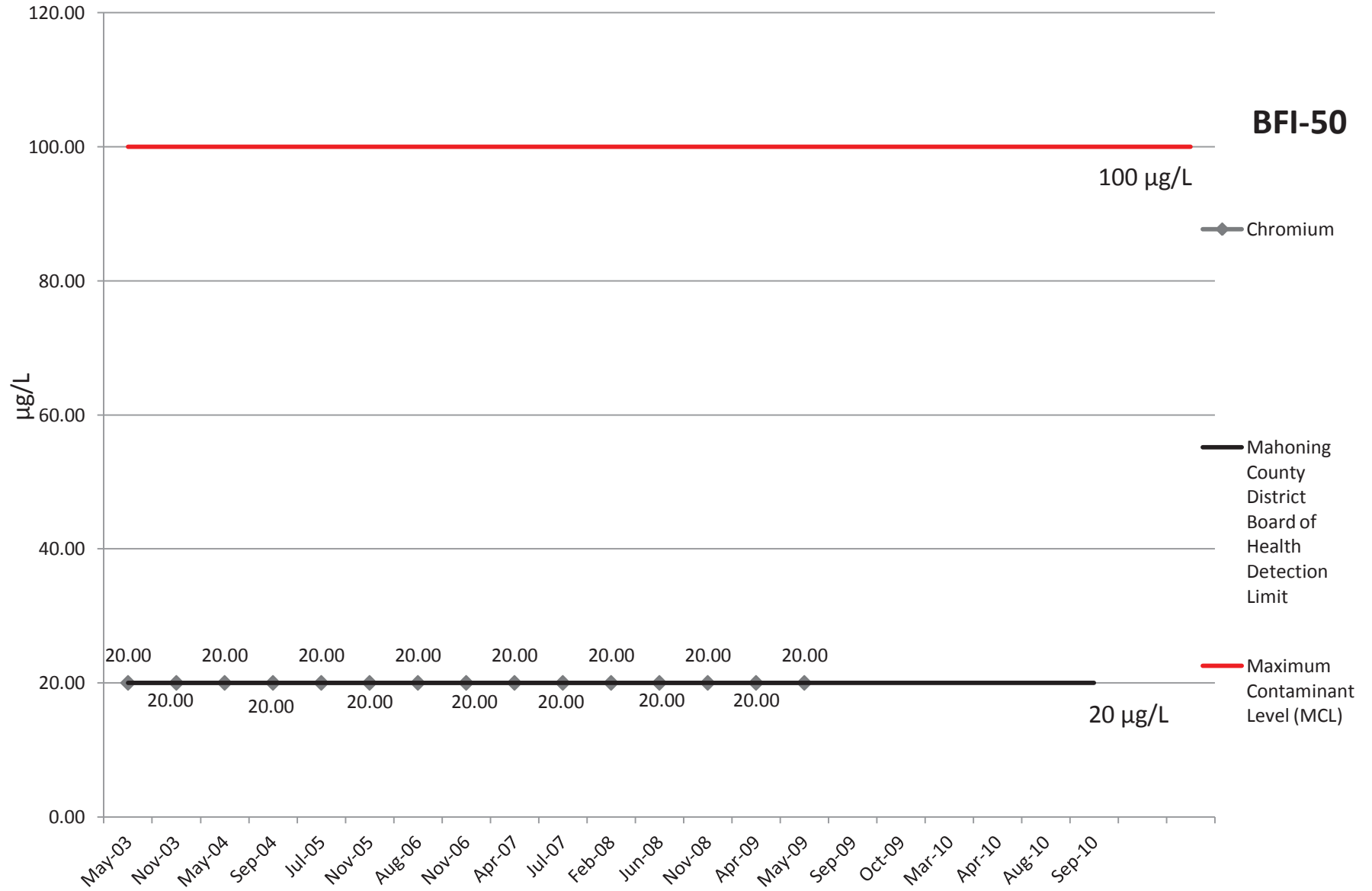


# Cadmium

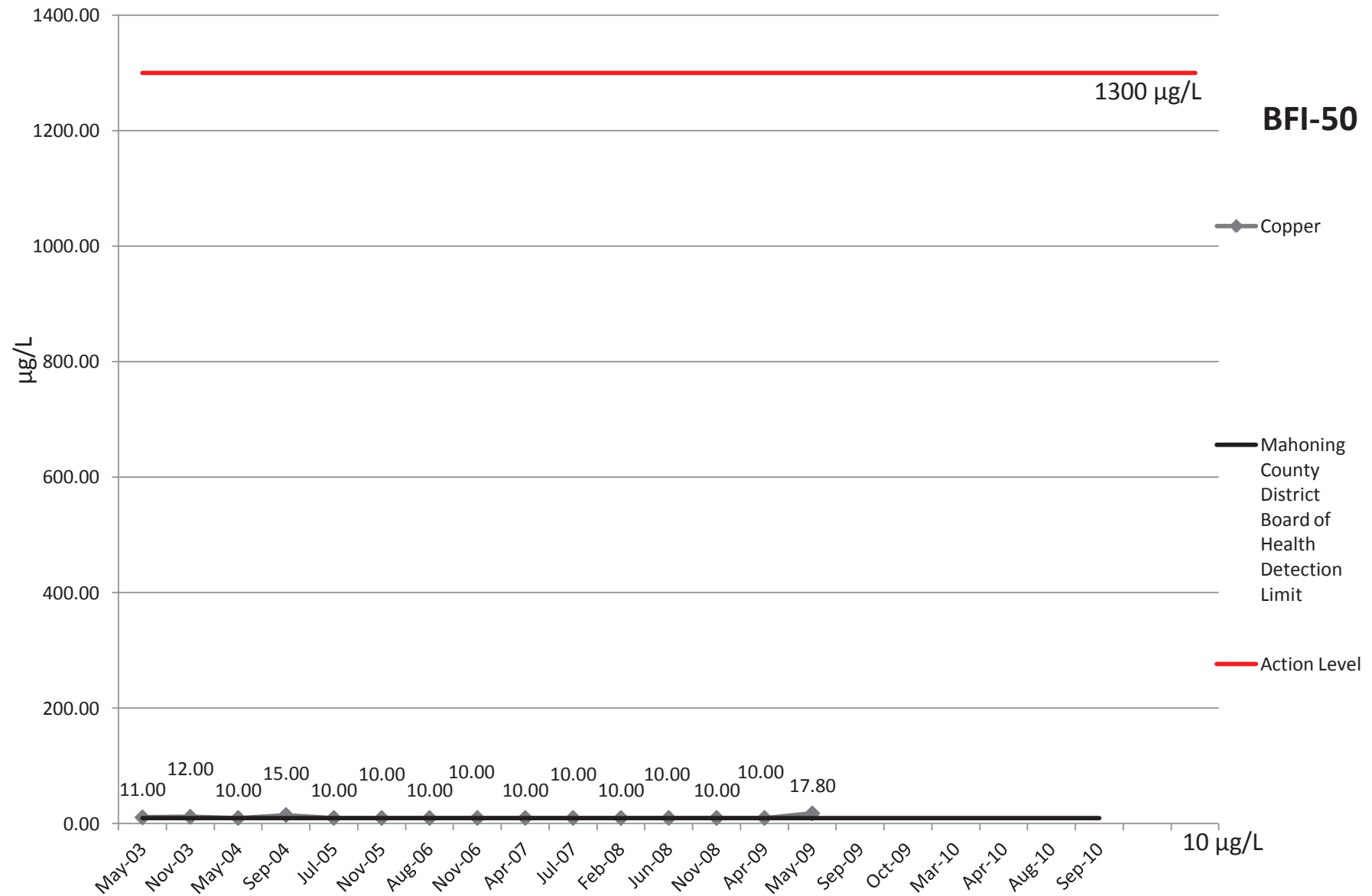




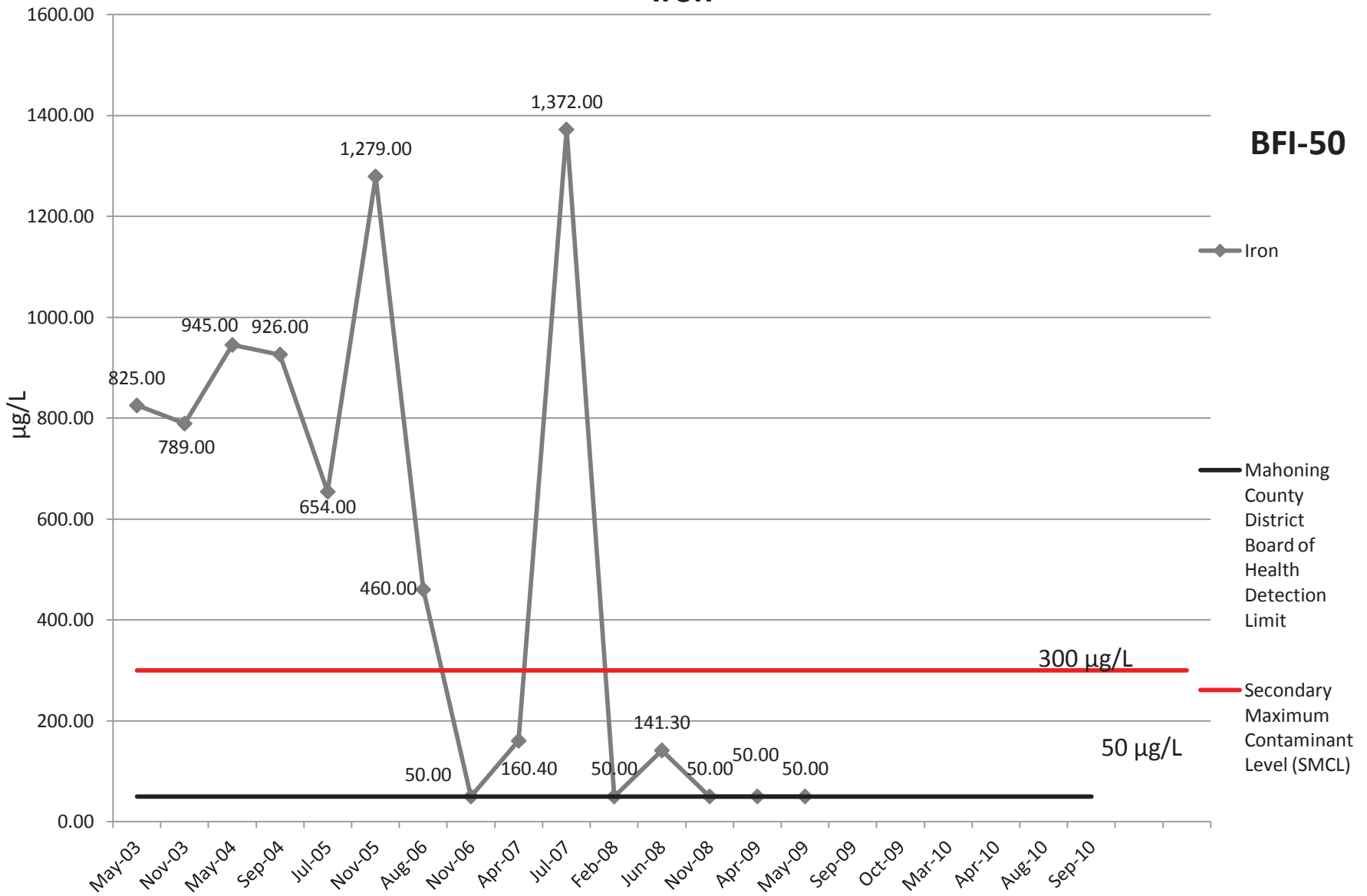
# Chromium



# Copper

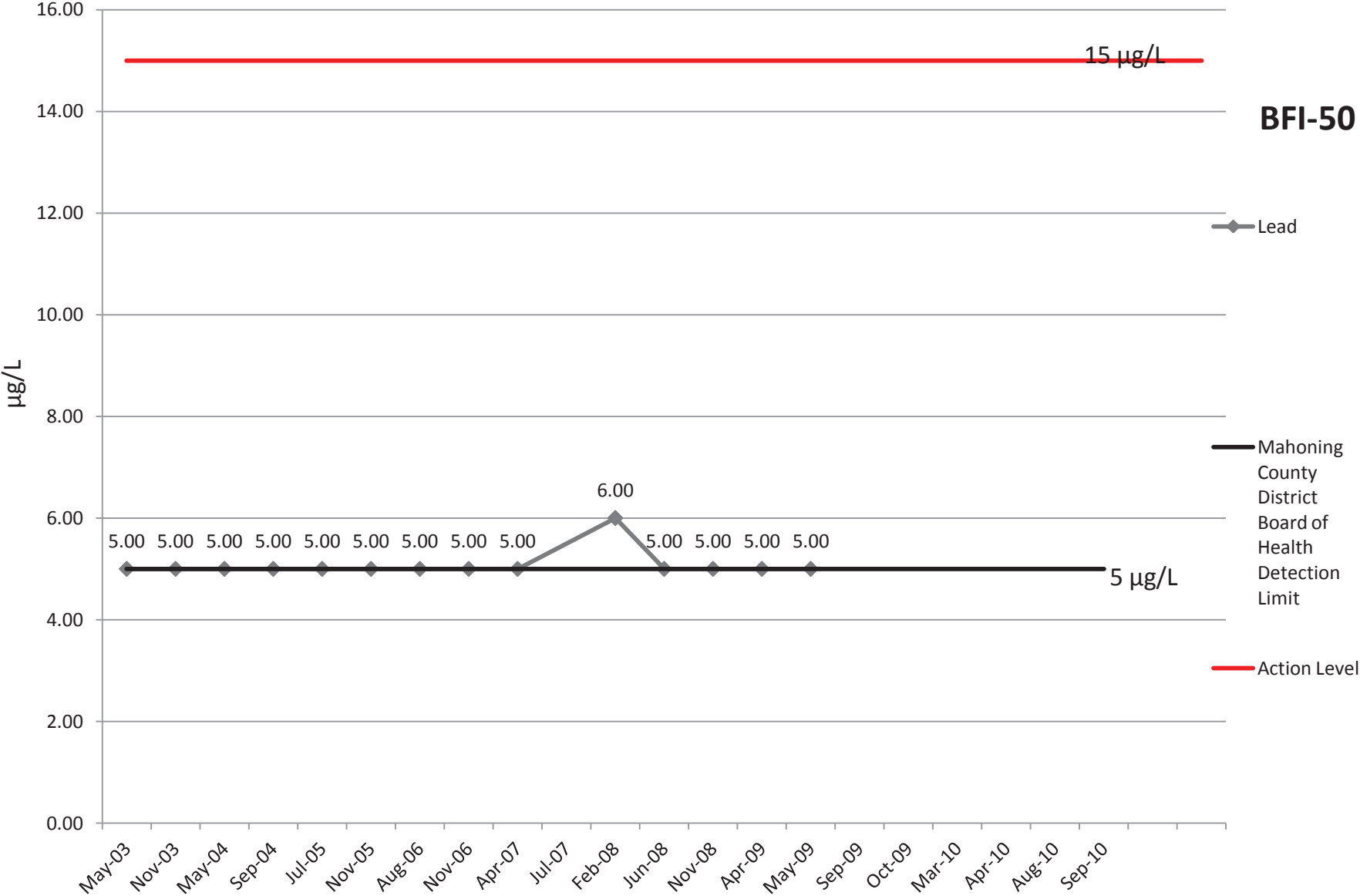


# Iron

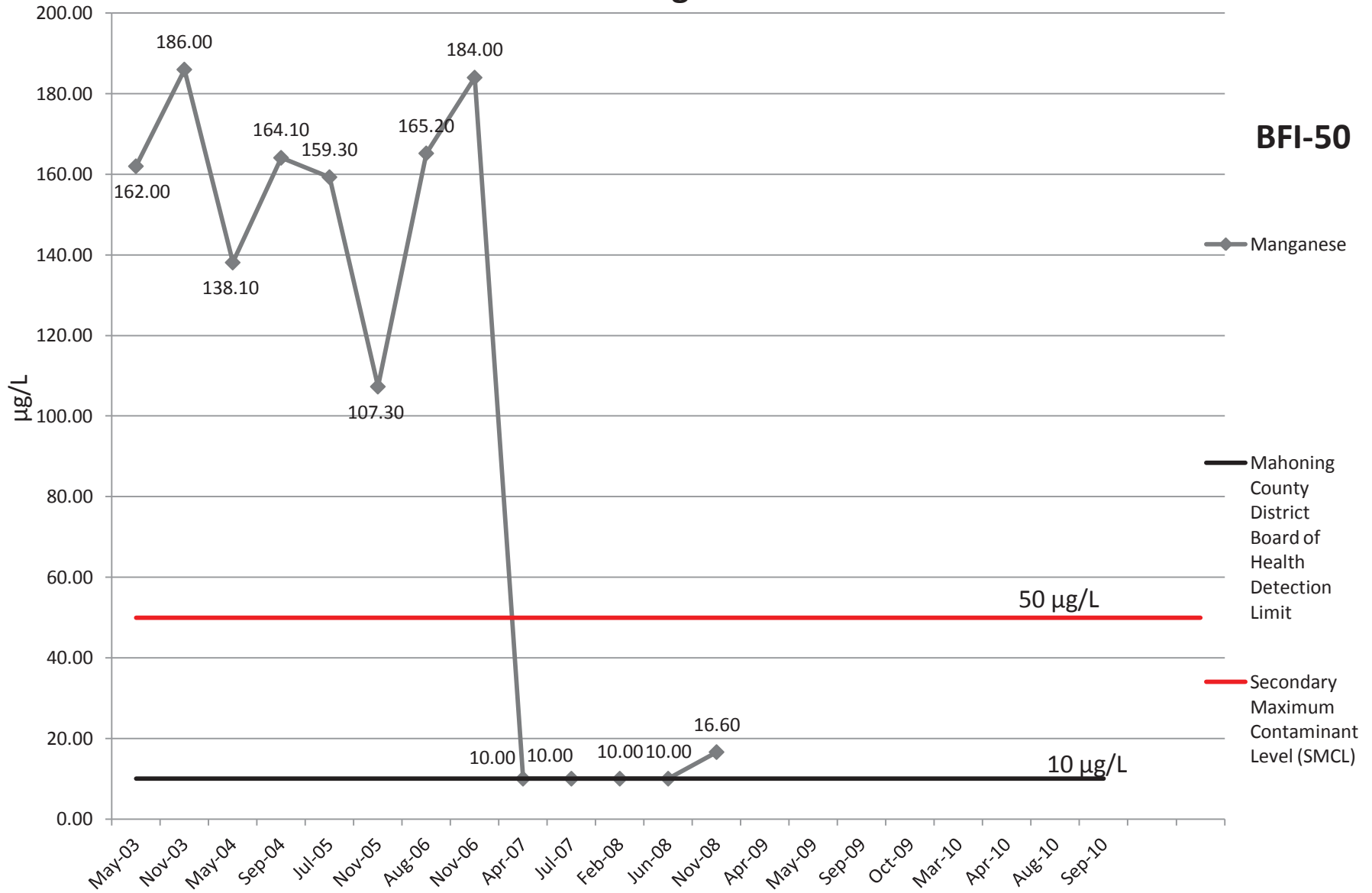


# Lead

**BFI-50**



# Manganese



# Mercury

**BFI-50**

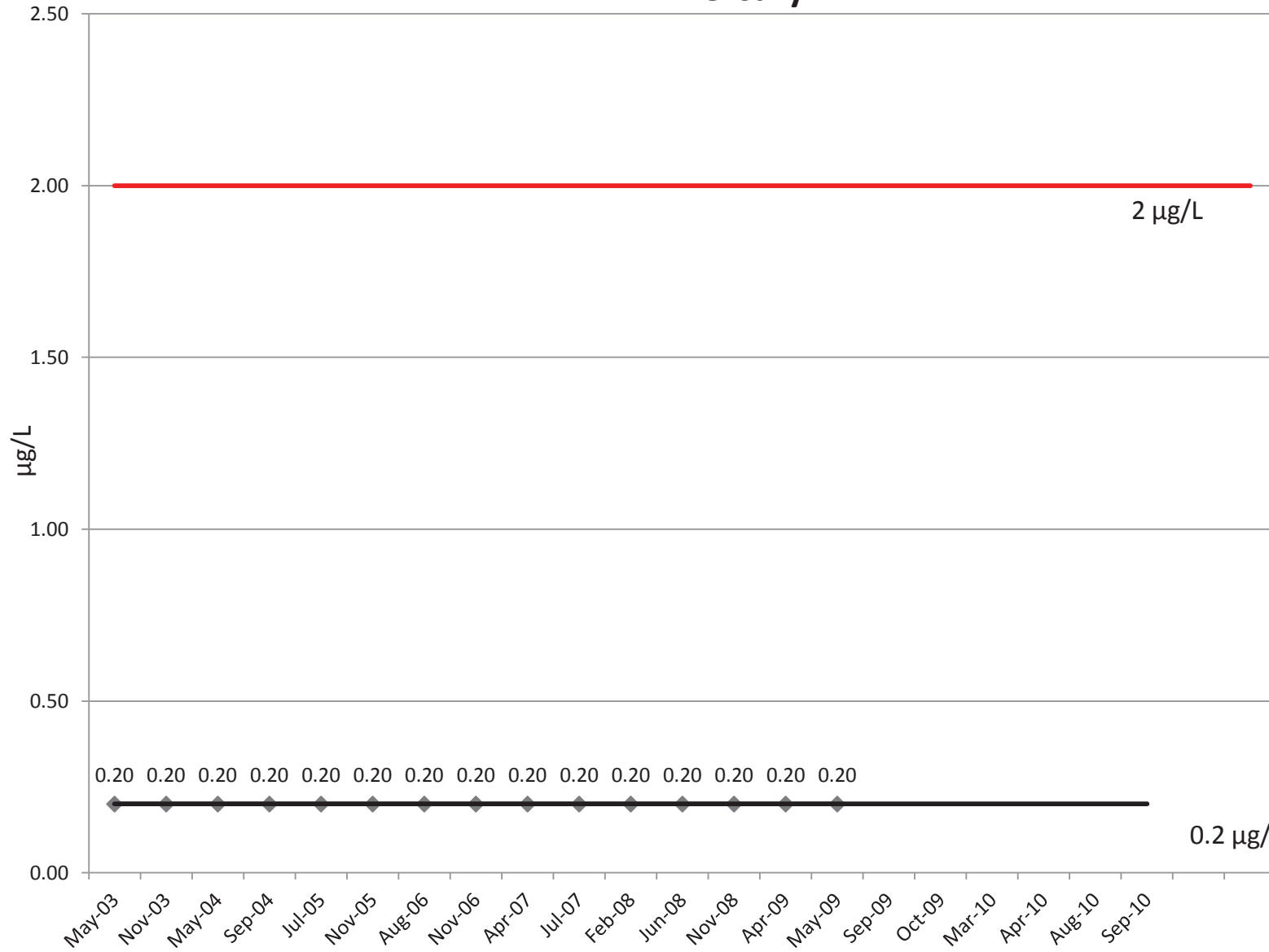
2 µg/L

Mercury

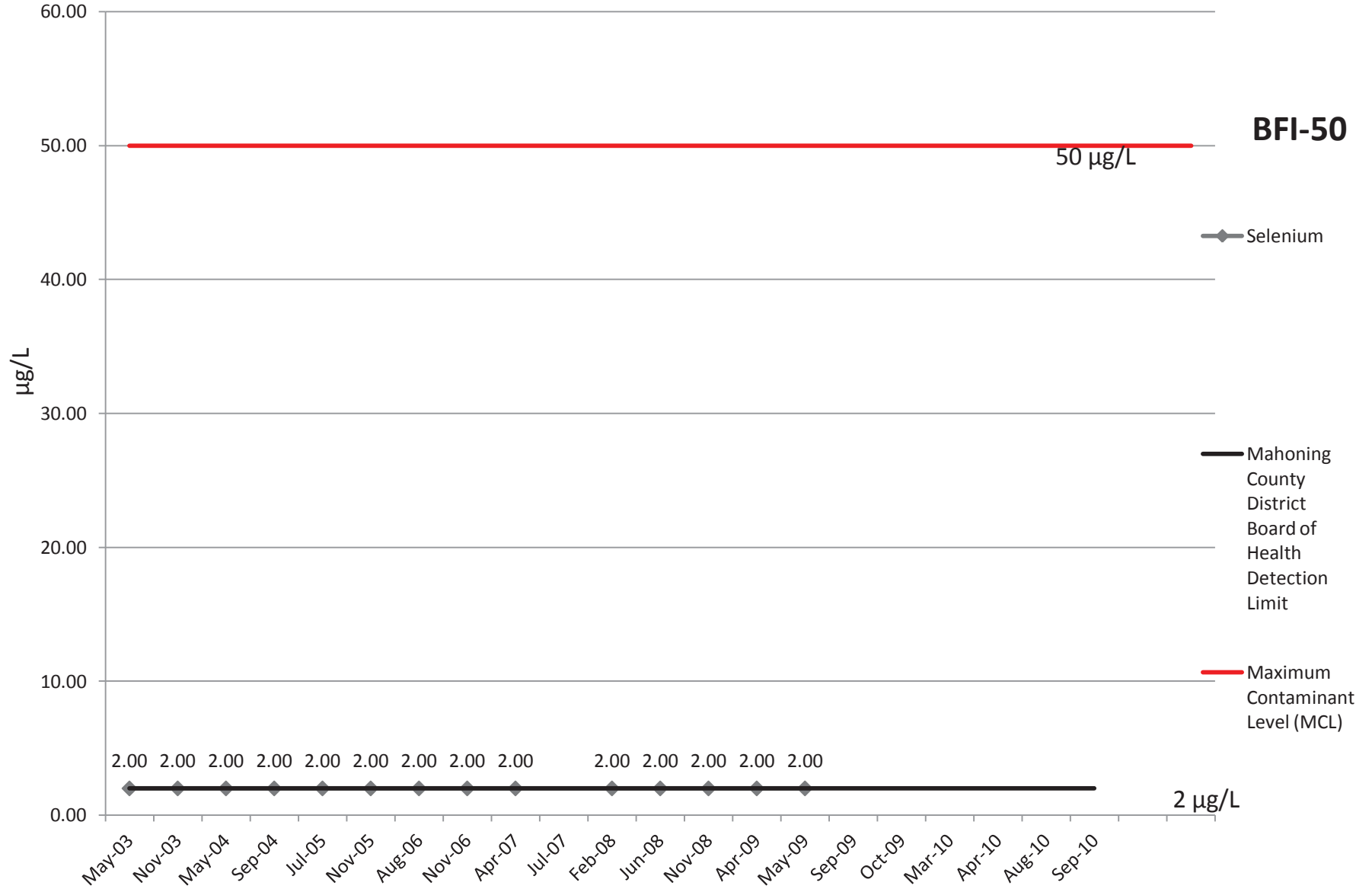
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

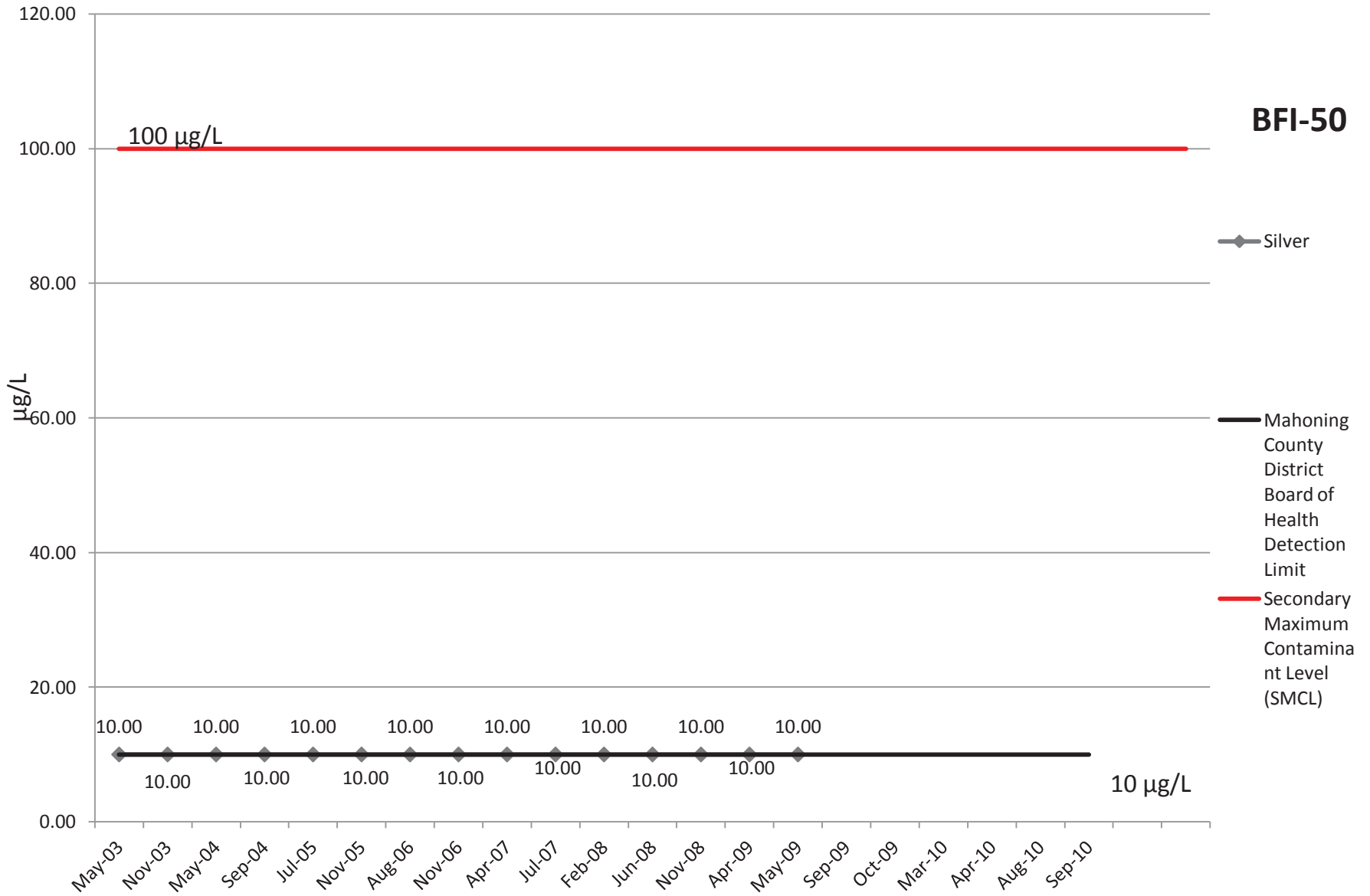
0.2 µg/L



# Selenium



# Silver



**BFI-50**

◆ Silver

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

100 µg/L

10.00

10.00

10.00

10.00

10.00

10.00

10.00

10.00

10.00

10.00

10.00

10.00

10.00

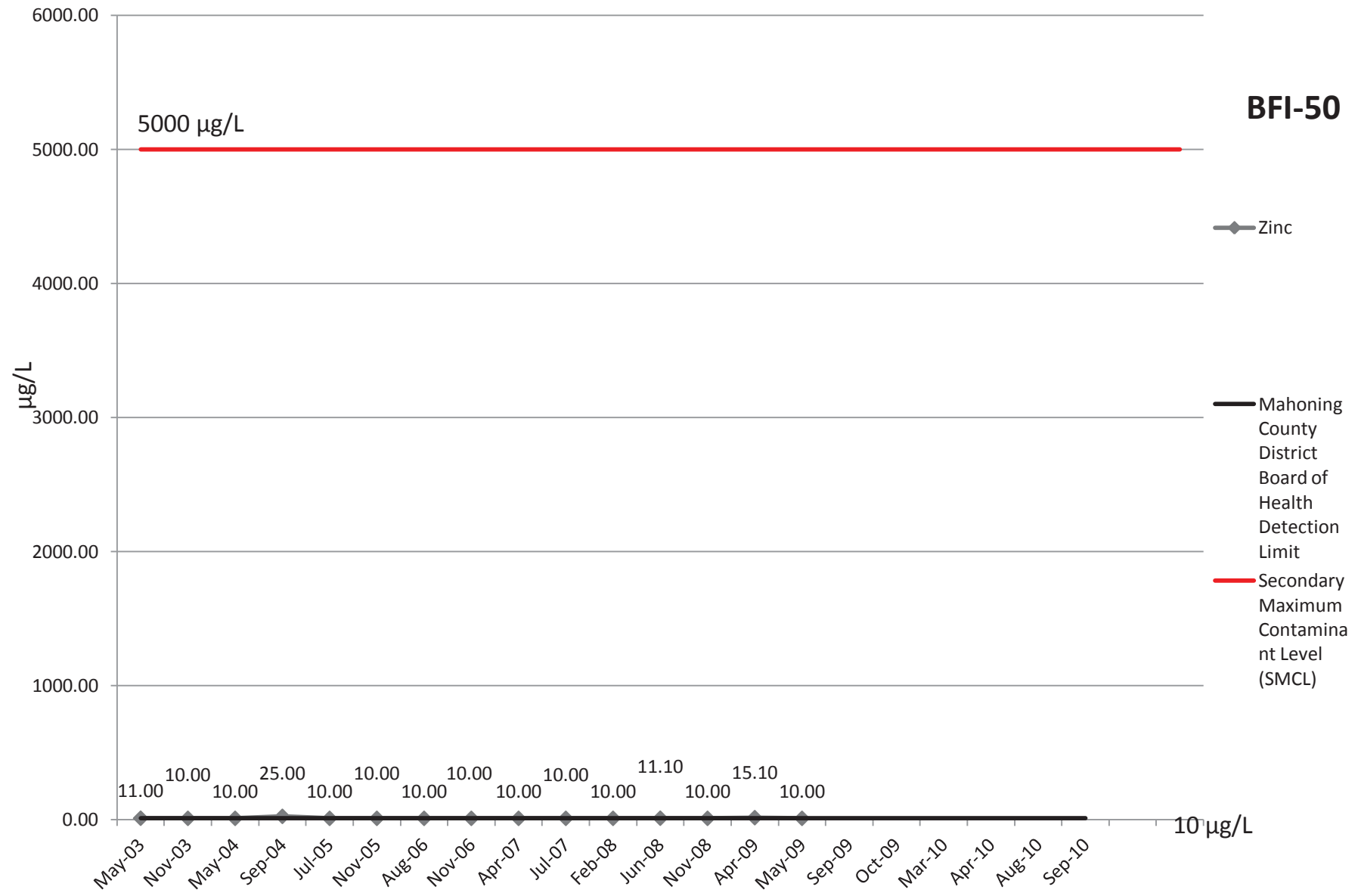
10.00

10.00

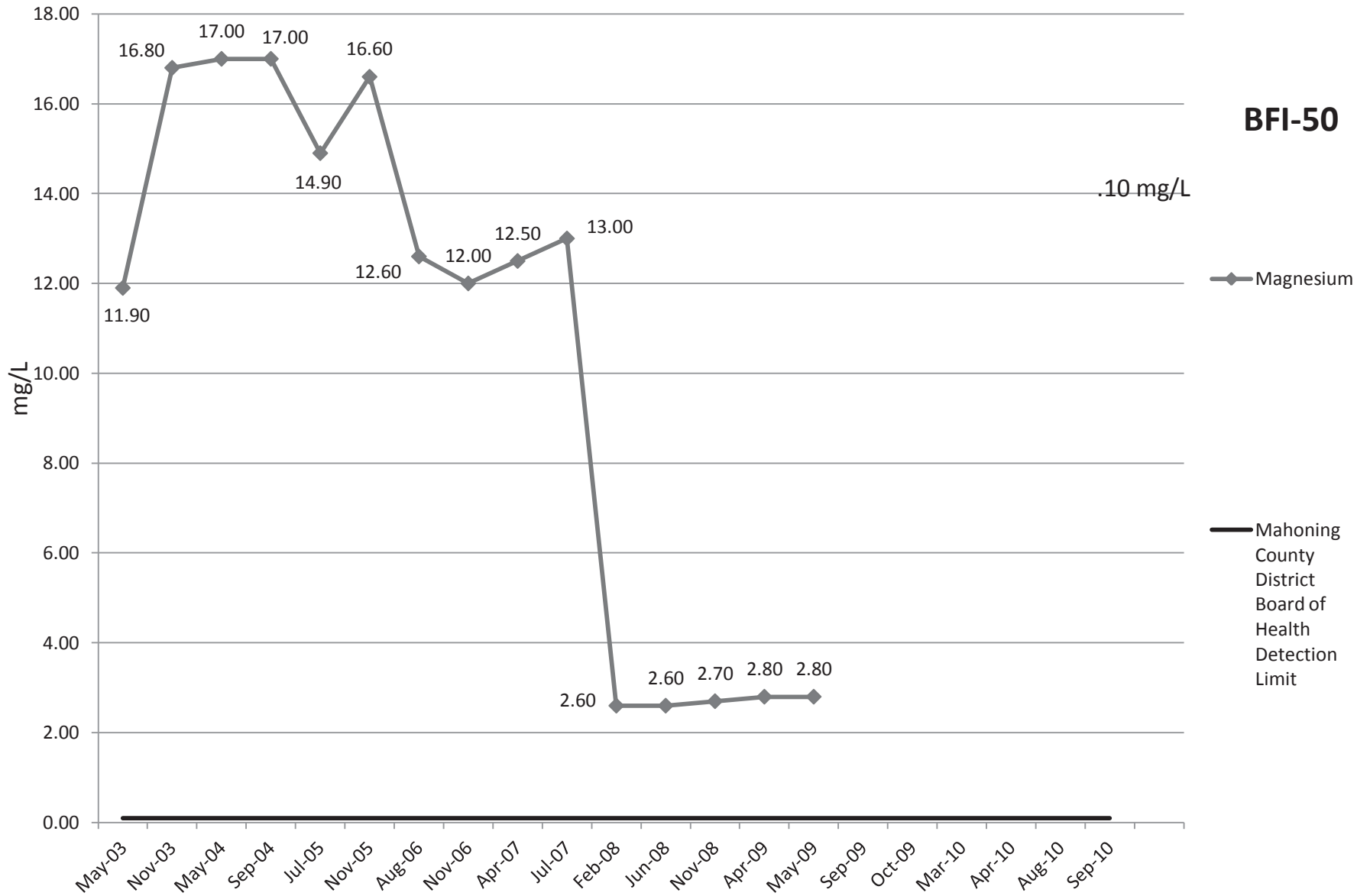
10 µg/L



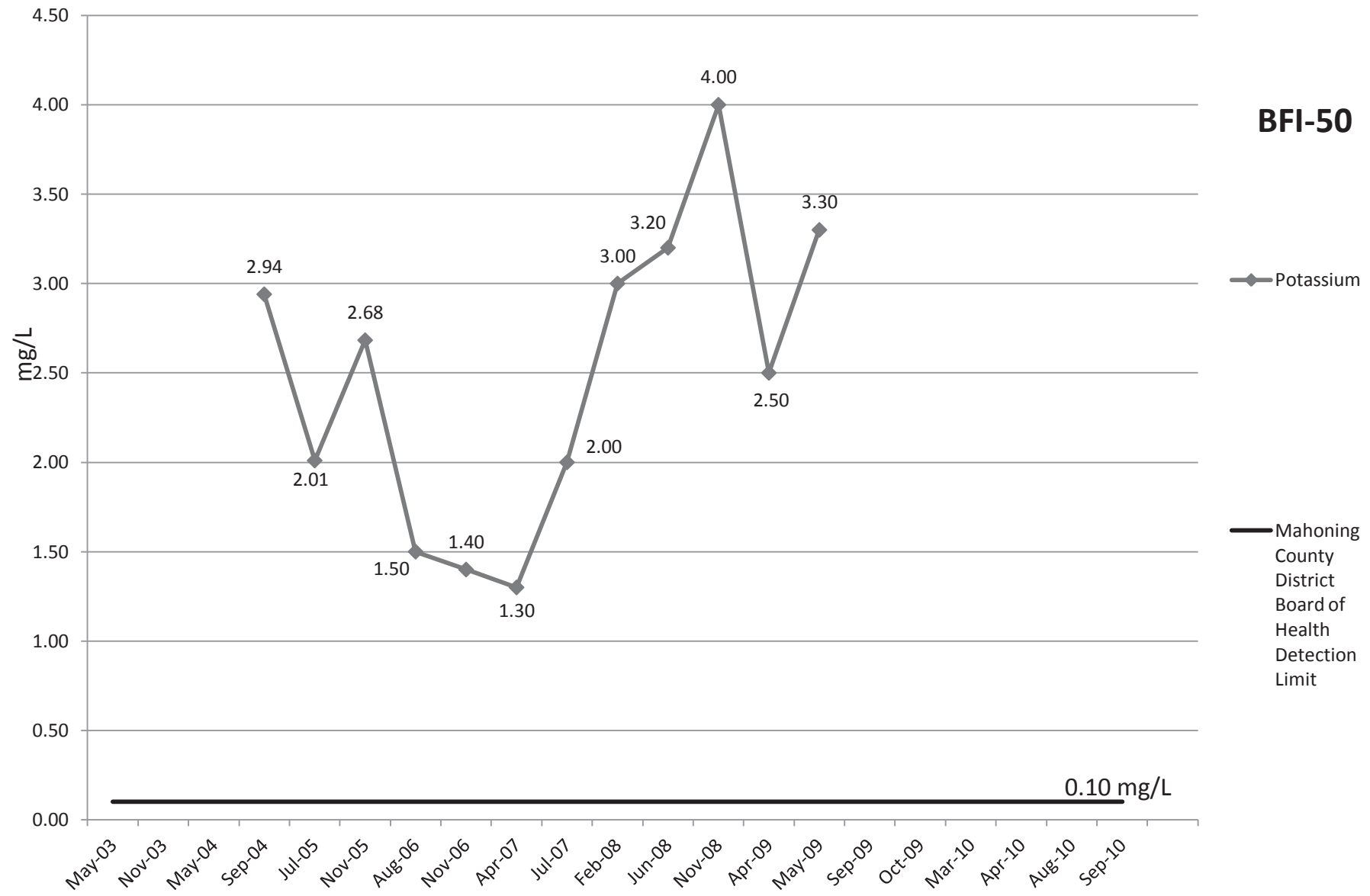
# Zinc



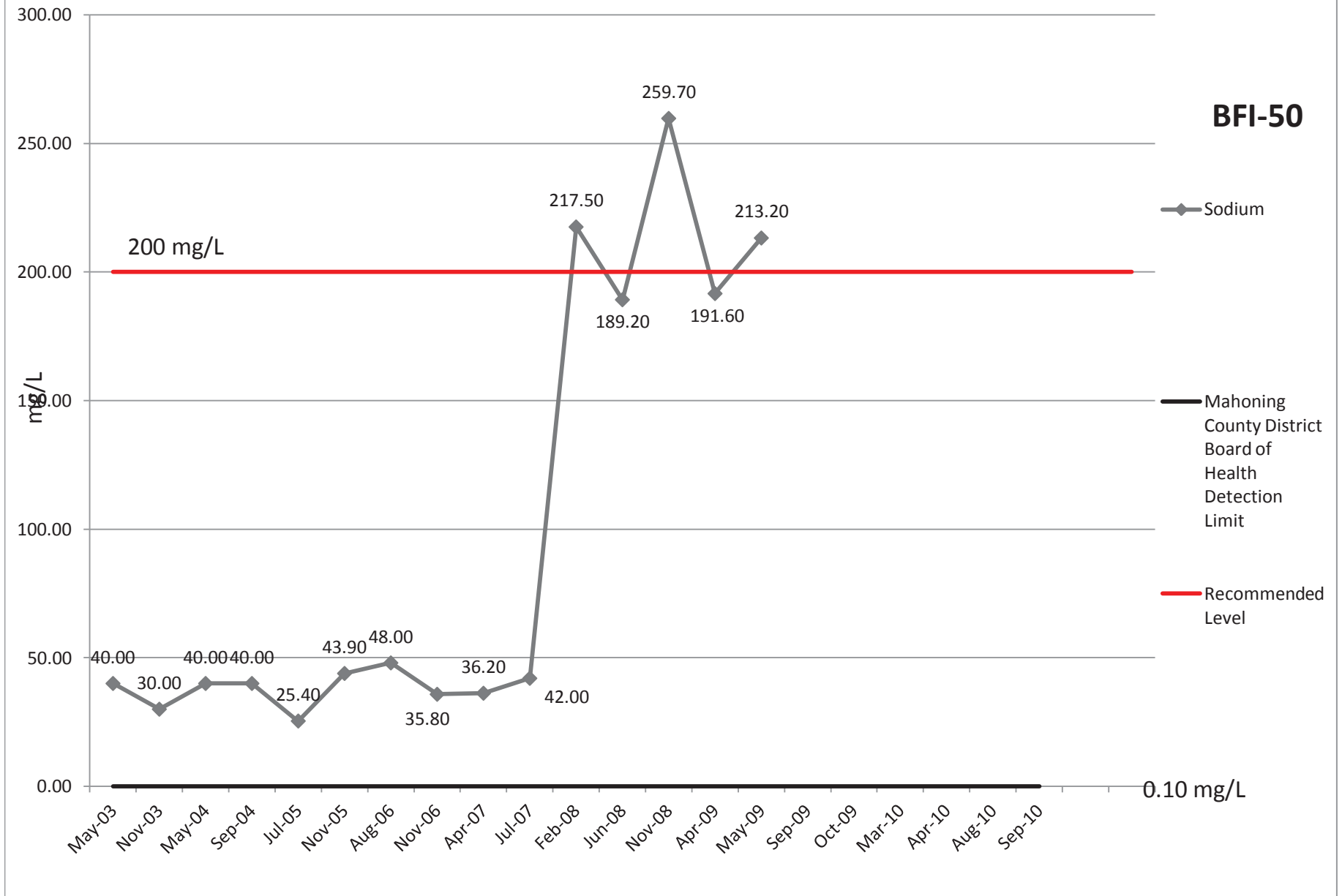
# Magnesium



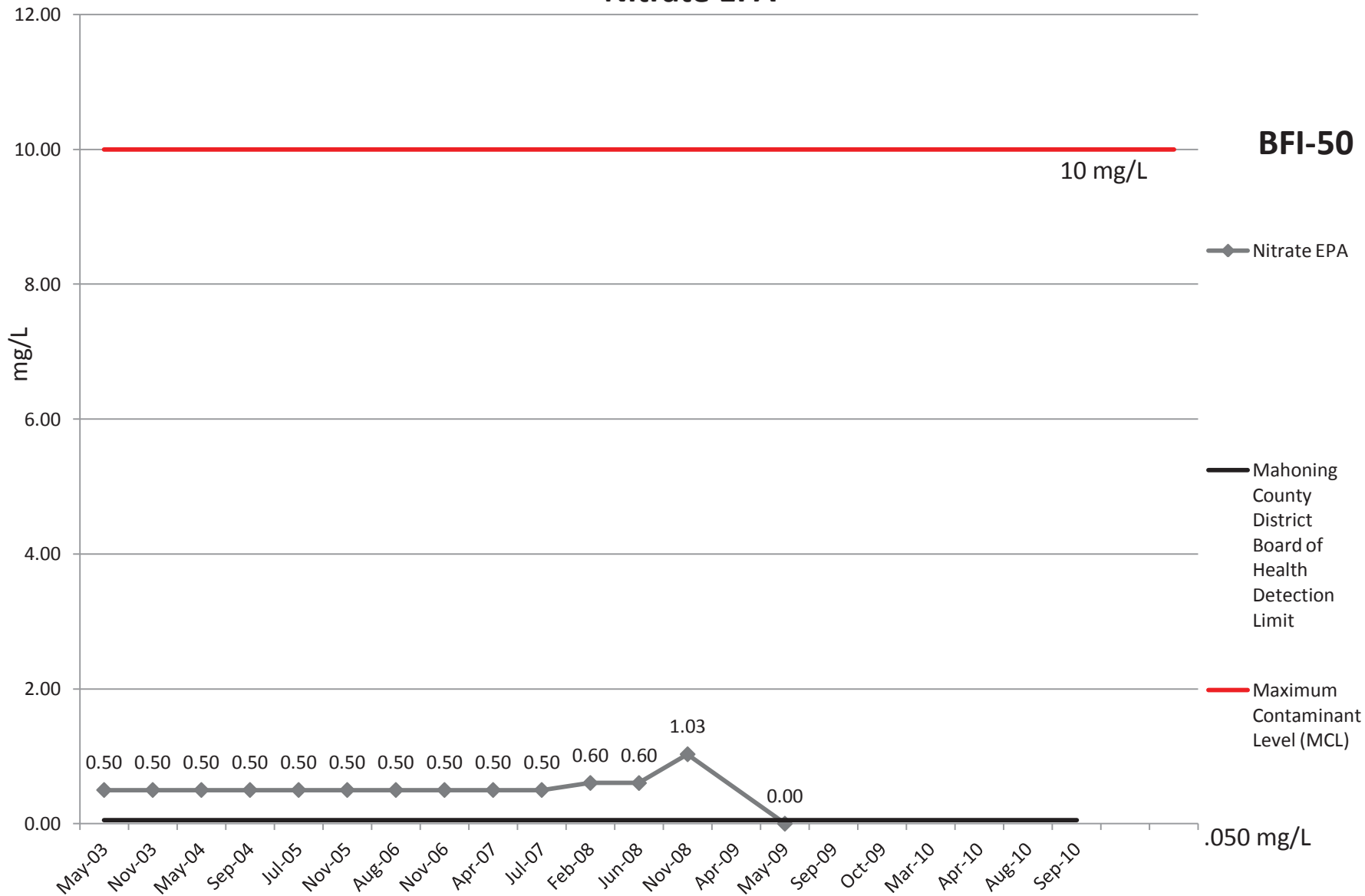
# Potassium



# Sodium



# Nitrate EPA



**BFI-50**

10 mg/L

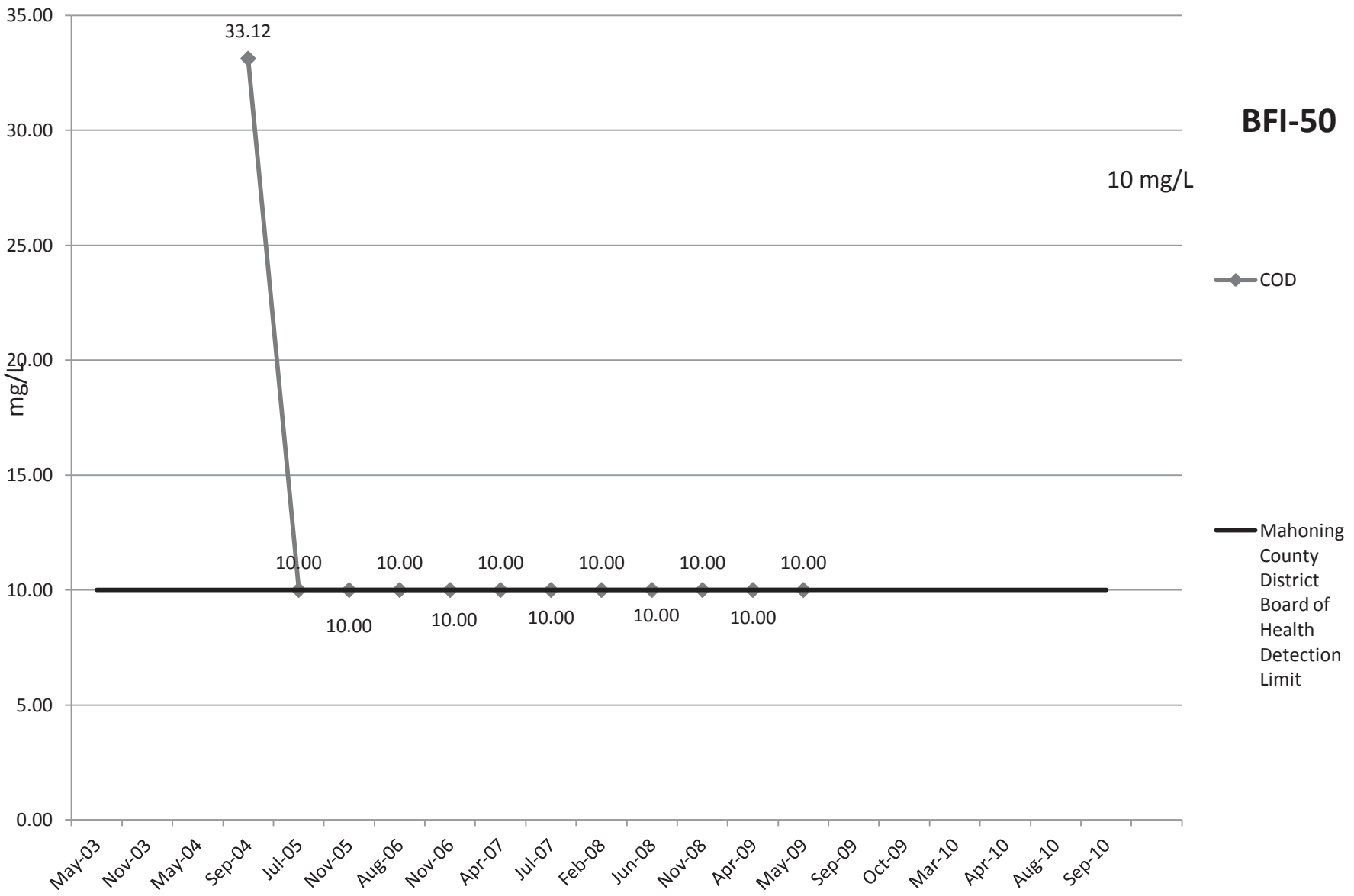
◆ Nitrate EPA

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

0.050 mg/L

# COD



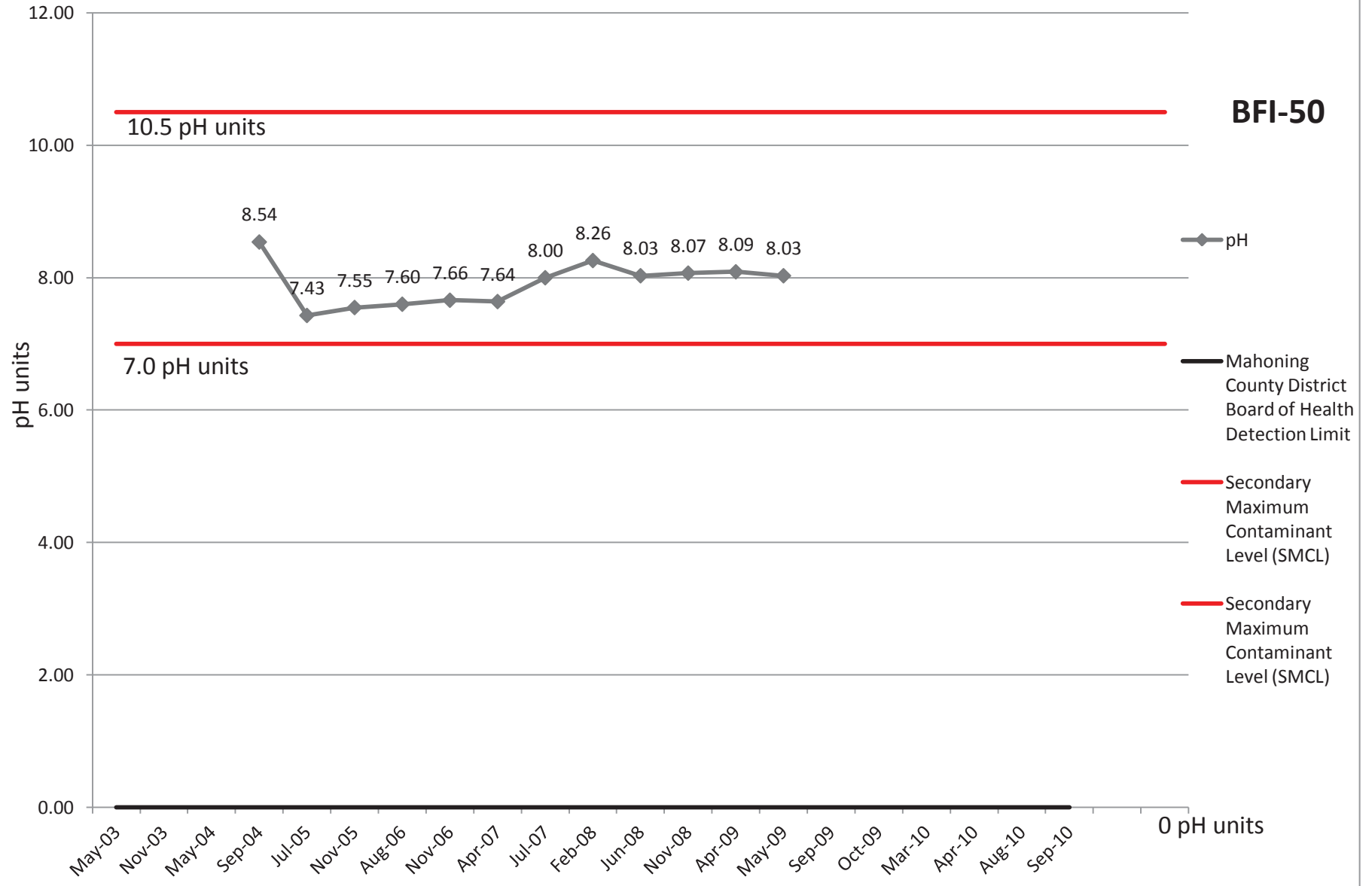
**BFI-50**

10 mg/L

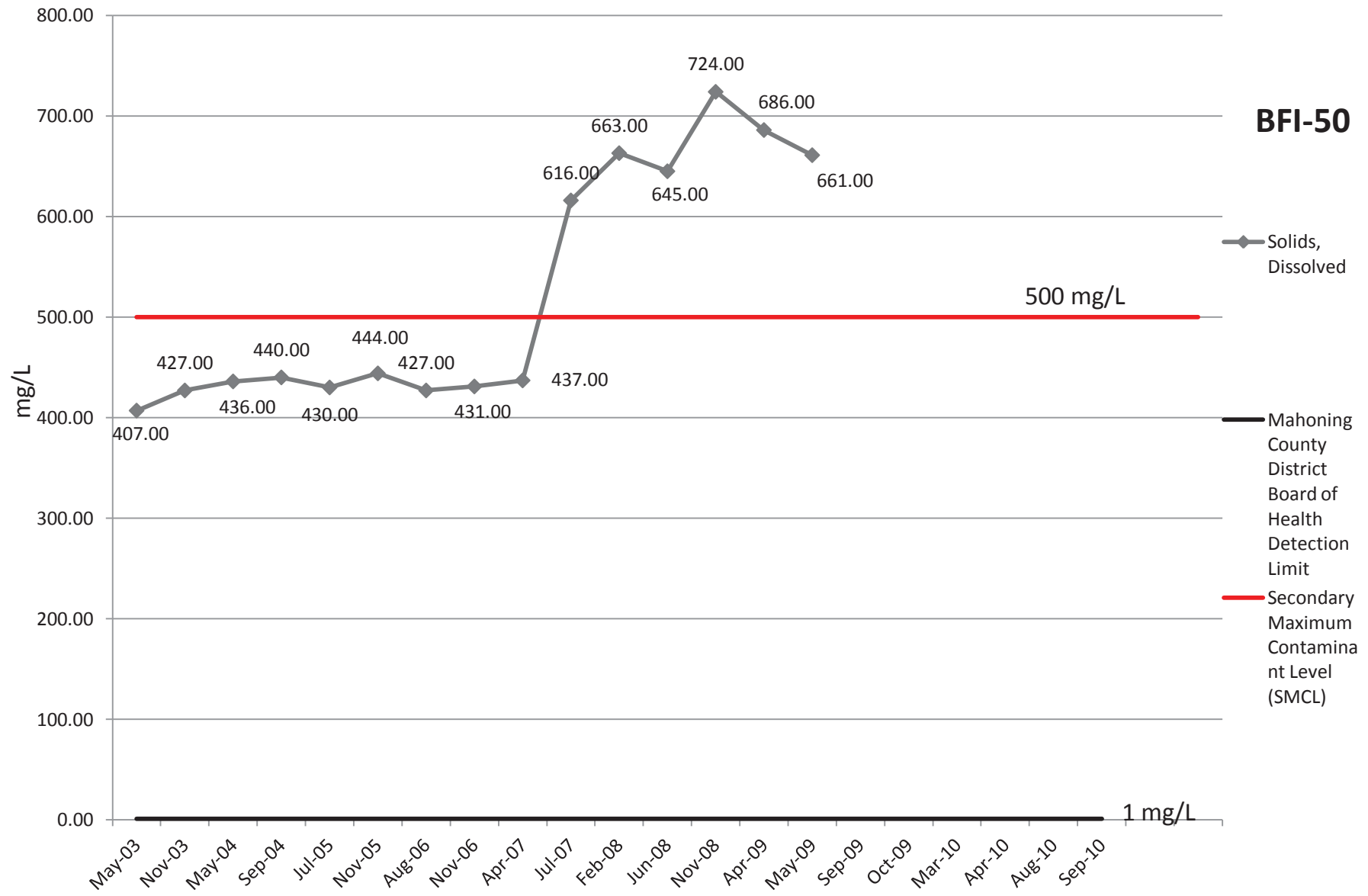
◆ COD

— Mahoning County District Board of Health Detection Limit

# pH

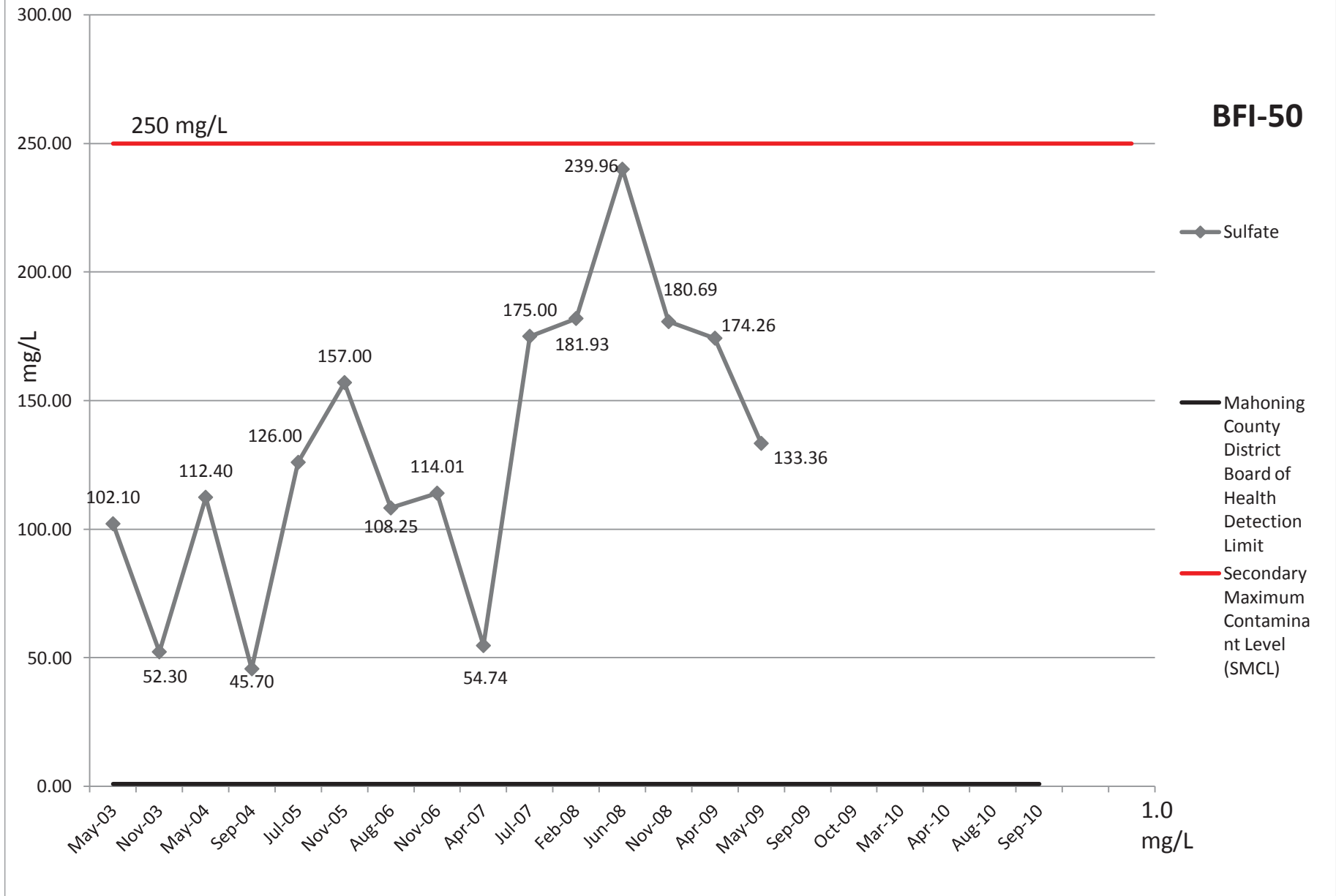


# Solids, Dissolved





# Sulfate



# Bacteria

## BFI-50

Positive/Negative

◆ Bacteria

positive (1)

1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

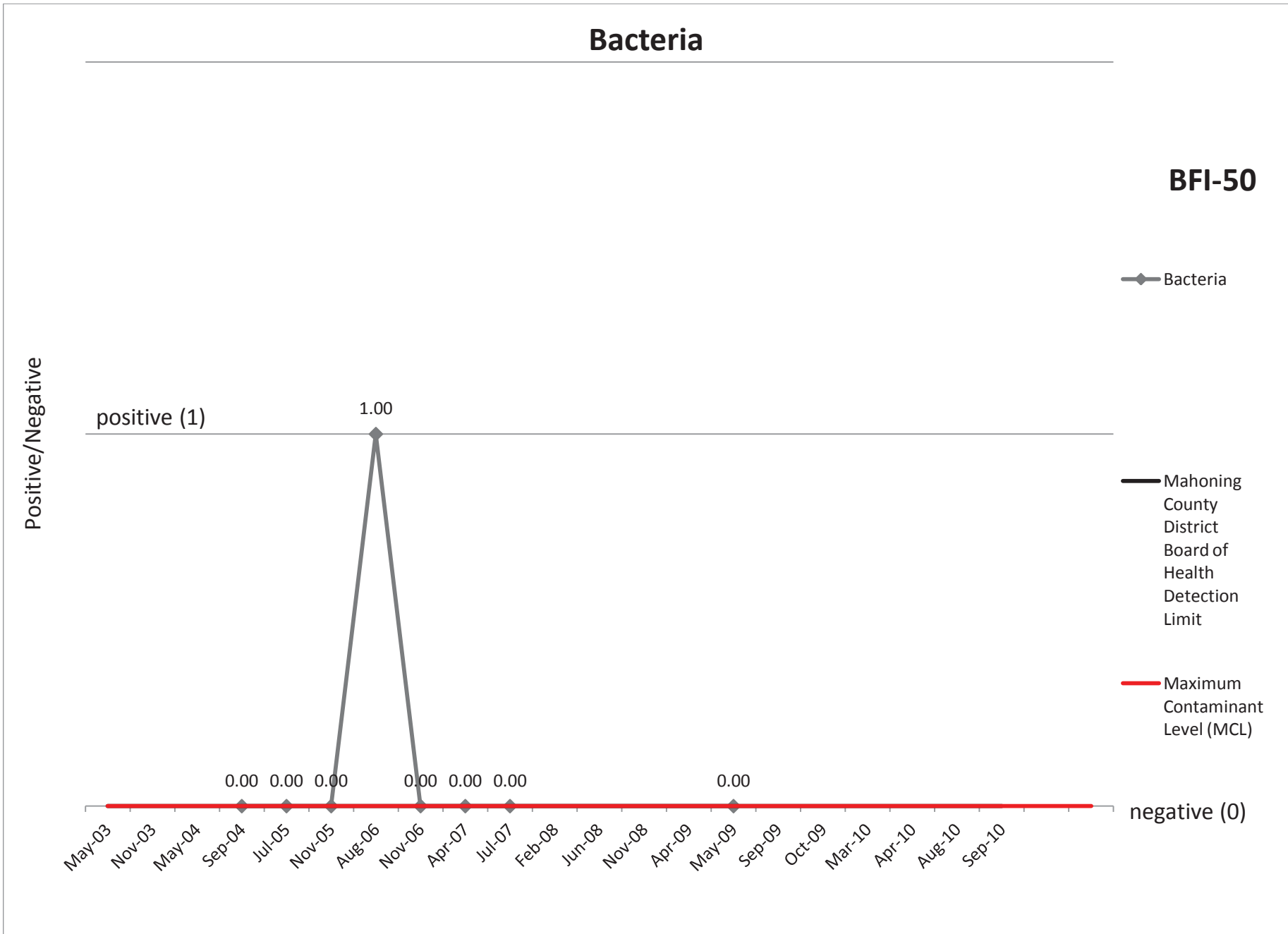
— Maximum  
Contaminant  
Level (MCL)

negative (0)

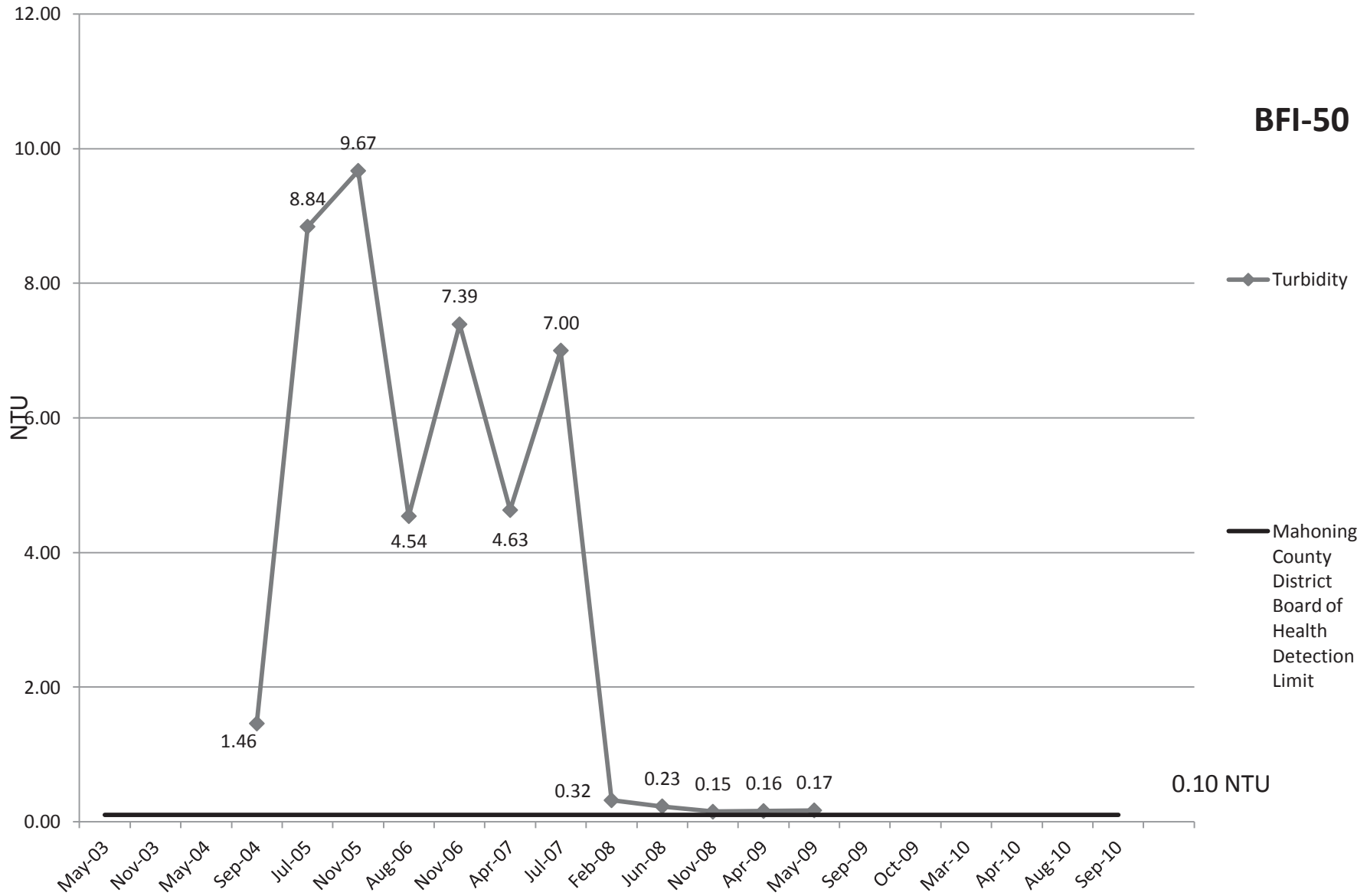
0.00 0.00 0.00 0.00 0.00 0.00 0.00

0.00

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

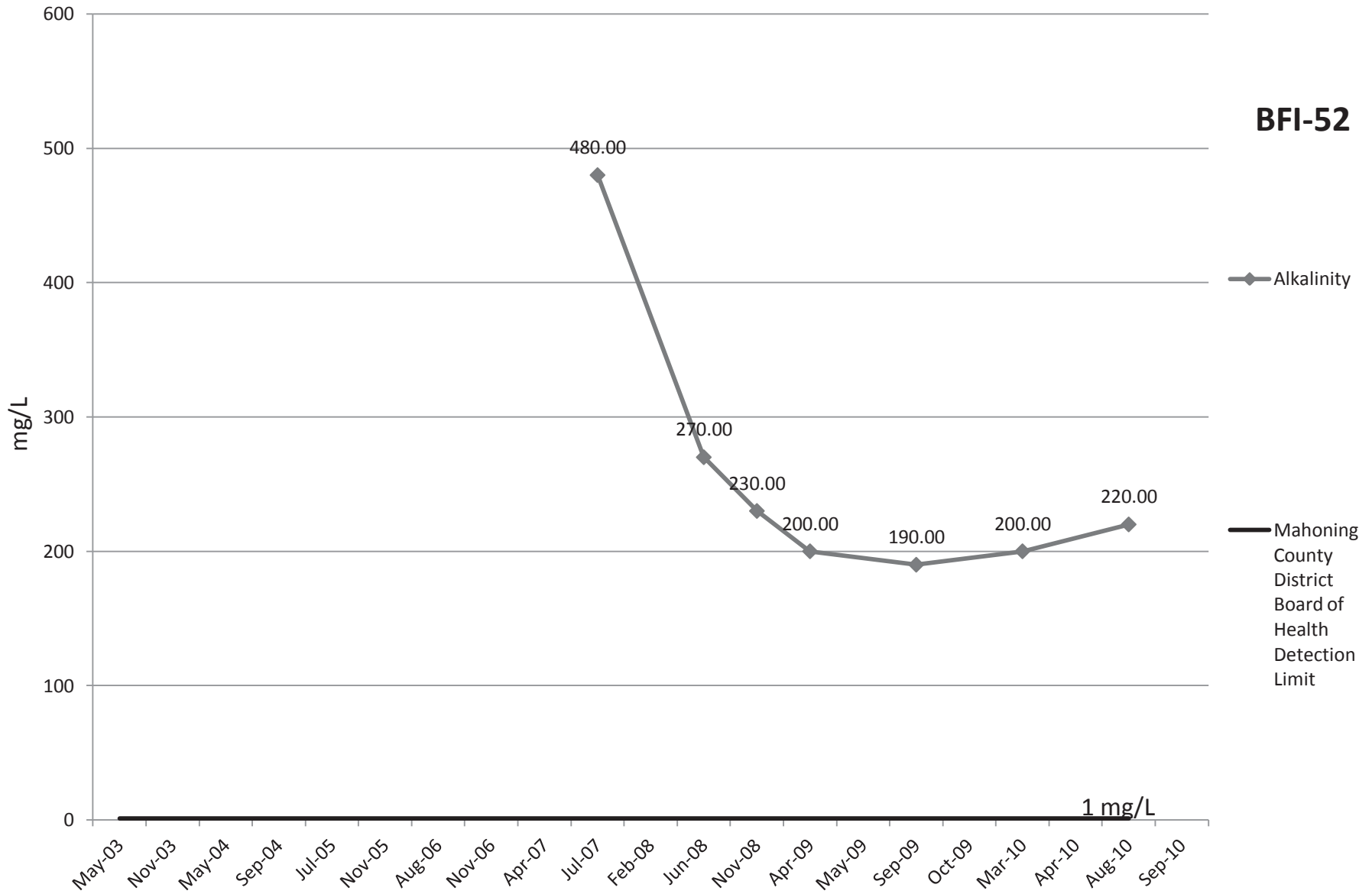


# Turbidity

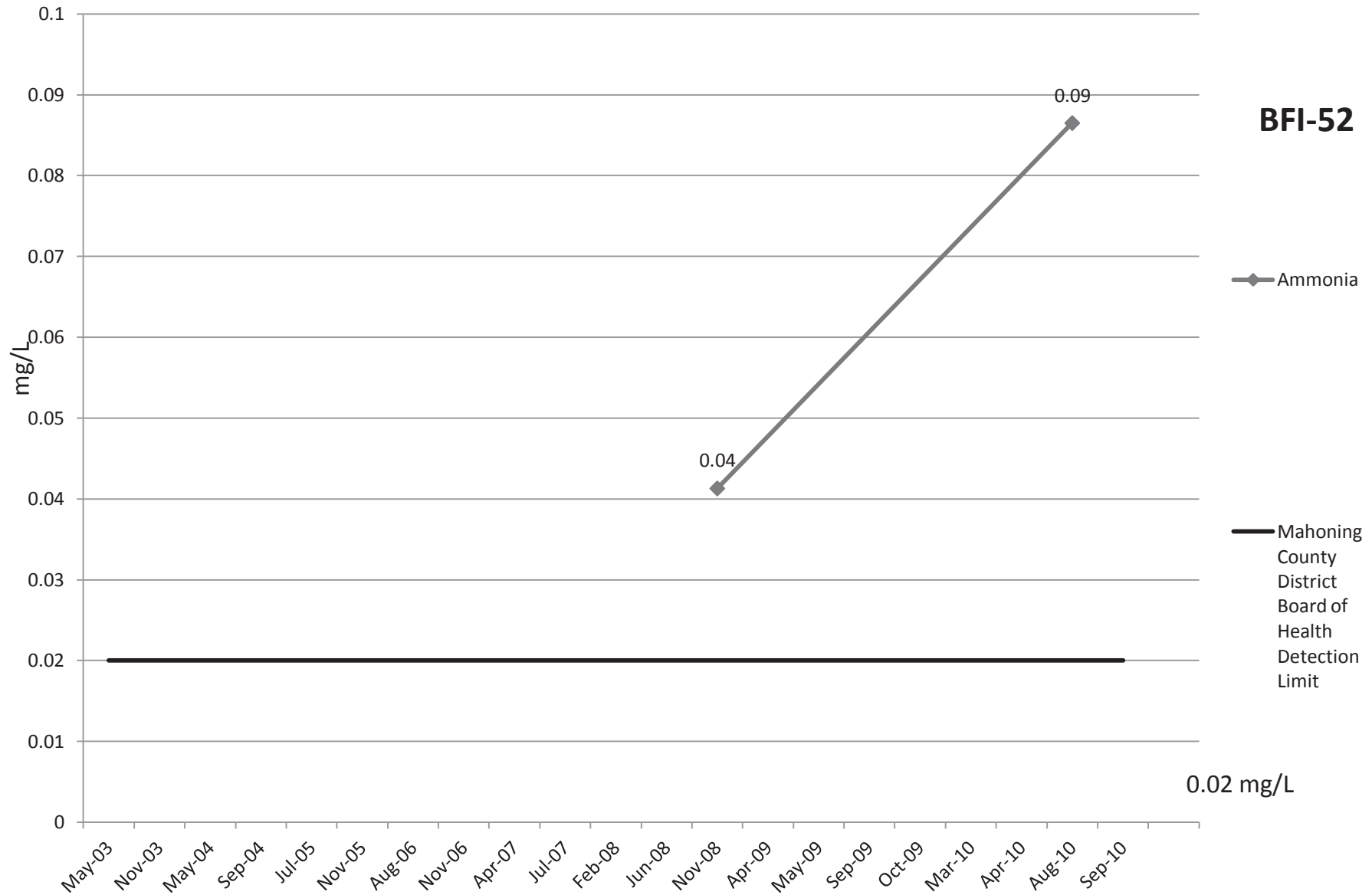


# Alkalinity

**BFI-52**



# Ammonia



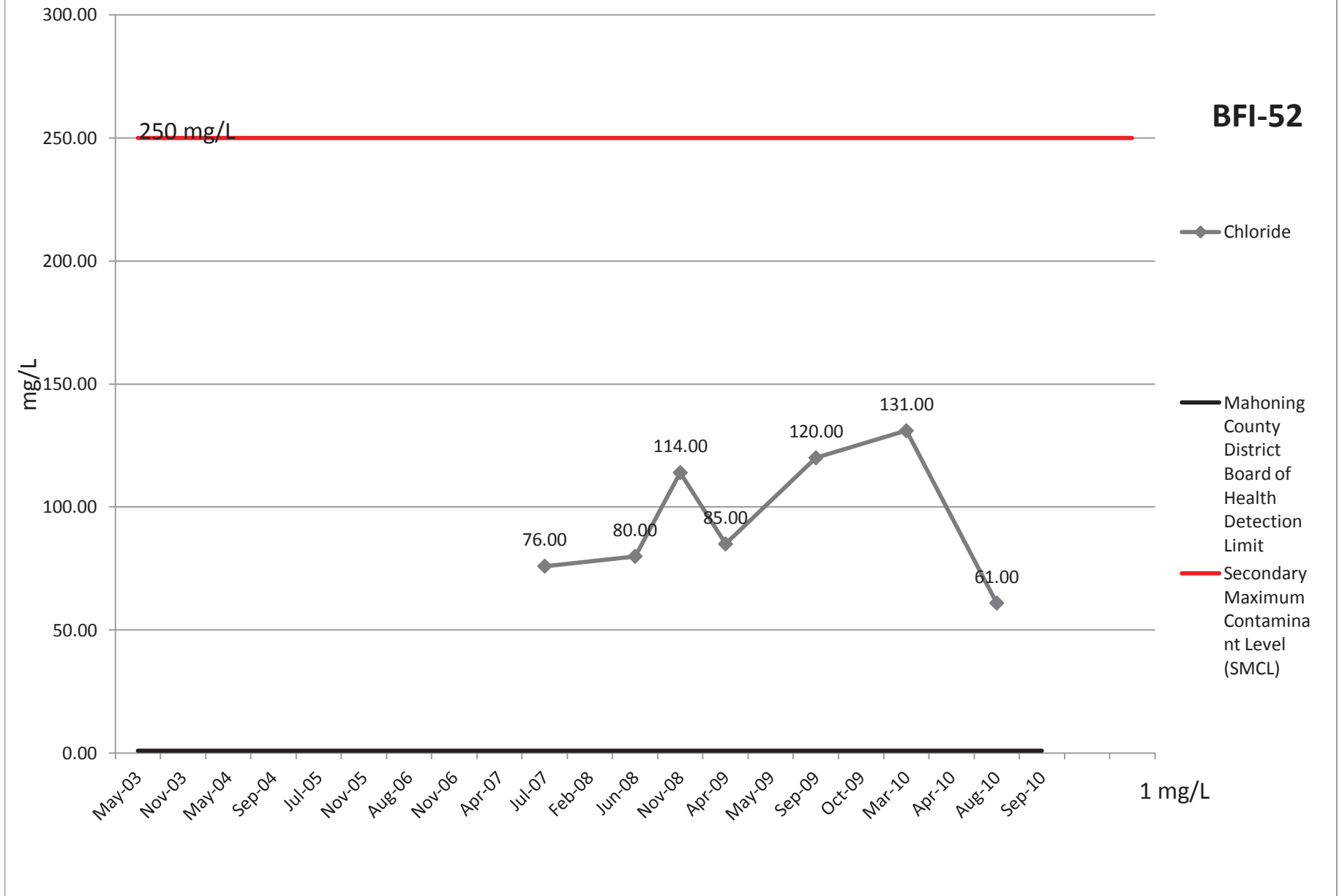
**BFI-52**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

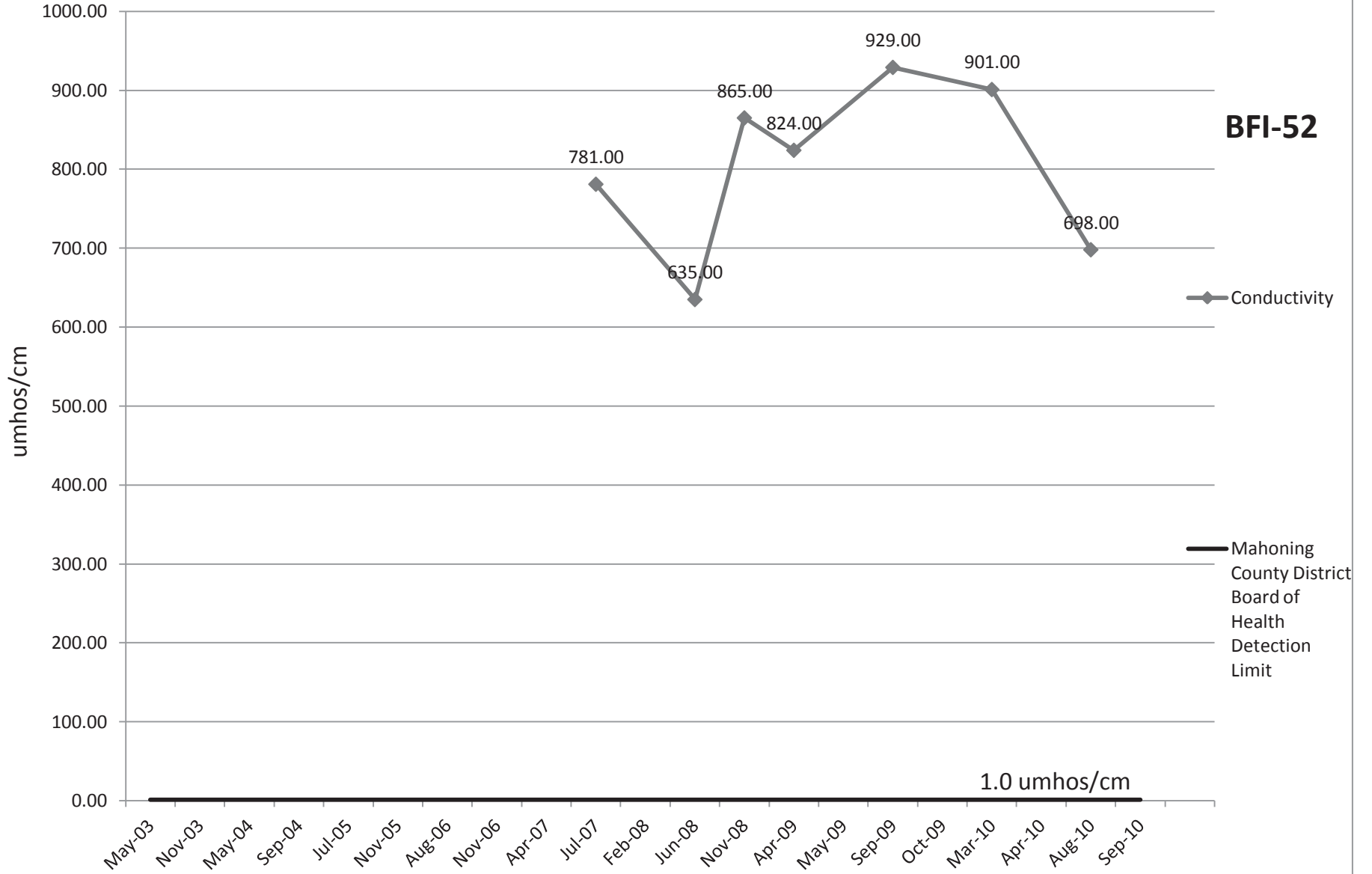
0.02 mg/L

# Chloride

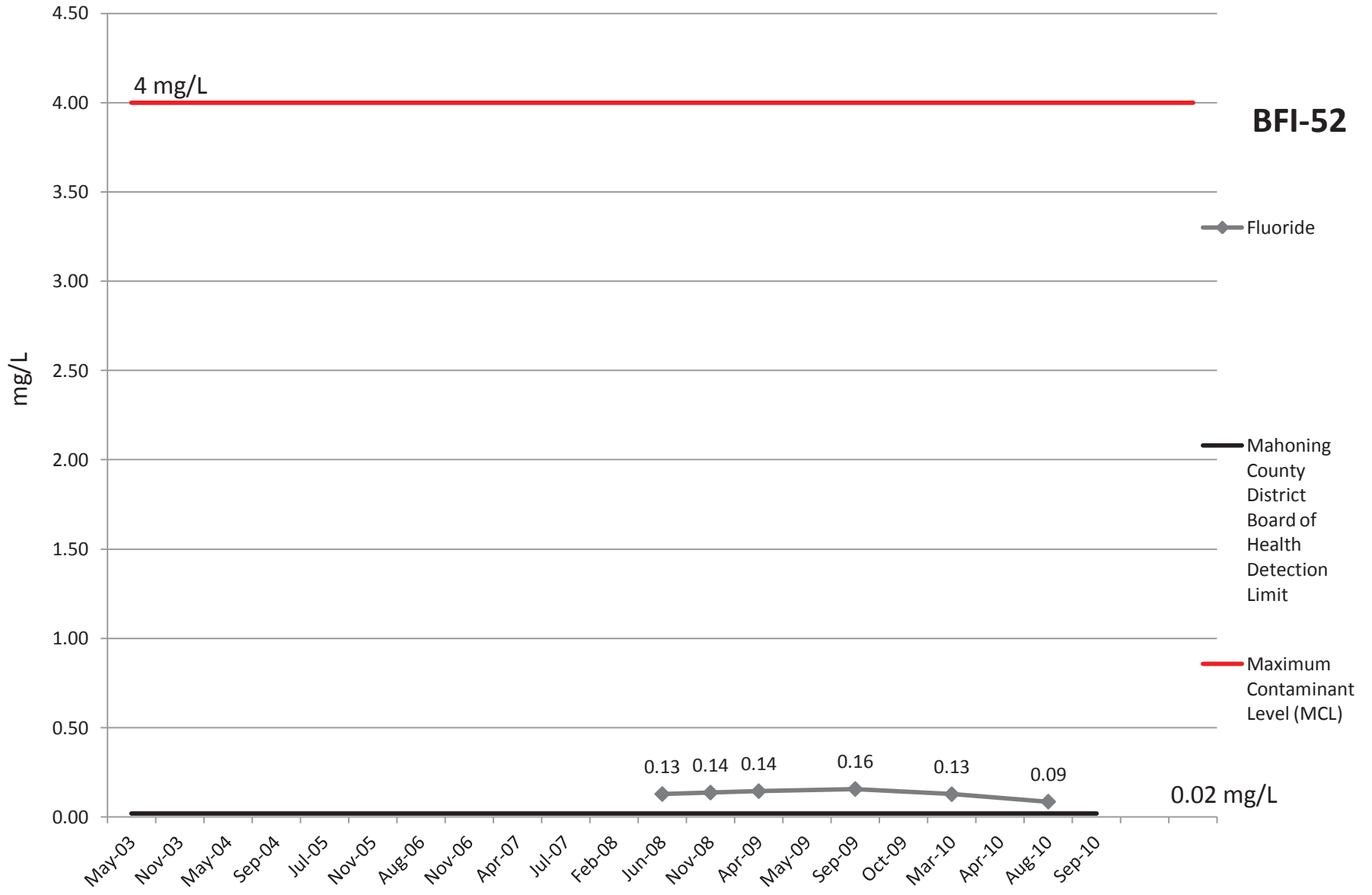


# Conductivity

**BFI-52**

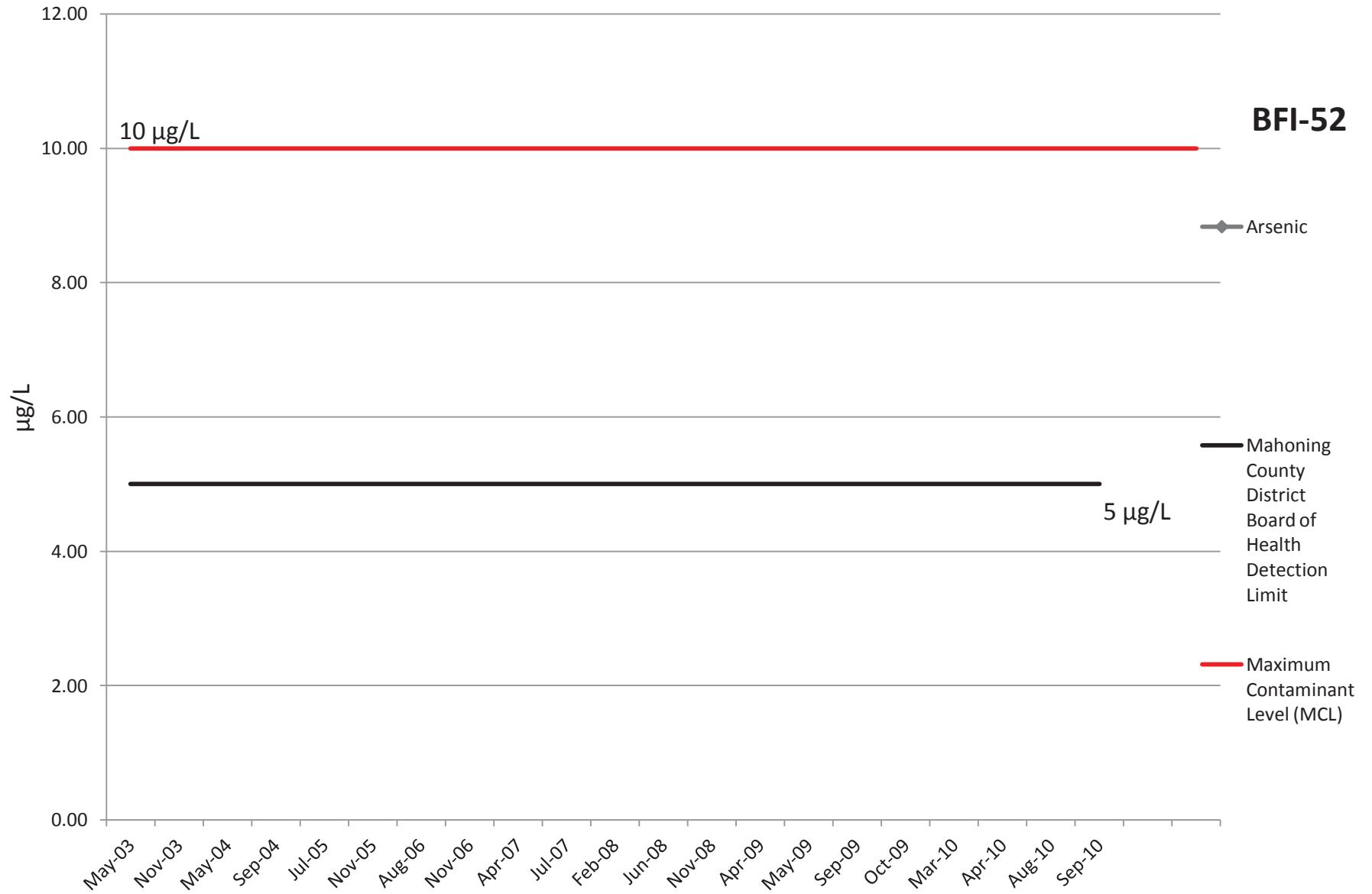


# Fluoride



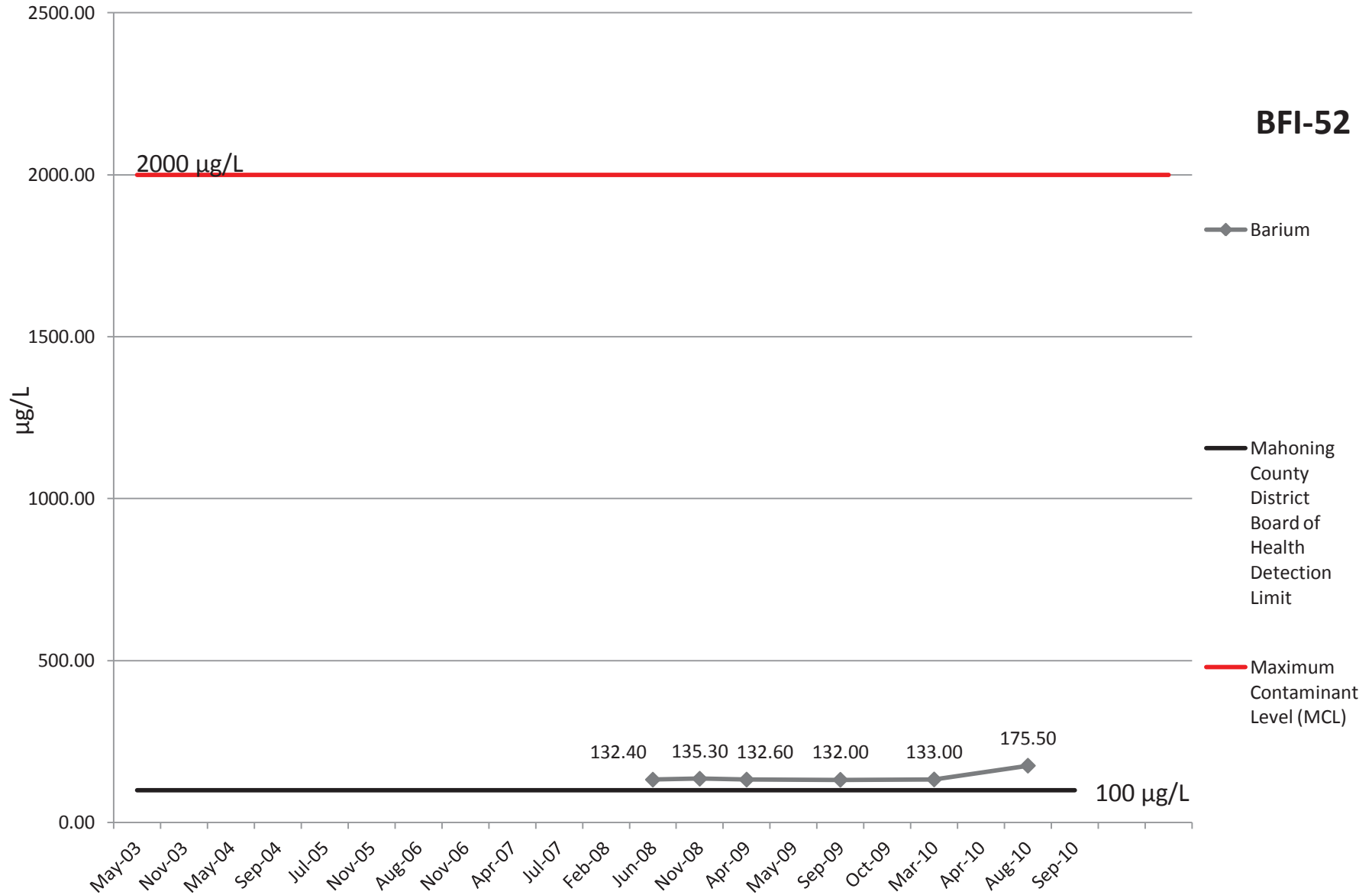


# Arsenic



# Barium

**BFI-52**



# Cadmium

**BFI-52**

10 µg/L

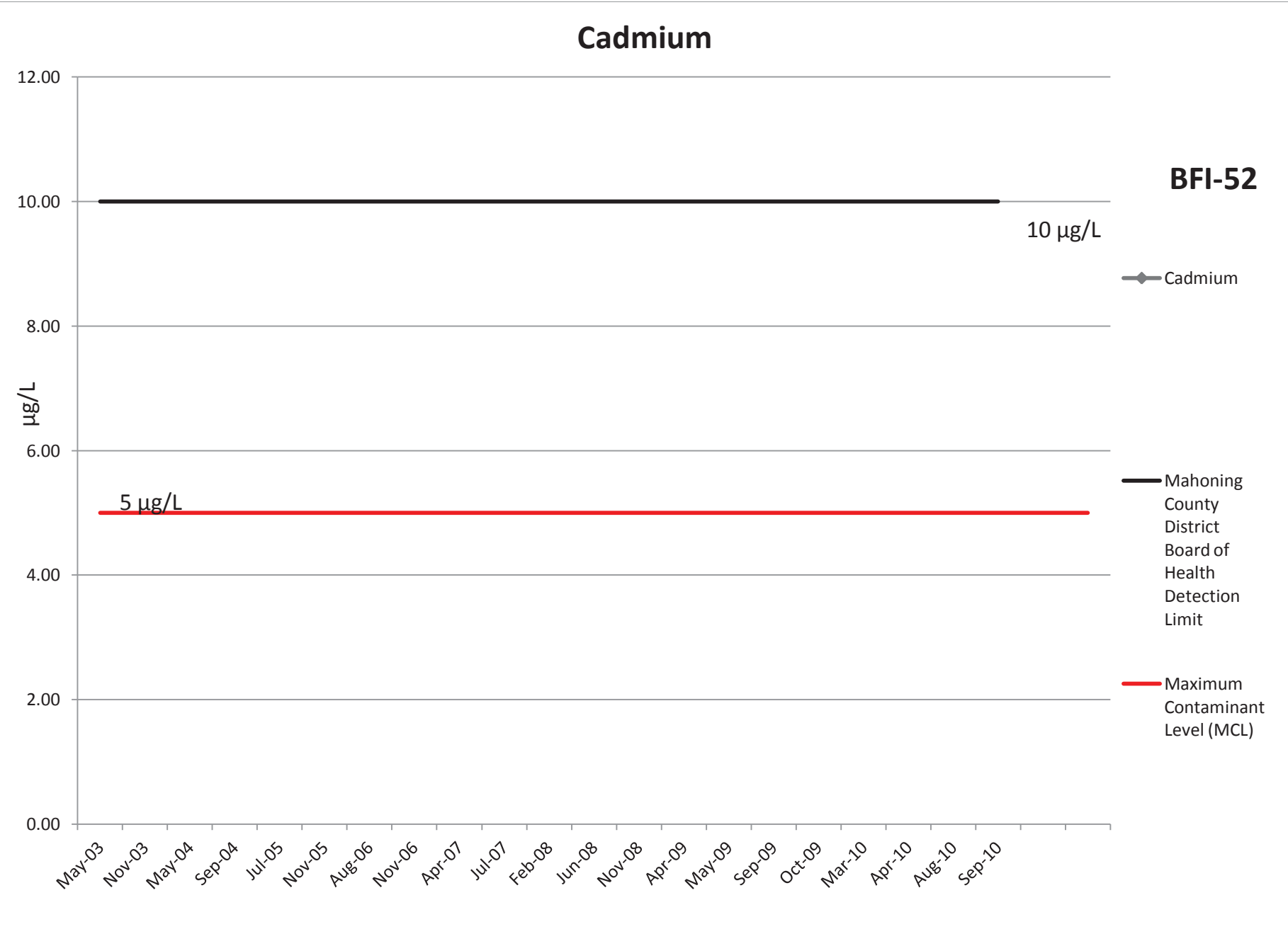
12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

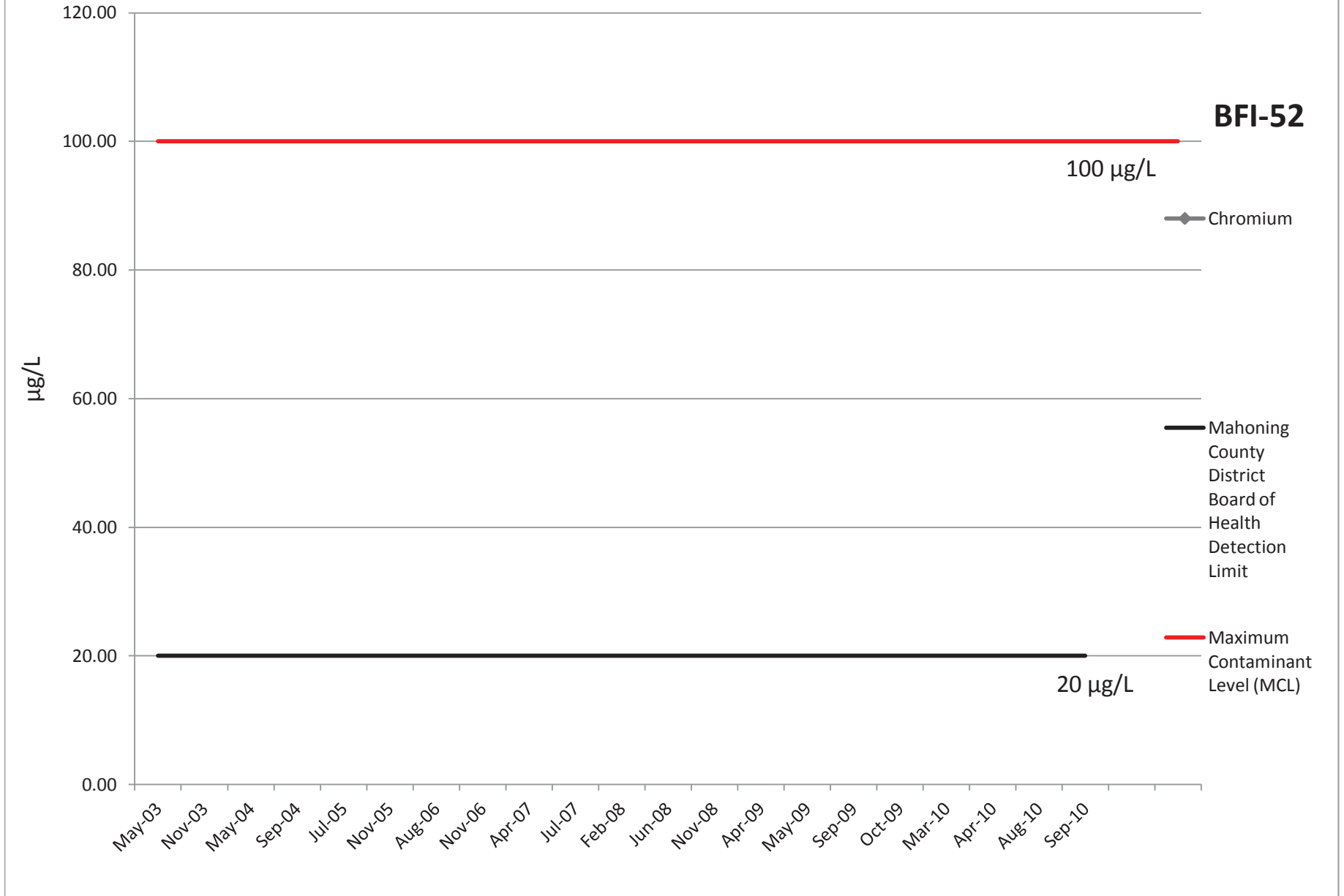
5 µg/L

- ◆ Cadmium
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

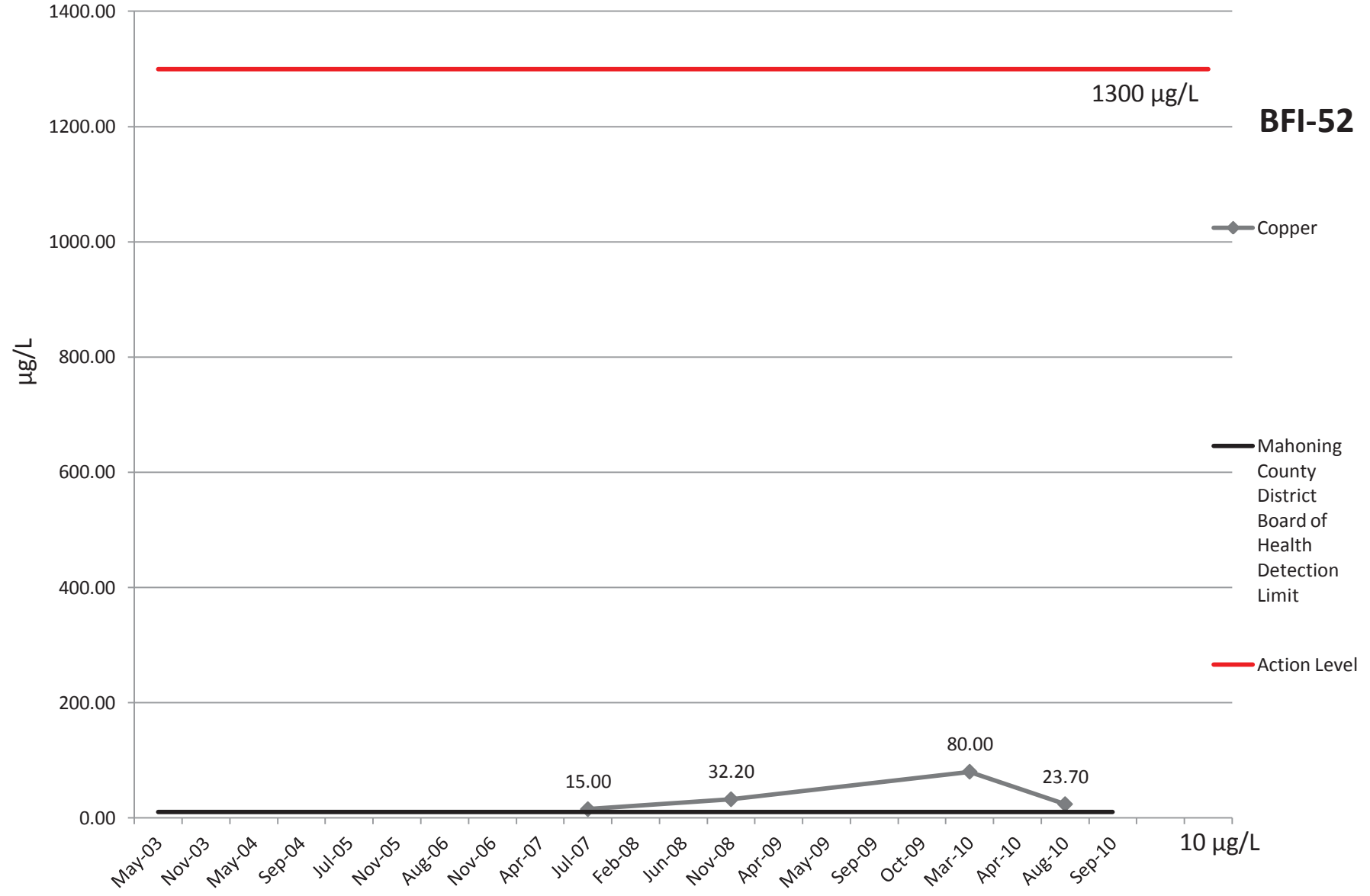
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



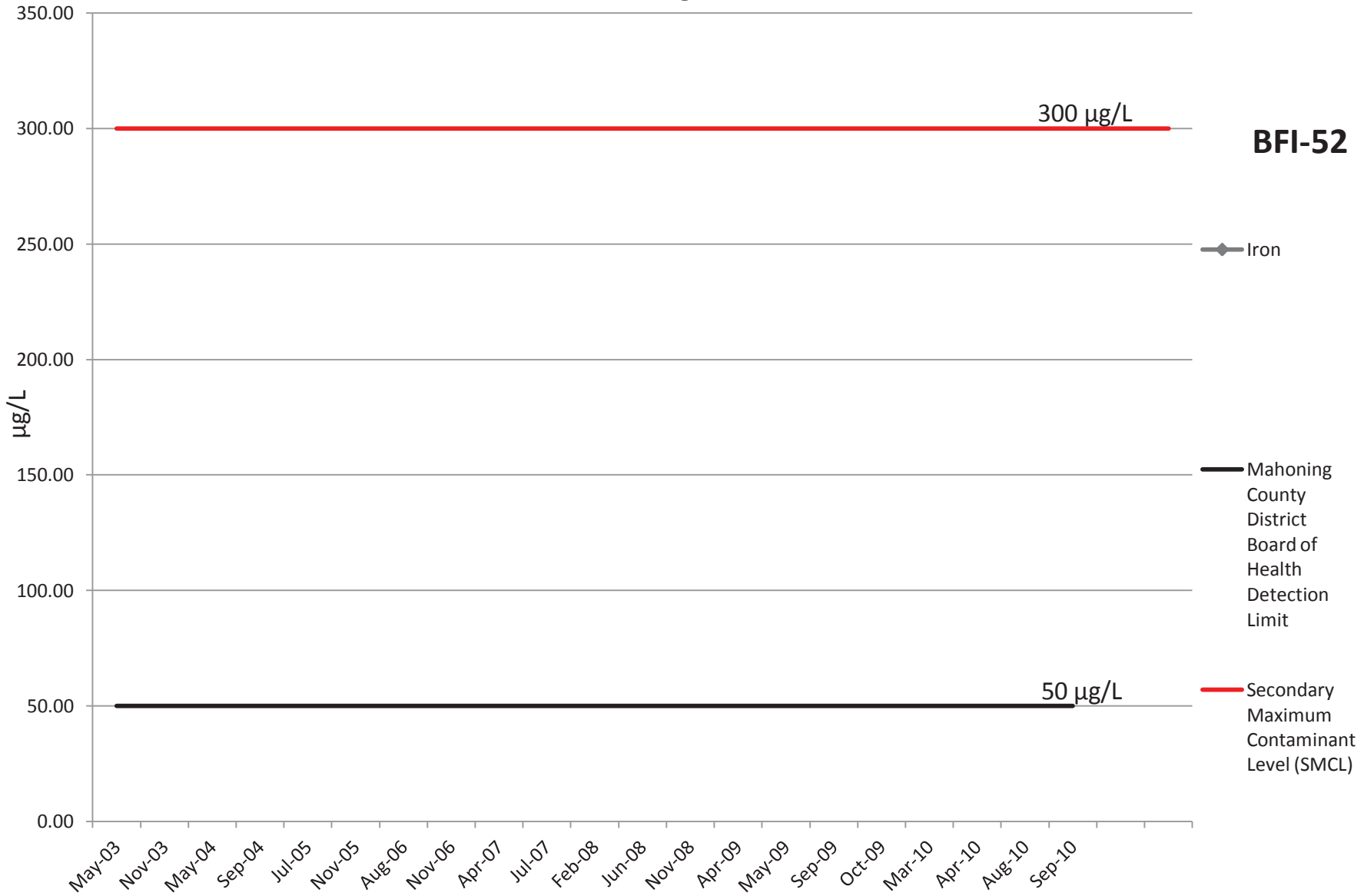
# Chromium



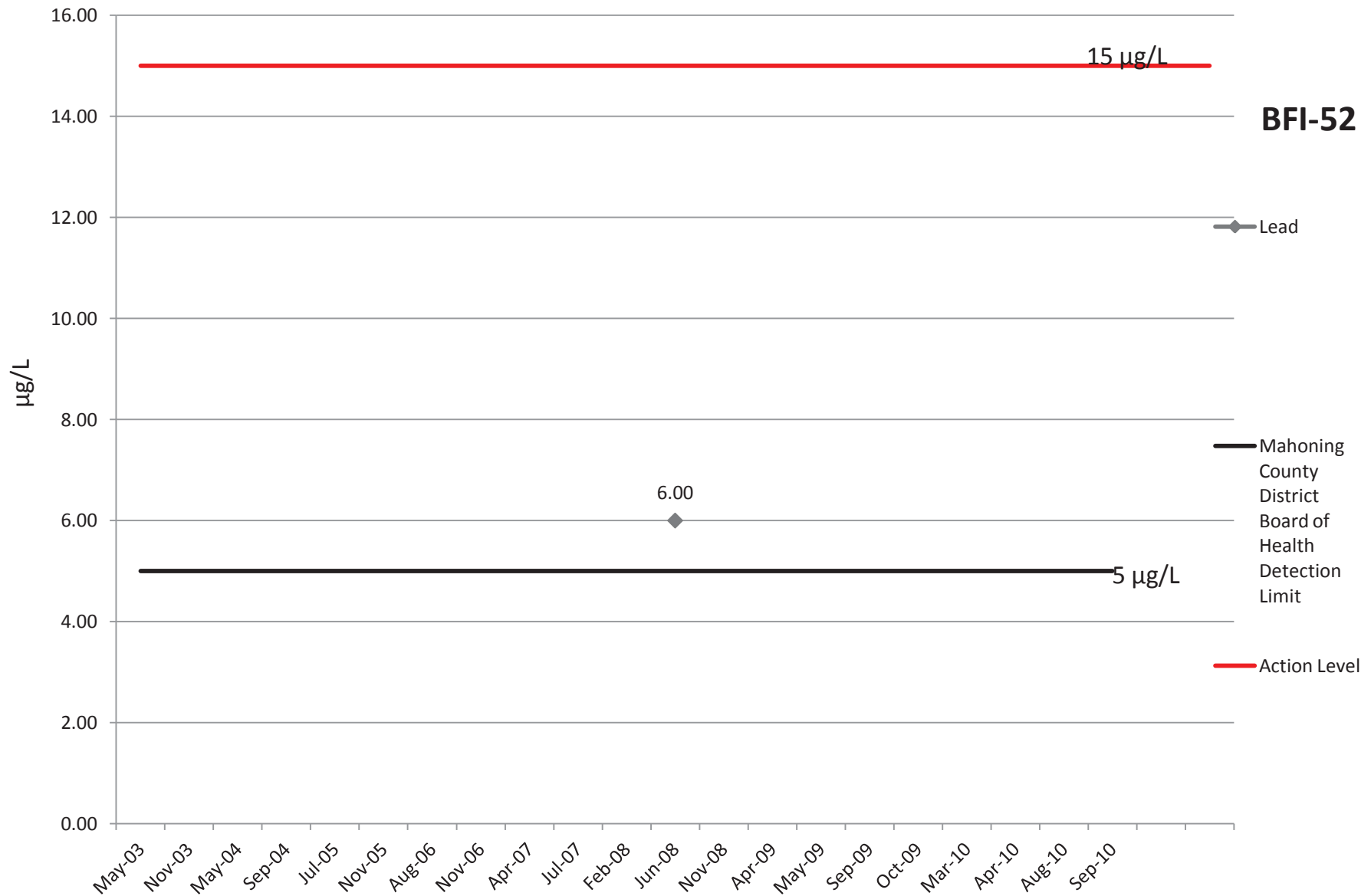
# Copper



# Iron

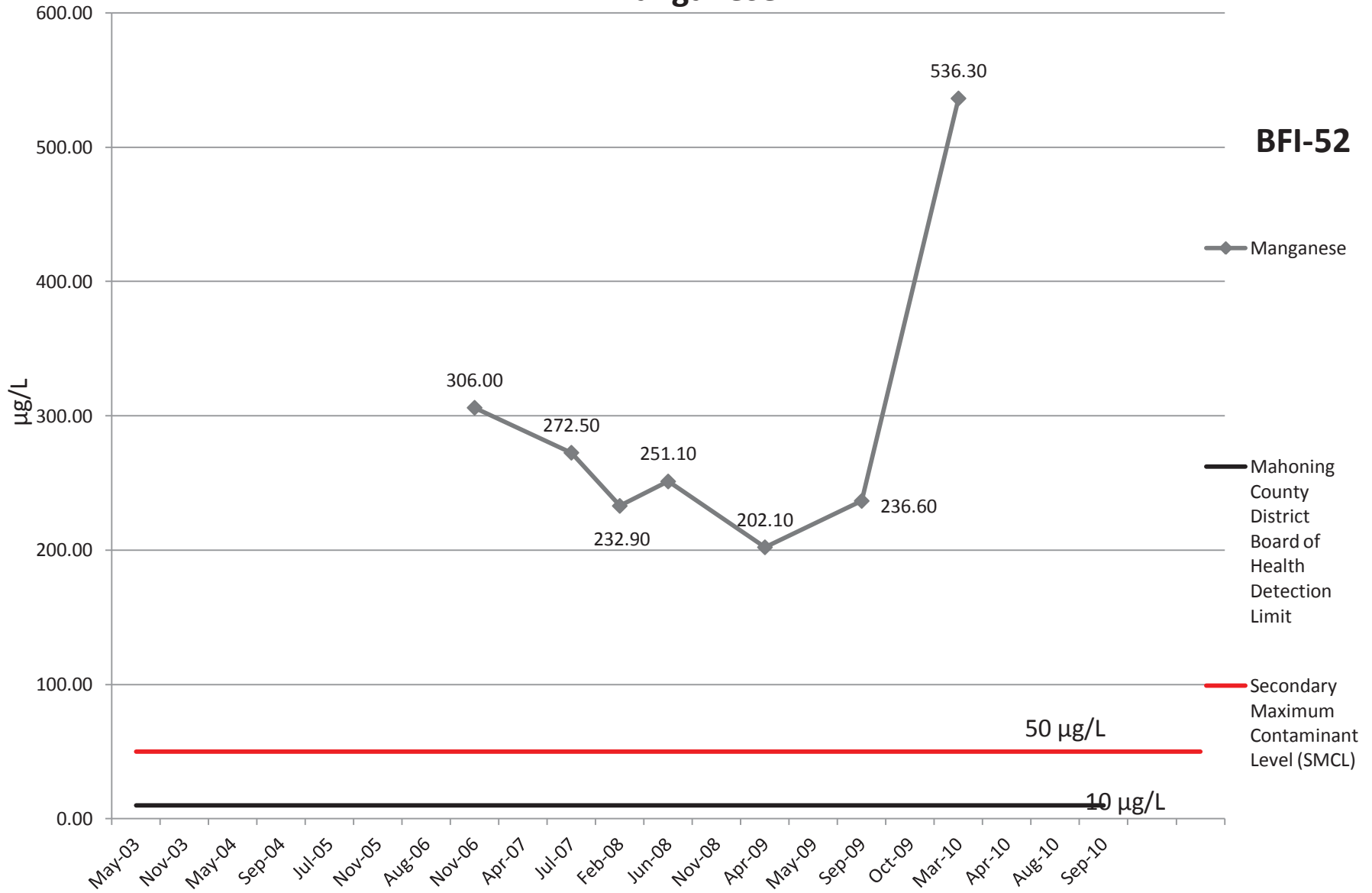


# Lead



# Manganese

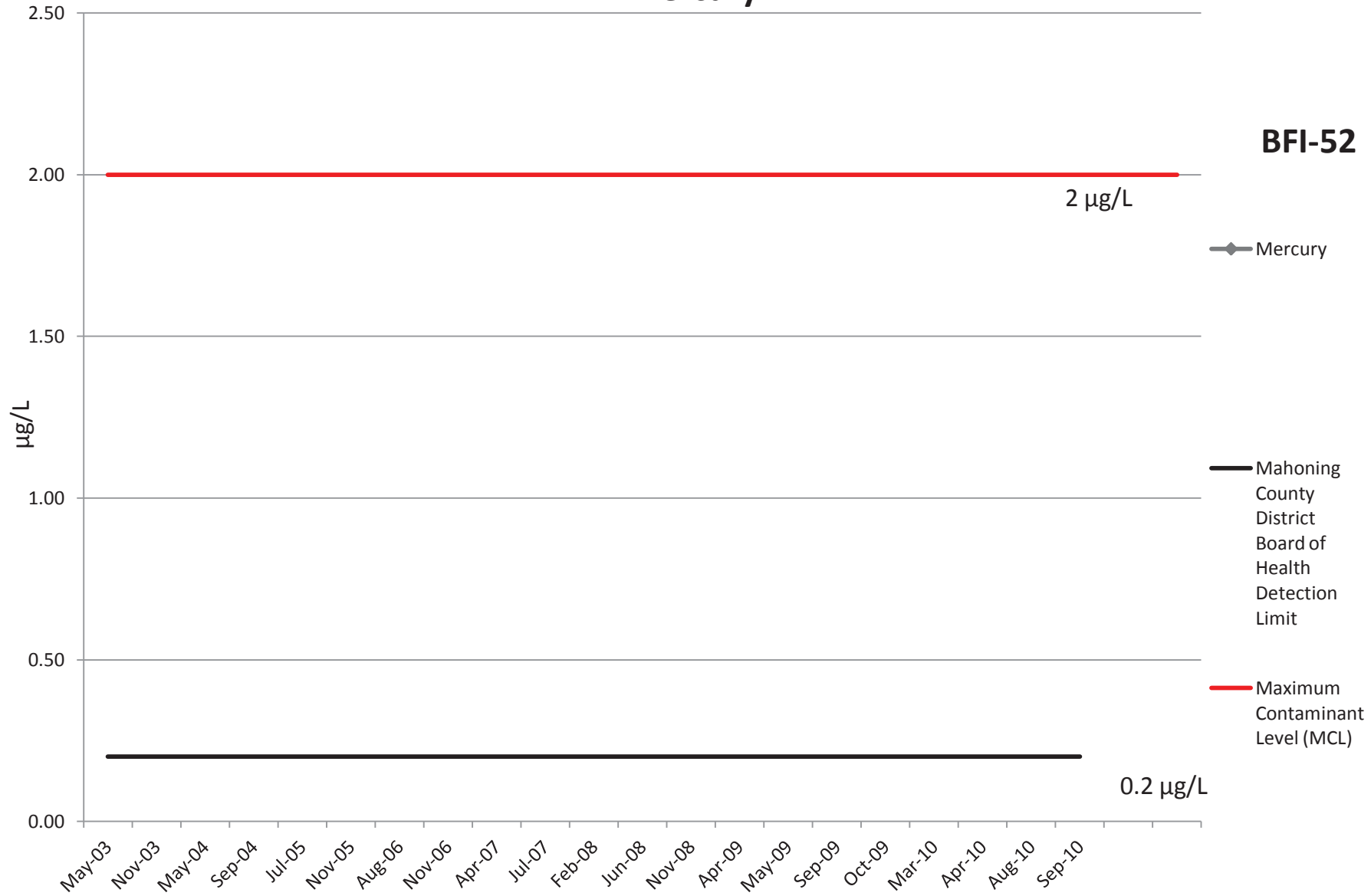
**BFI-52**



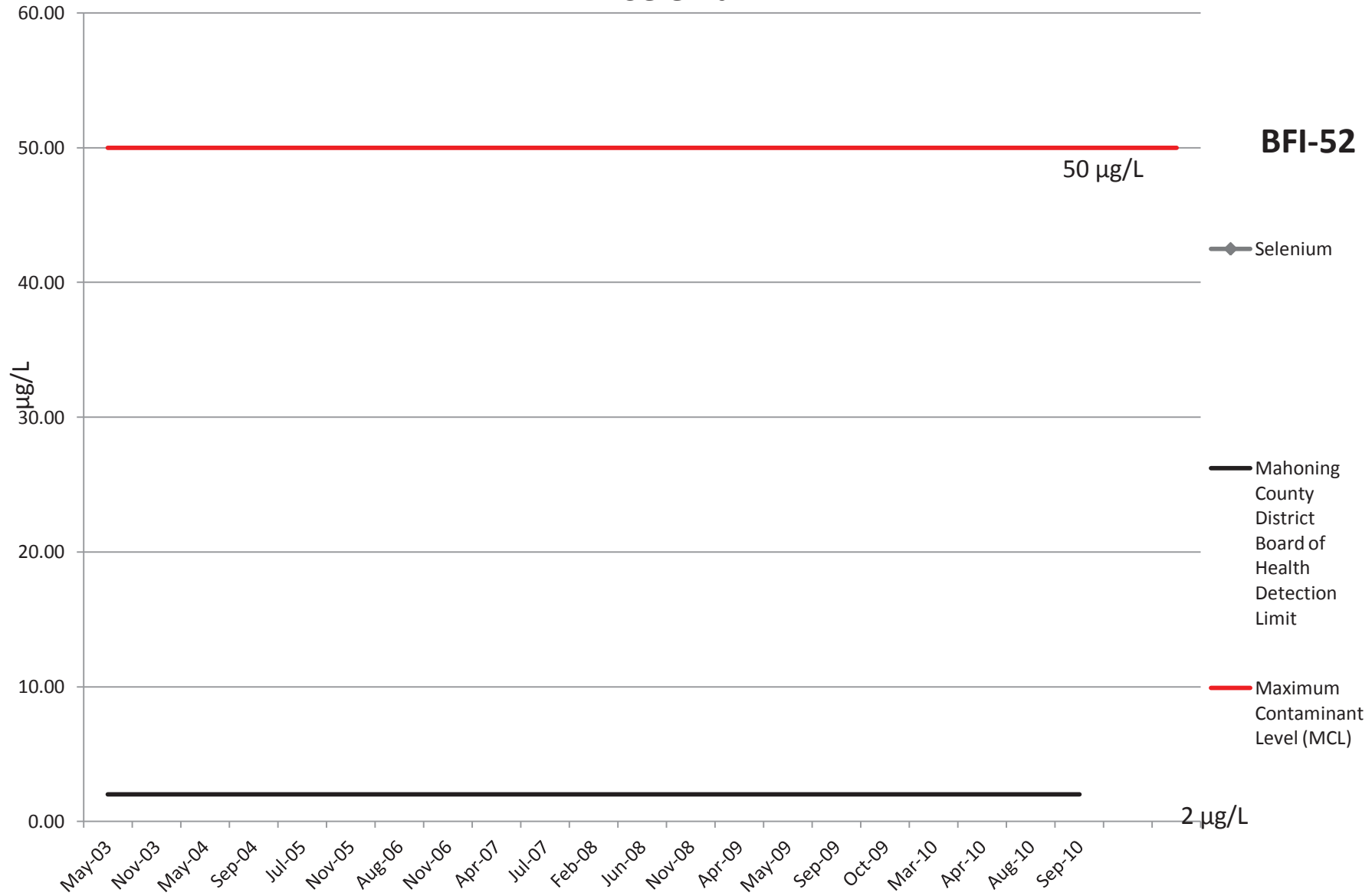


# Mercury

**BFI-52**



# Selenium



**BFI-52**

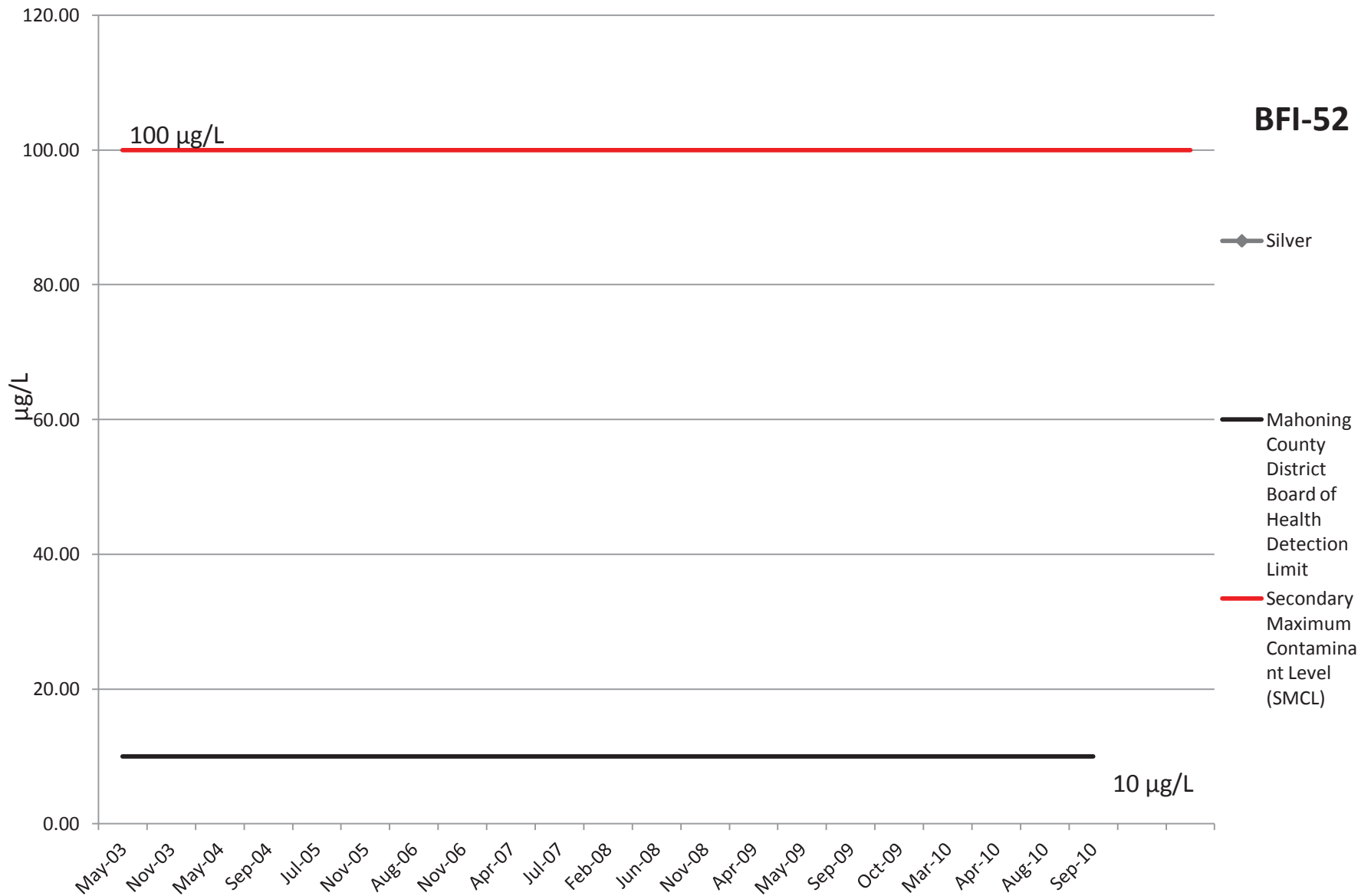
◆ Selenium

— Mahoning County District Board of Health Detection Limit

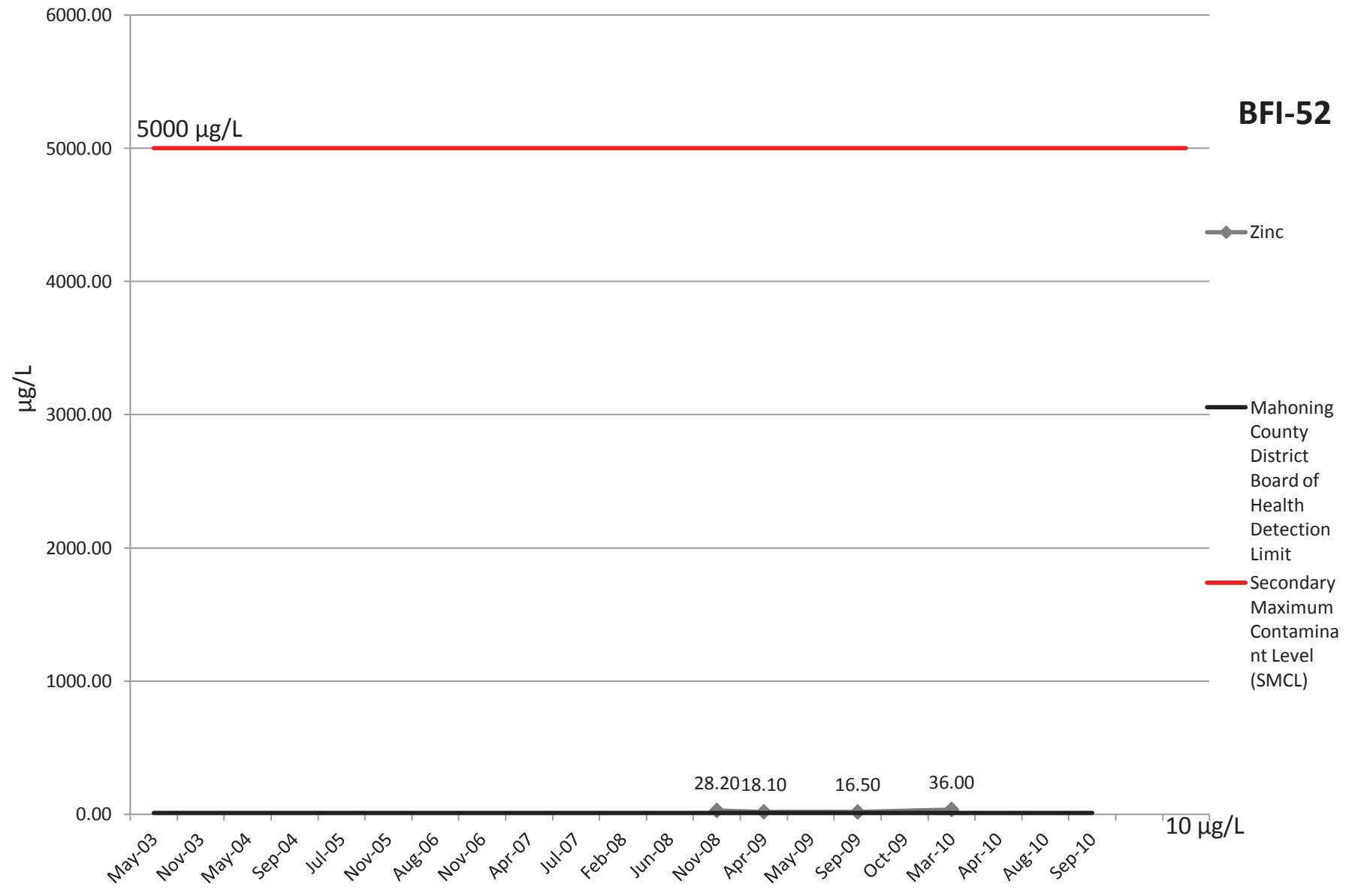
— Maximum Contaminant Level (MCL)

# Silver

**BFI-52**

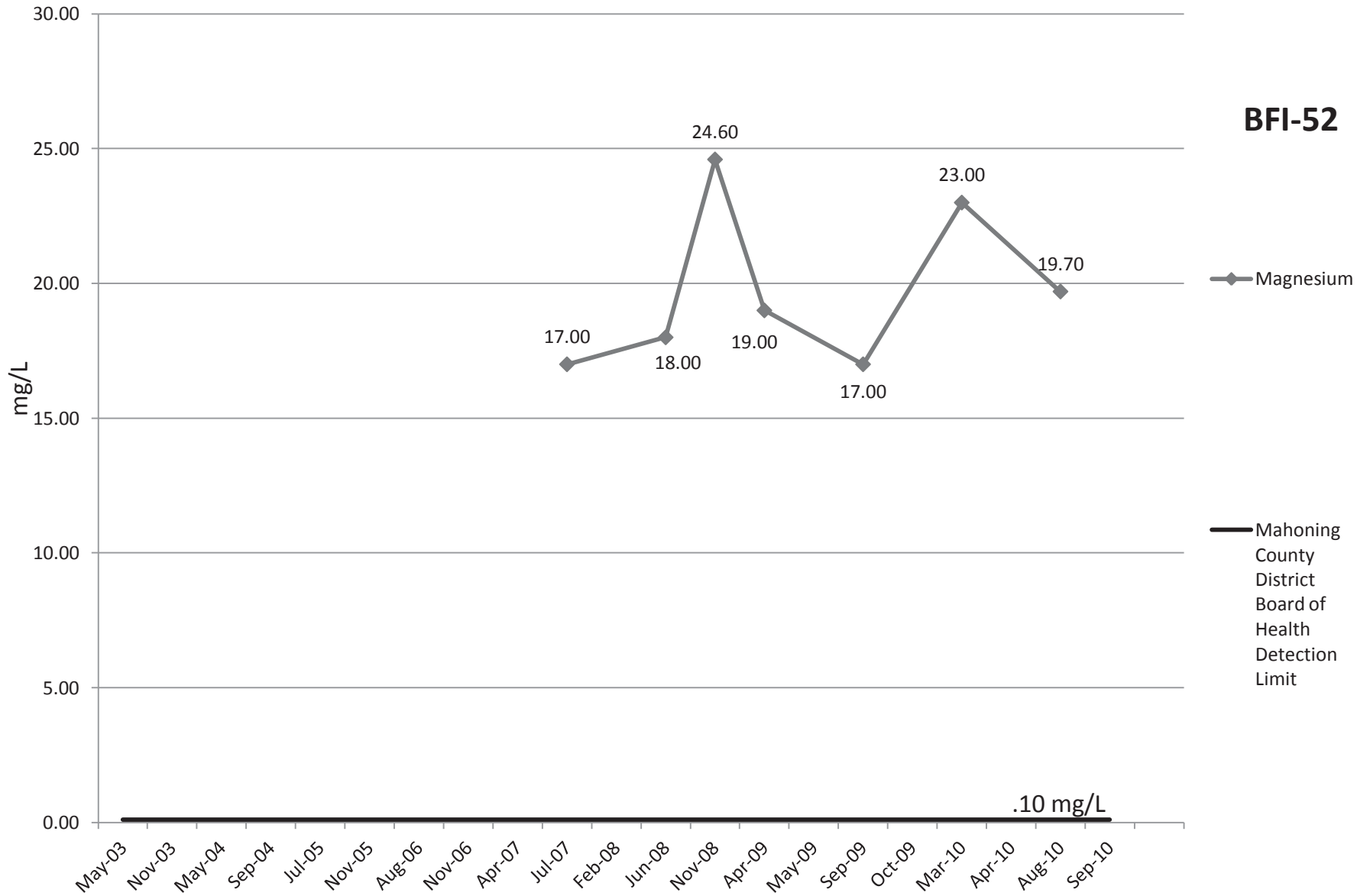


# Zinc

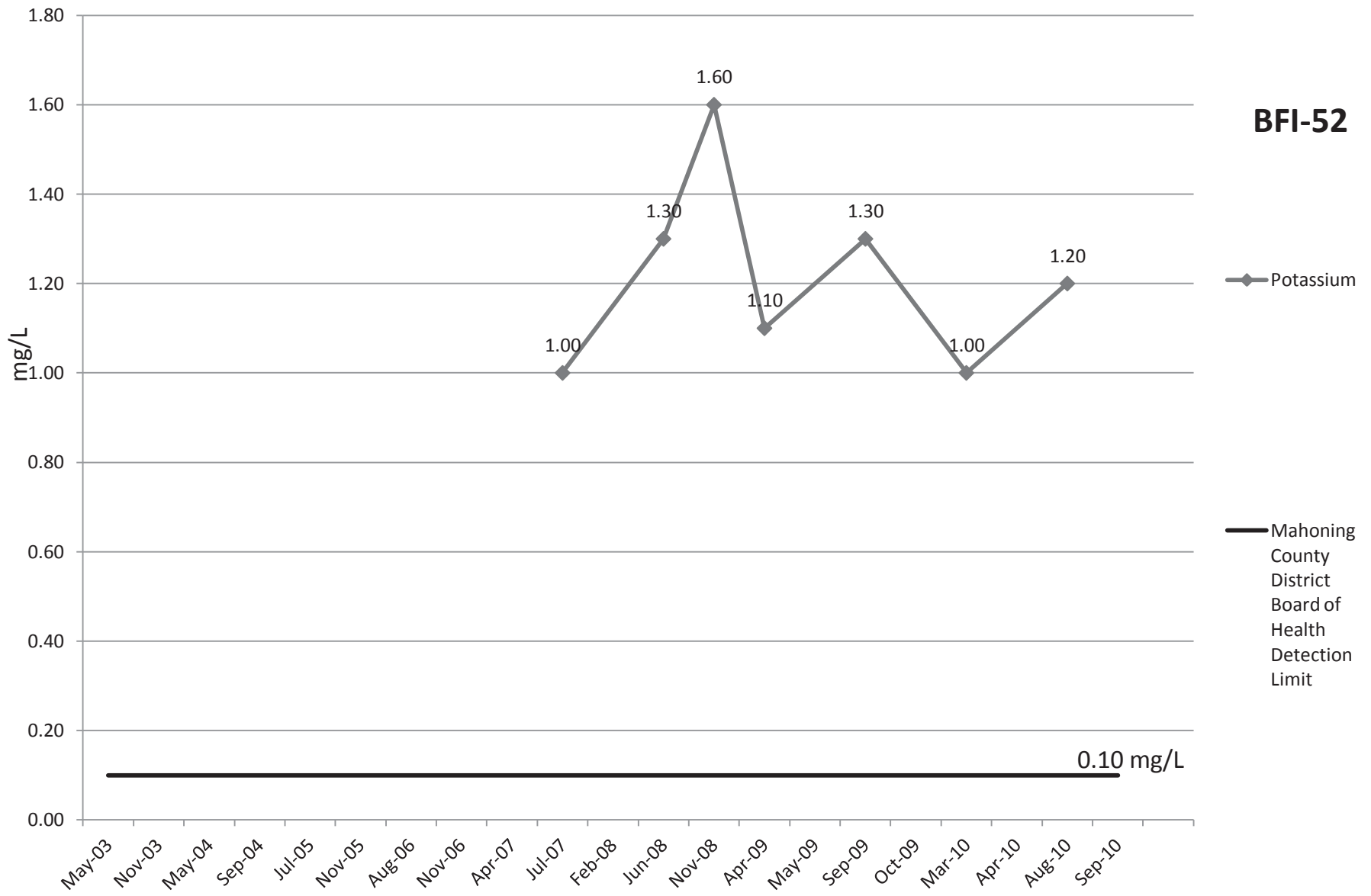


# Magnesium

**BFI-52**

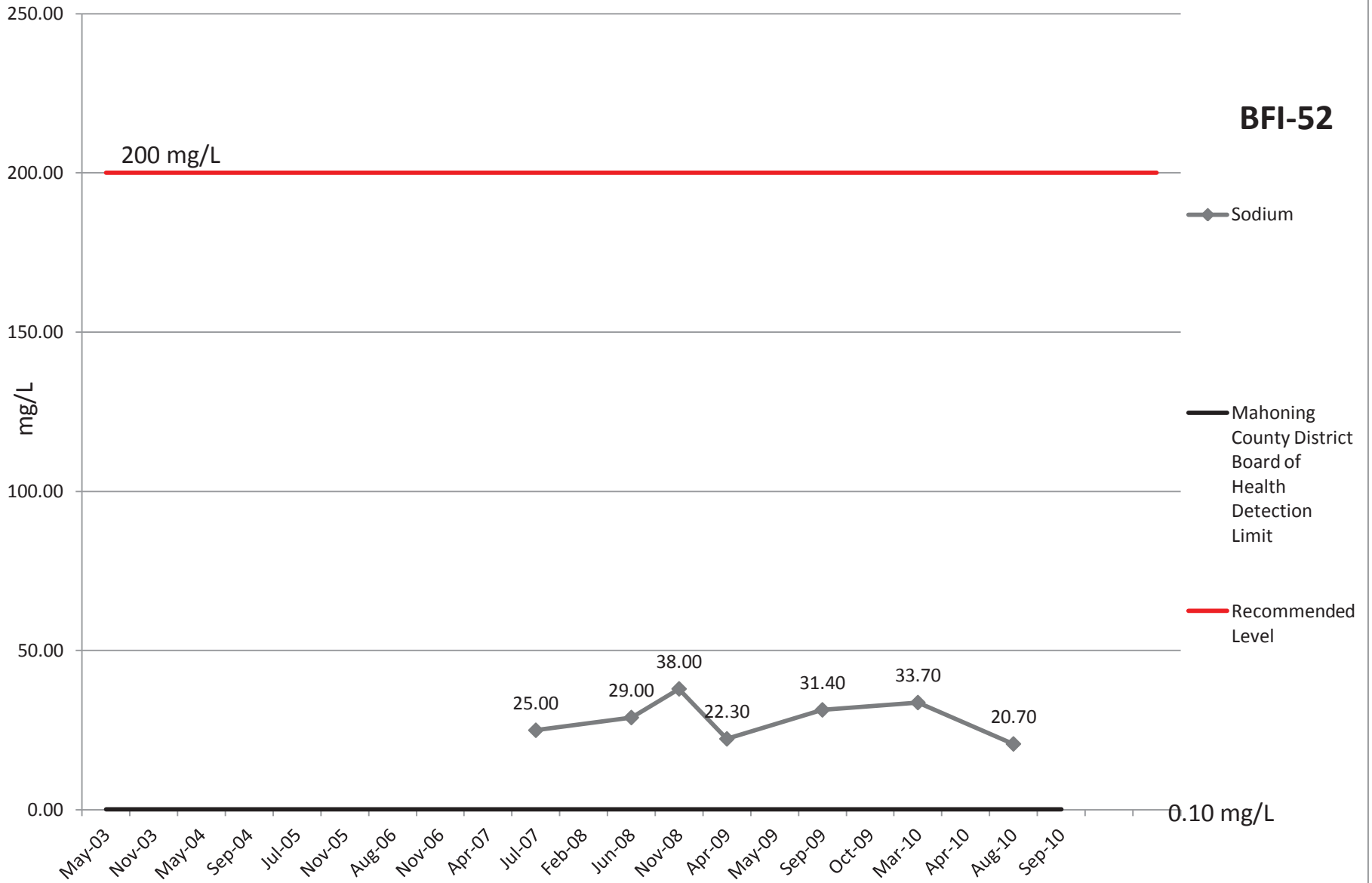


# Potassium

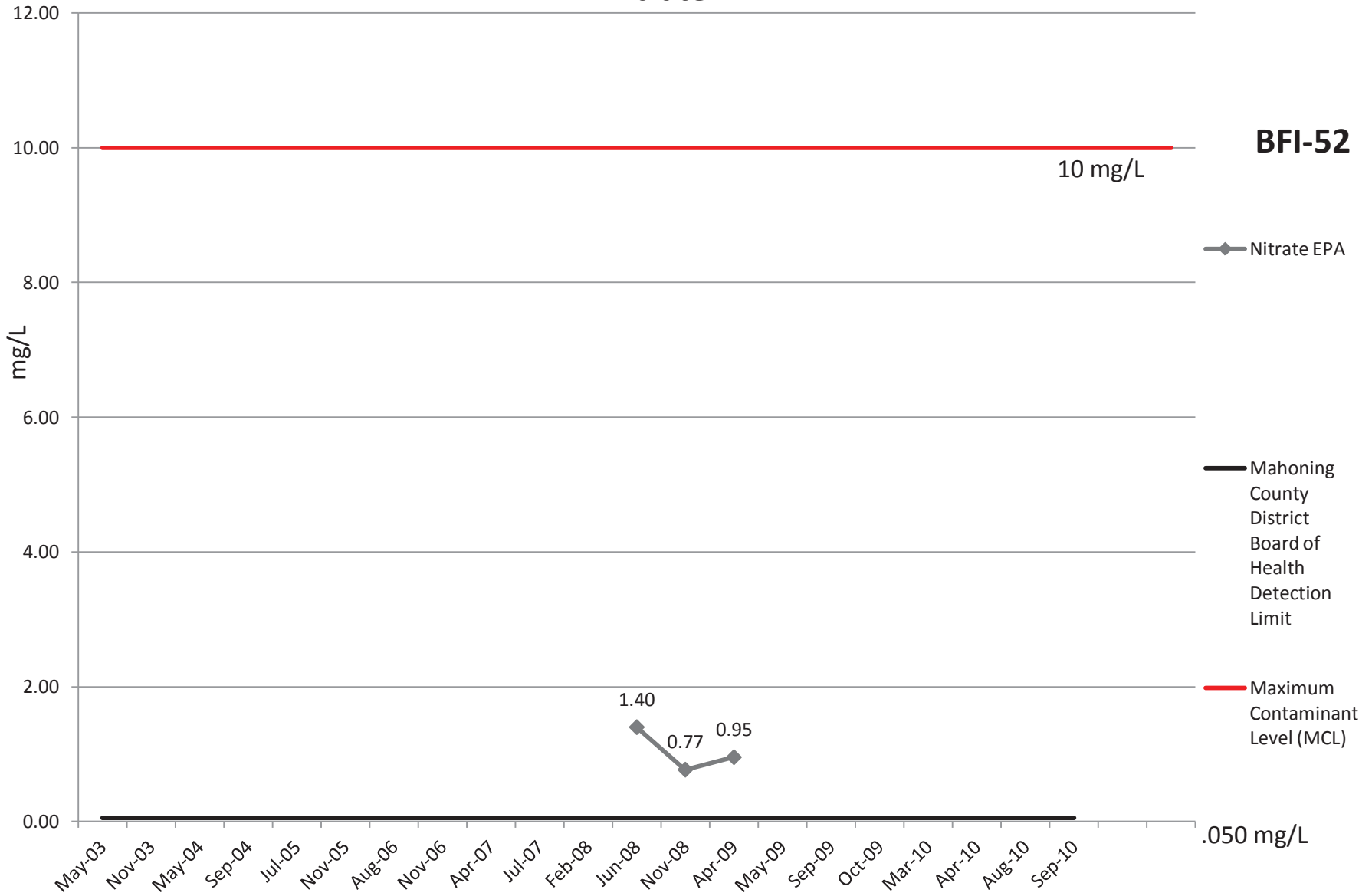


# Sodium

**BFI-52**



# Nitrate EPA





# COD

**BFI-52**

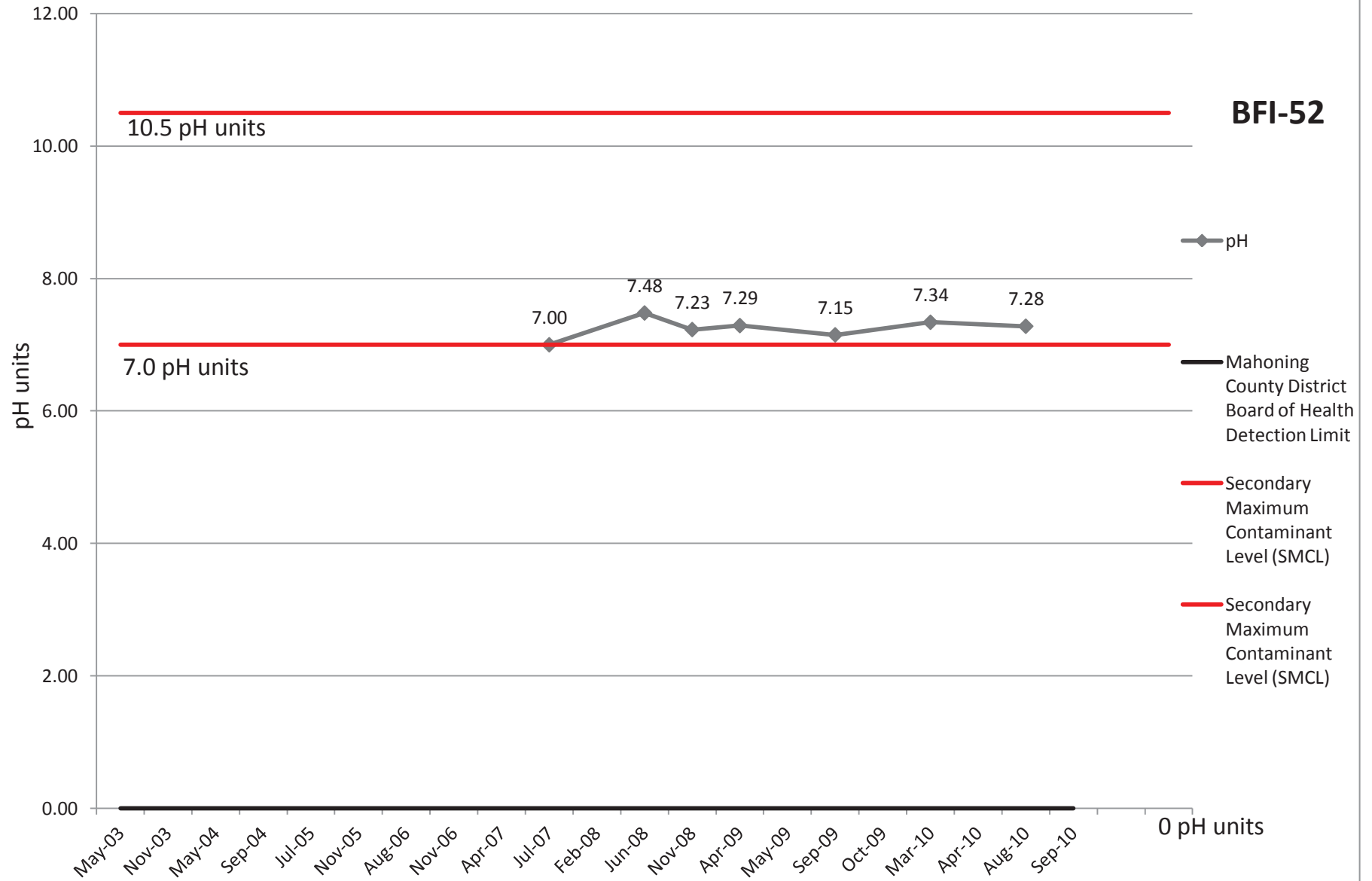
10 mg/L

—◆— COD

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

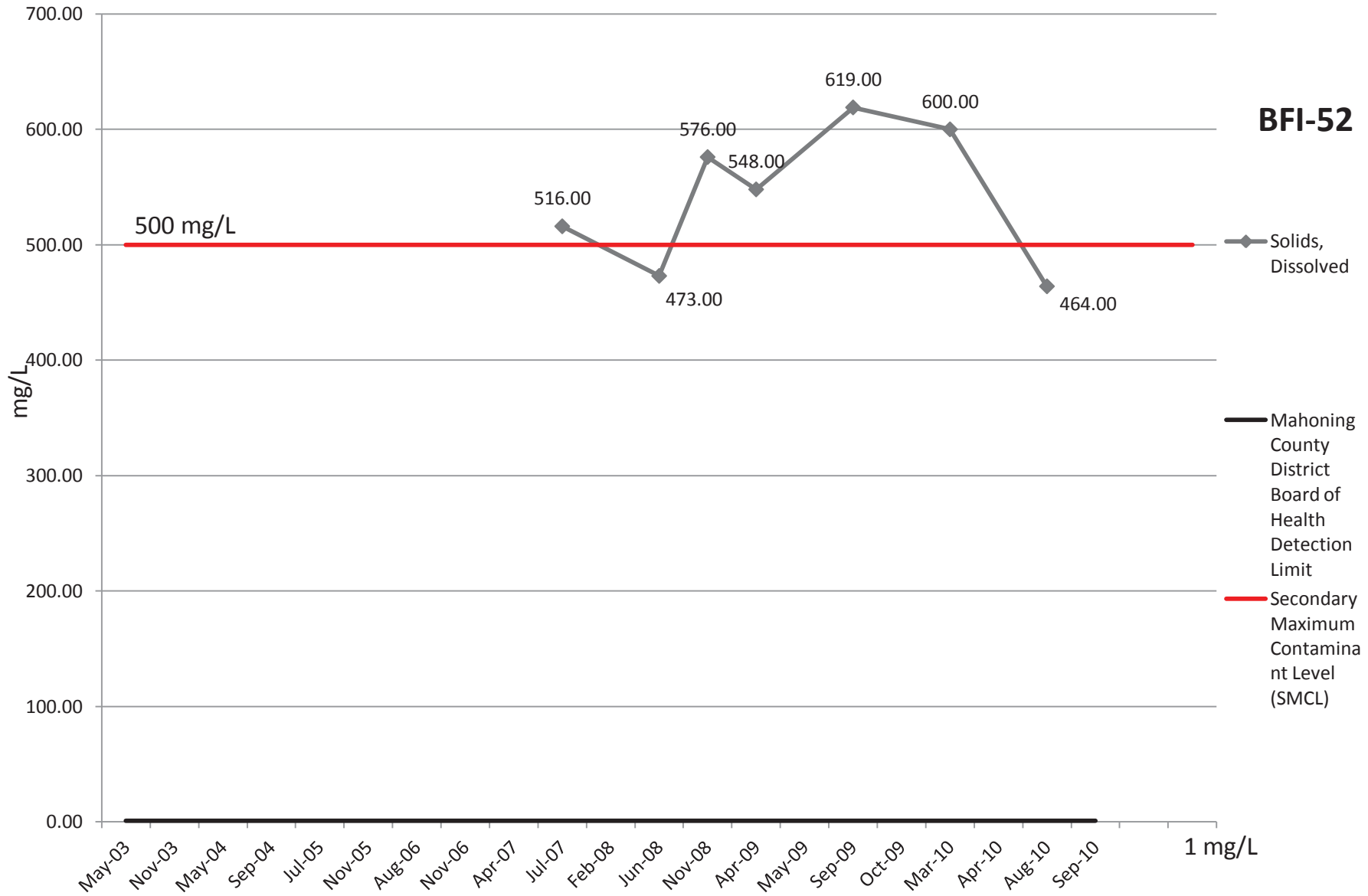


# pH



# Solids, Dissolved

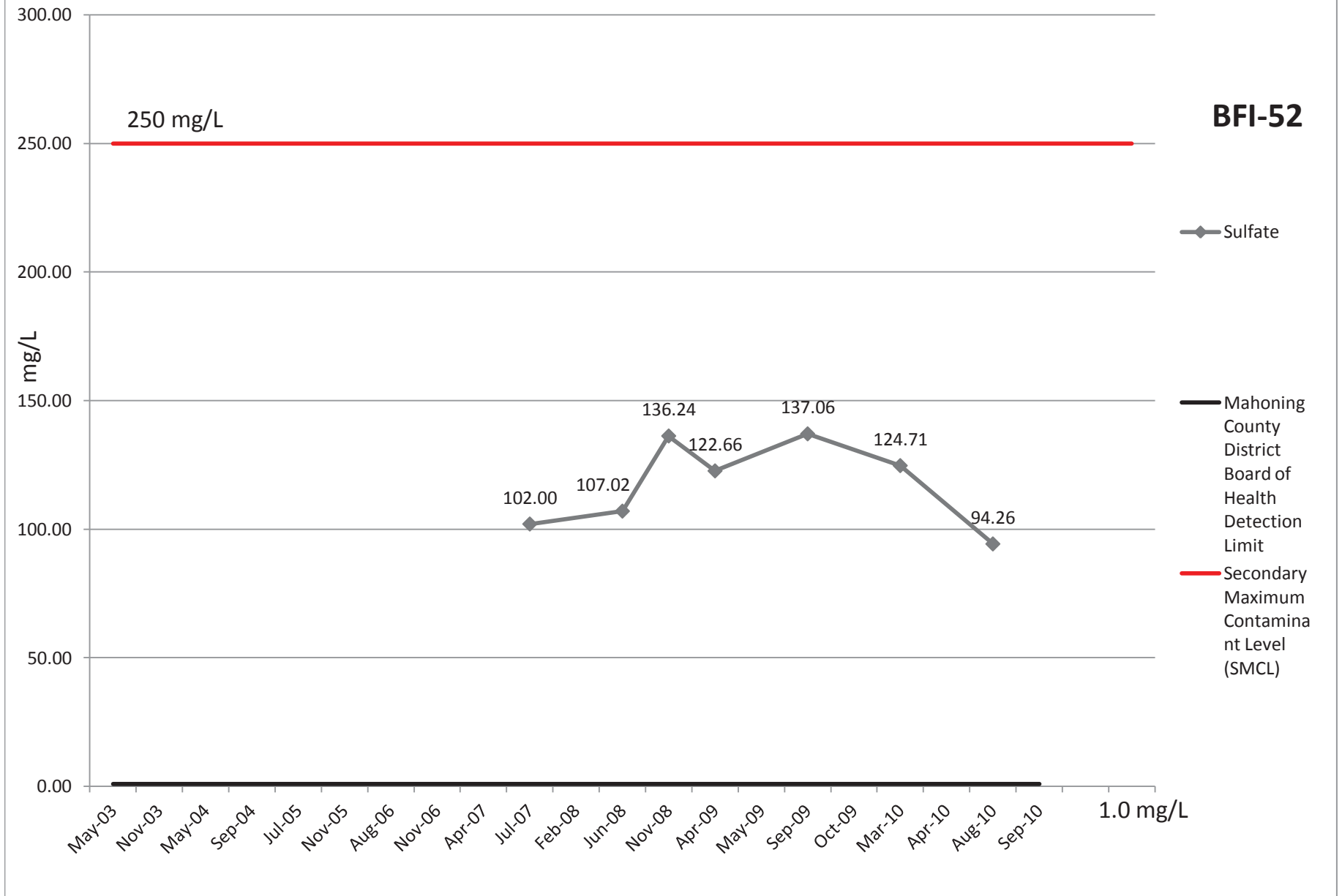
**BFI-52**



◆ Solids, Dissolved

— Mahoning County District Board of Health Detection Limit  
— Secondary Maximum Contaminant Level (SMCL)

# Sulfate



# Bacteria

positive (1)

**BFI-52**

Positive/Negative

◆ Bacteria

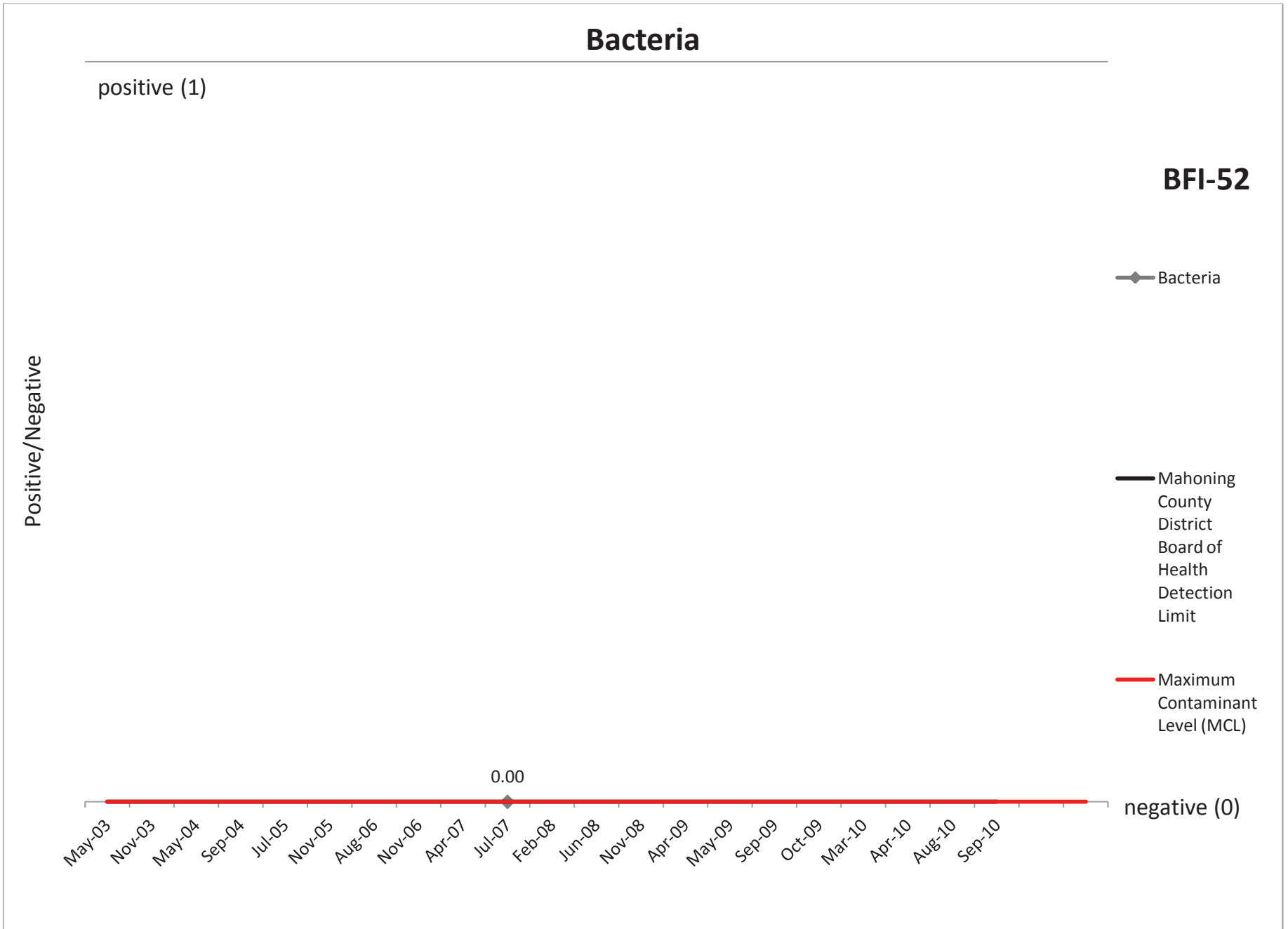
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

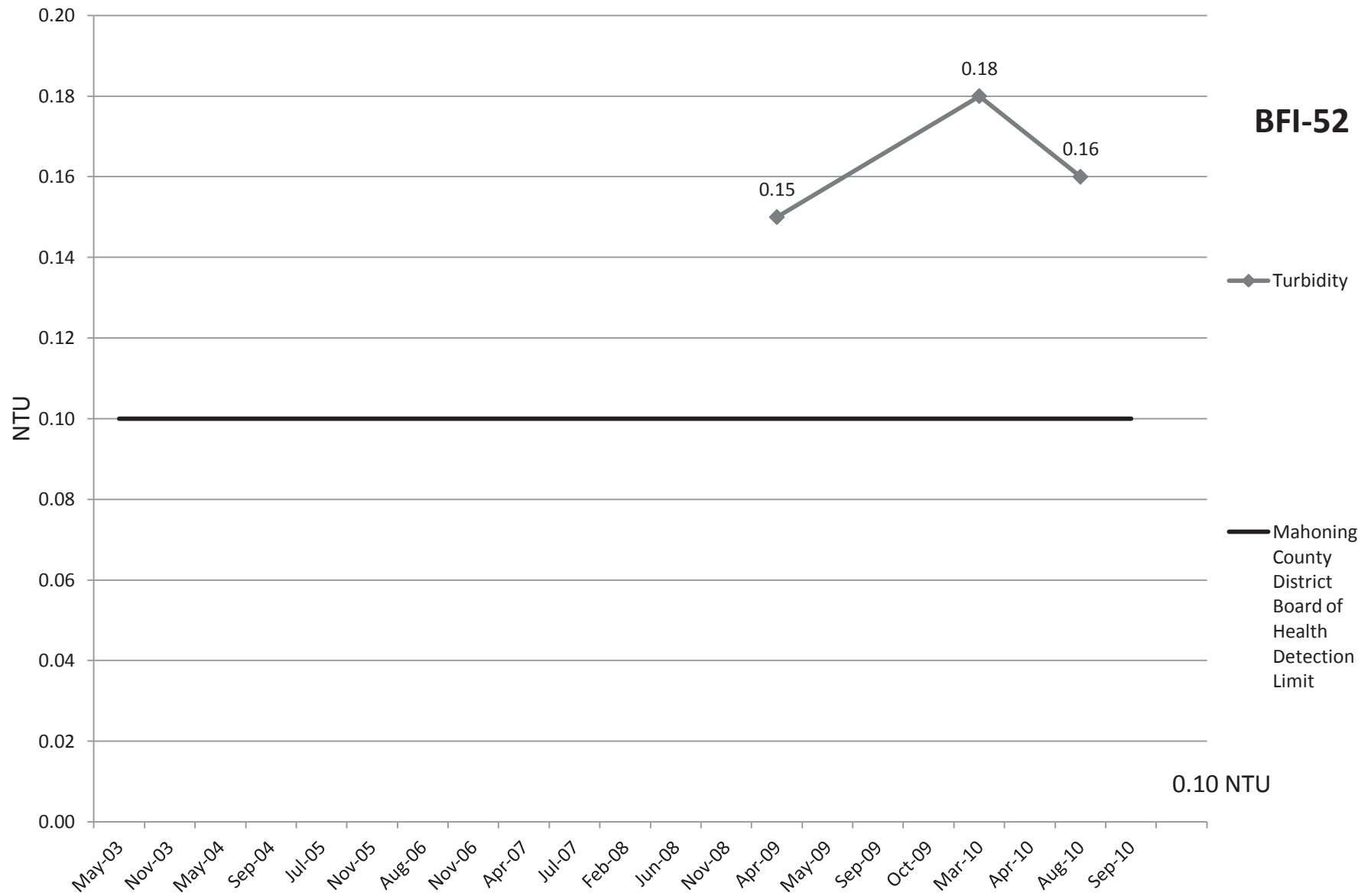
0.00

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

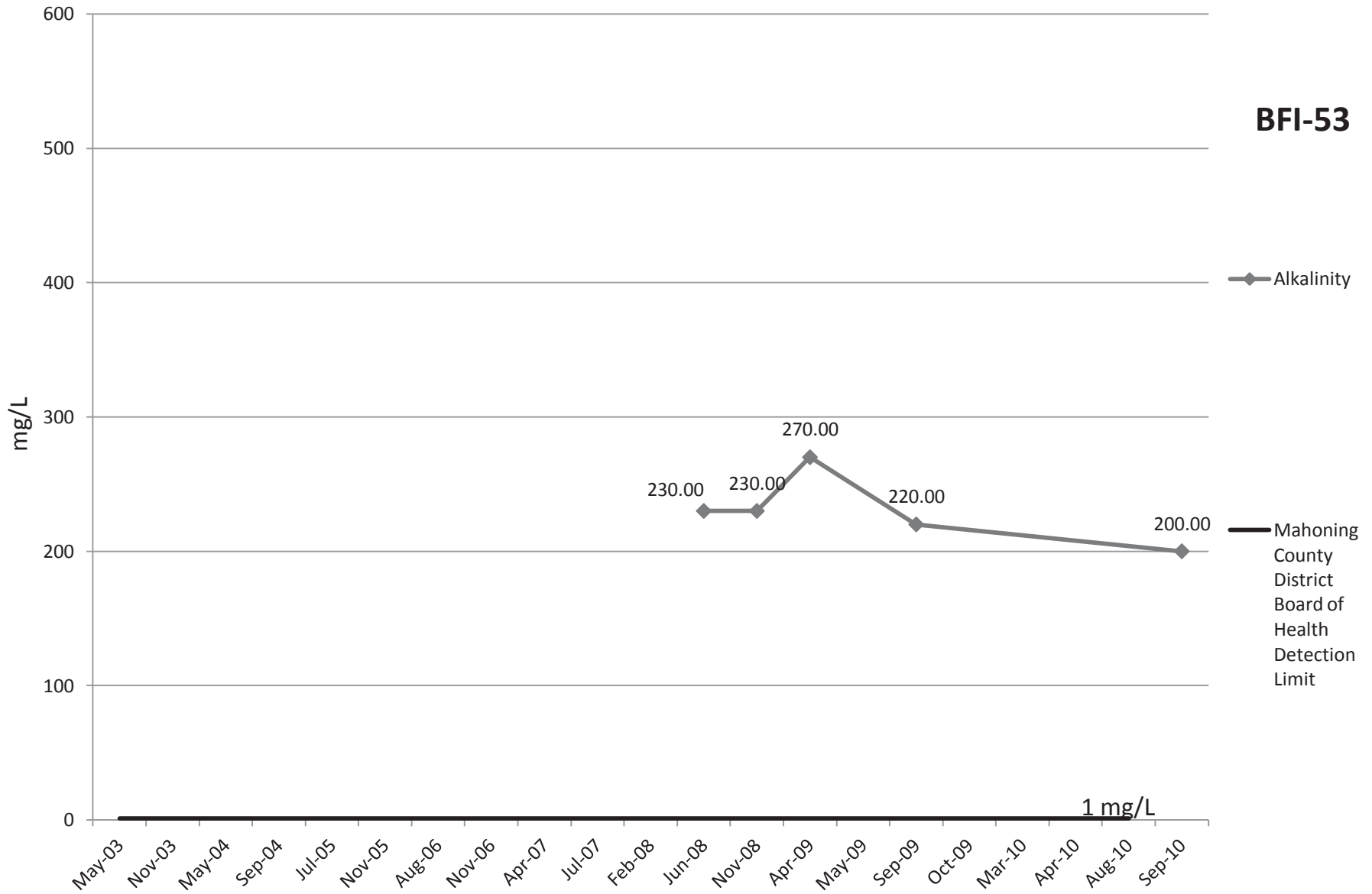


# Turbidity

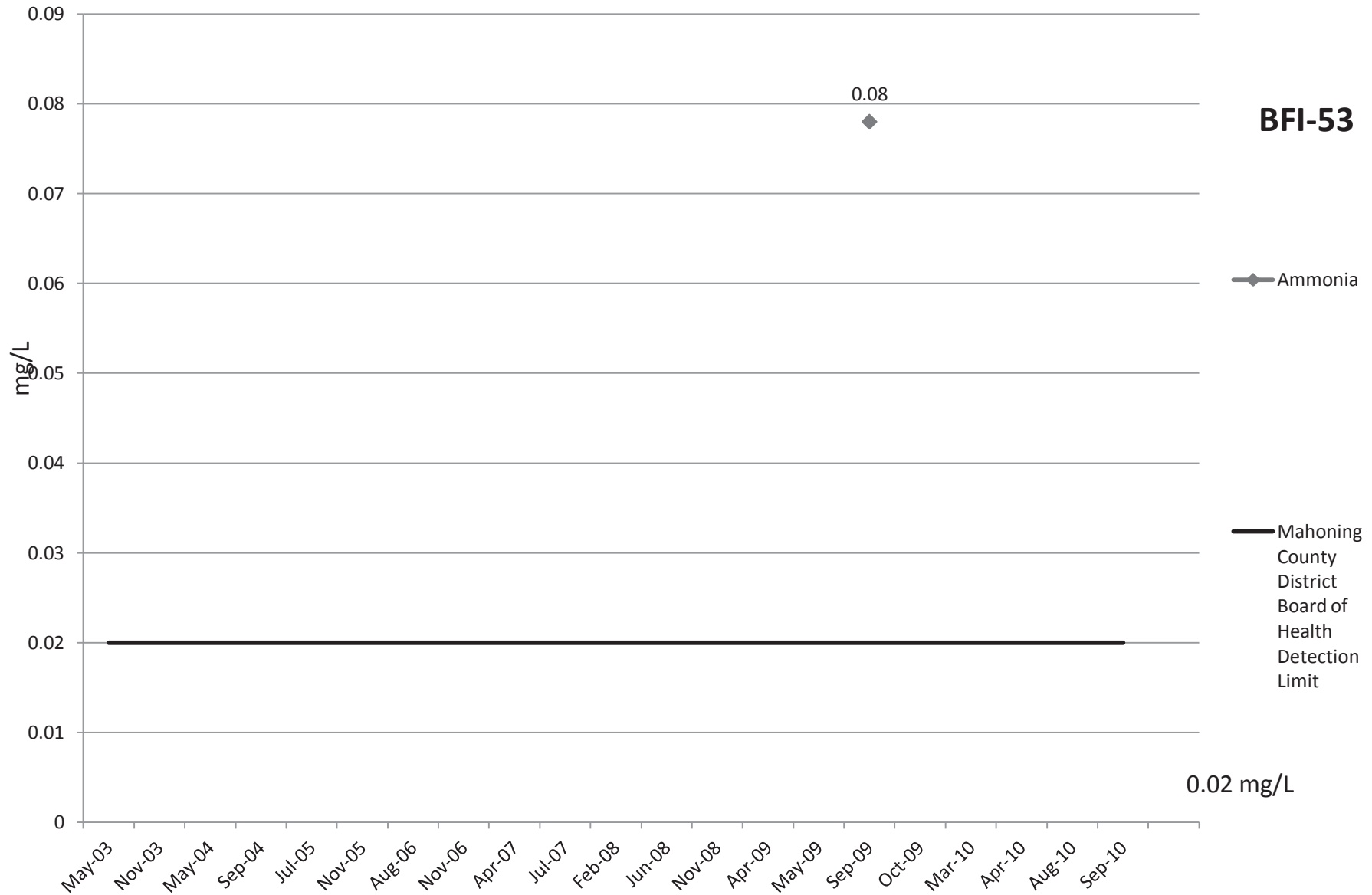


# Alkalinity

**BFI-53**



# Ammonia



**BFI-53**

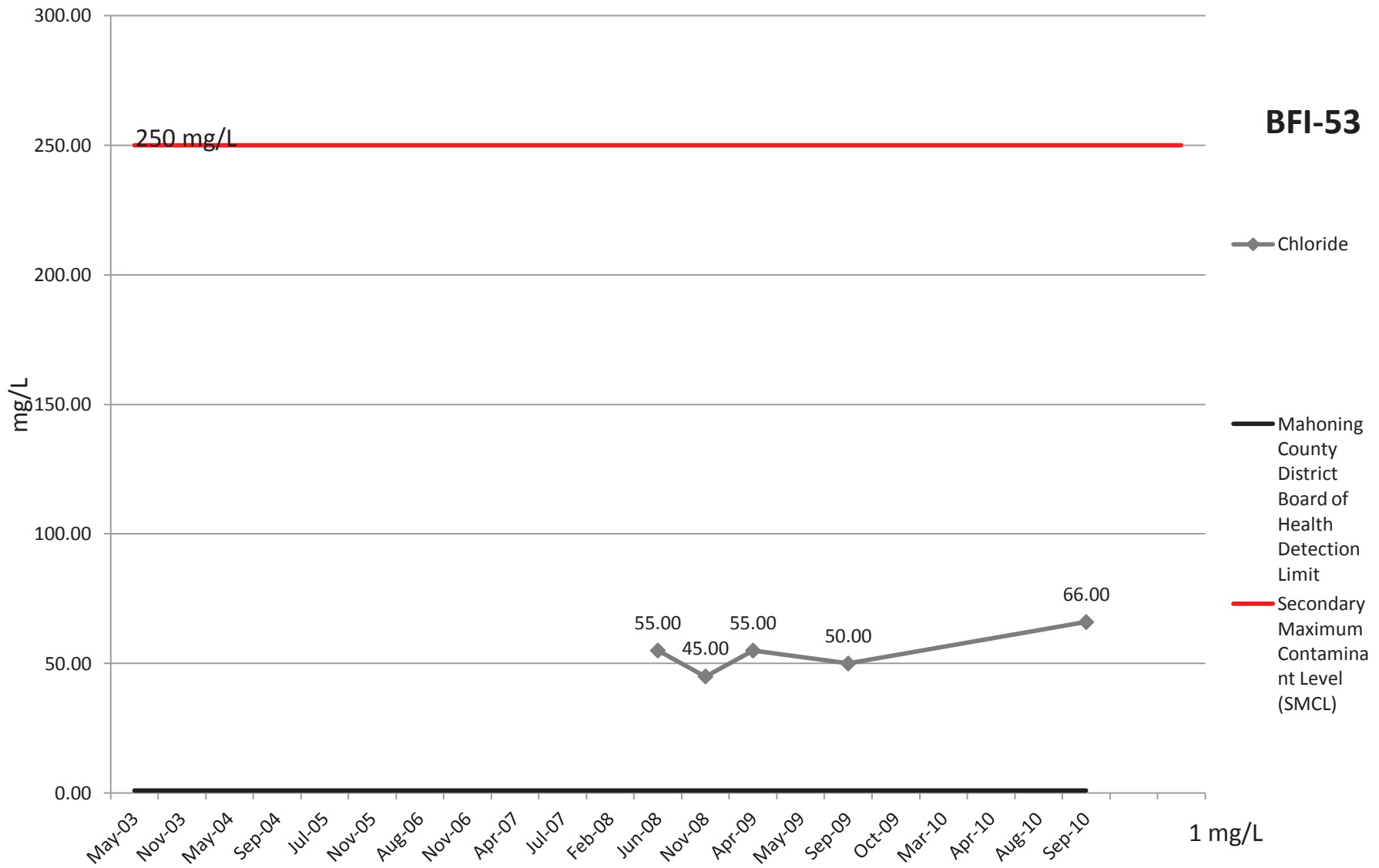
◆ Ammonia

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

0.02 mg/L

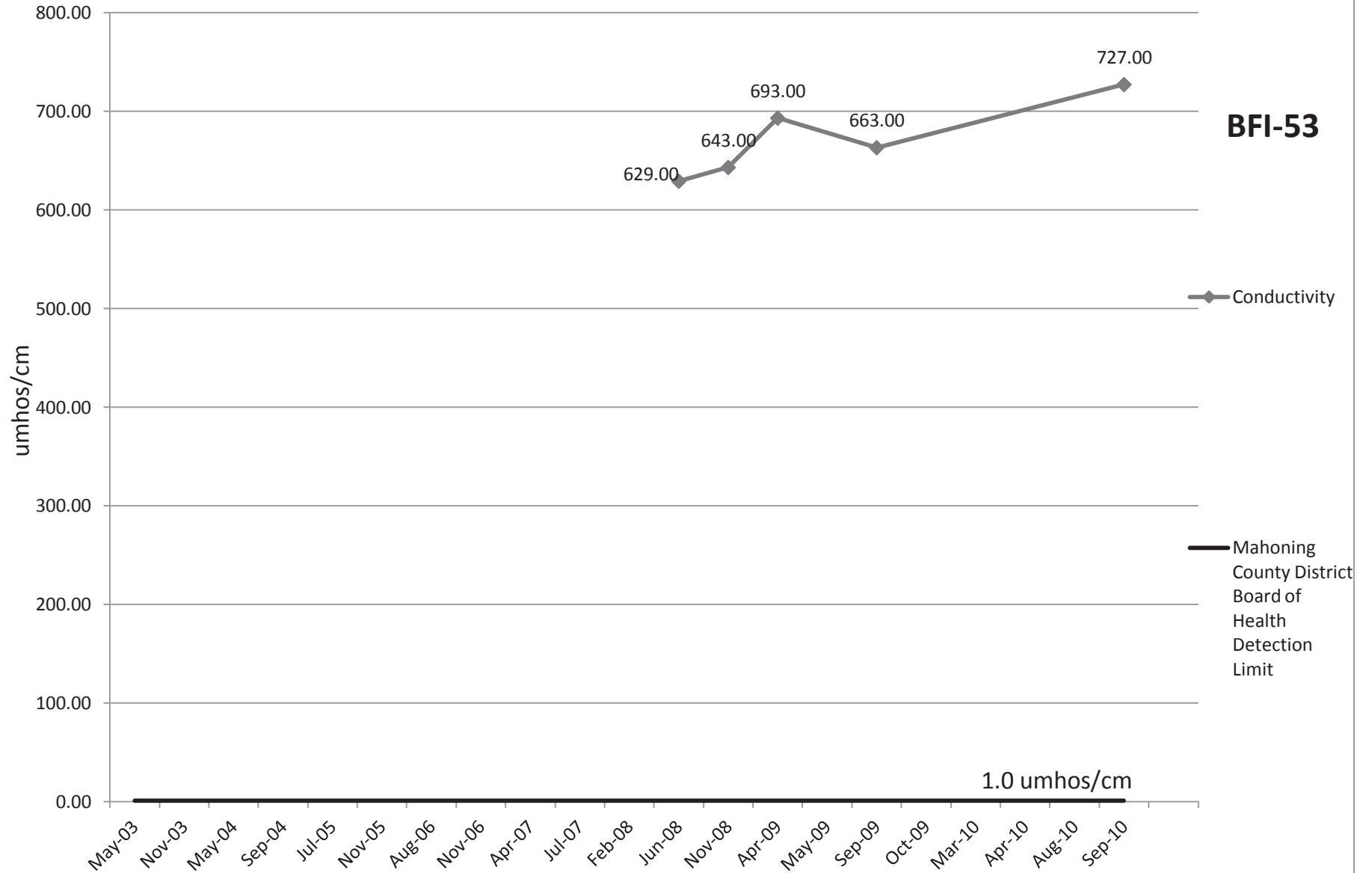


# Chloride

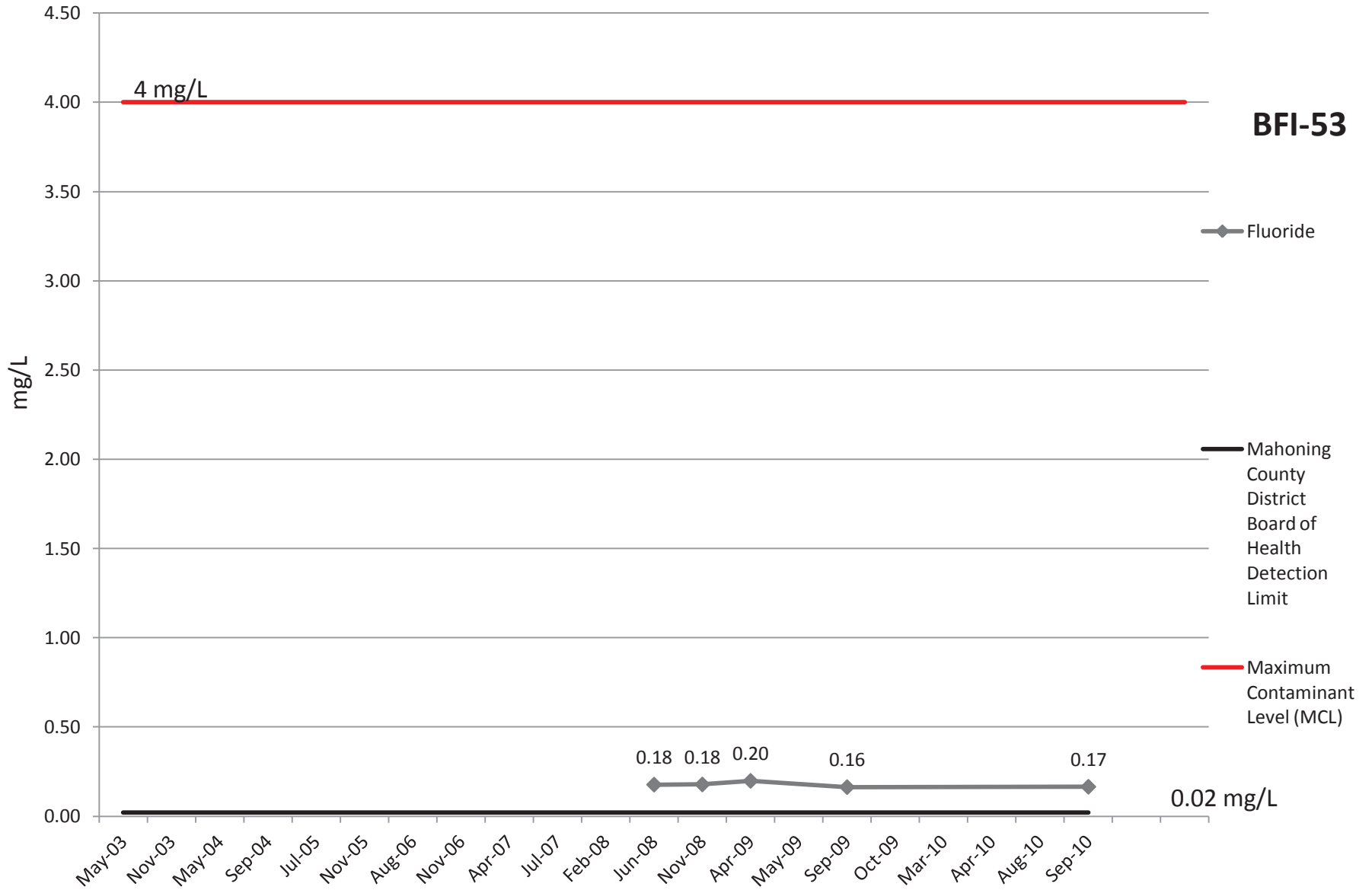


# Conductivity

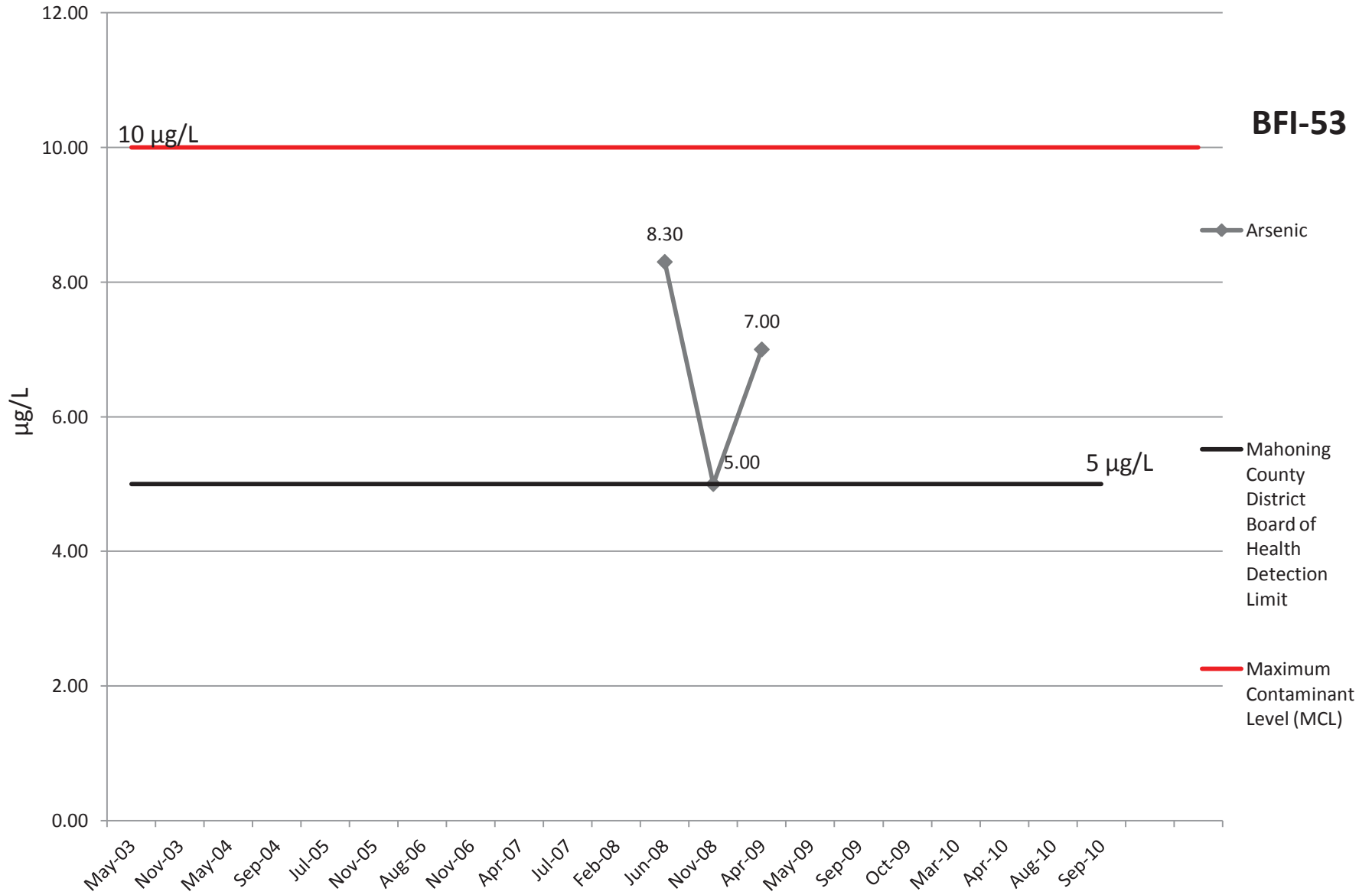
**BFI-53**



# Fluoride



# Arsenic



**BFI-53**

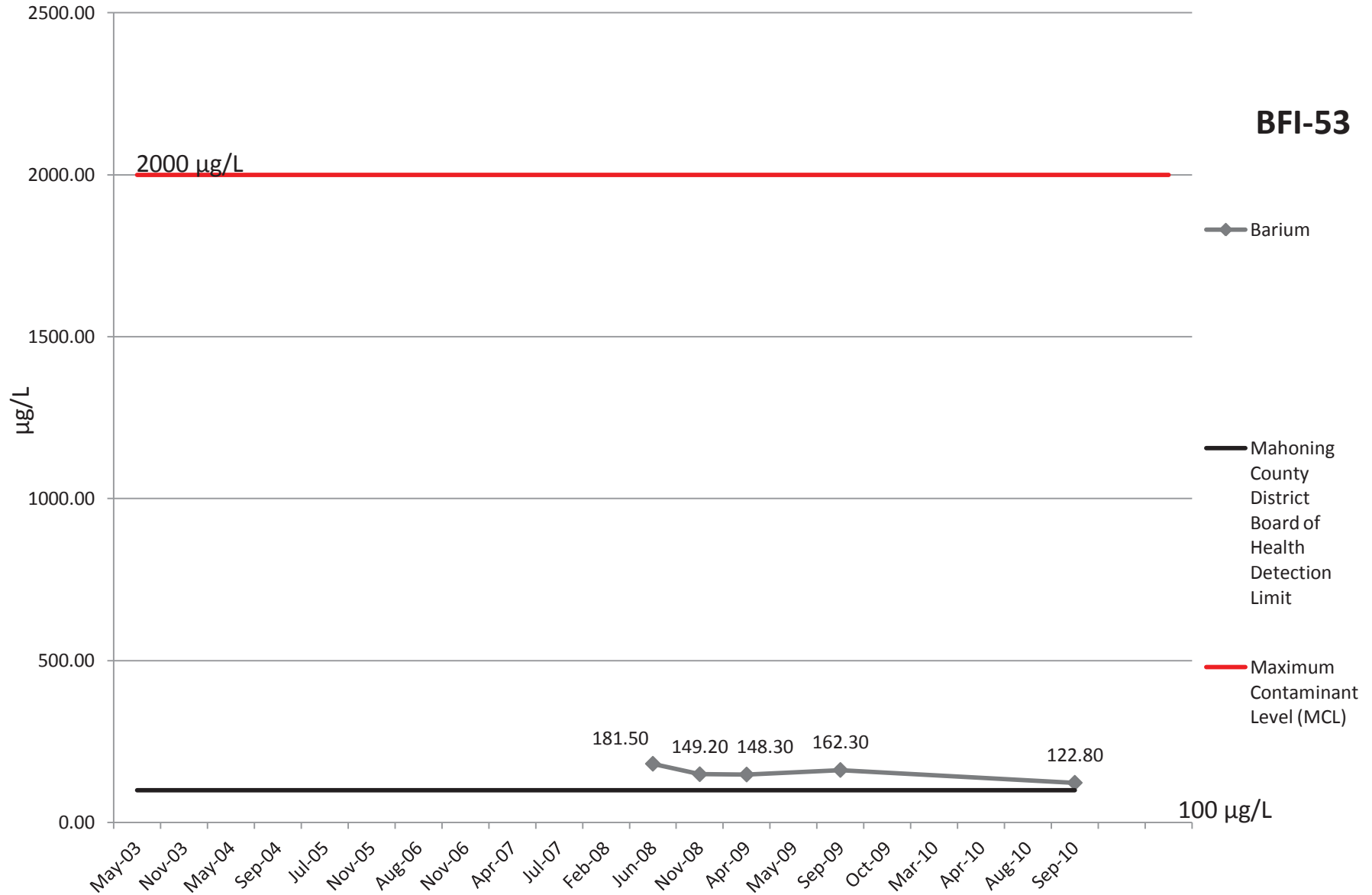
◆ Arsenic

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

# Barium

**BFI-53**



# Cadmium

**BFI-53**

10 µg/L

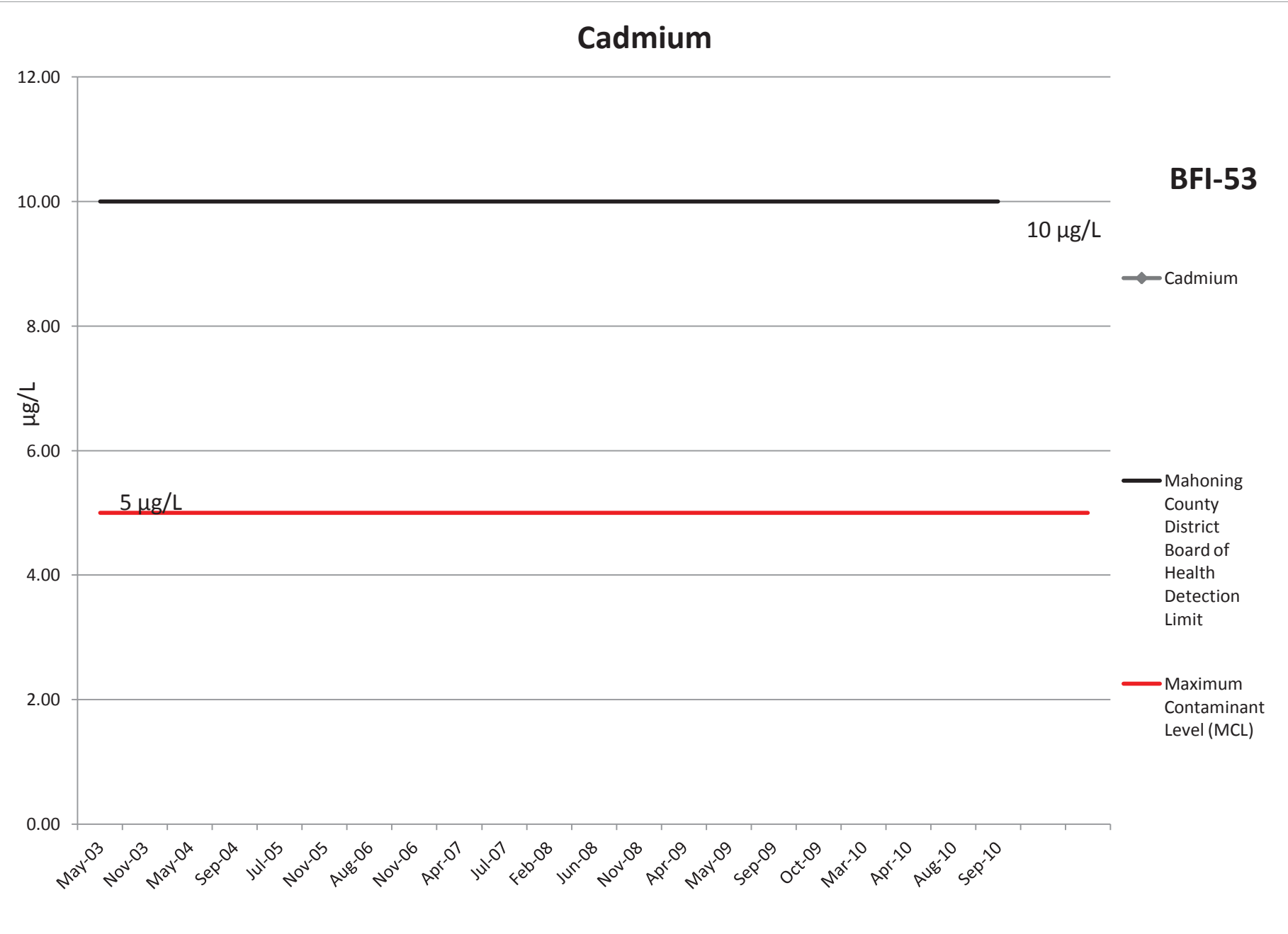
12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

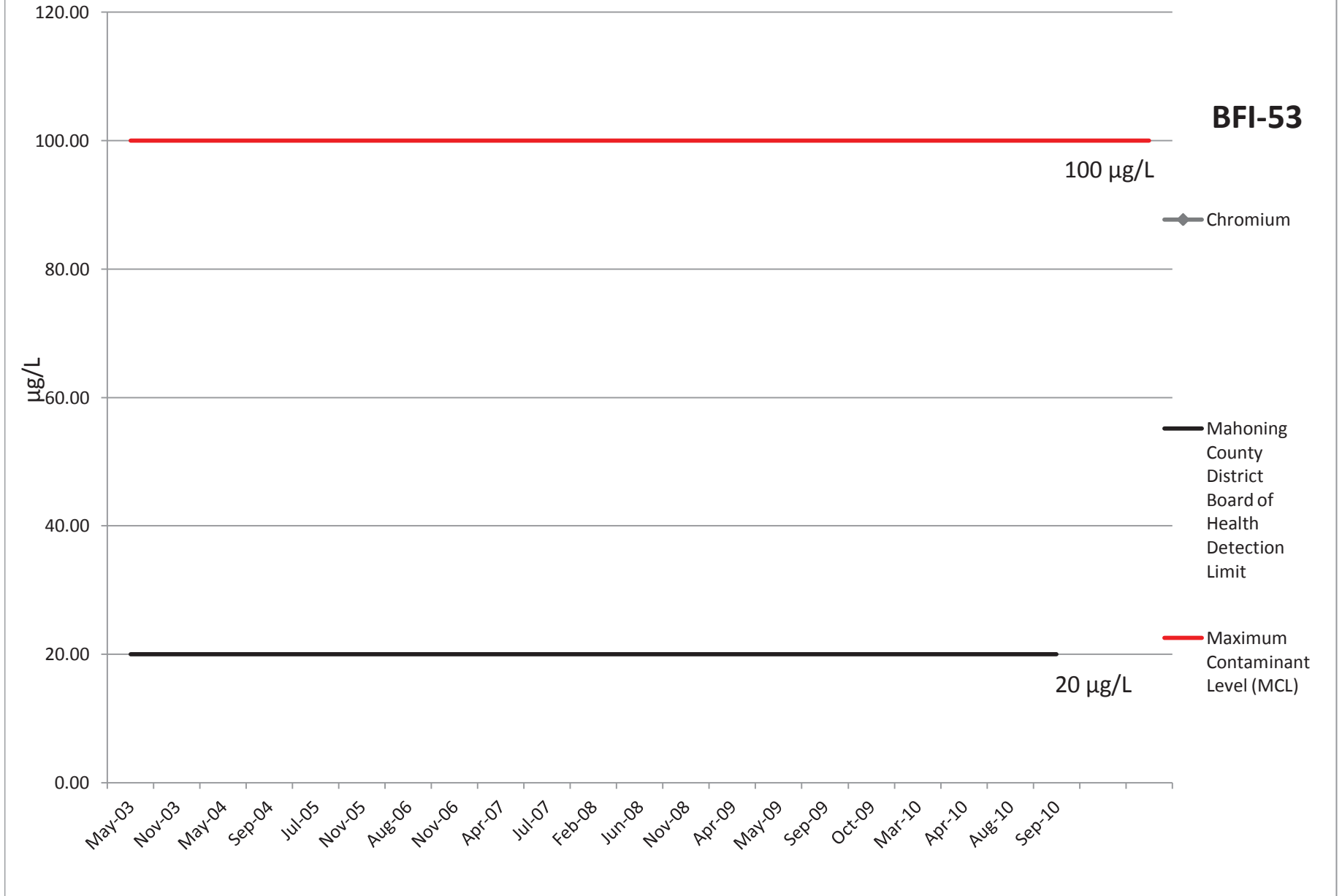
5 µg/L

- ◆ Cadmium
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

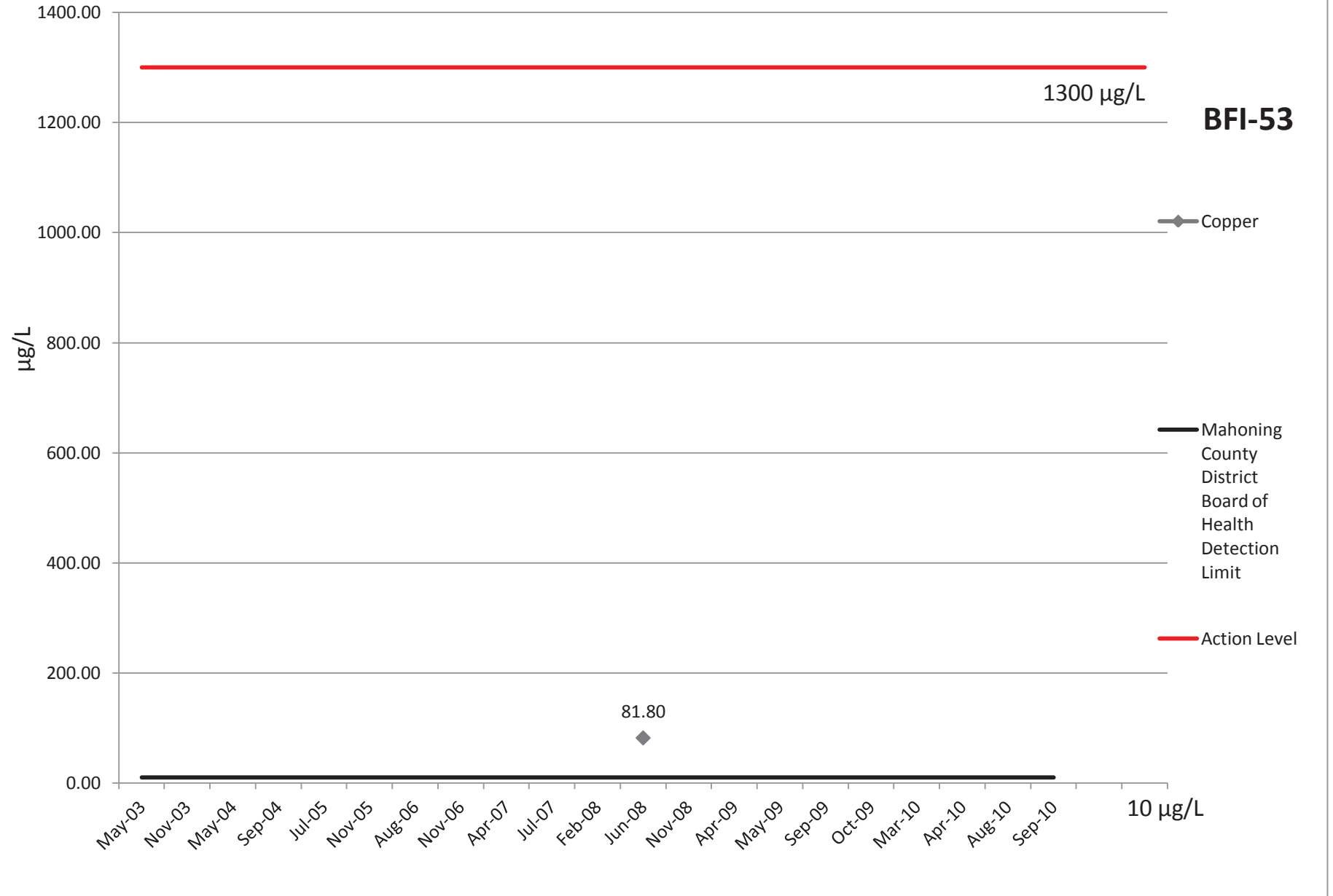
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# Chromium



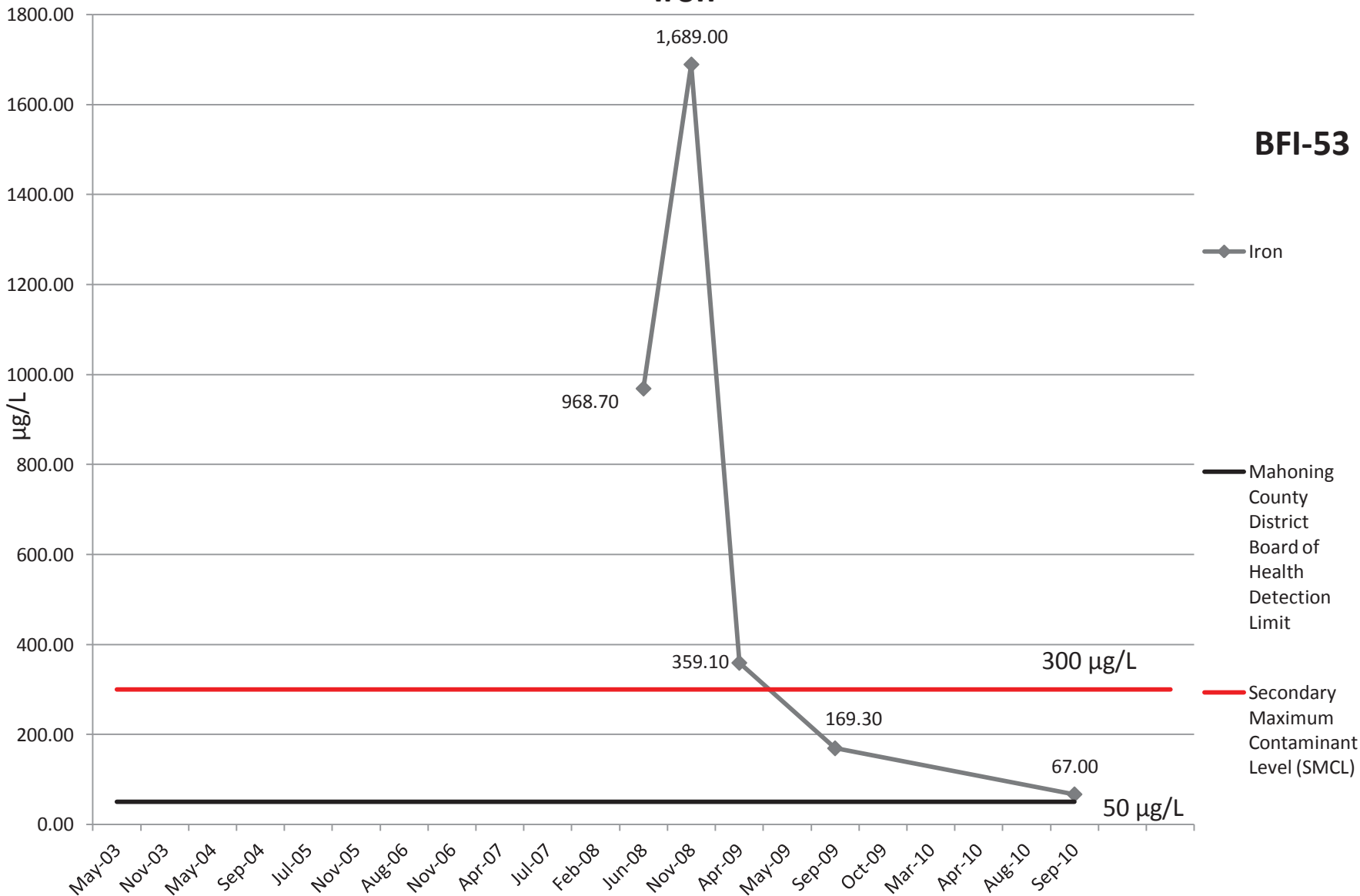
# Copper





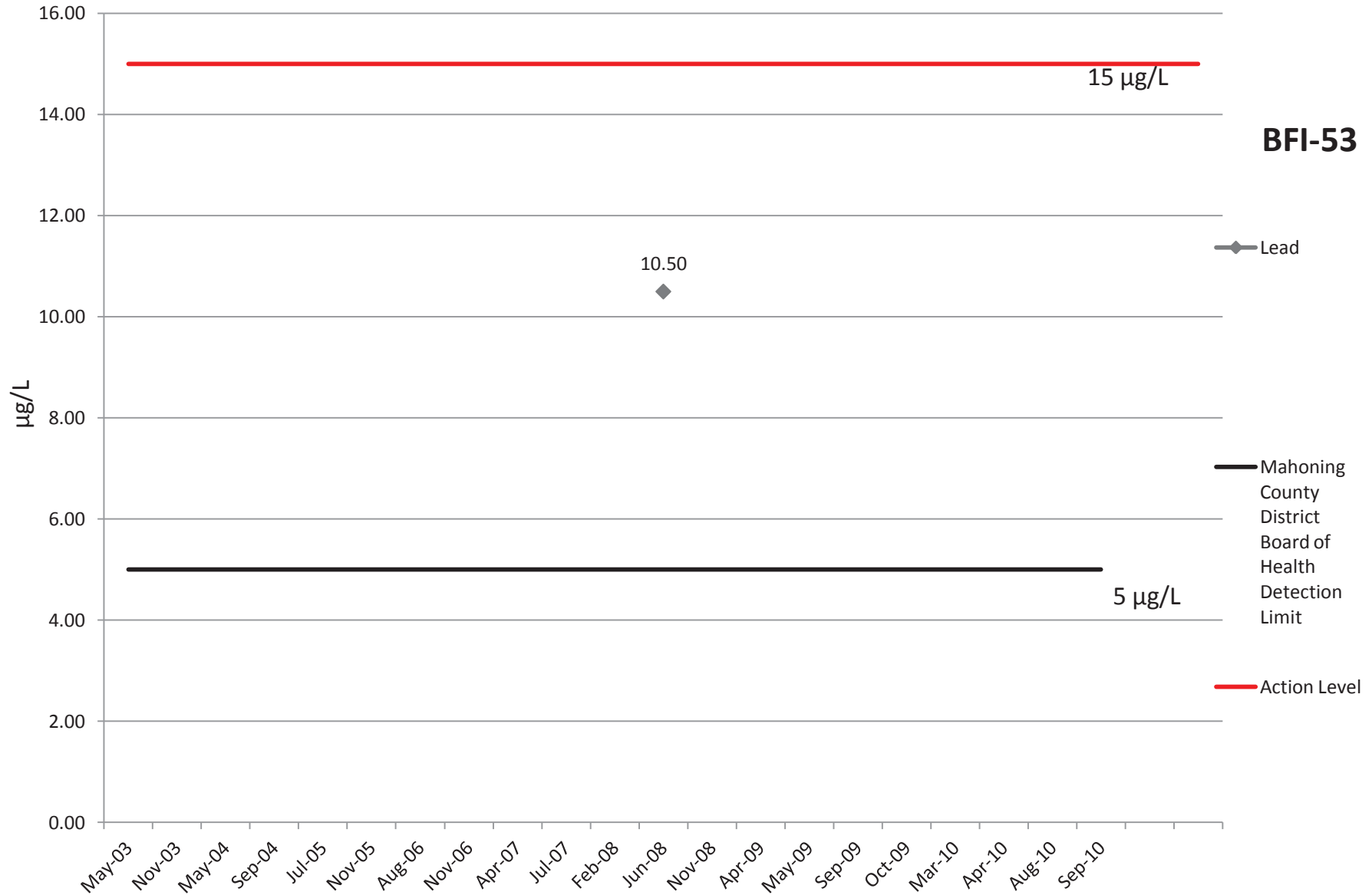
# Iron

**BFI-53**



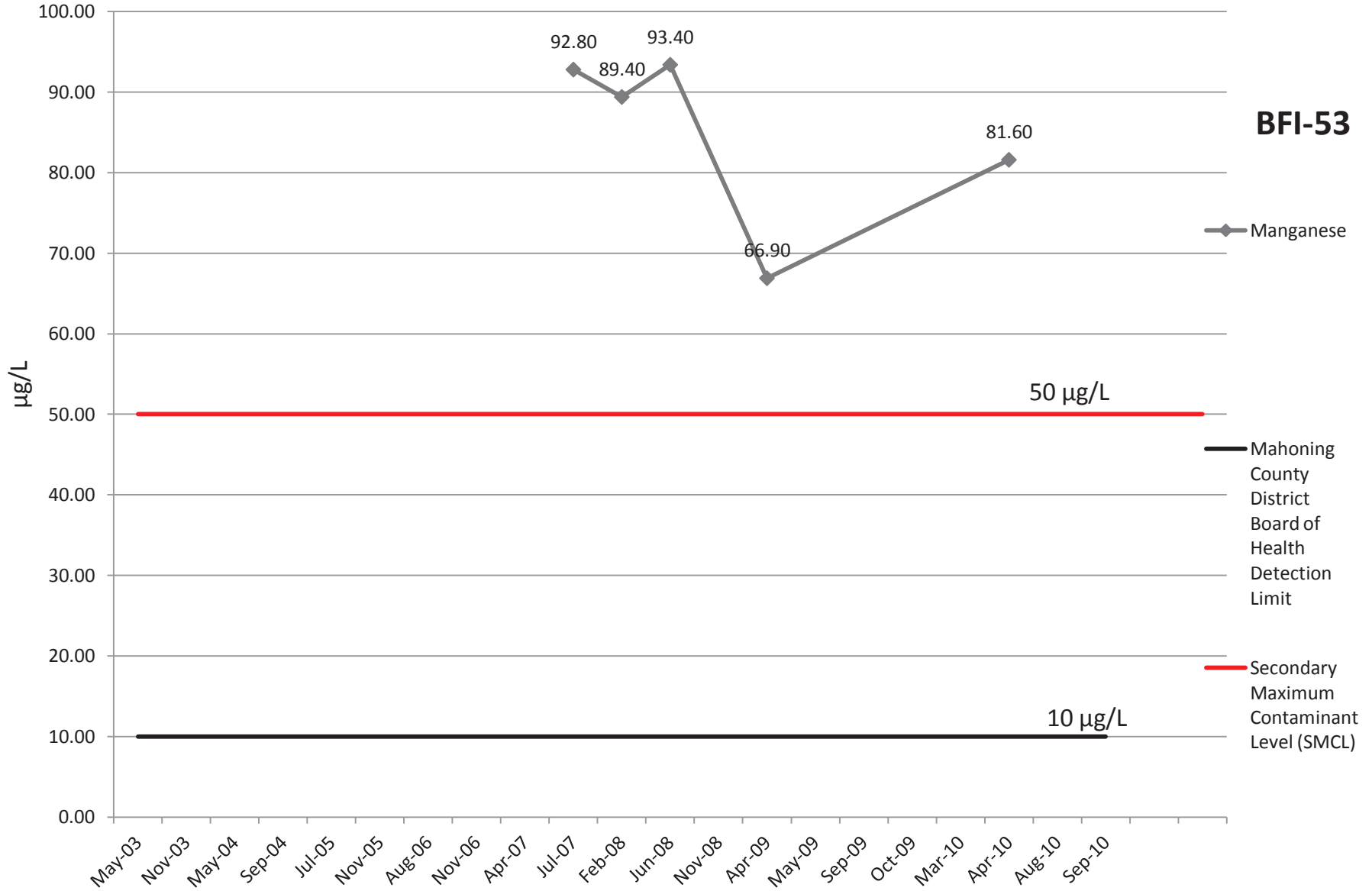
# Lead

**BFI-53**



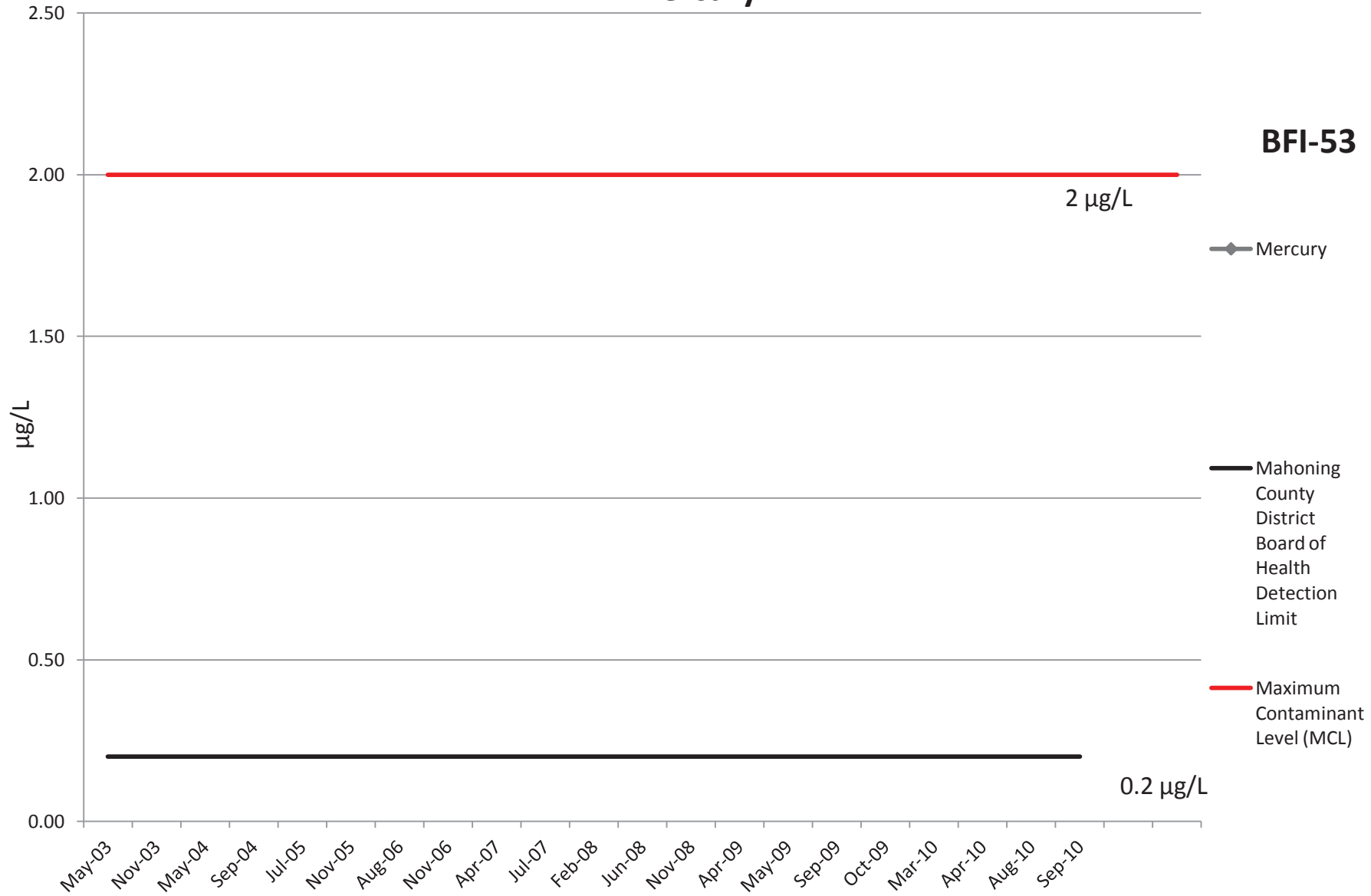
# Manganese

**BFI-53**

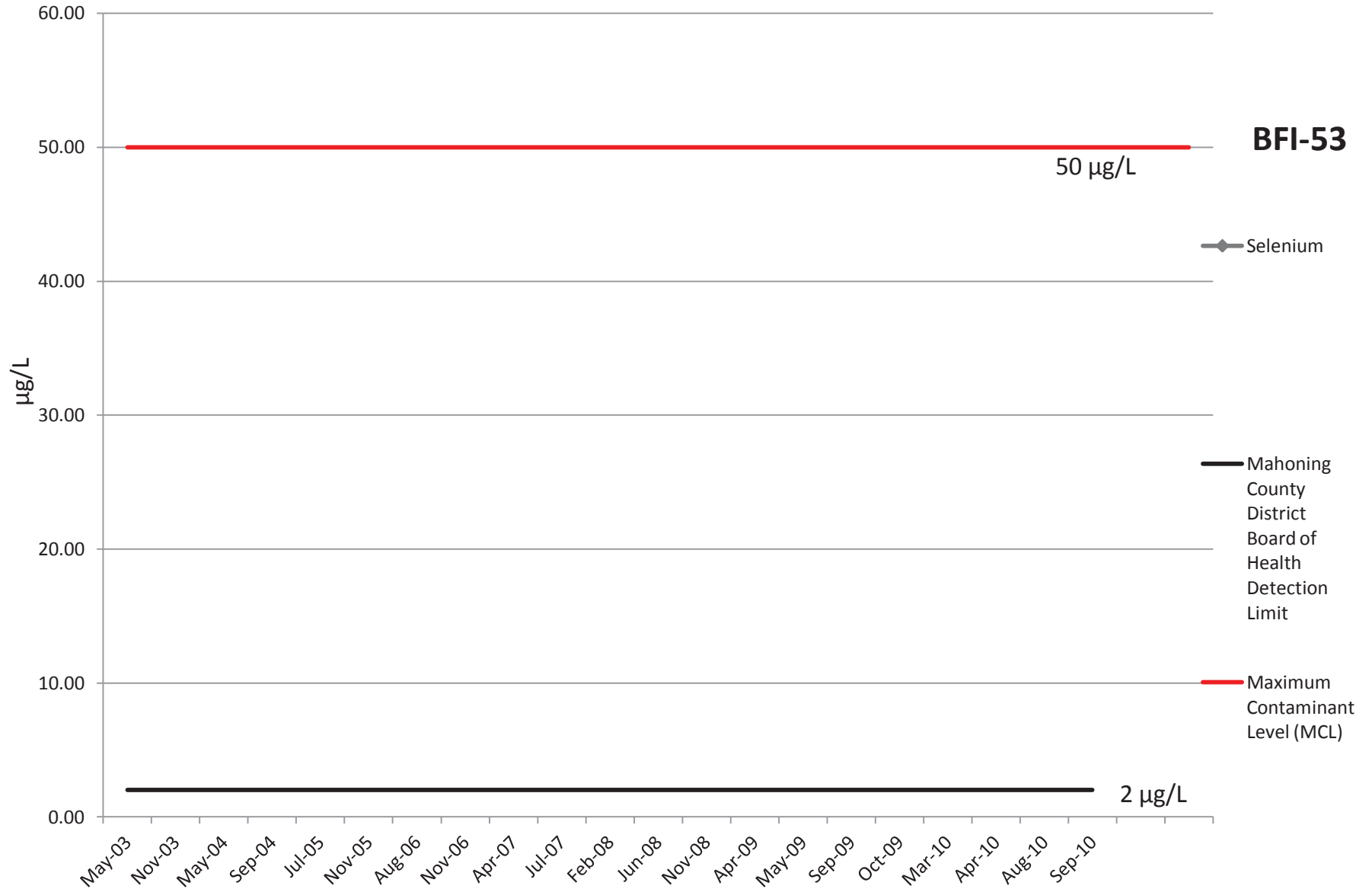


# Mercury

**BFI-53**



# Selenium



**BFI-53**

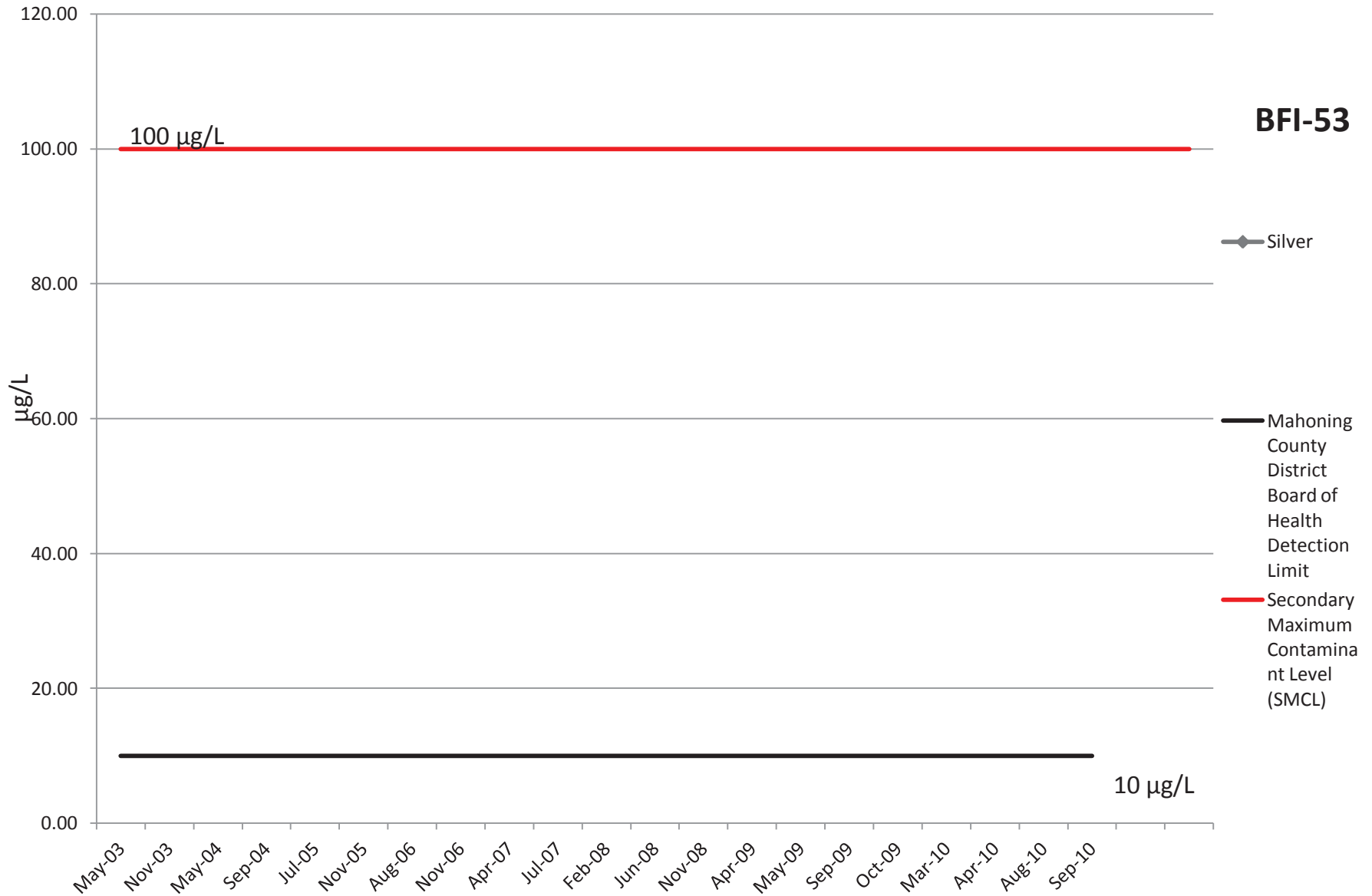
◆ Selenium

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

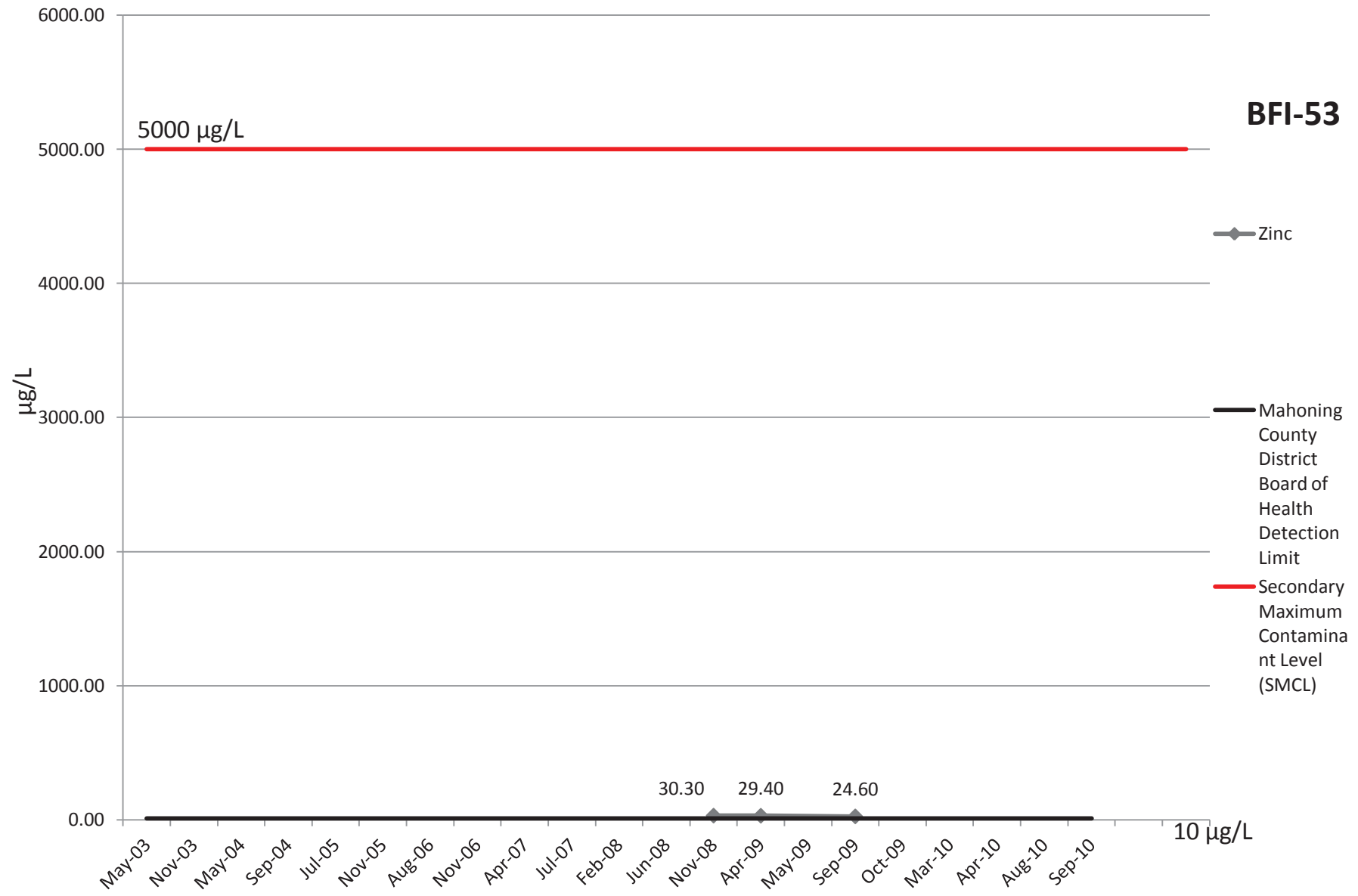
# Silver

**BFI-53**



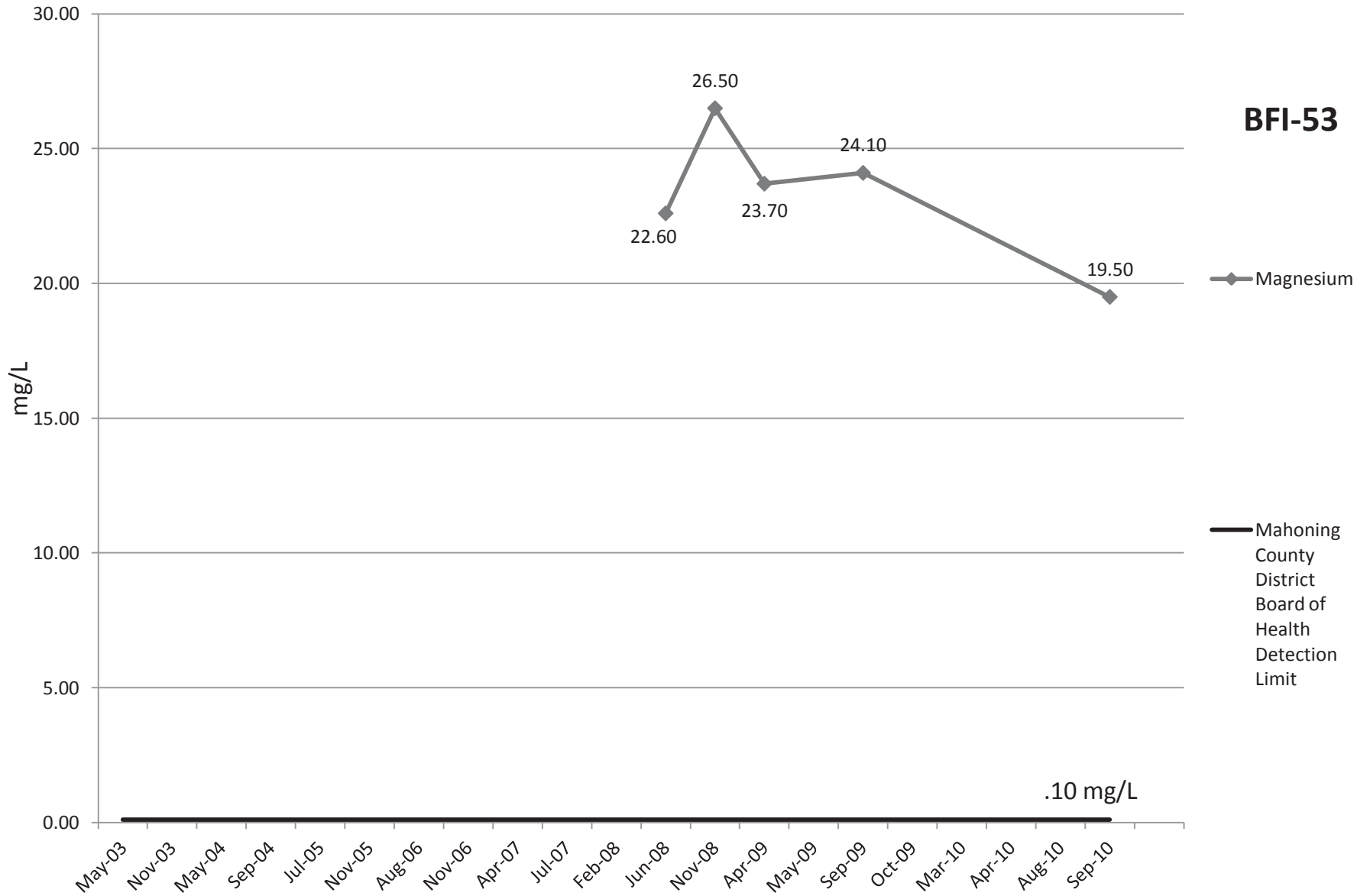
# Zinc

**BFI-53**



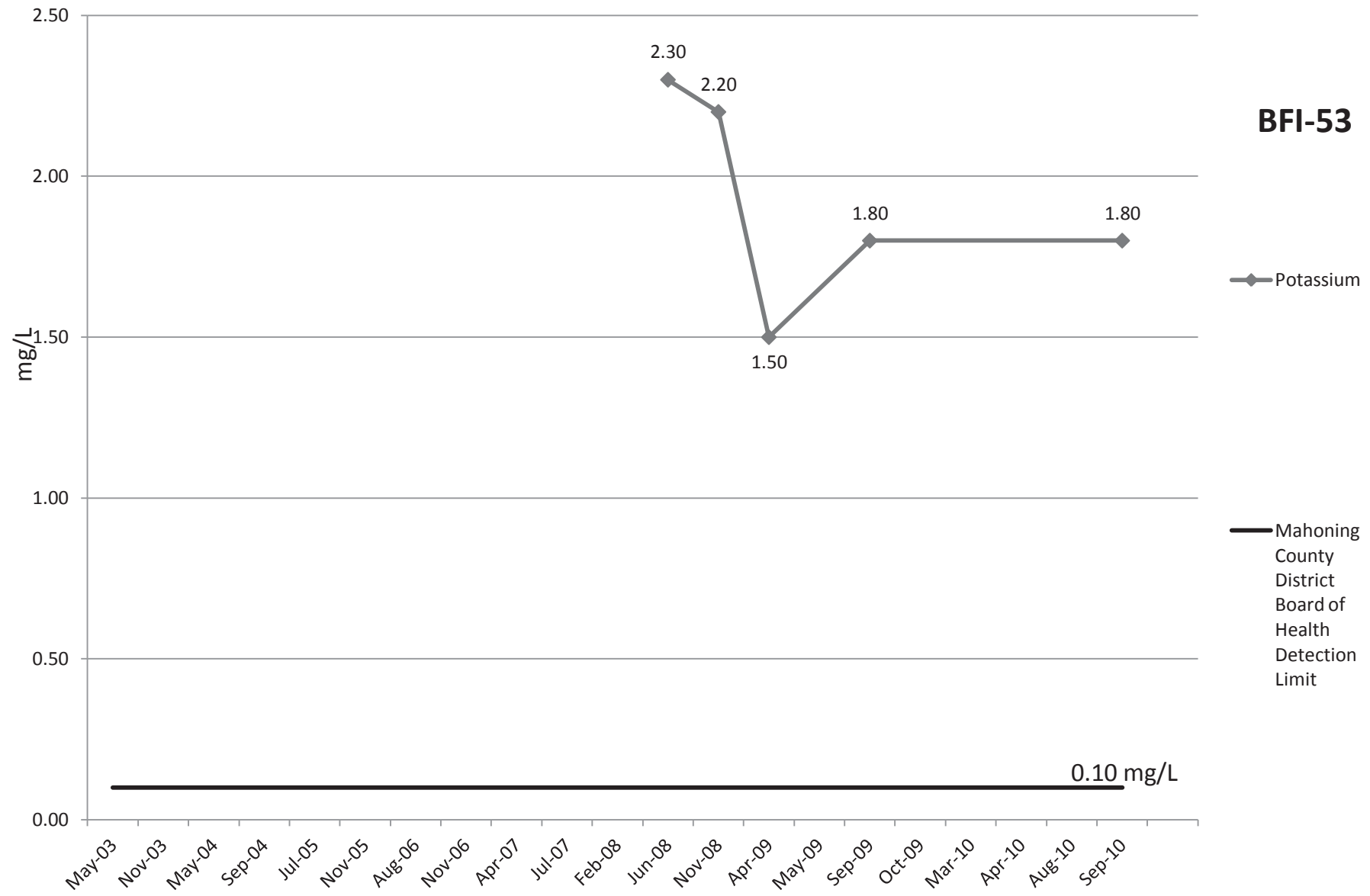
# Magnesium

**BFI-53**



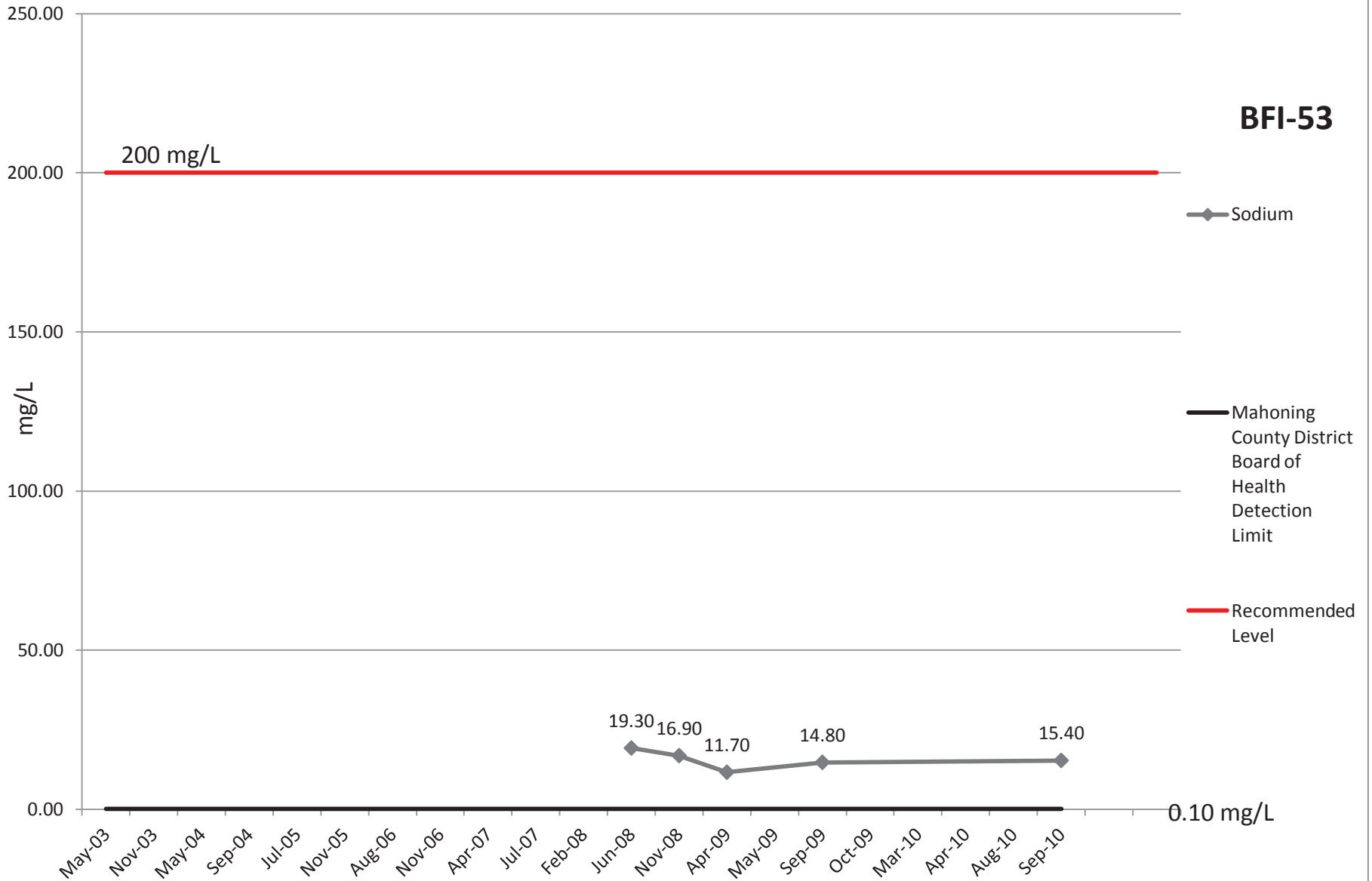


# Potassium

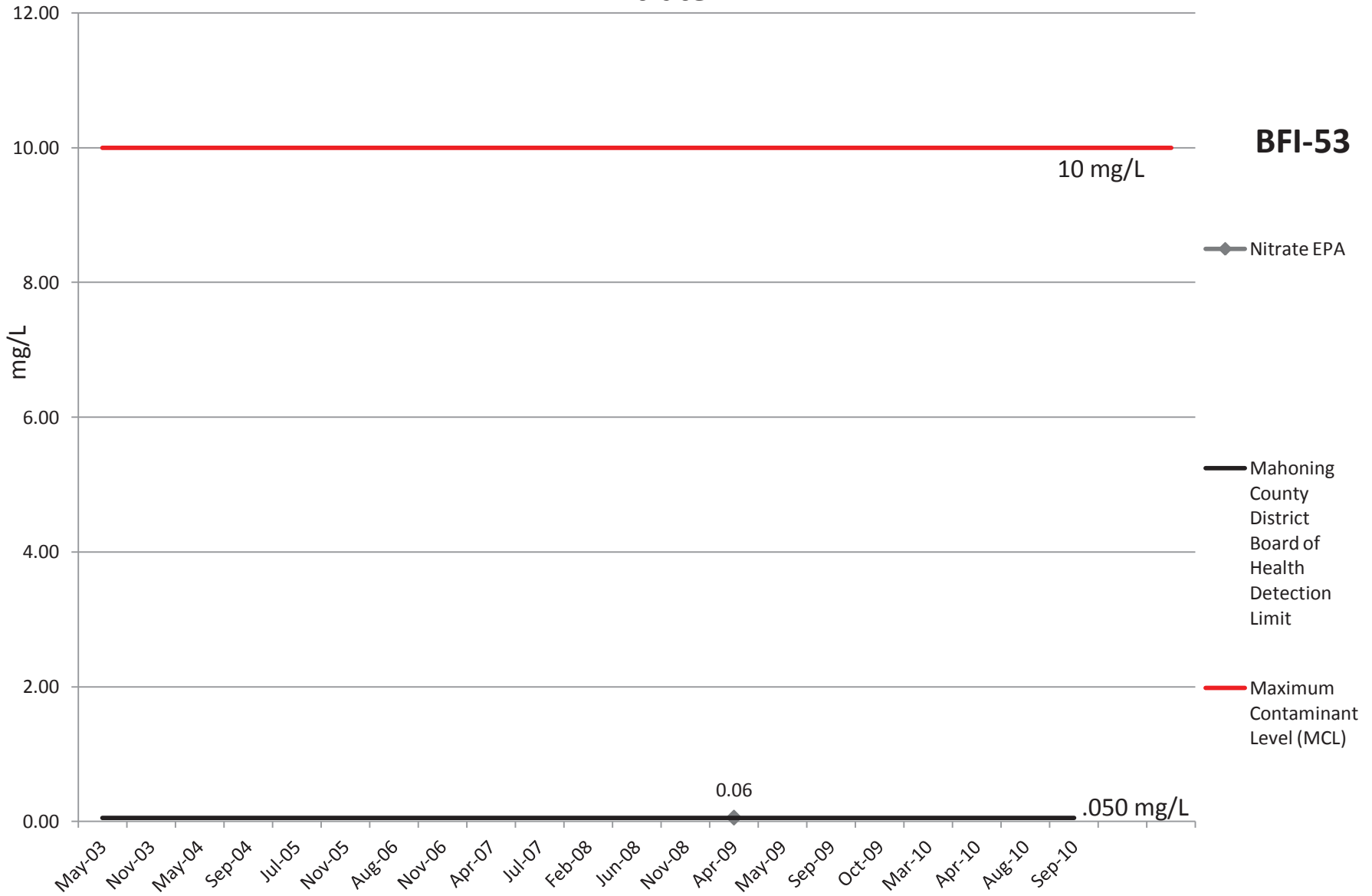


# Sodium

**BFI-53**



# Nitrate EPA



**BFI-53**

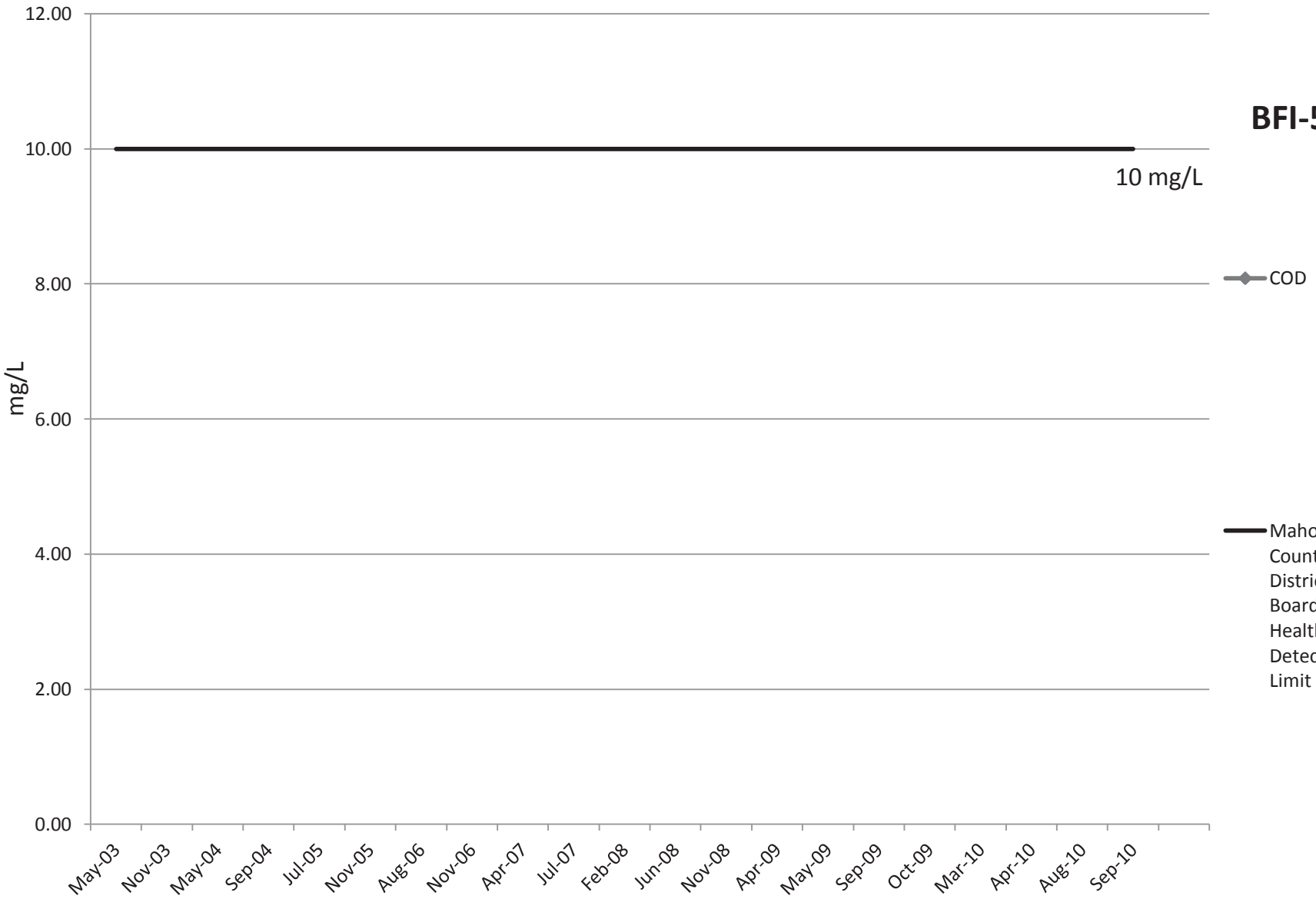
◆ Nitrate EPA

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

# COD

**BFI-53**

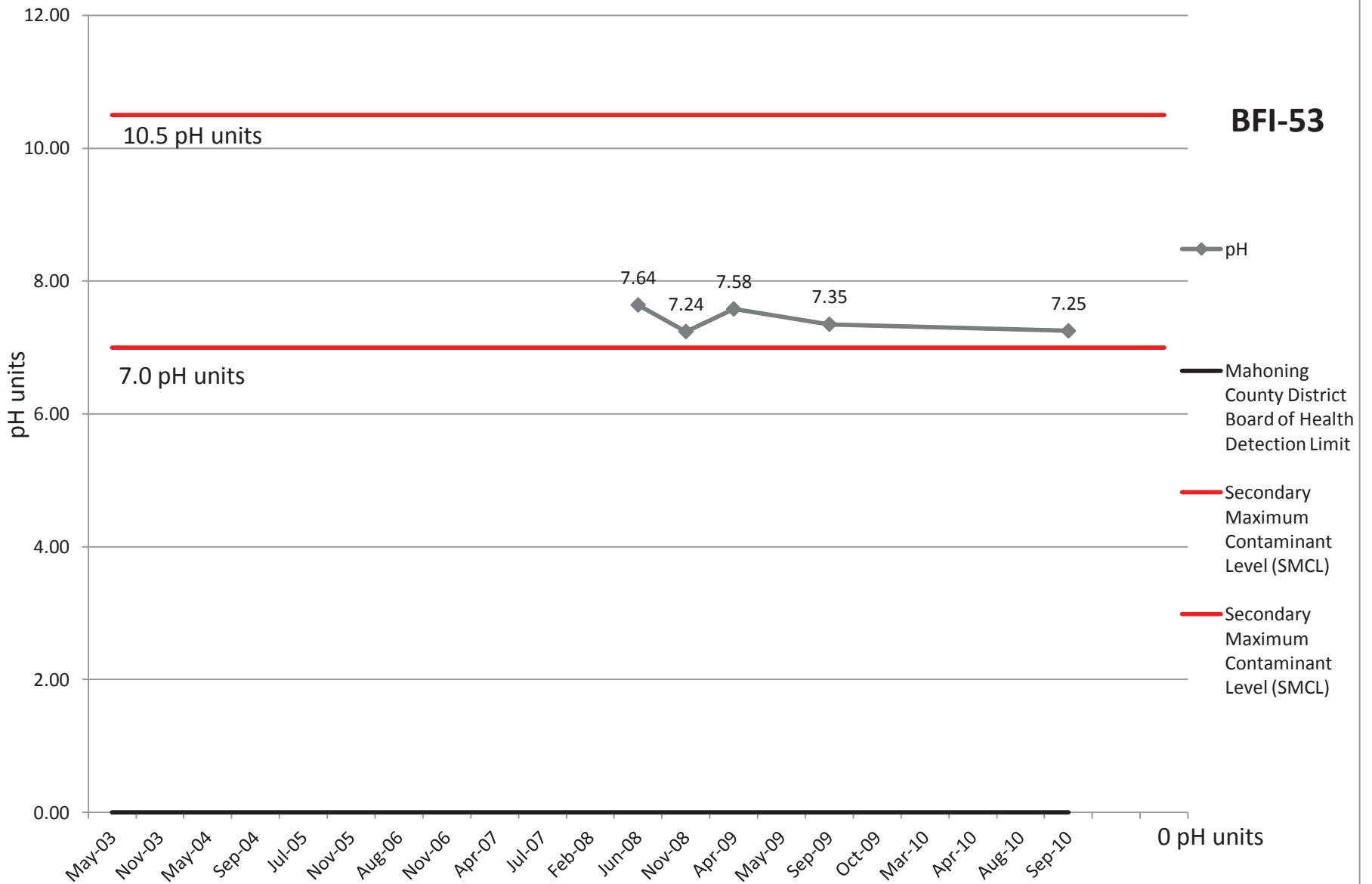


10 mg/L

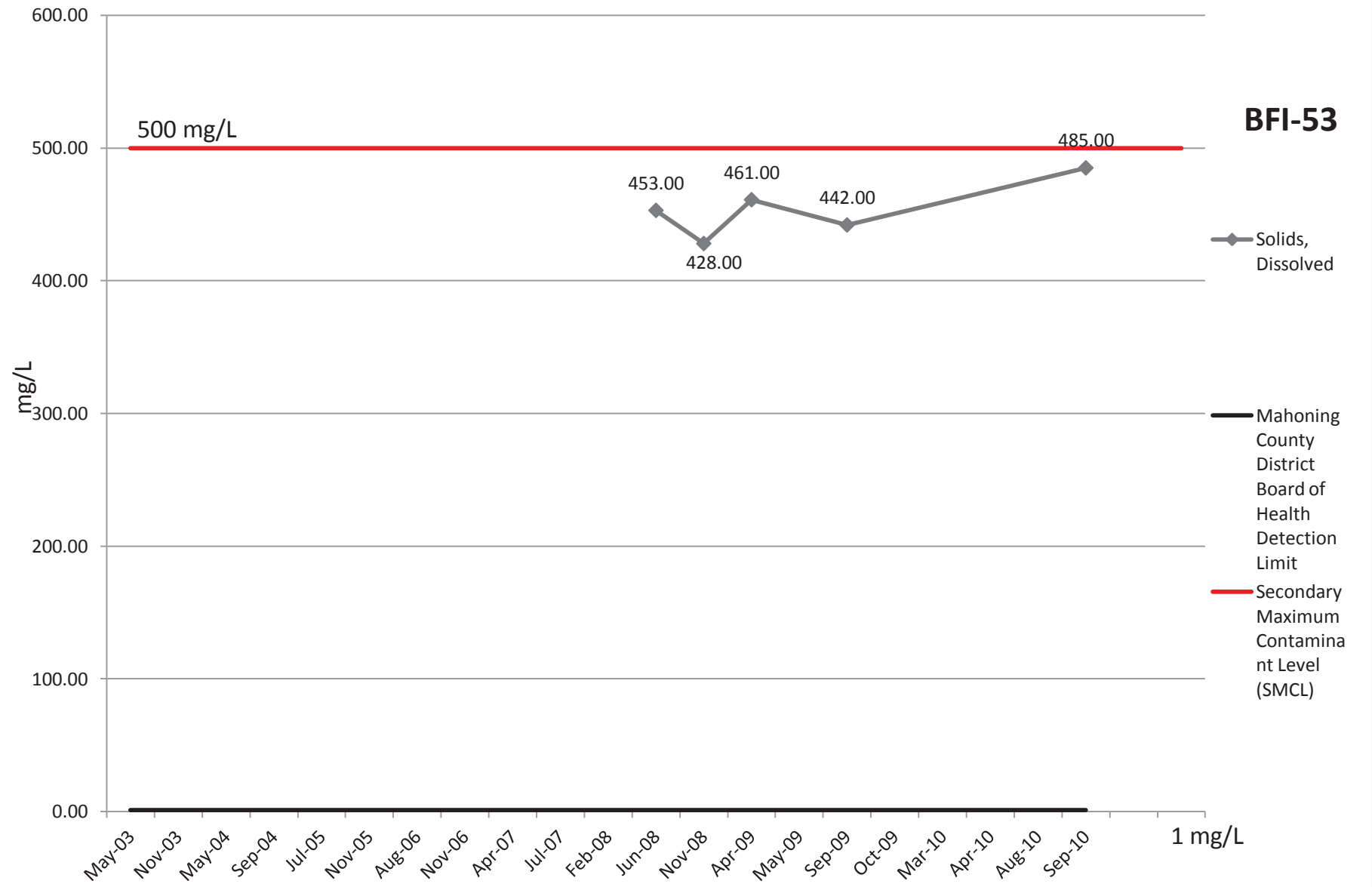
◆ COD

— Mahoning County District Board of Health Detection Limit

# pH

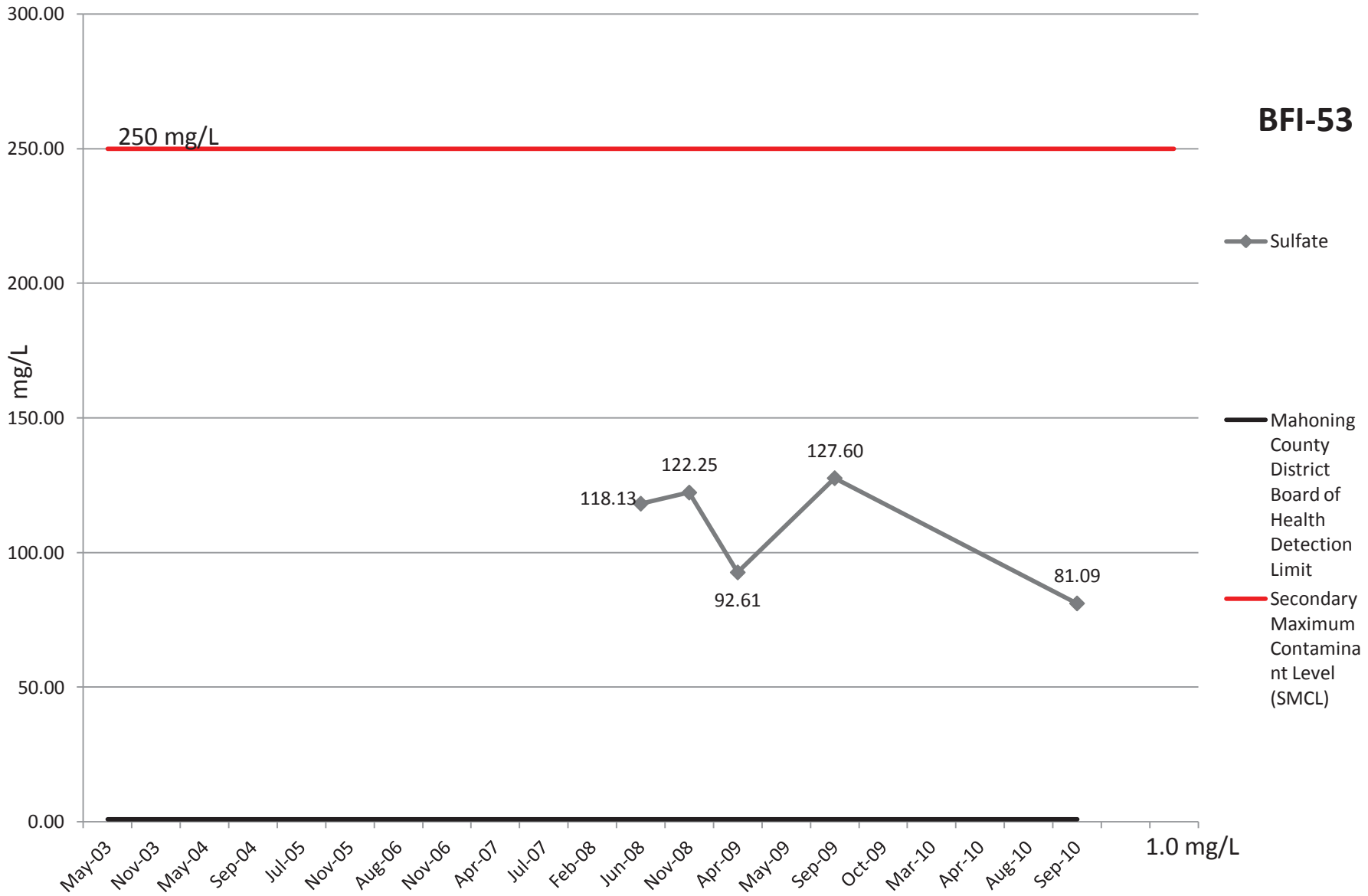


# Solids, Dissolved



# Sulfate

**BFI-53**



# Bacteria

**BFI-53**

Positive/Negative

◆ Bacteria

positive (1)

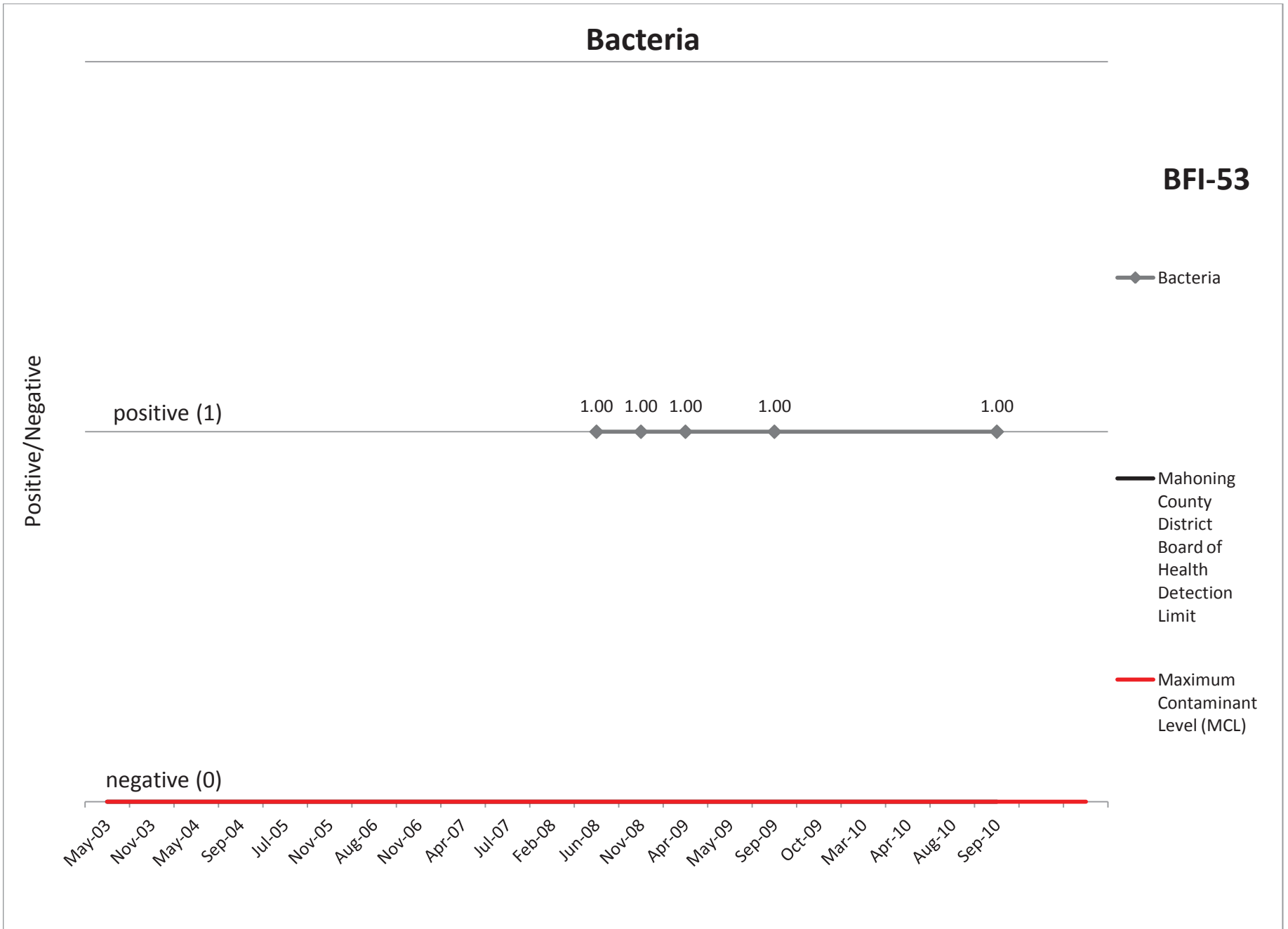
1.00 1.00 1.00 1.00 1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

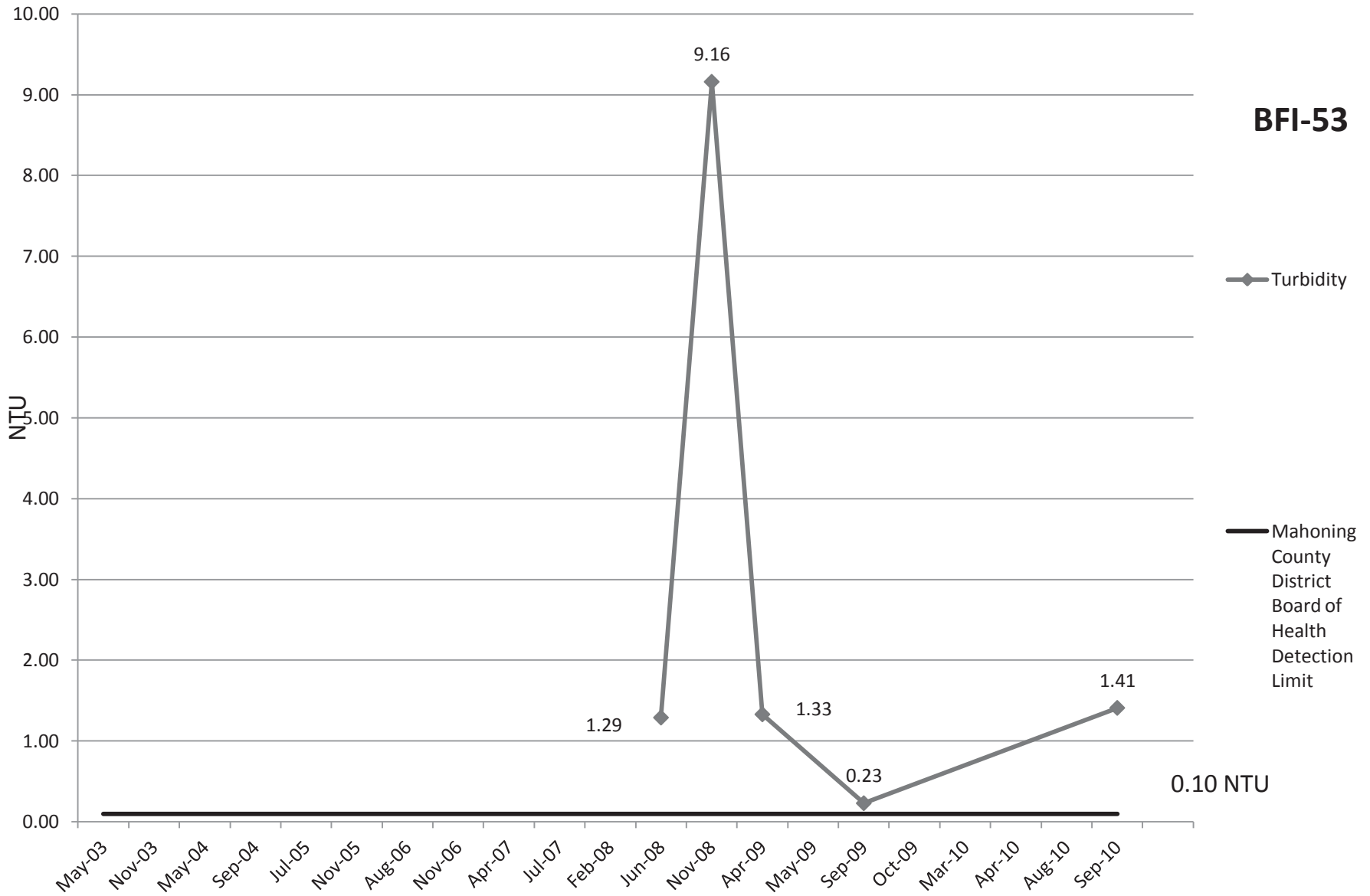
negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



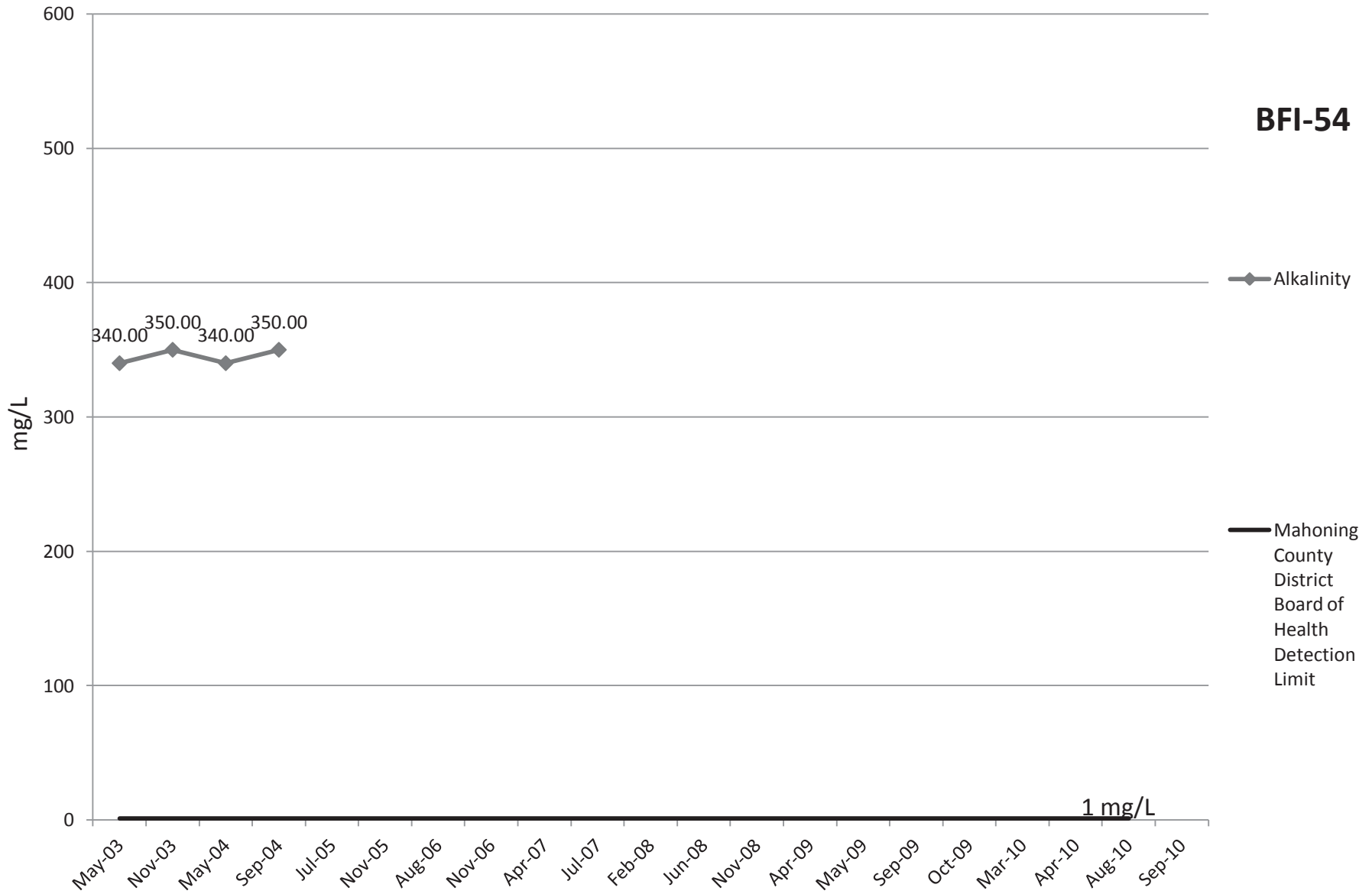


# Turbidity



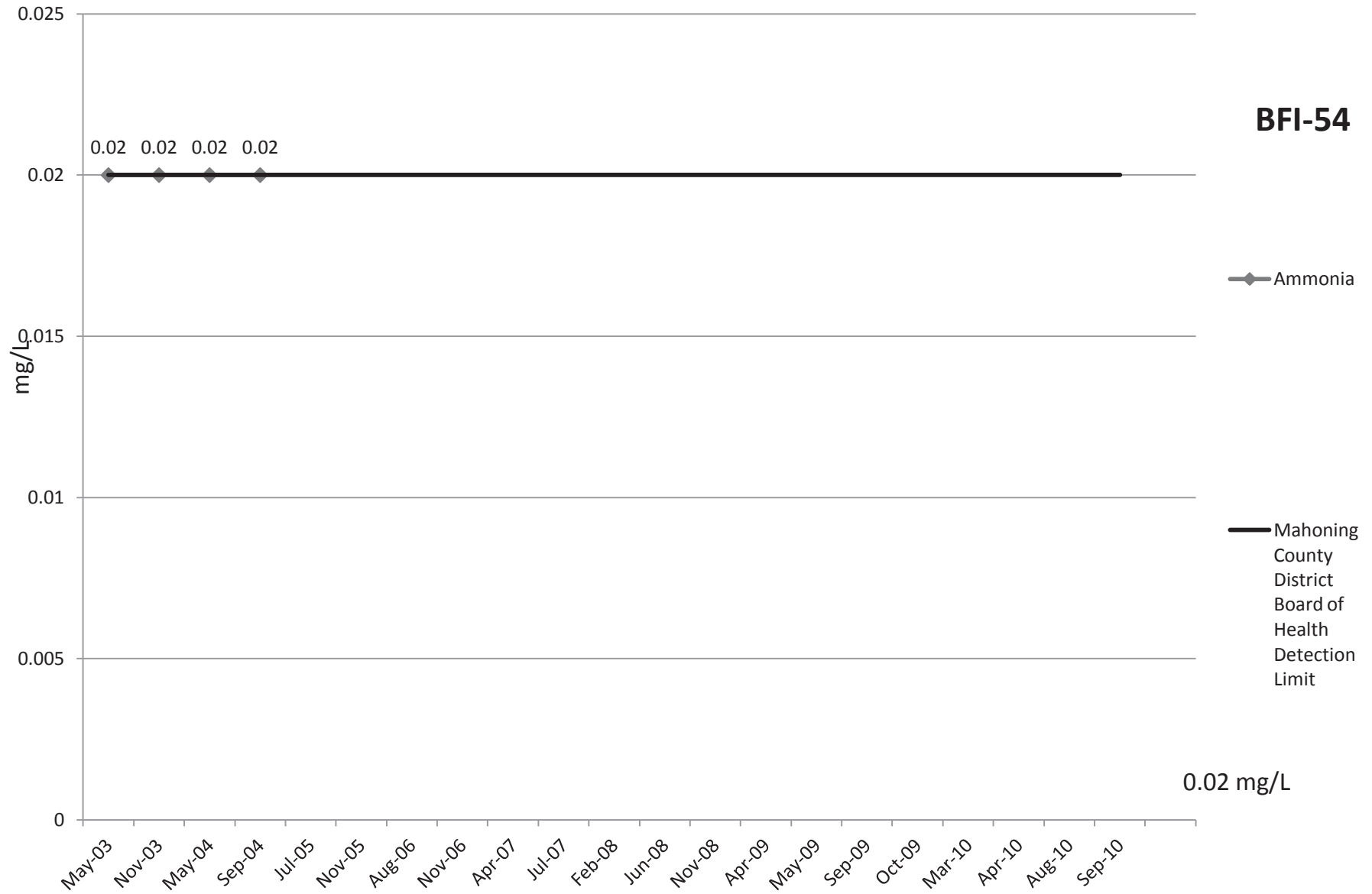
# Alkalinity

**BFI-54**



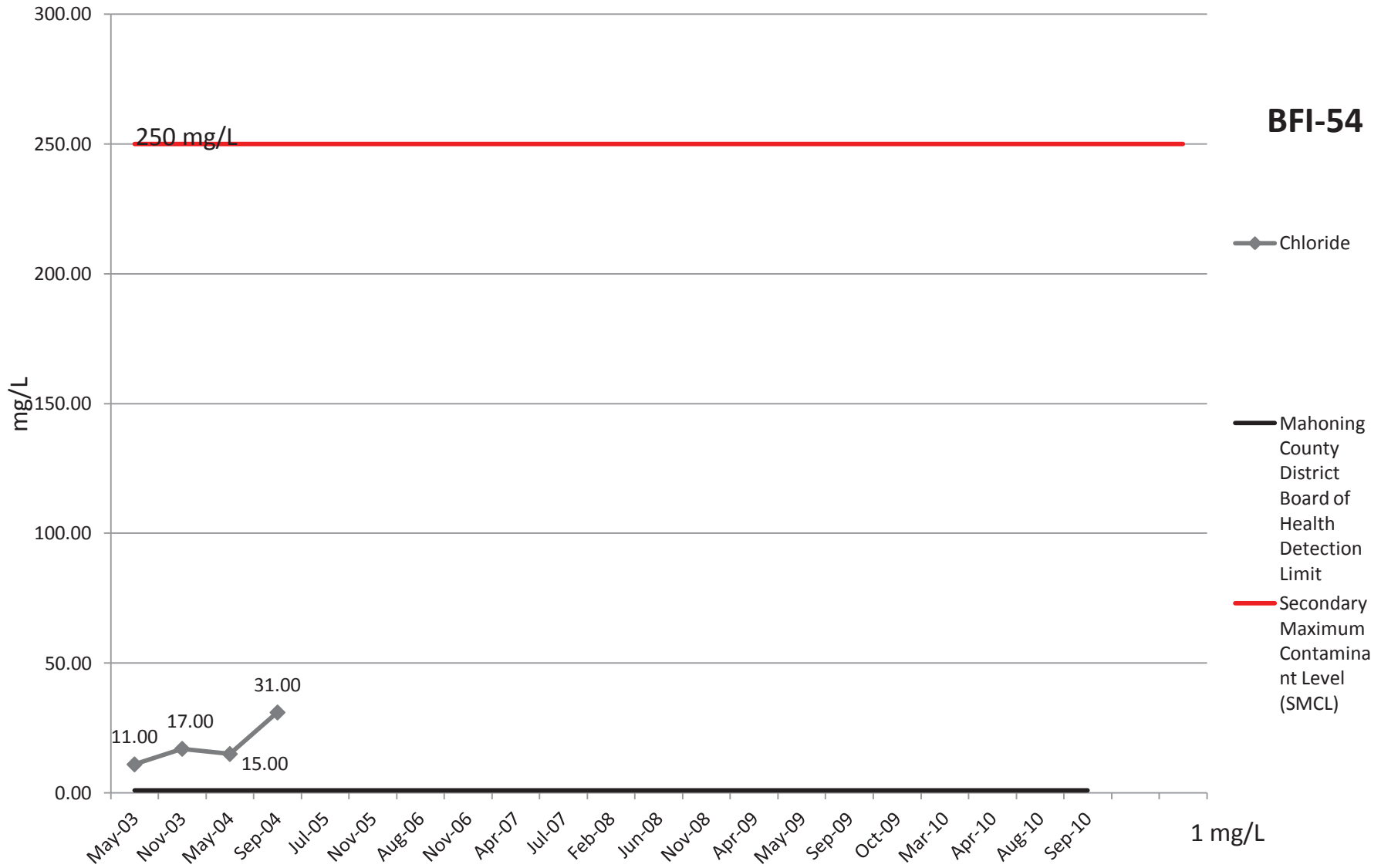
# Ammonia

**BFI-54**

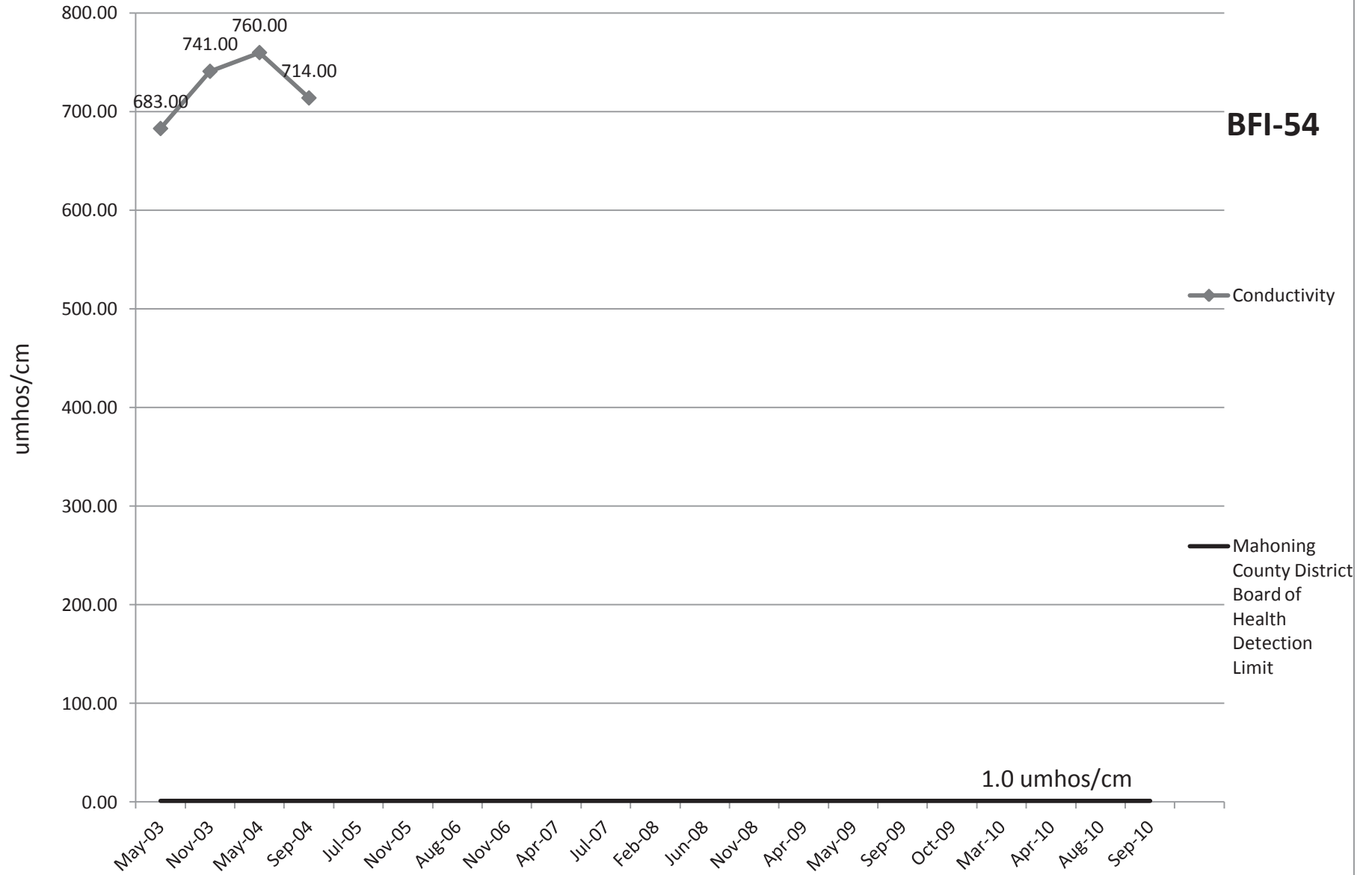


0.02 mg/L

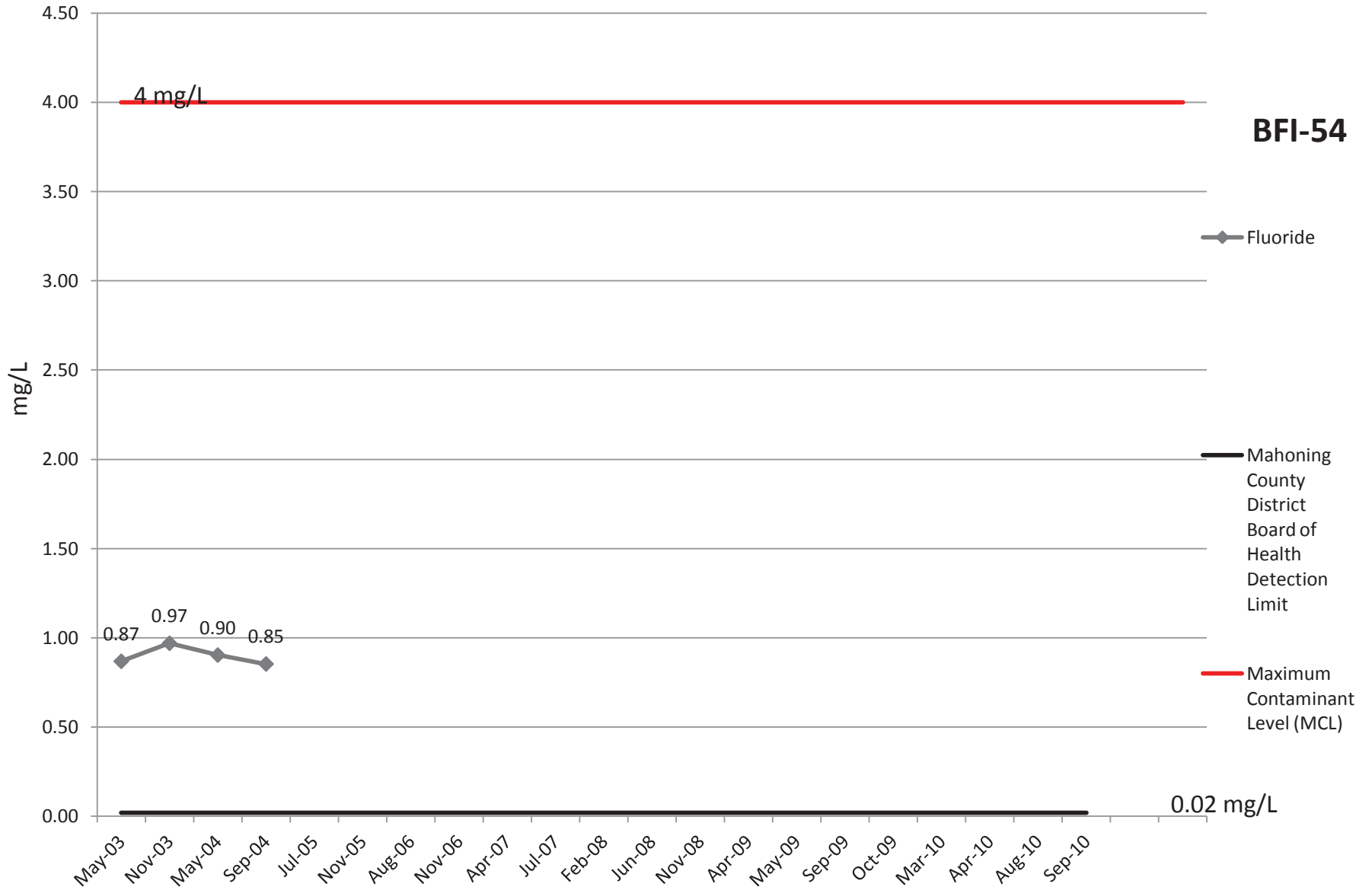
# Chloride



# Conductivity

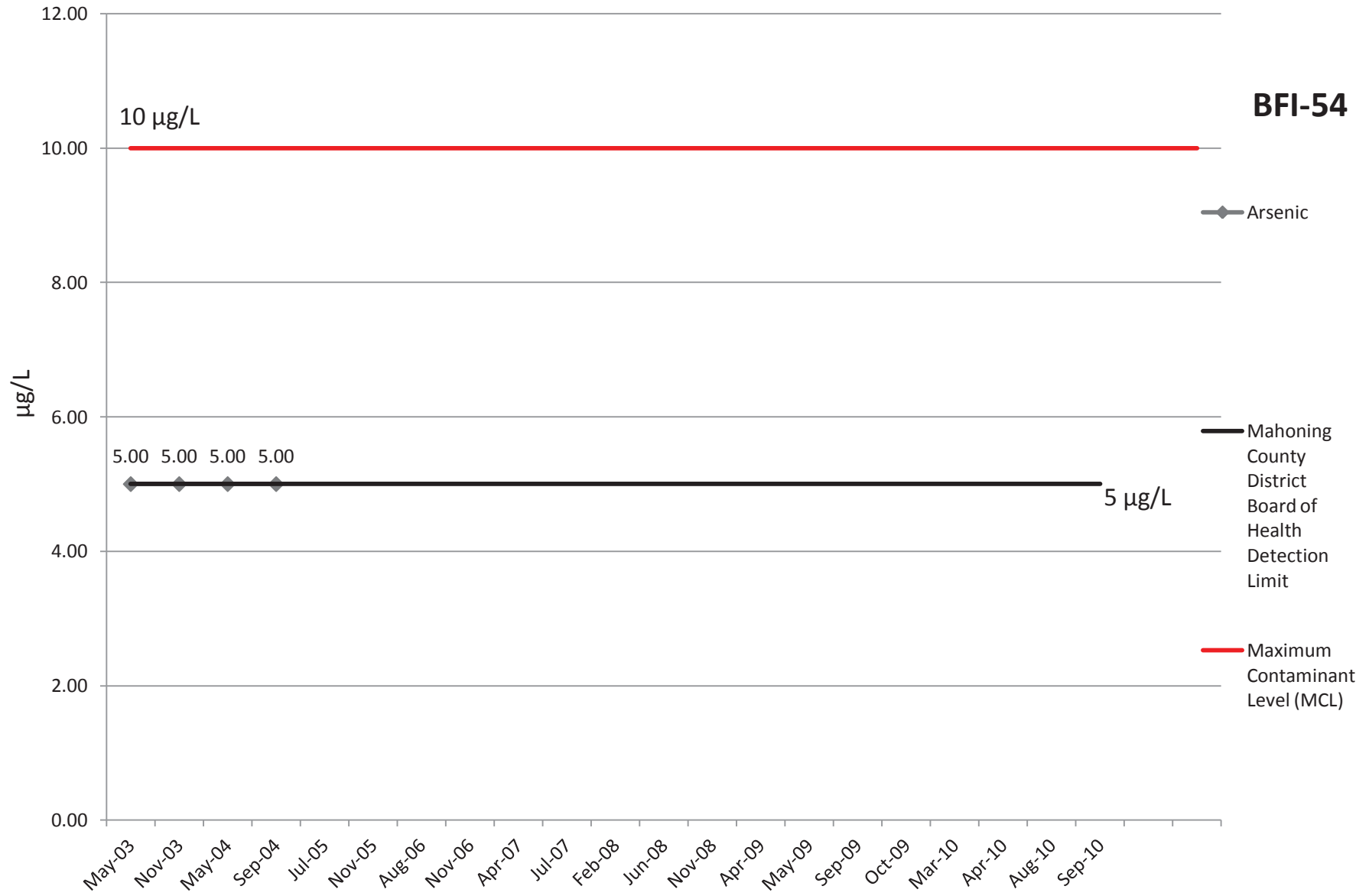


# Fluoride

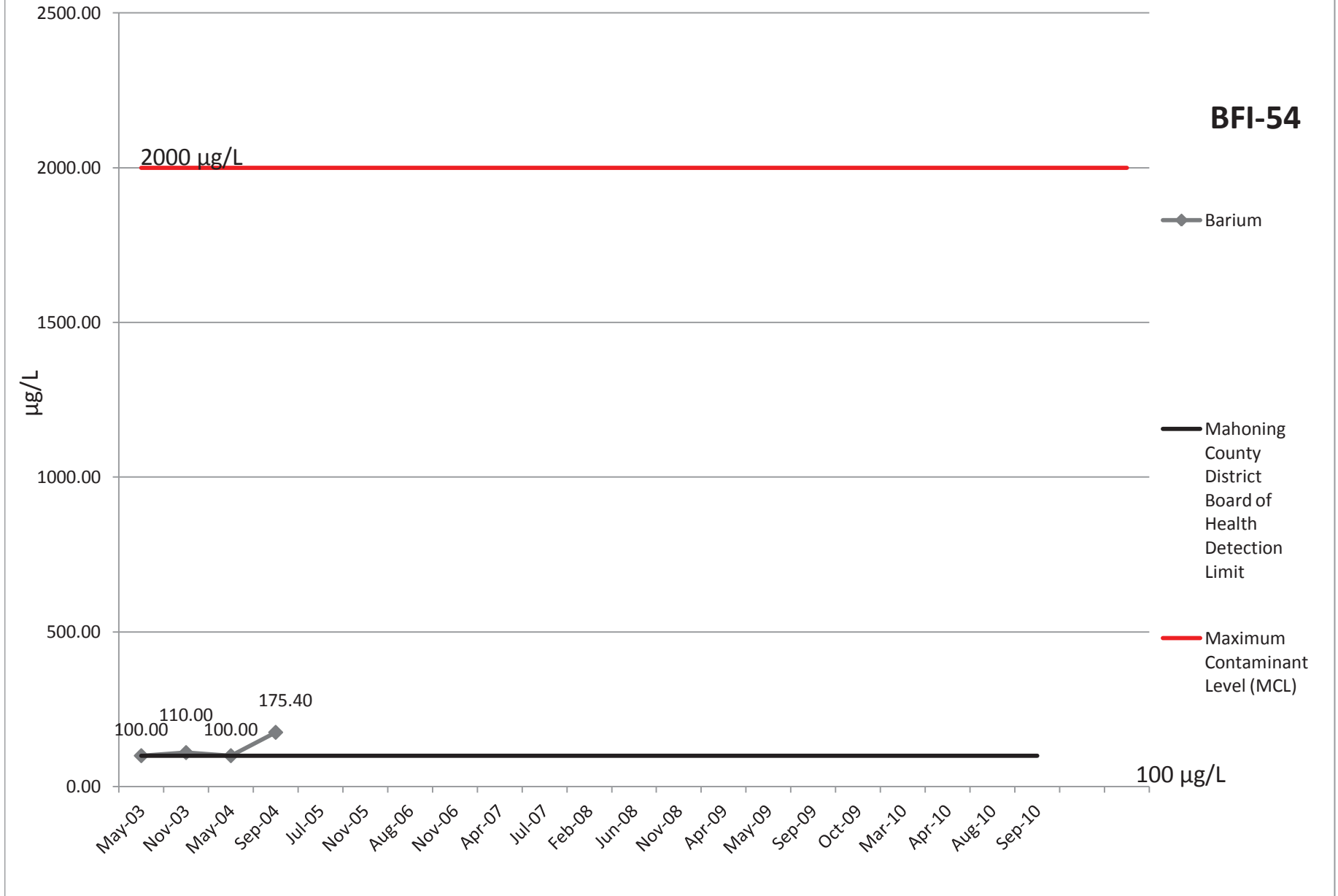


# Arsenic

**BFI-54**

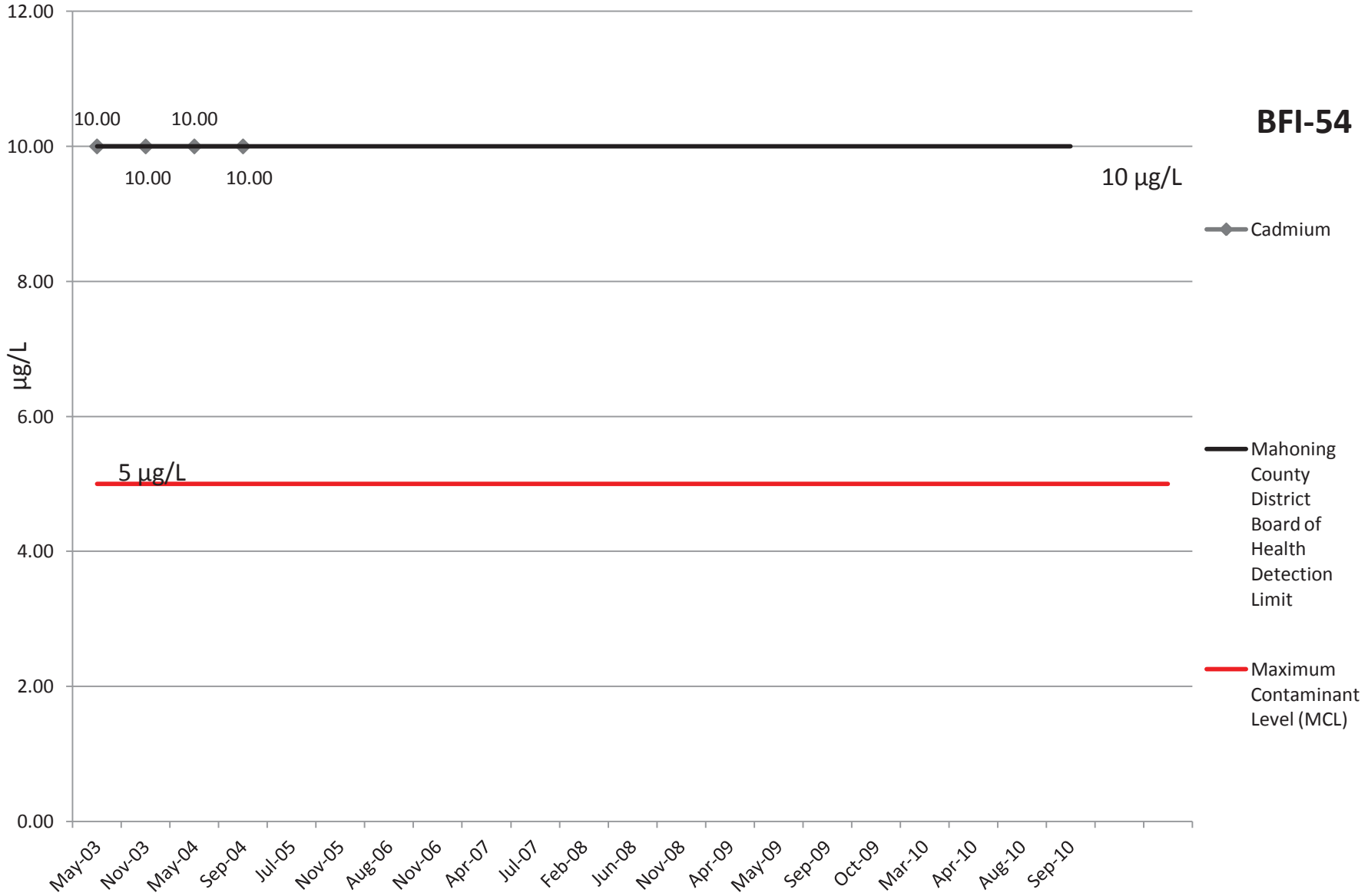


# Barium

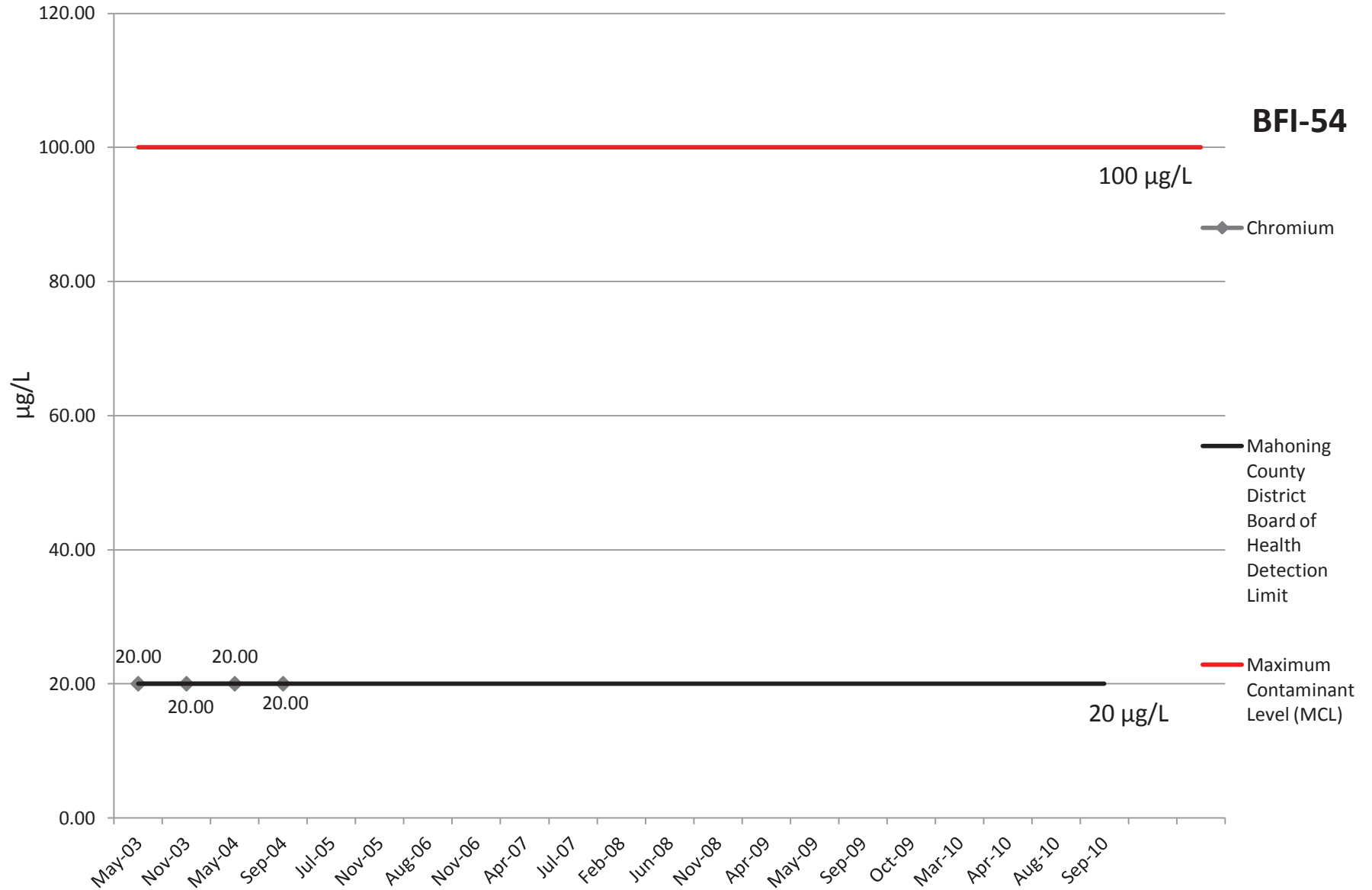




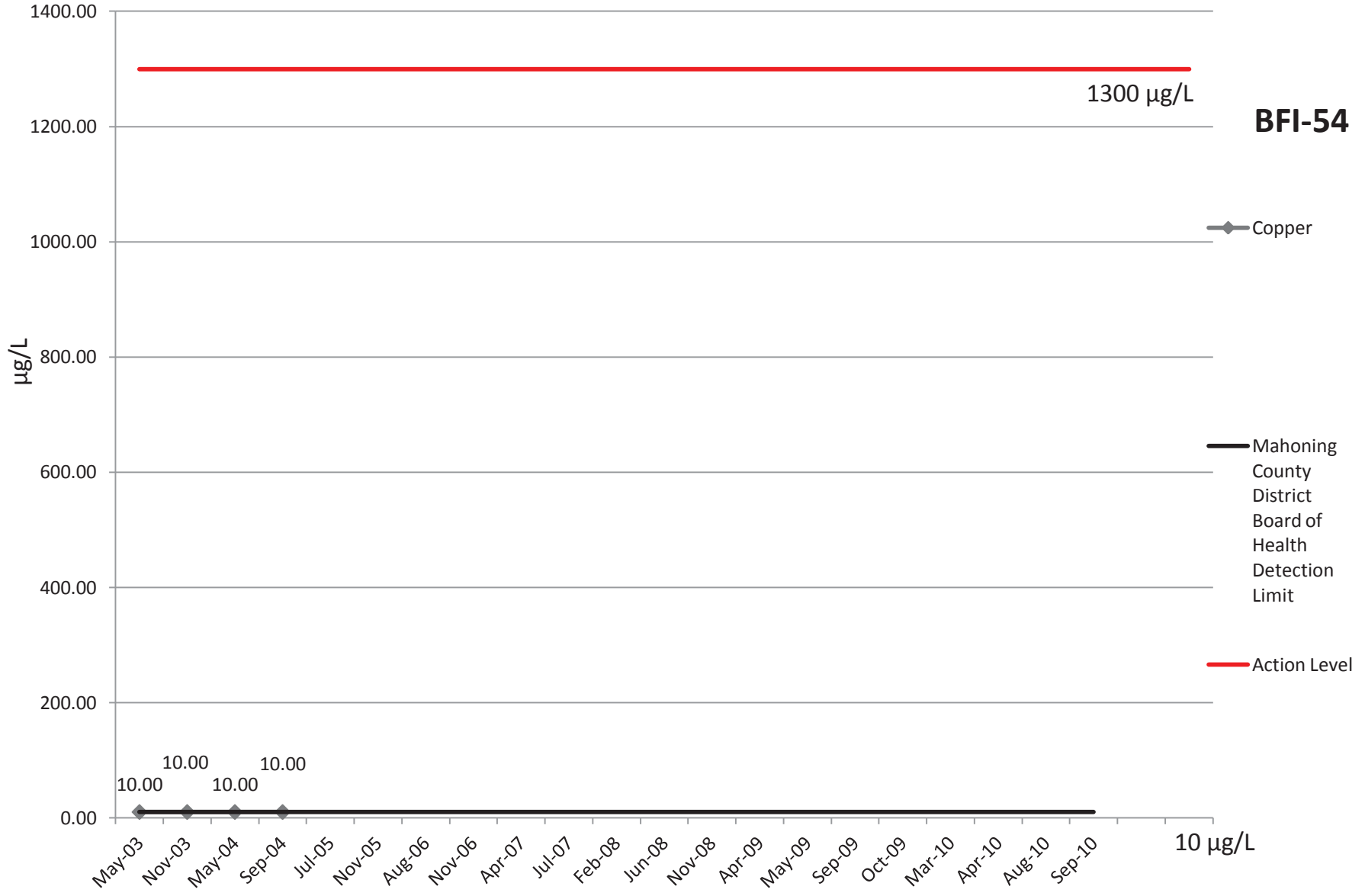
# Cadmium



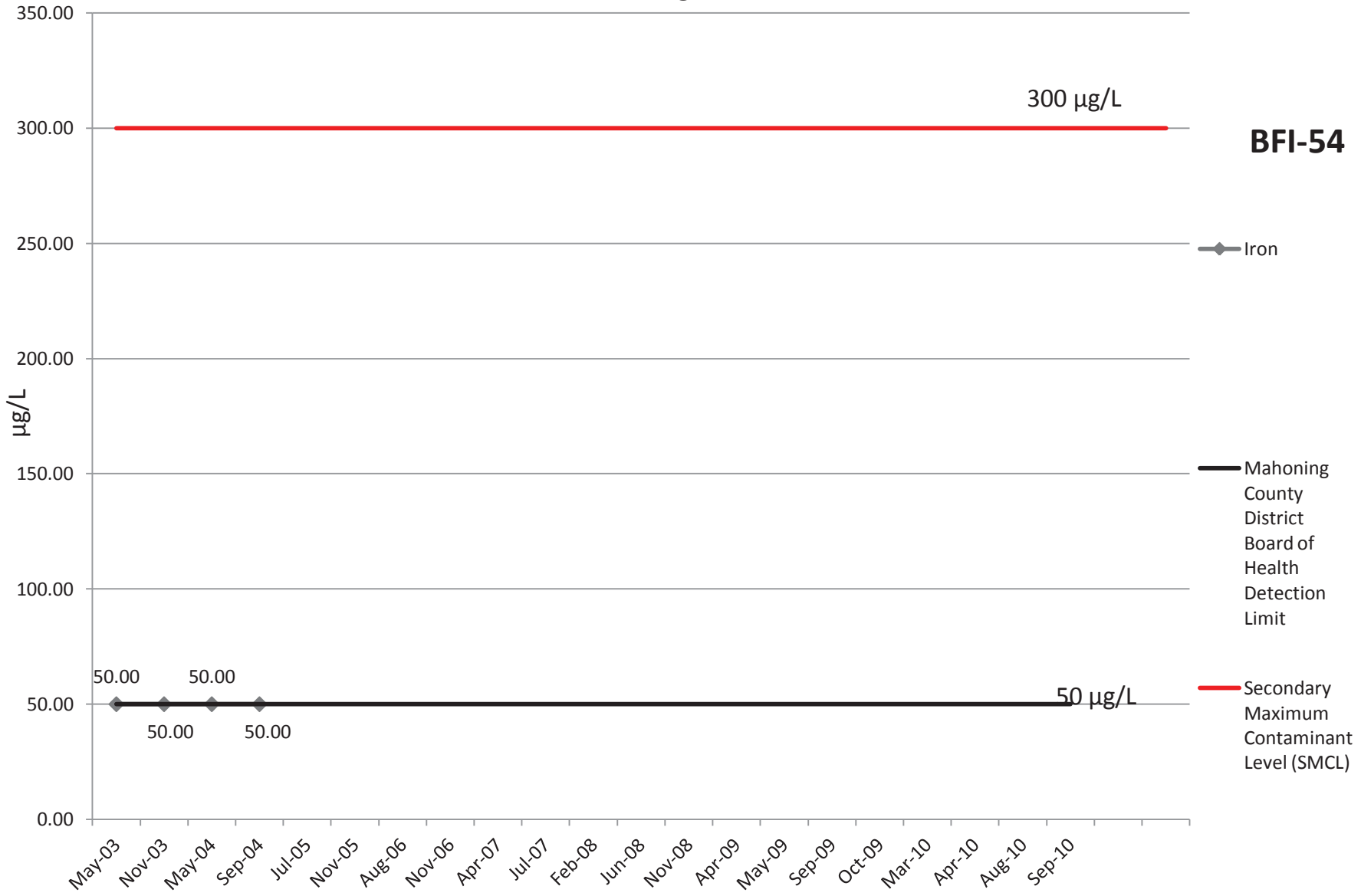
# Chromium



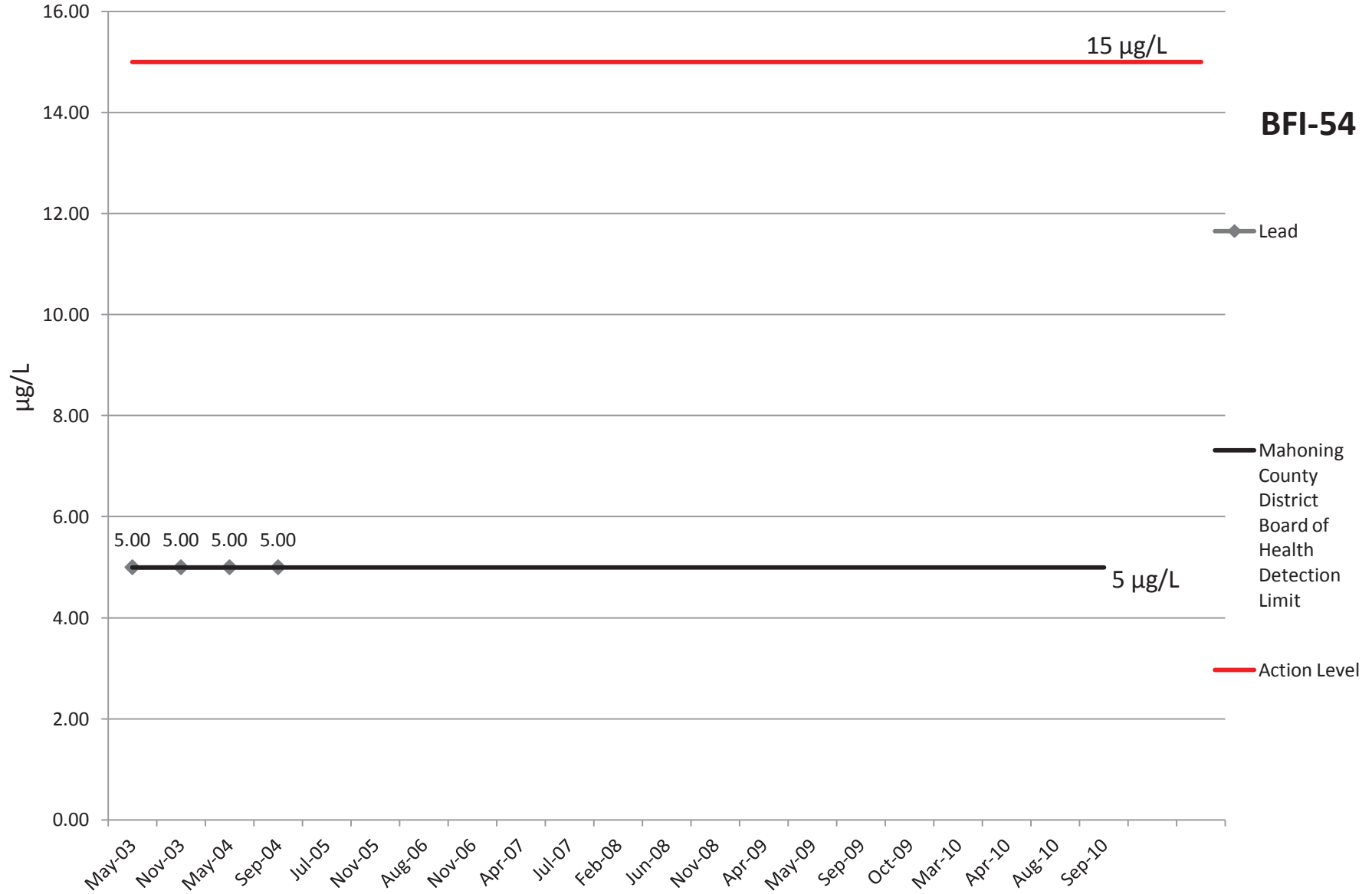
# Copper



# Iron



# Lead



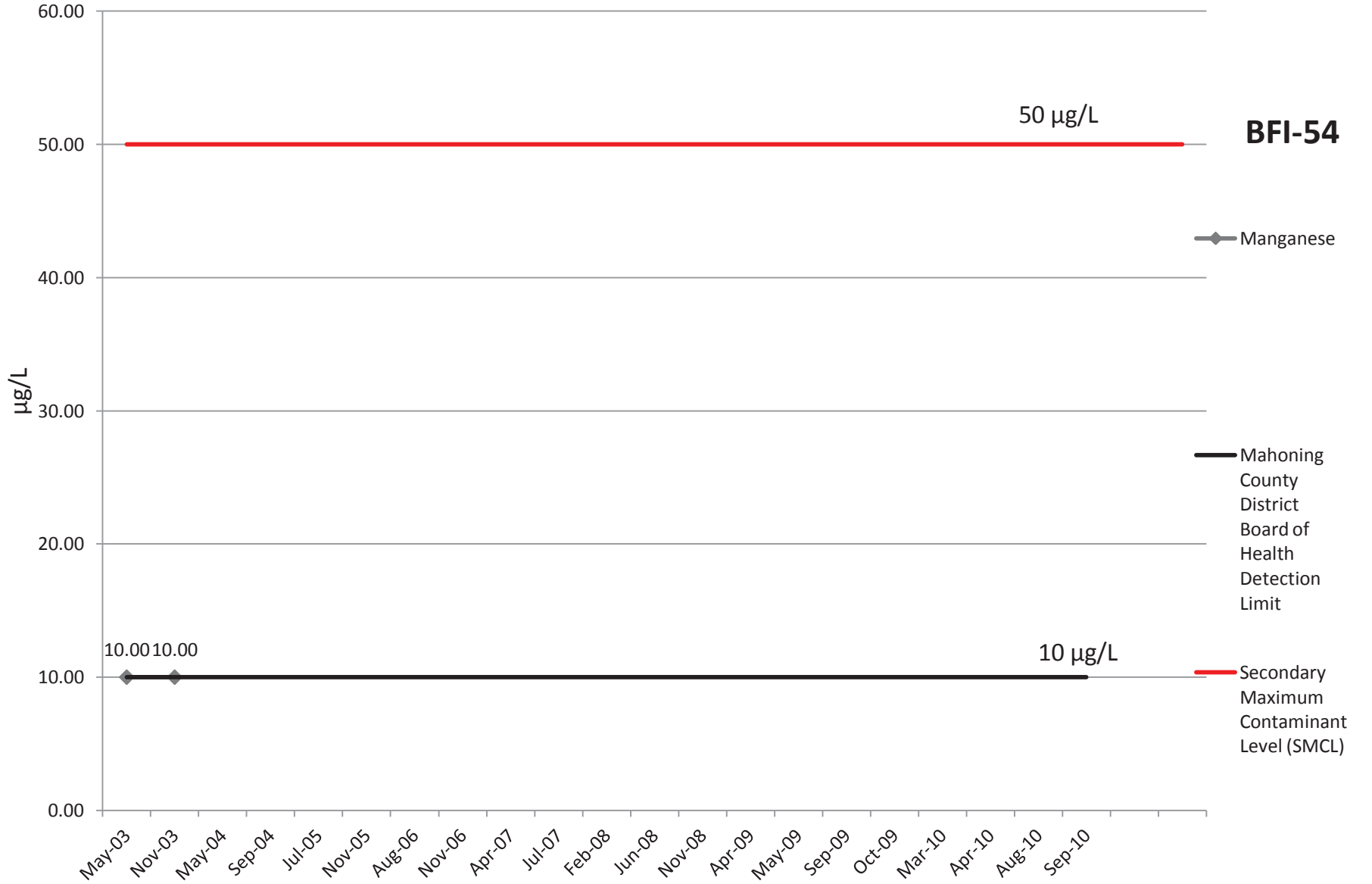
**BFI-54**

◆ Lead

— Mahoning County District Board of Health Detection Limit

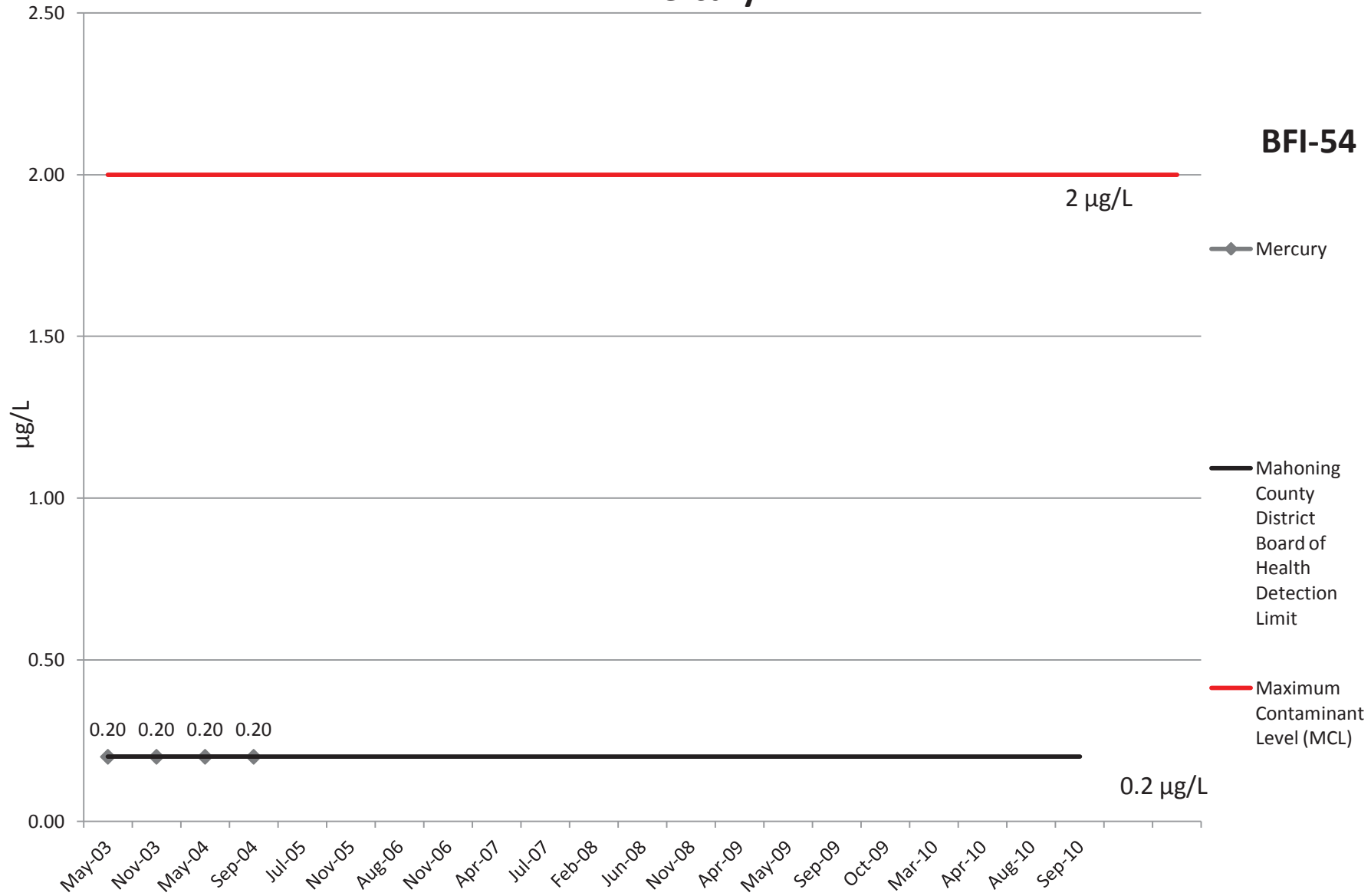
— Action Level

# Manganese

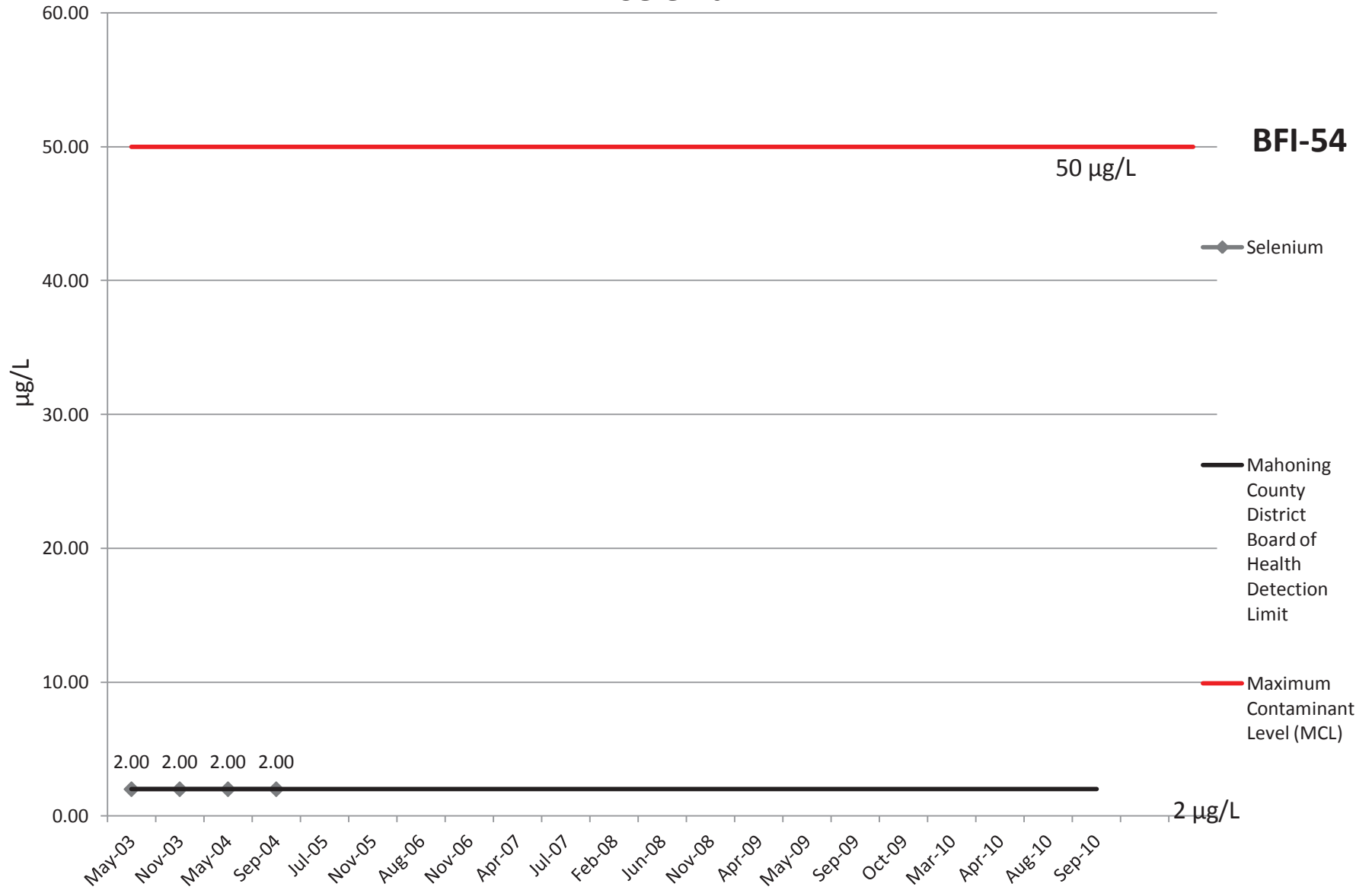


# Mercury

**BFI-54**

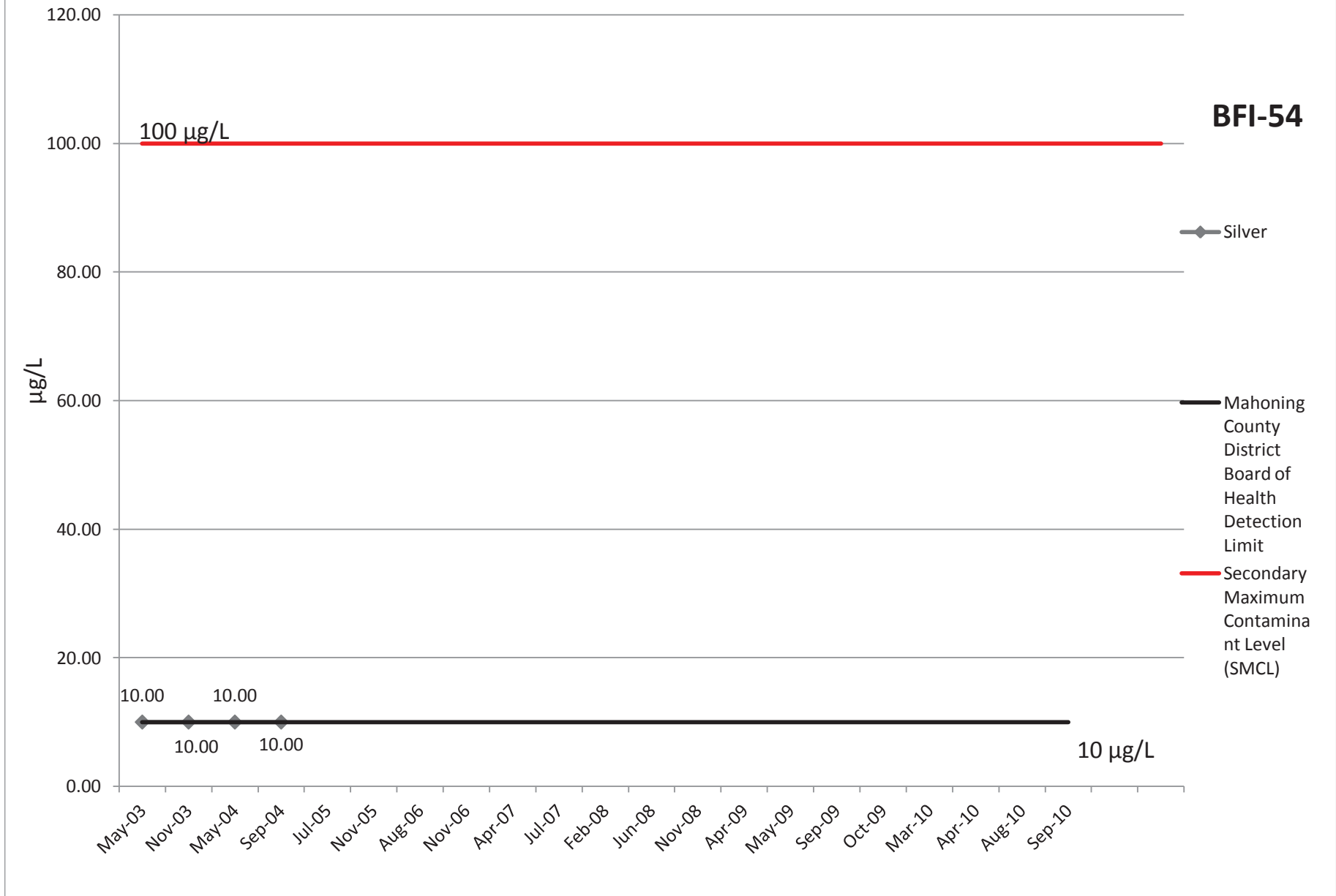


# Selenium

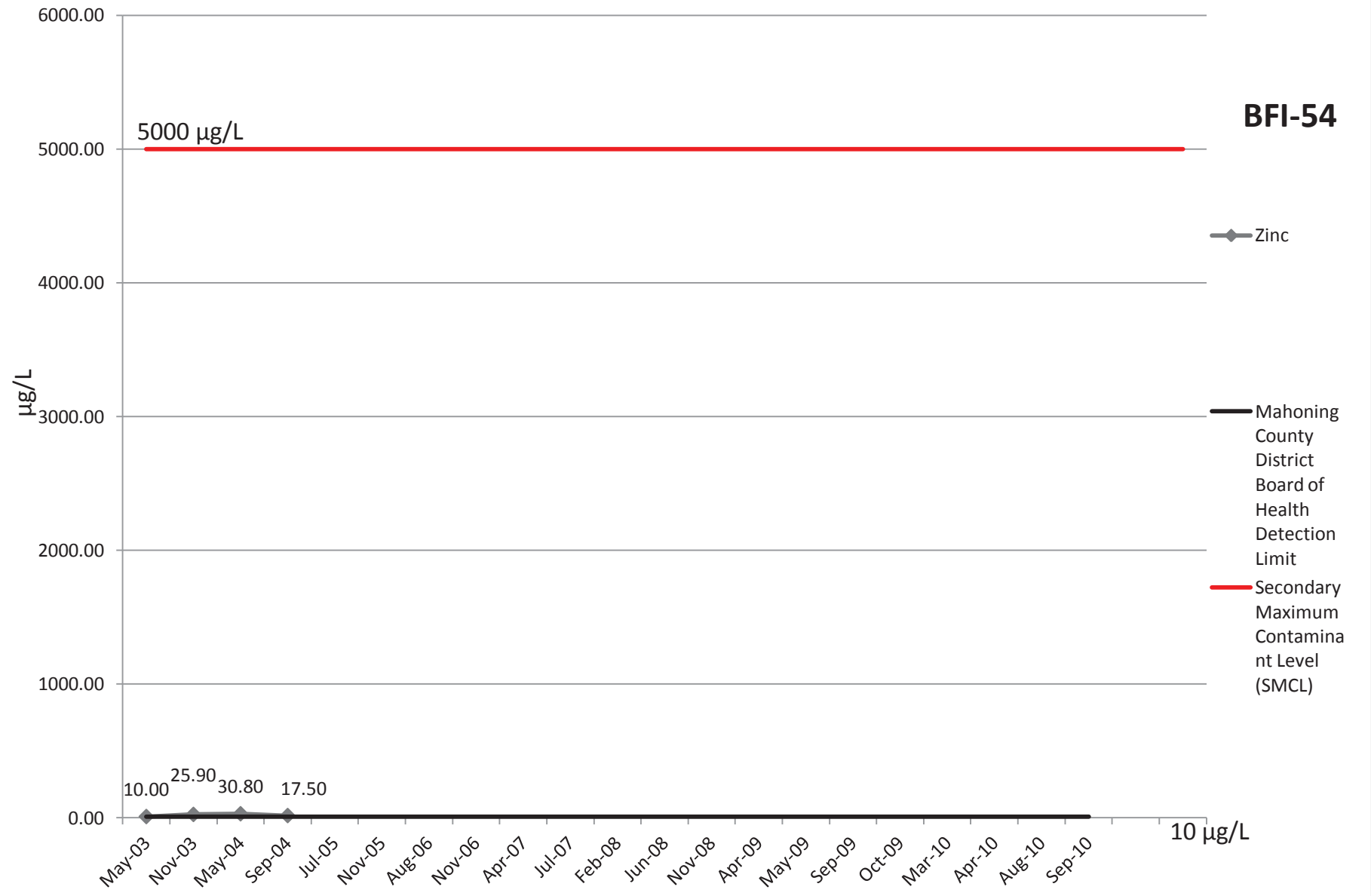




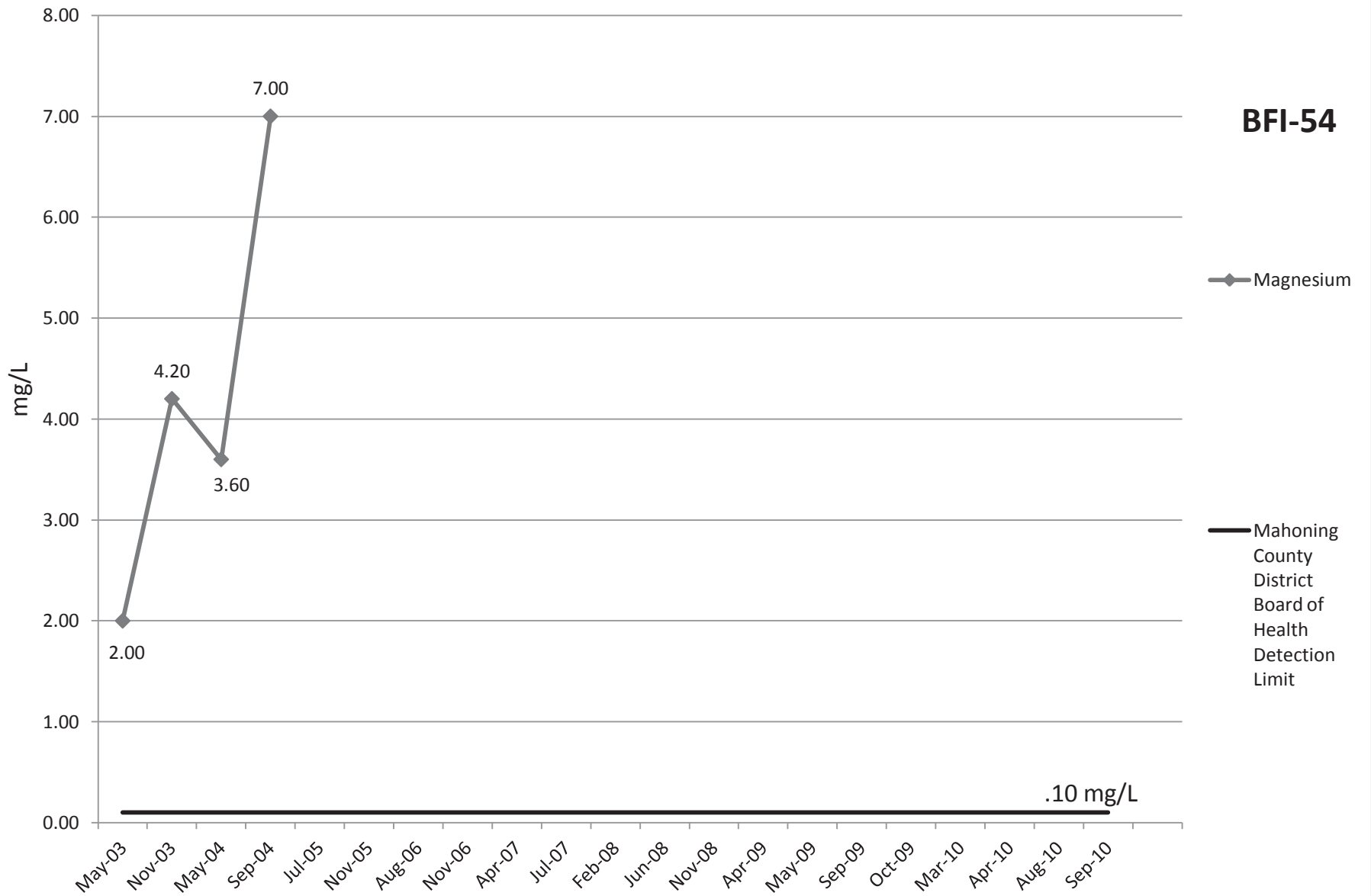
# Silver



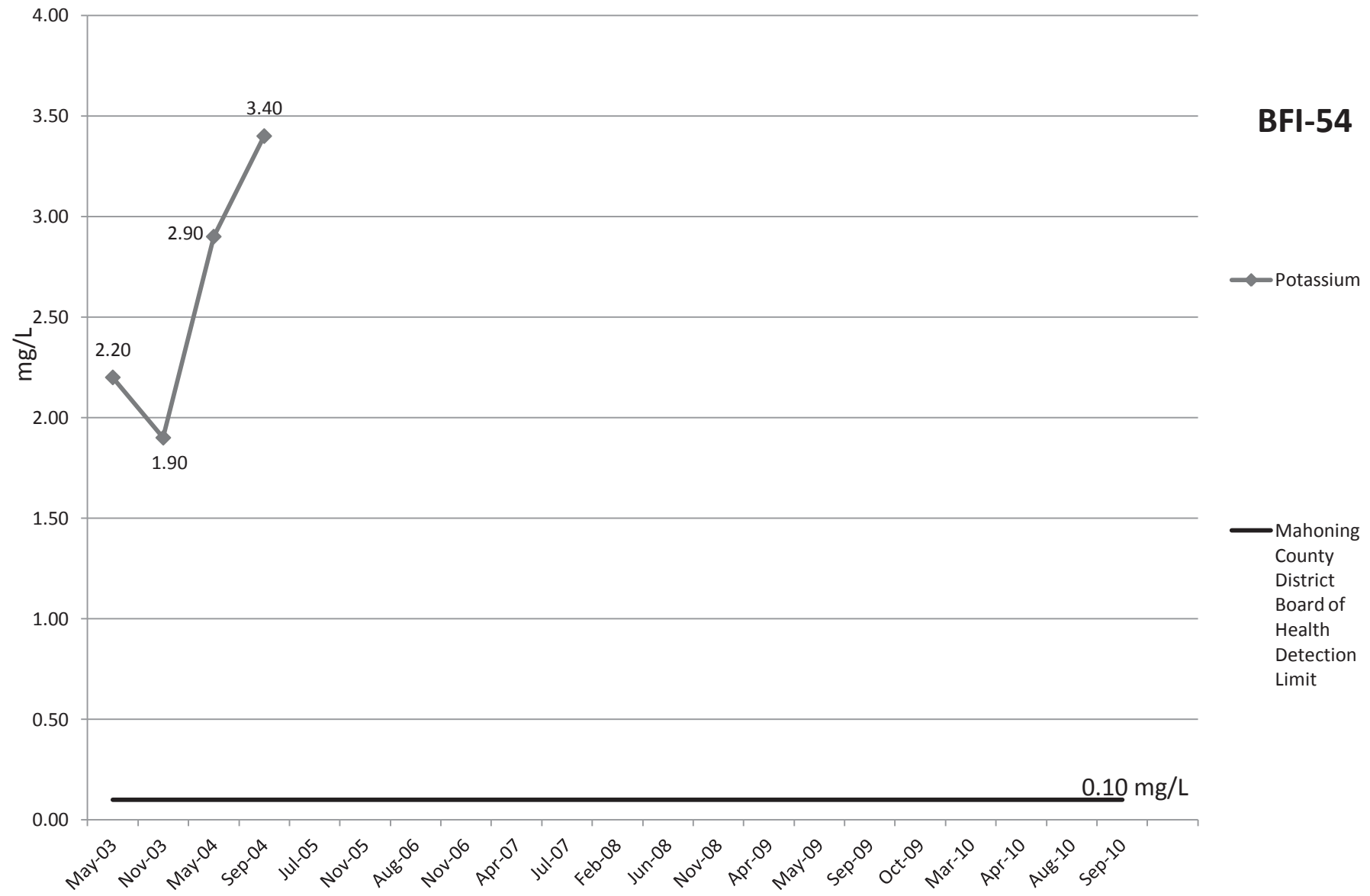
# Zinc



# Magnesium

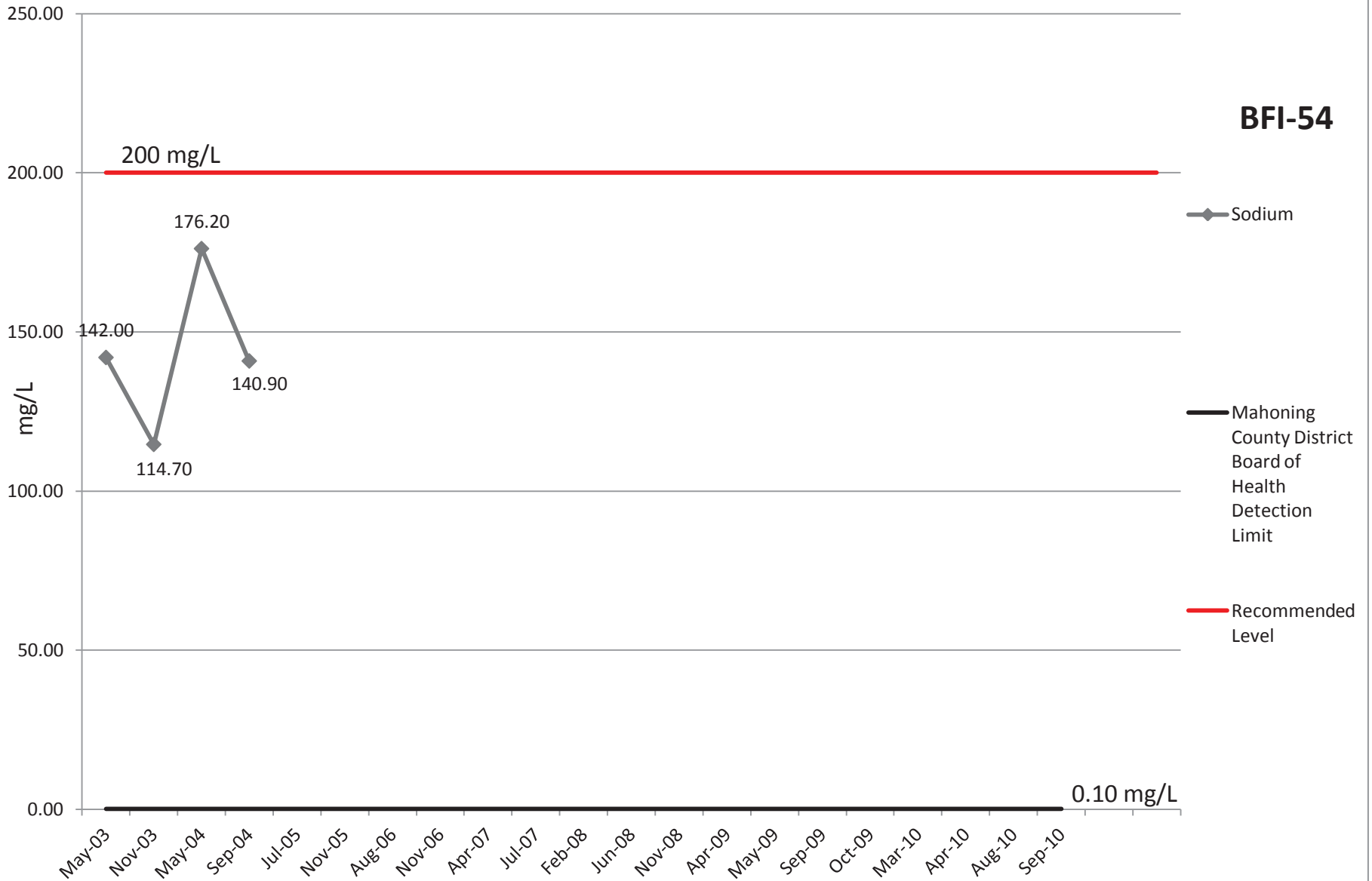


# Potassium

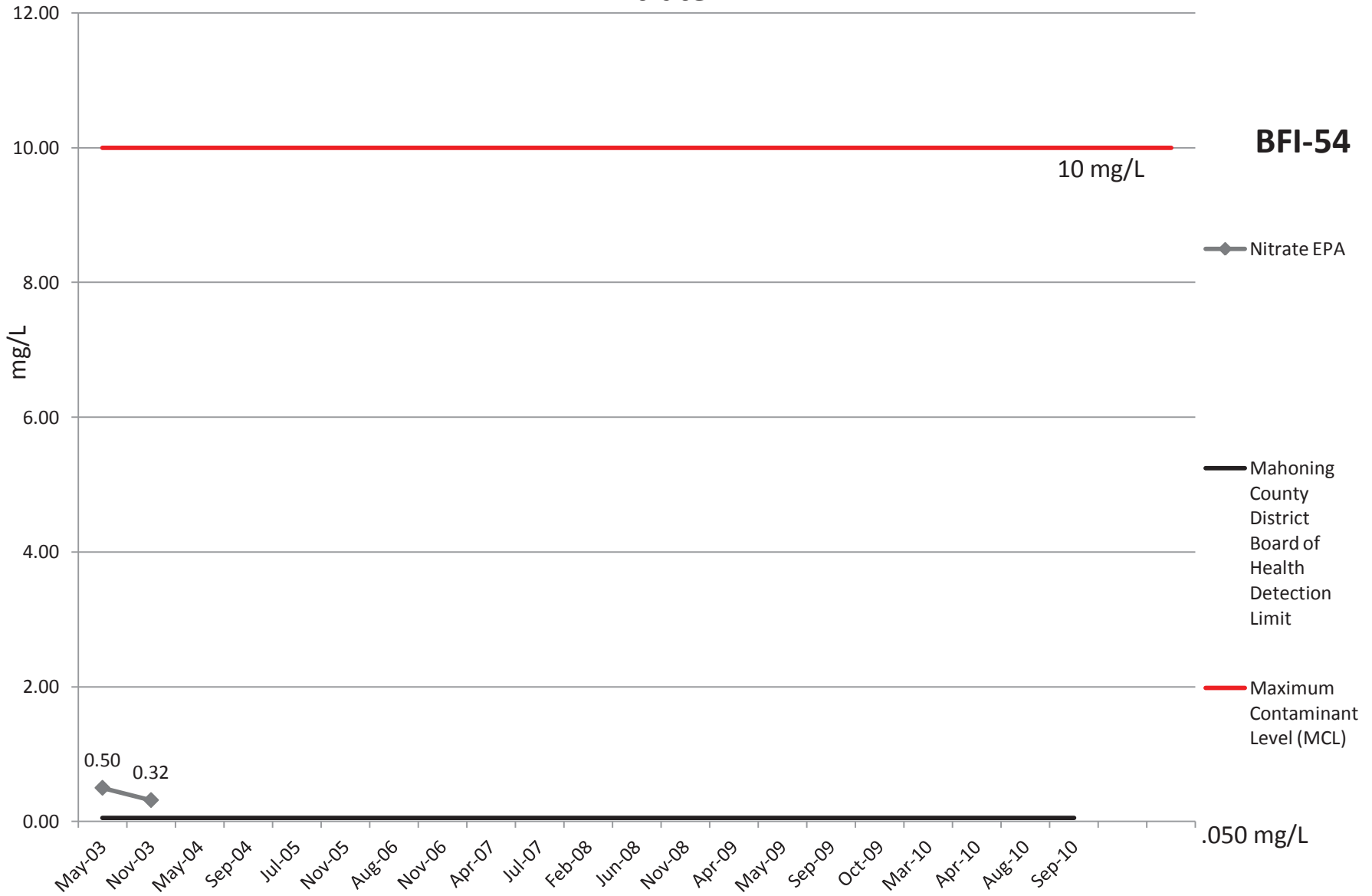


# Sodium

**BFI-54**



# Nitrate EPA



**BFI-54**

◆ Nitrate EPA

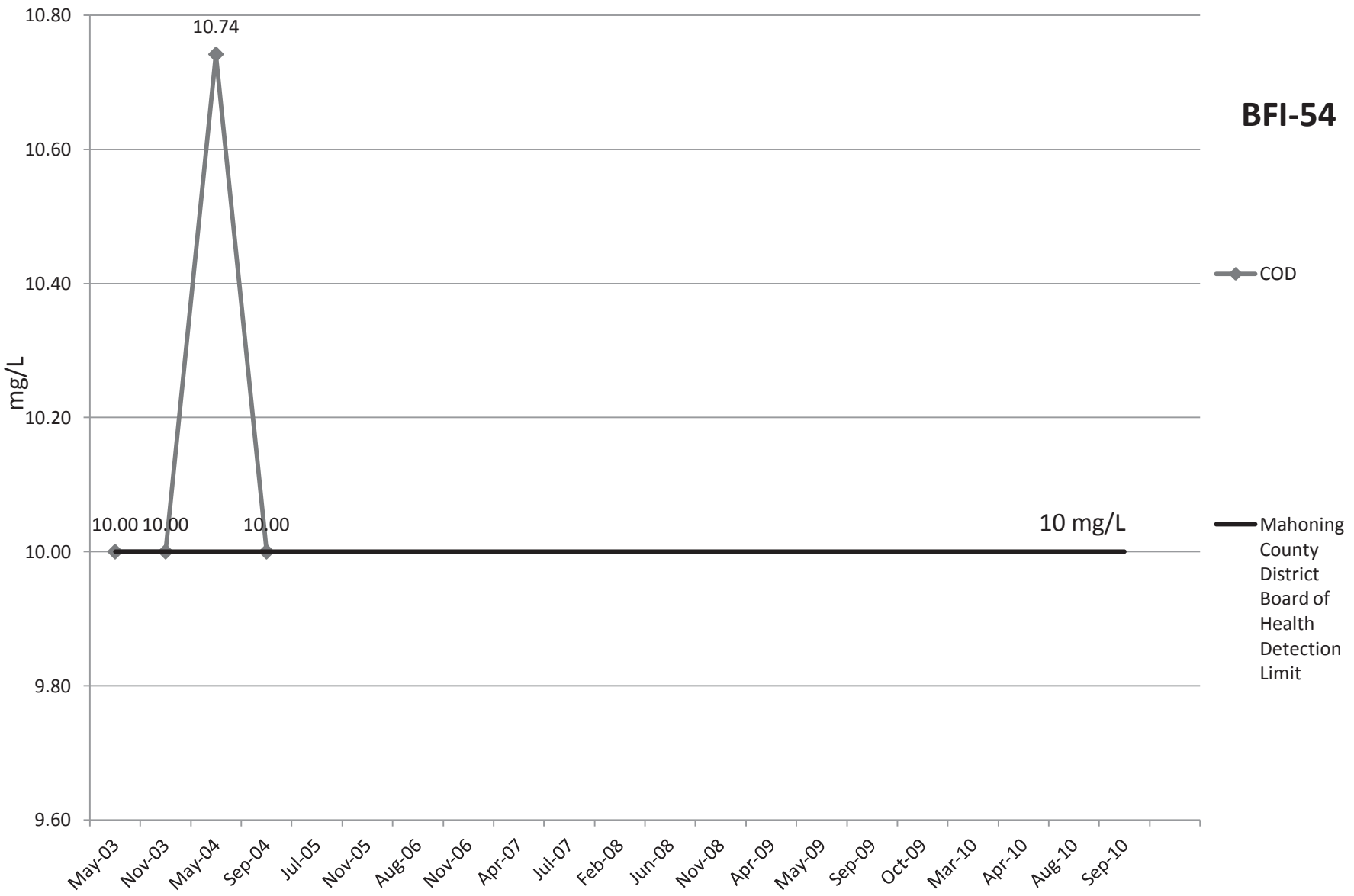
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

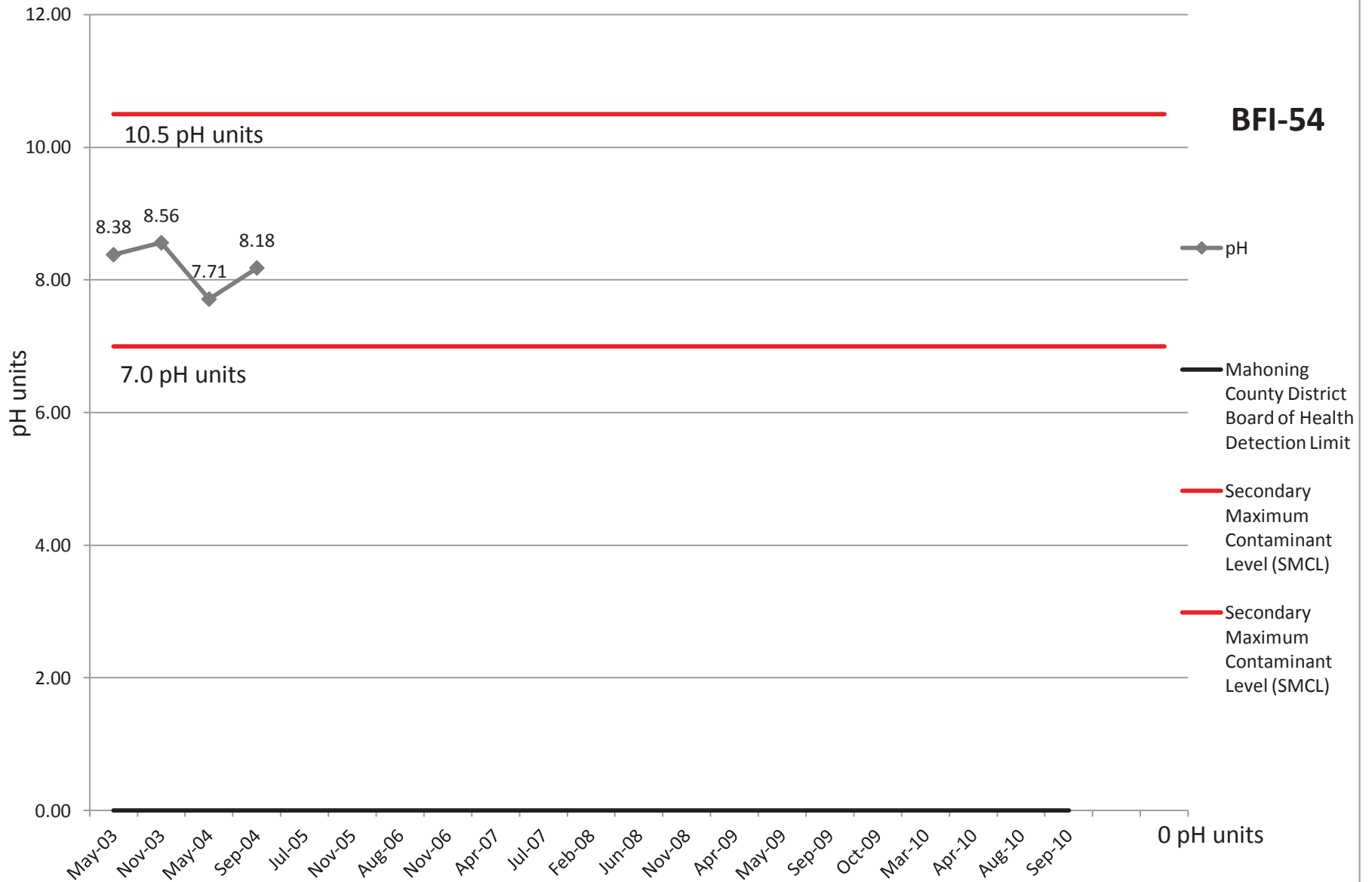
0.050 mg/L

# COD

**BFI-54**

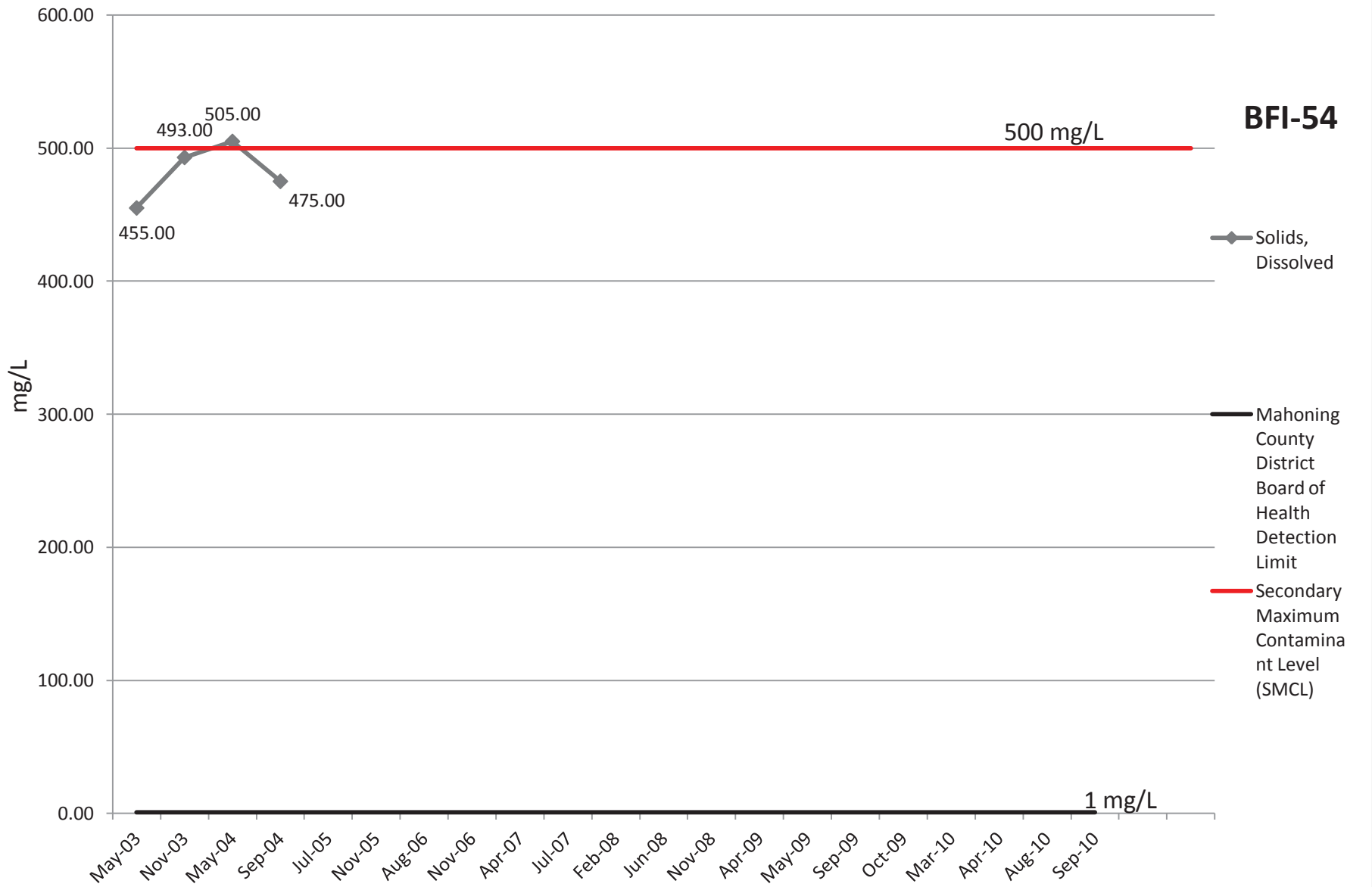


# pH





# Solids, Dissolved

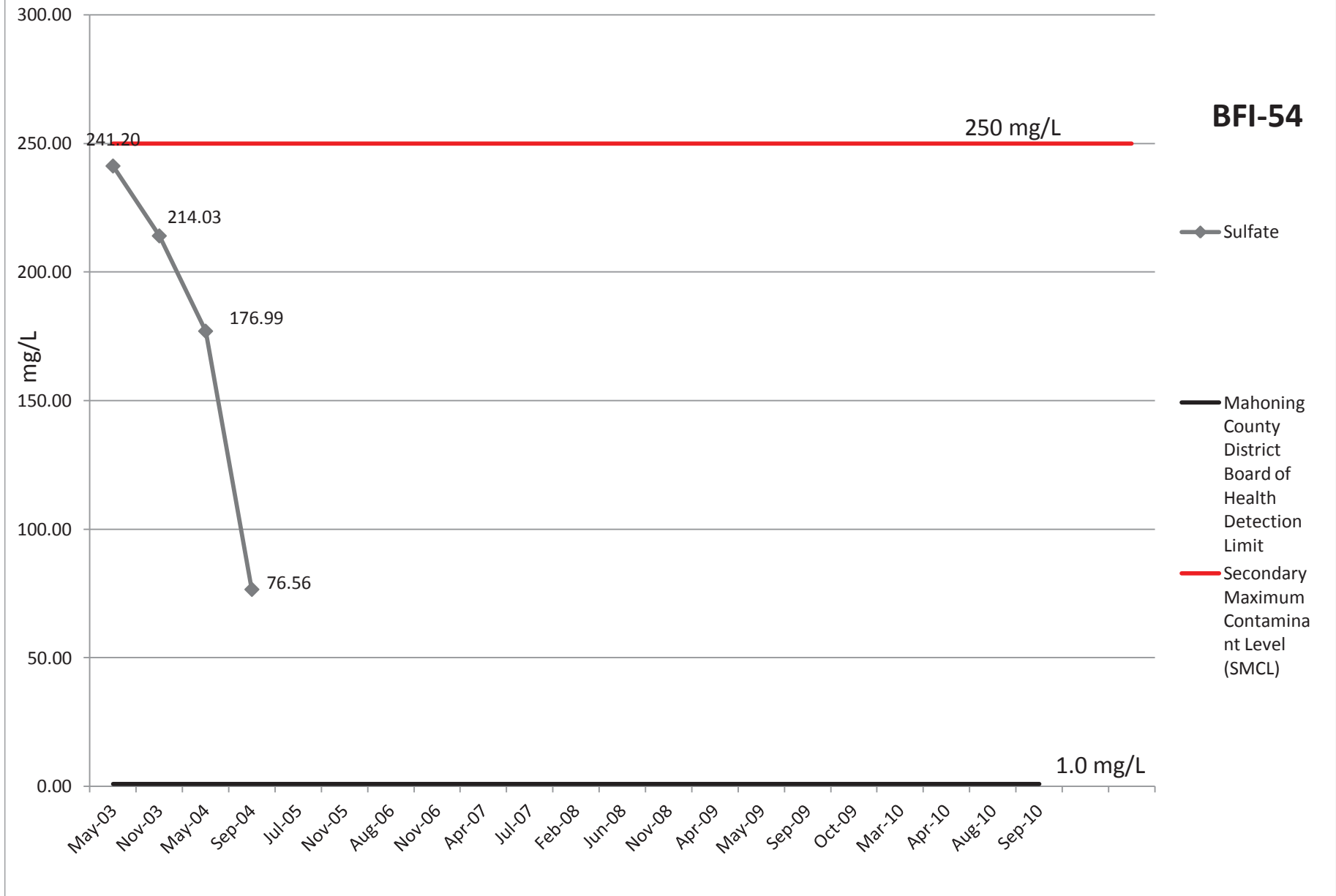


**BFI-54**

◆ Solids, Dissolved

— Mahoning County District Board of Health Detection Limit  
— Secondary Maximum Contaminant Level (SMCL)

# Sulfate



# Bacteria

positive (1)

**BFI-54**

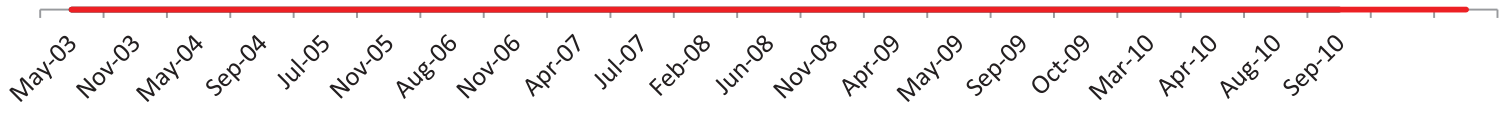
Positive/Negative

◆ Bacteria

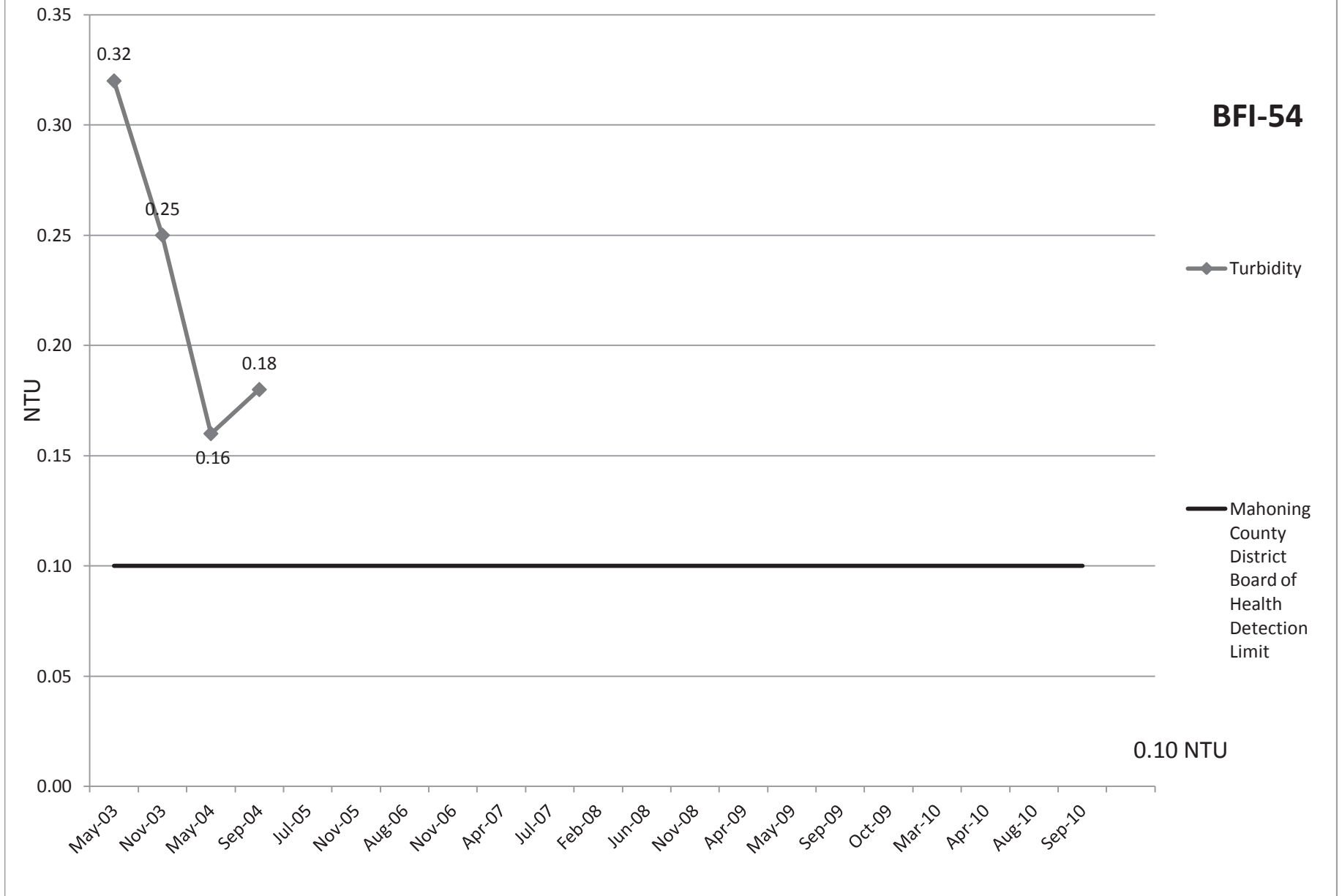
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

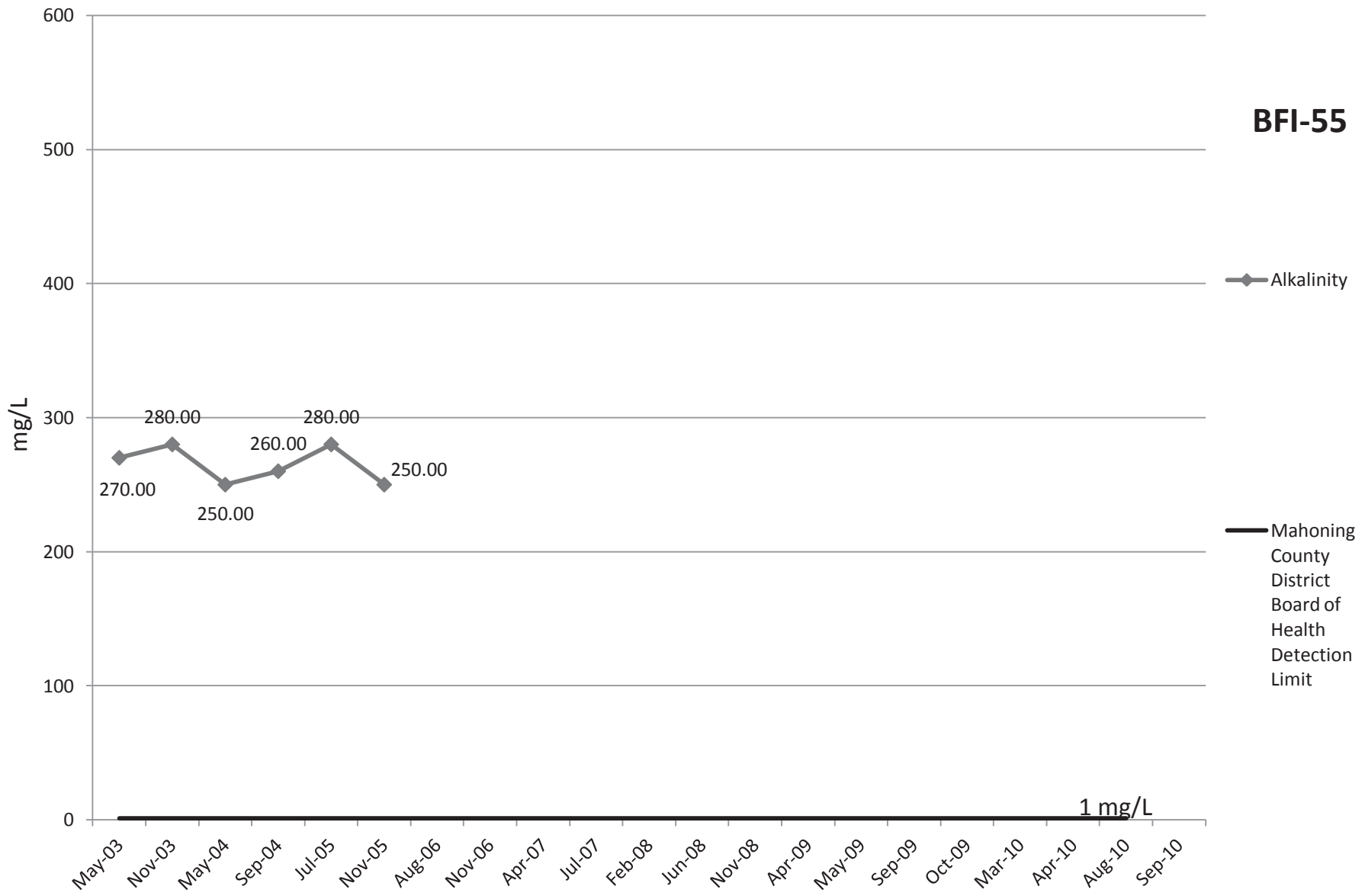
negative (0)



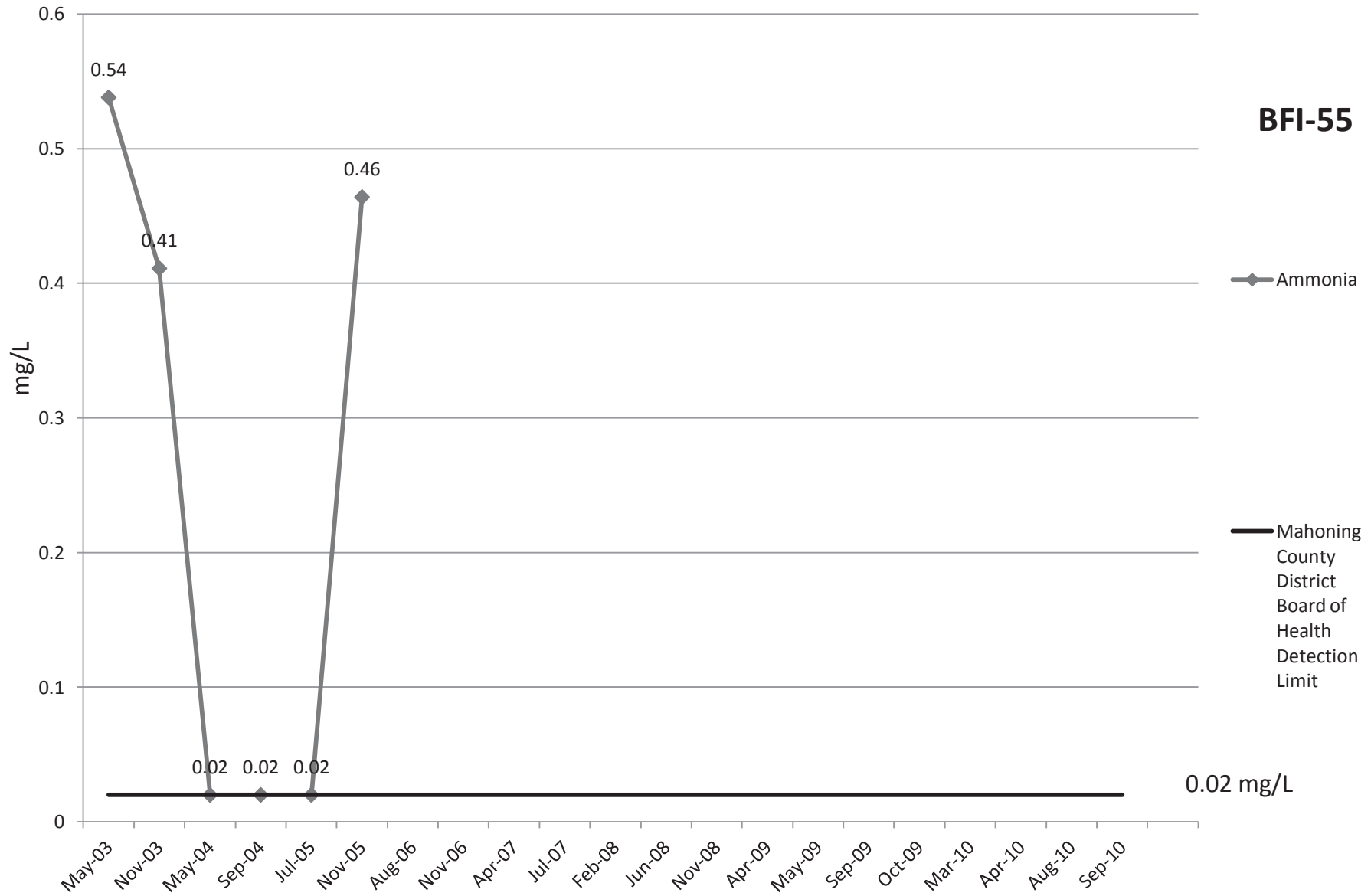
# Turbidity



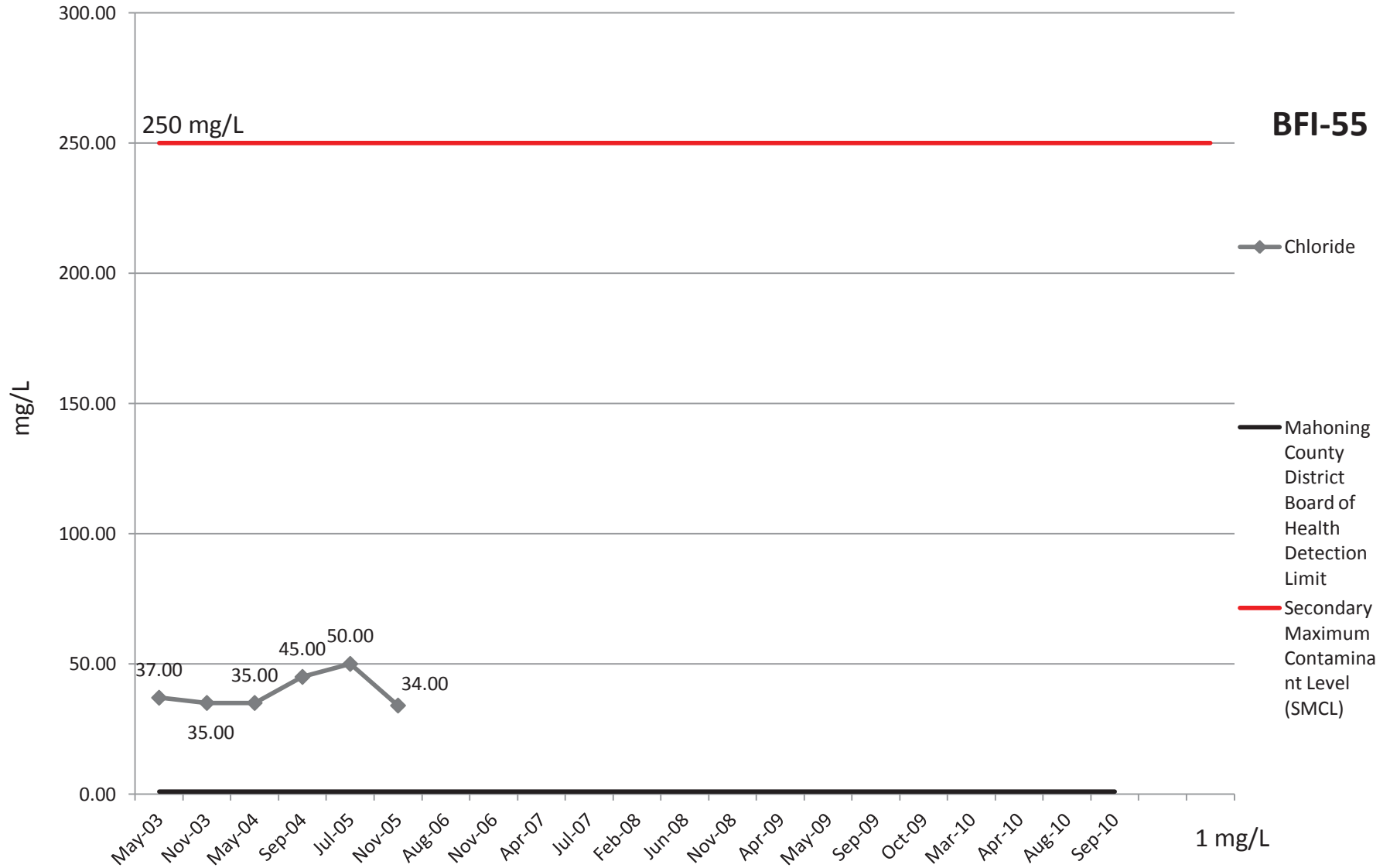
# Alkalinity



# Ammonia

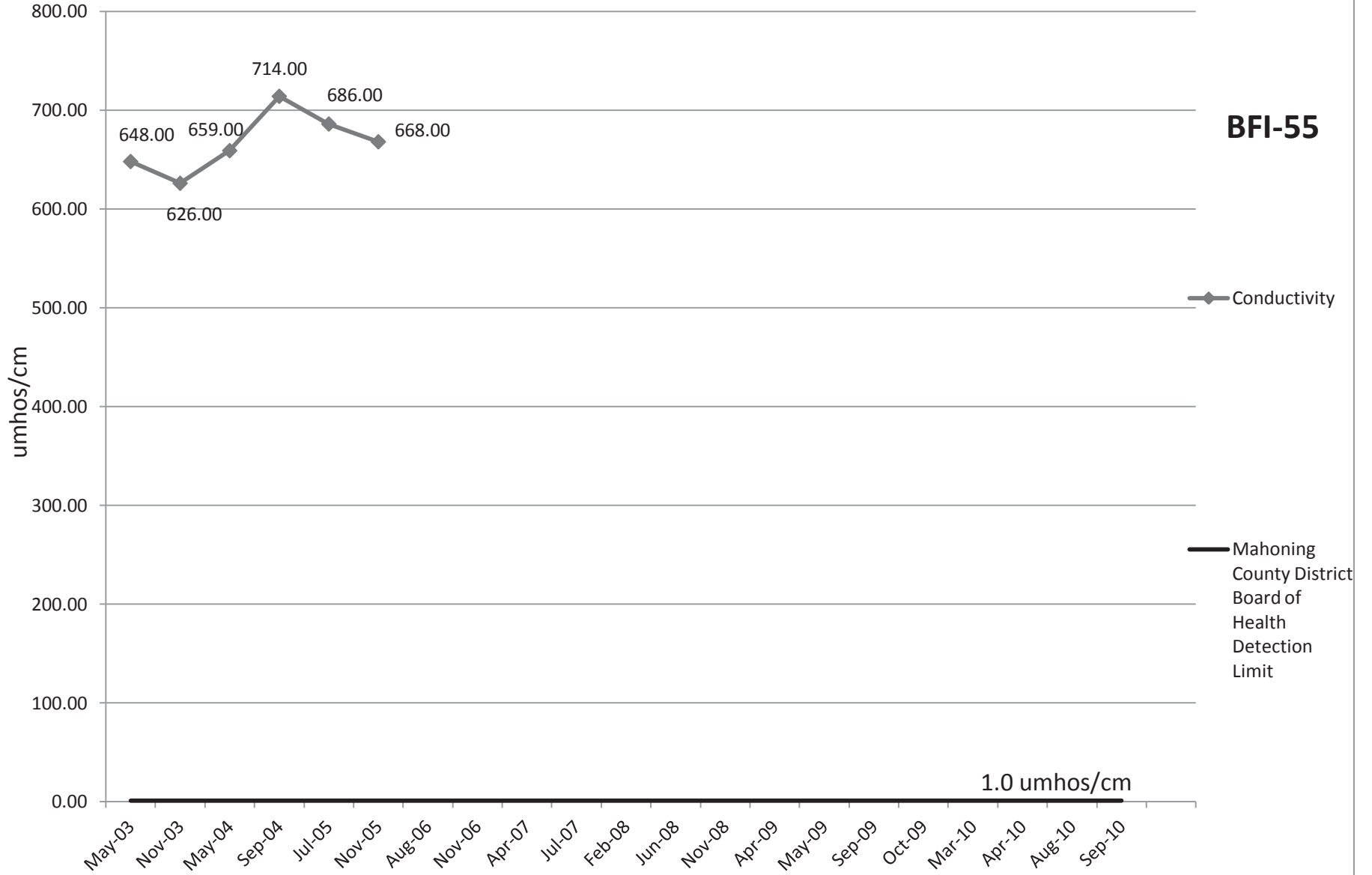


# Chloride



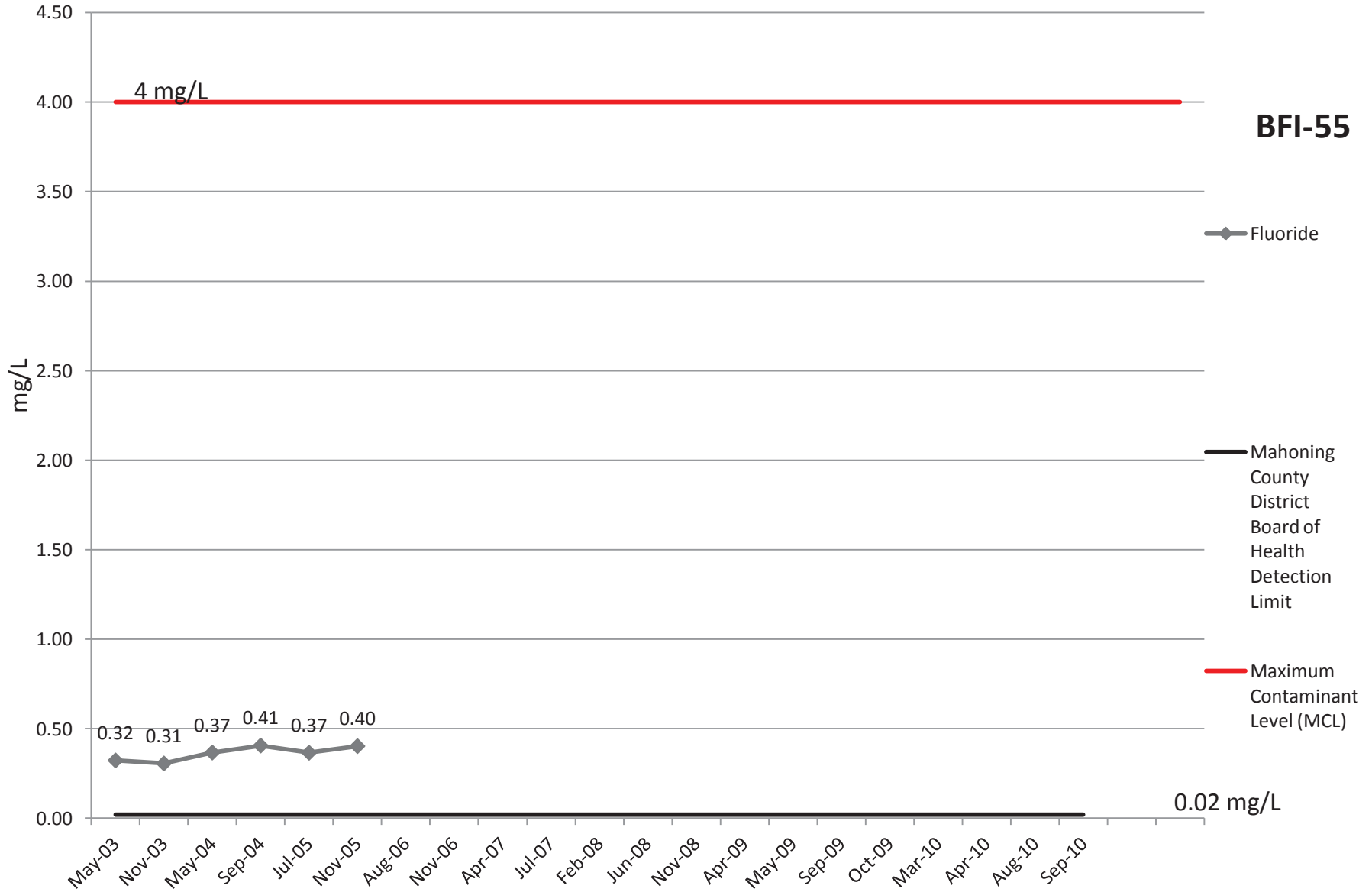
# Conductivity

**BFI-55**

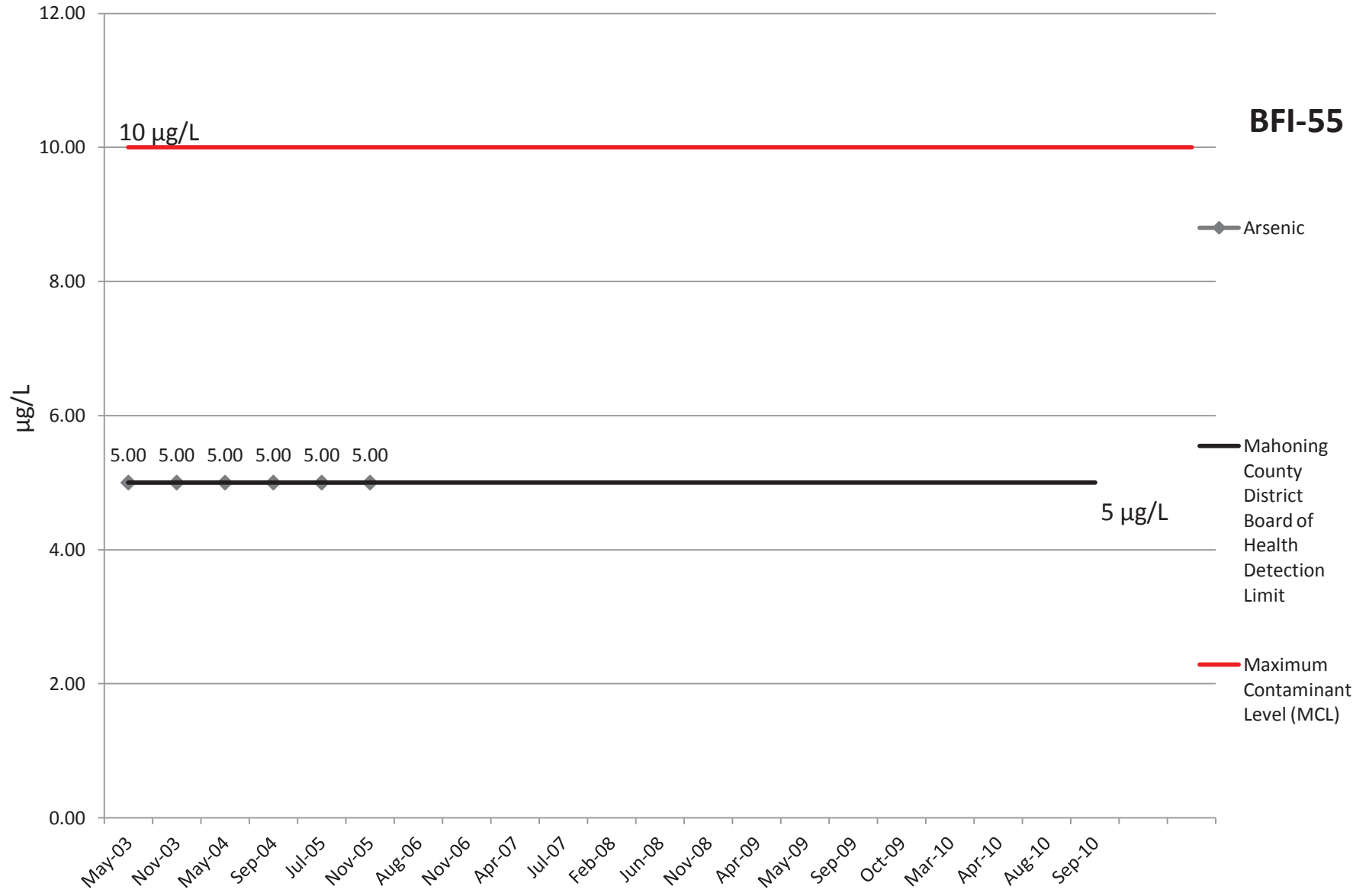




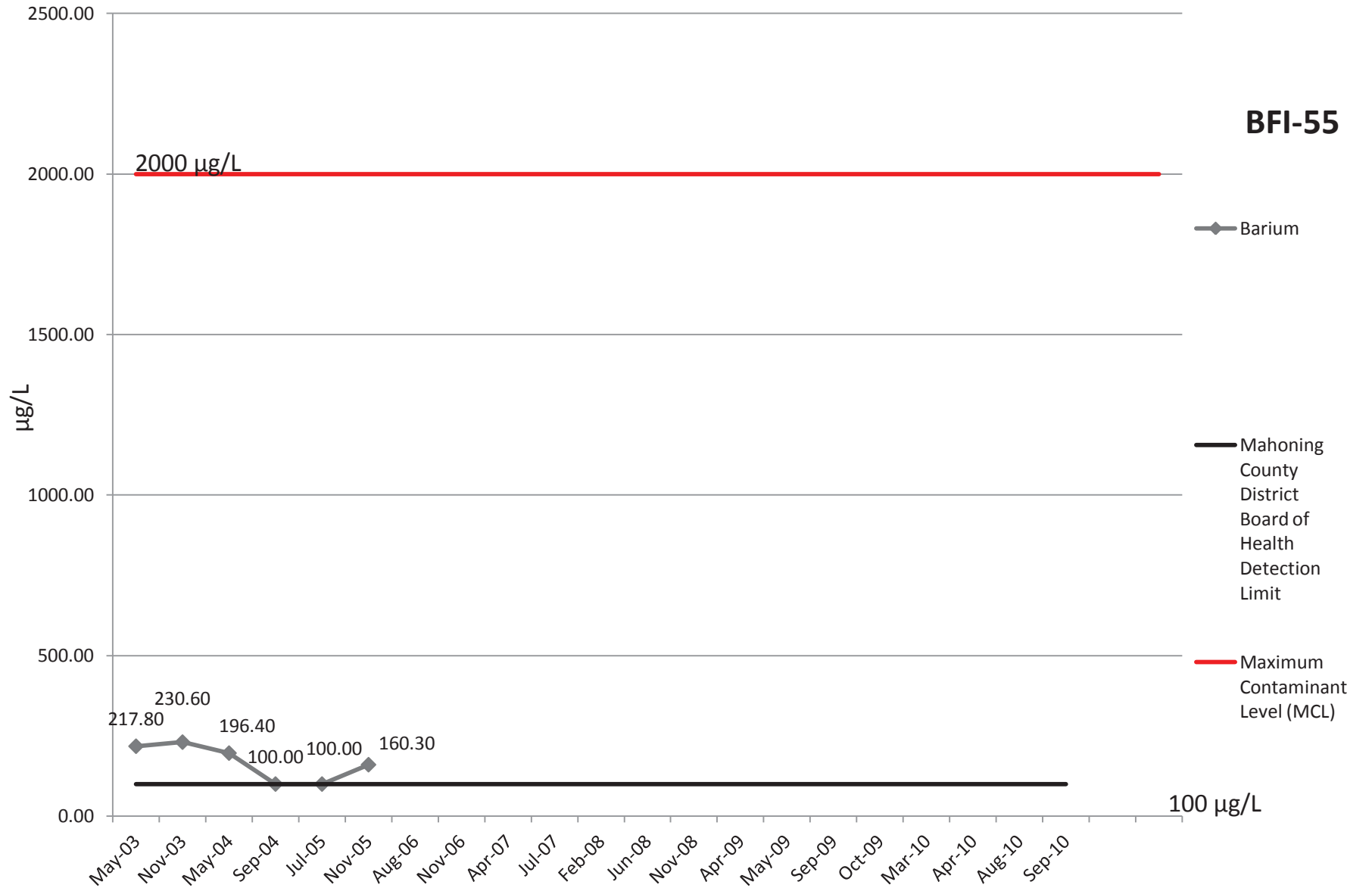
# Fluoride



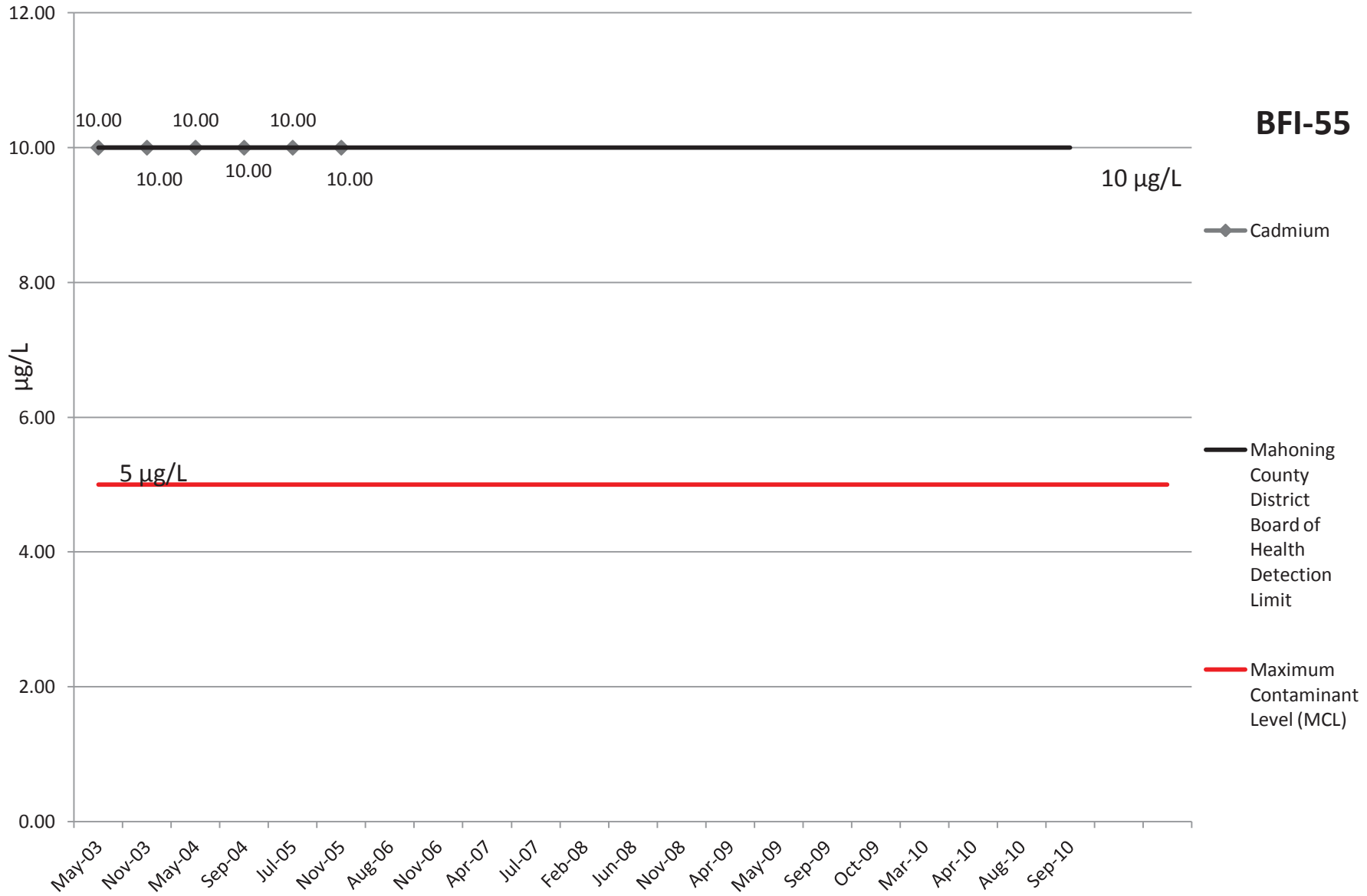
# Arsenic



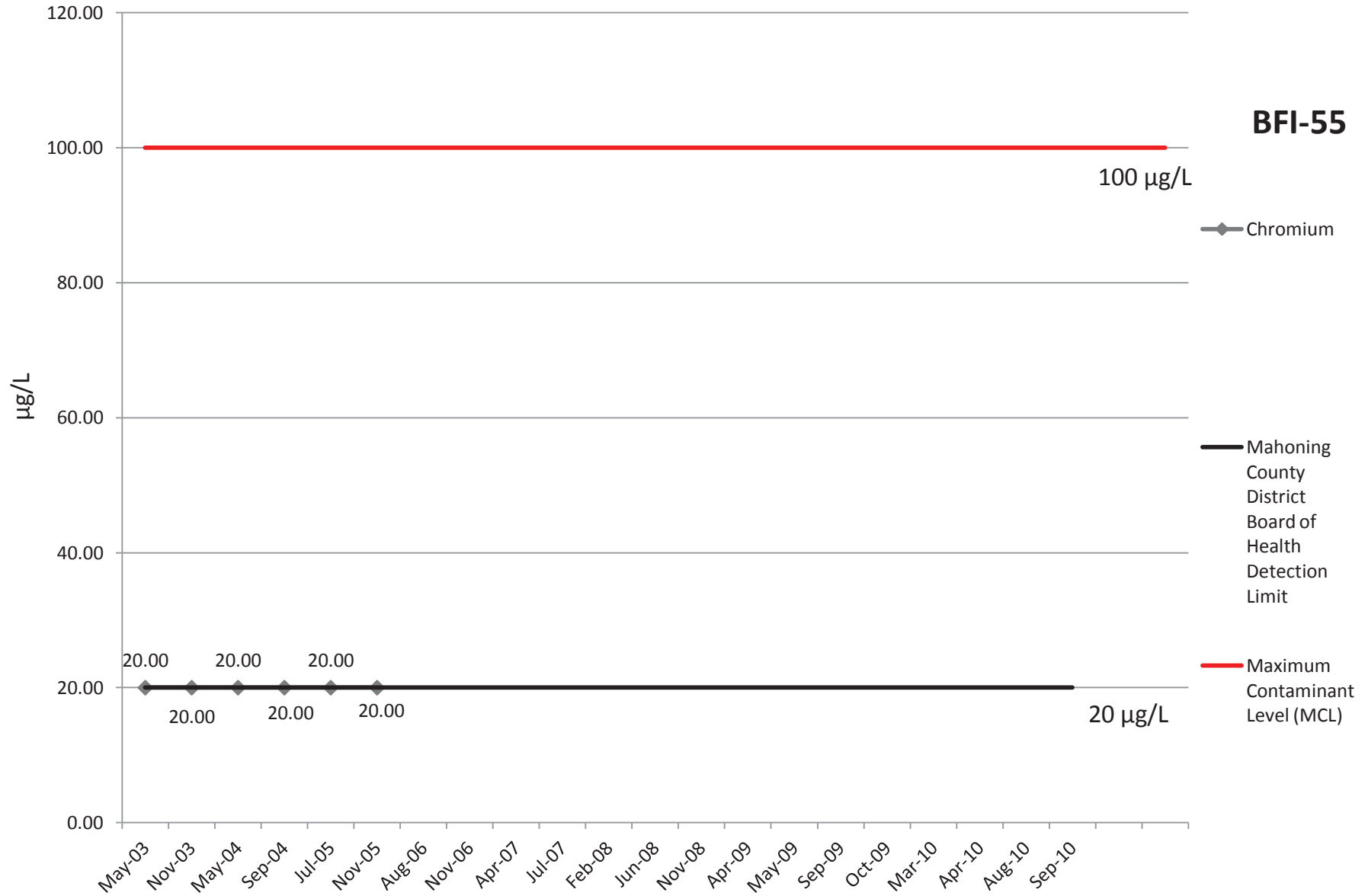
# Barium



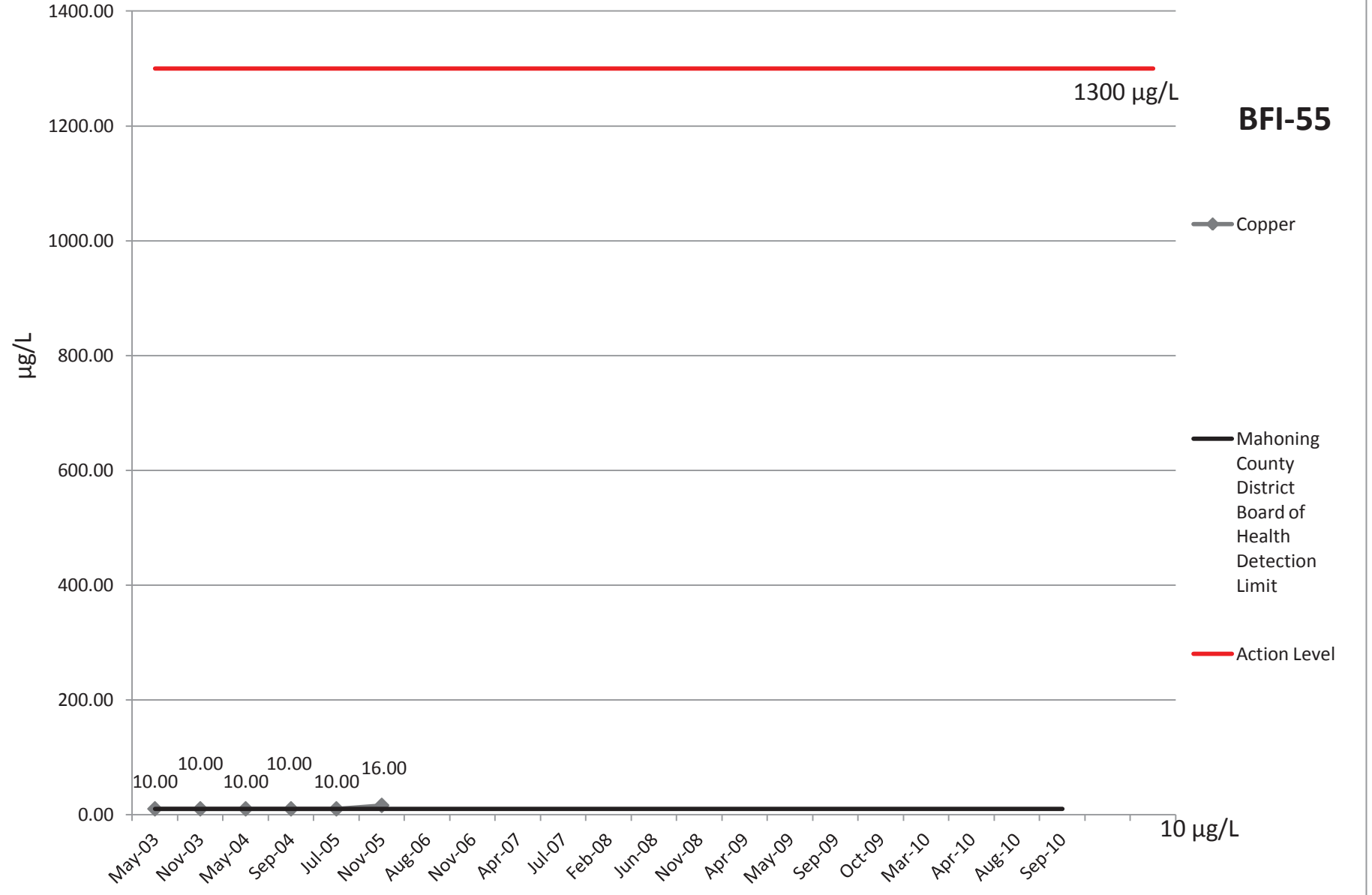
# Cadmium



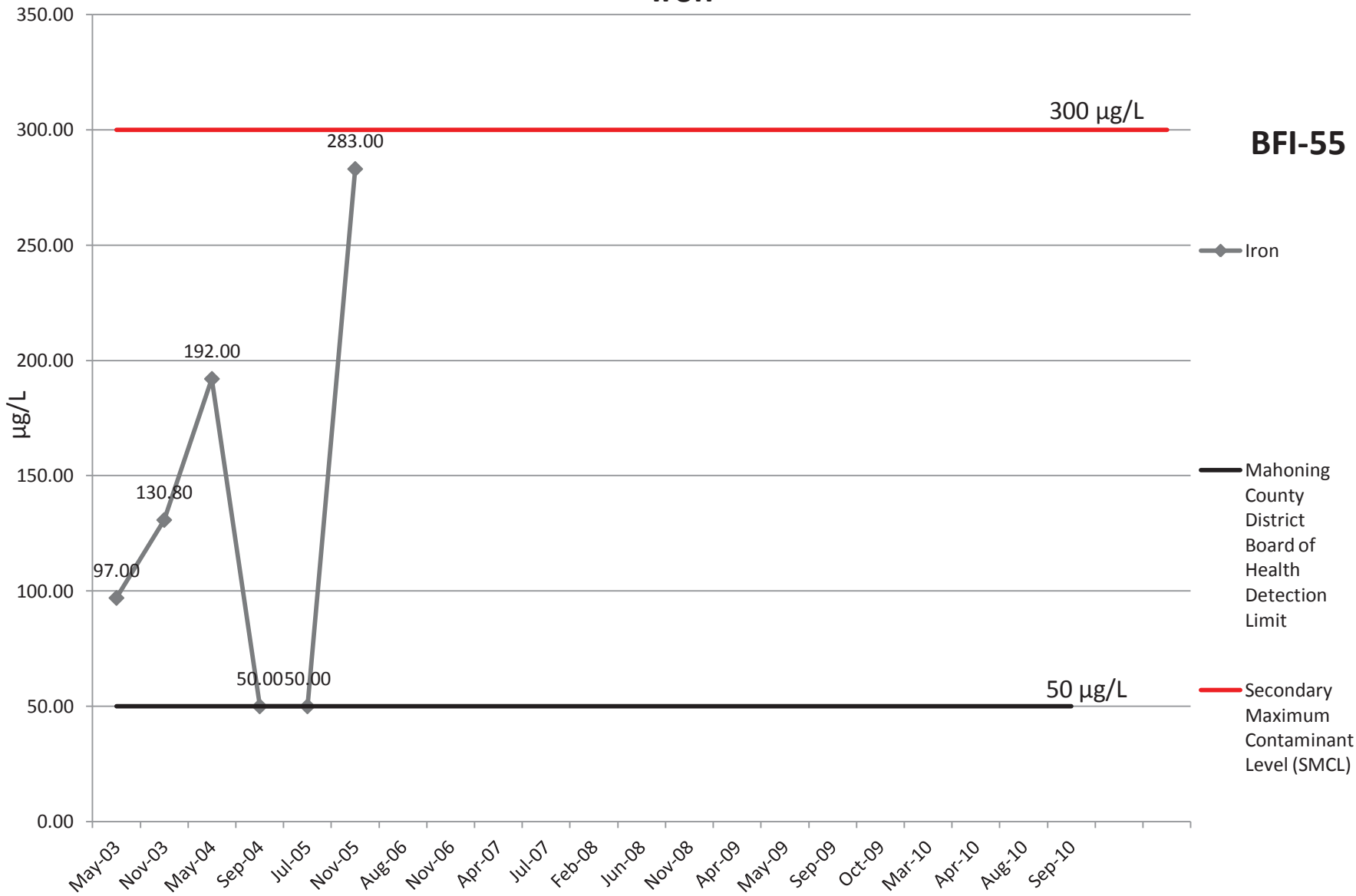
# Chromium



# Copper



# Iron



**BFI-55**

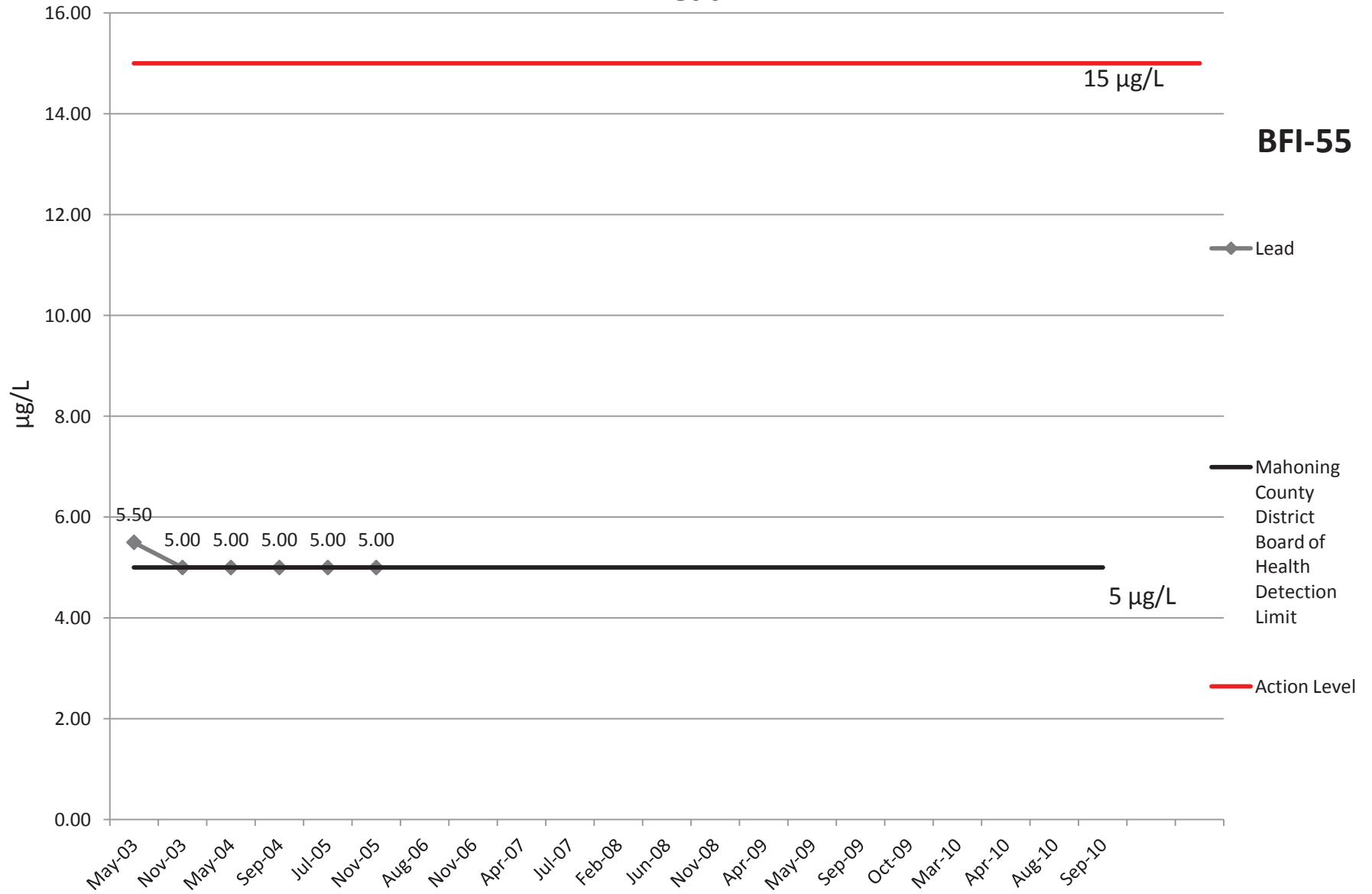
Iron

Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Secondary  
Maximum  
Contaminant  
Level (SMCL)

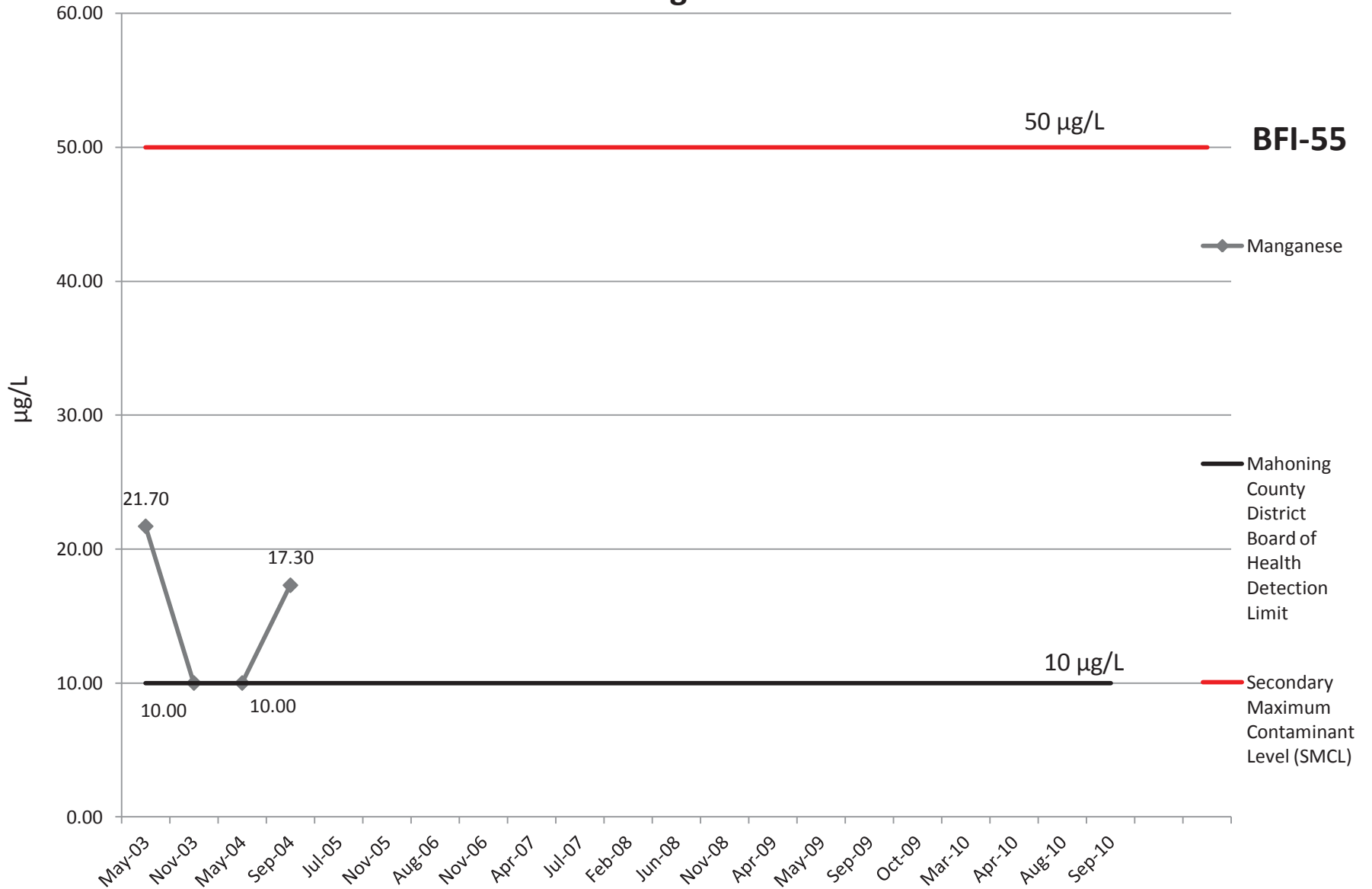
# Lead

**BFI-55**





# Manganese



50 µg/L  
**BFI-55**

◆ Manganese

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

10 µg/L  
— Secondary  
Maximum  
Contaminant  
Level (SMCL)

# Mercury

**BFI-55**

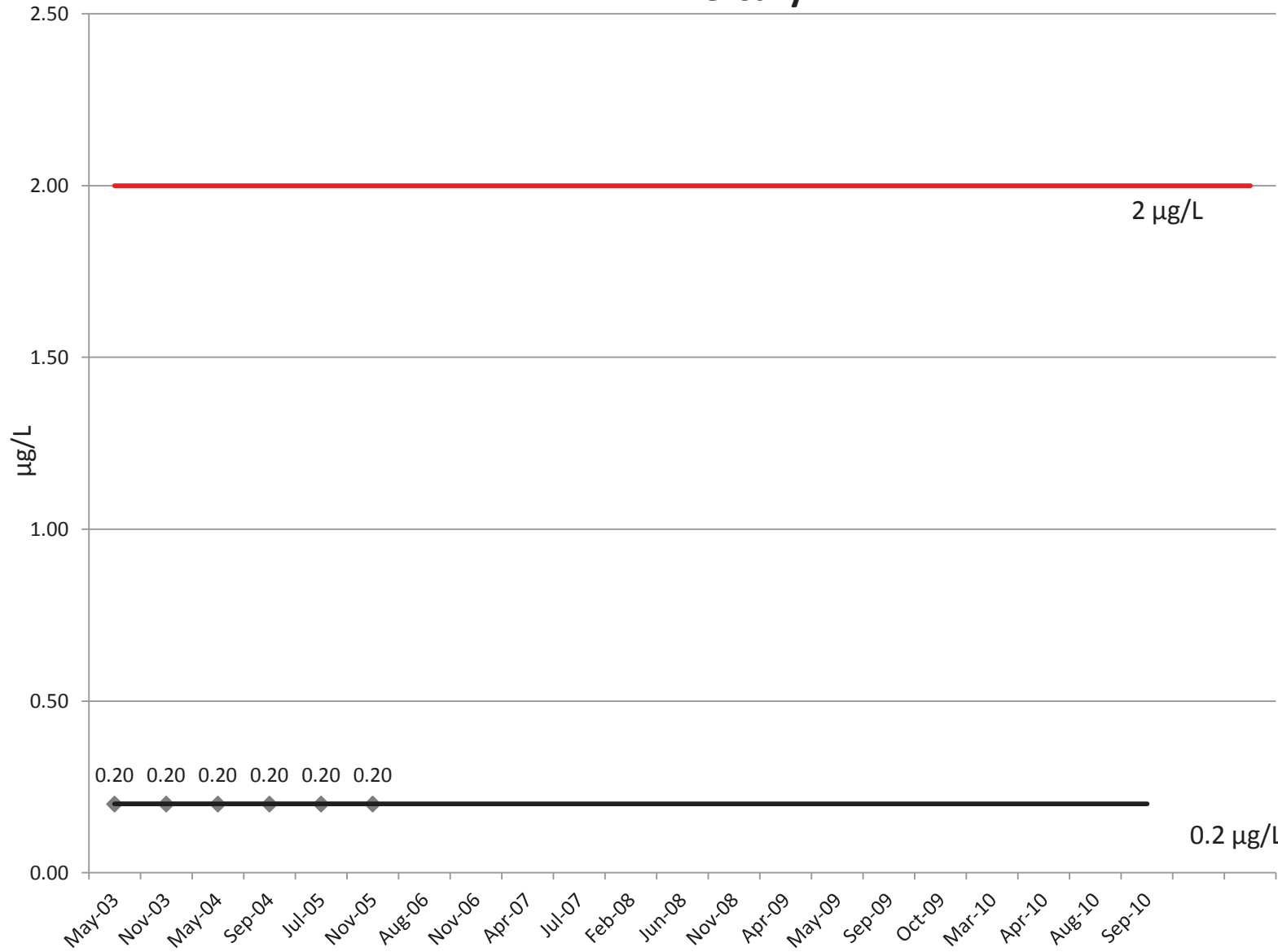
2 µg/L

Mercury

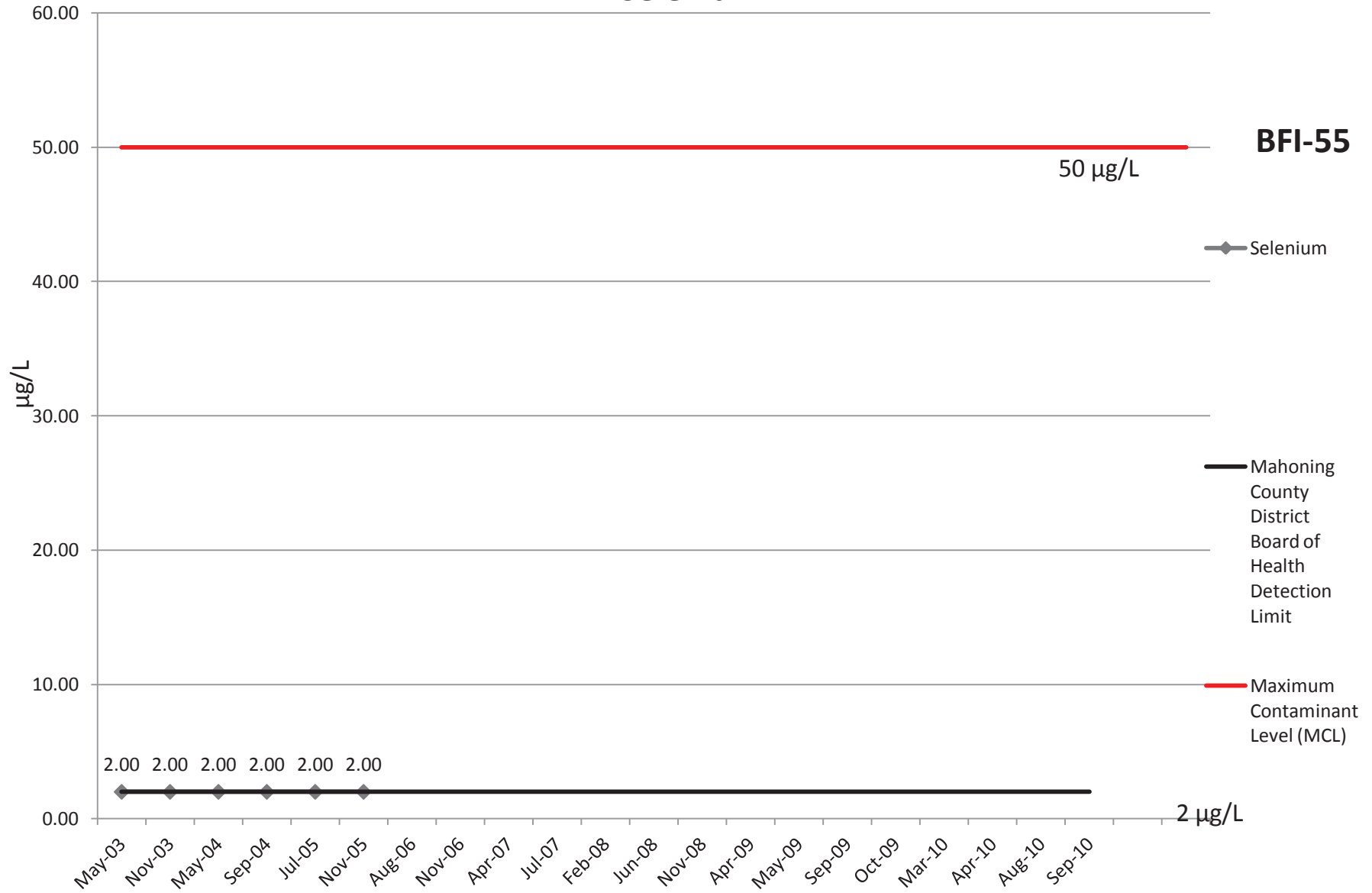
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

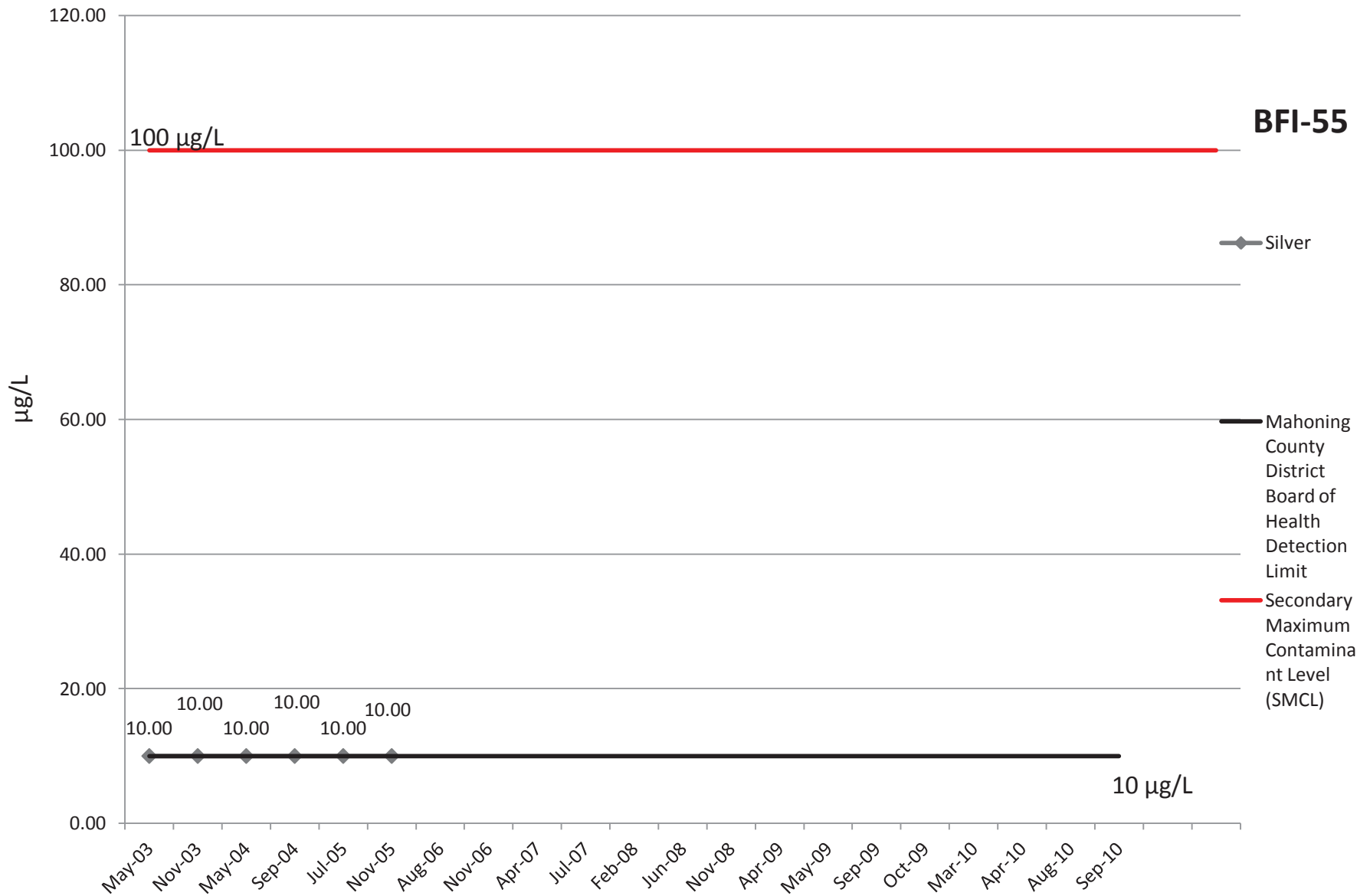
0.2 µg/L



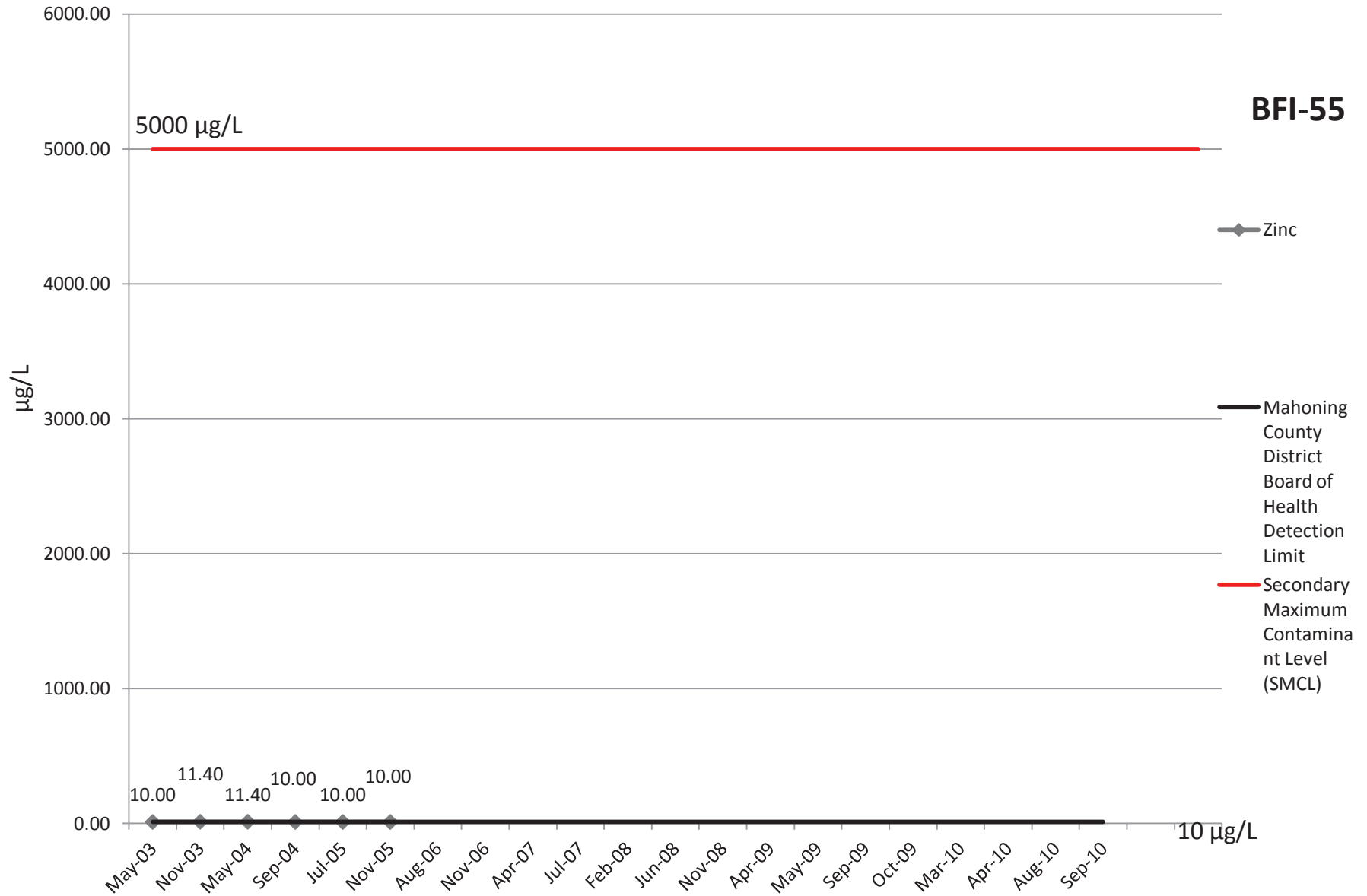
# Selenium



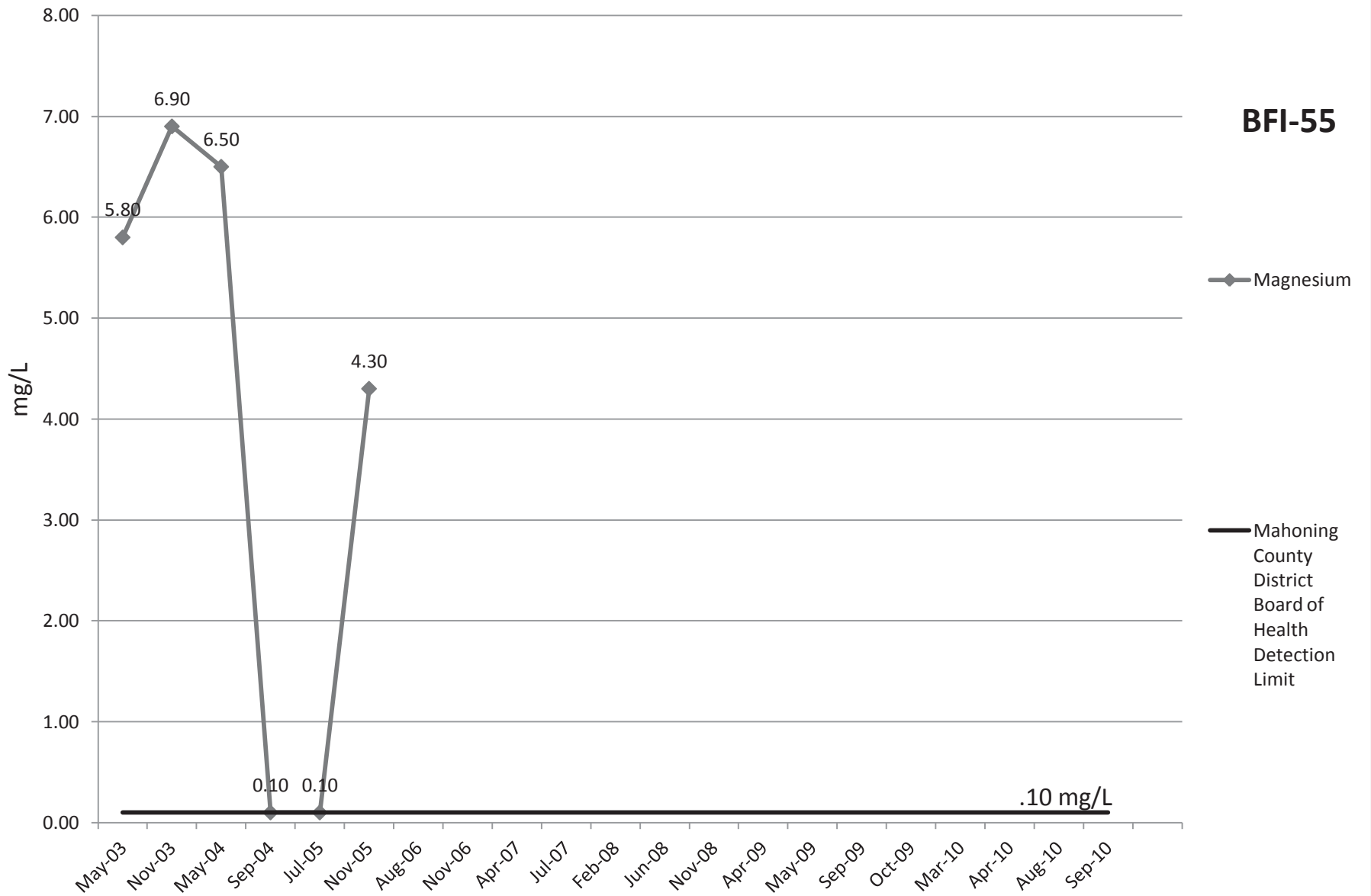
# Silver



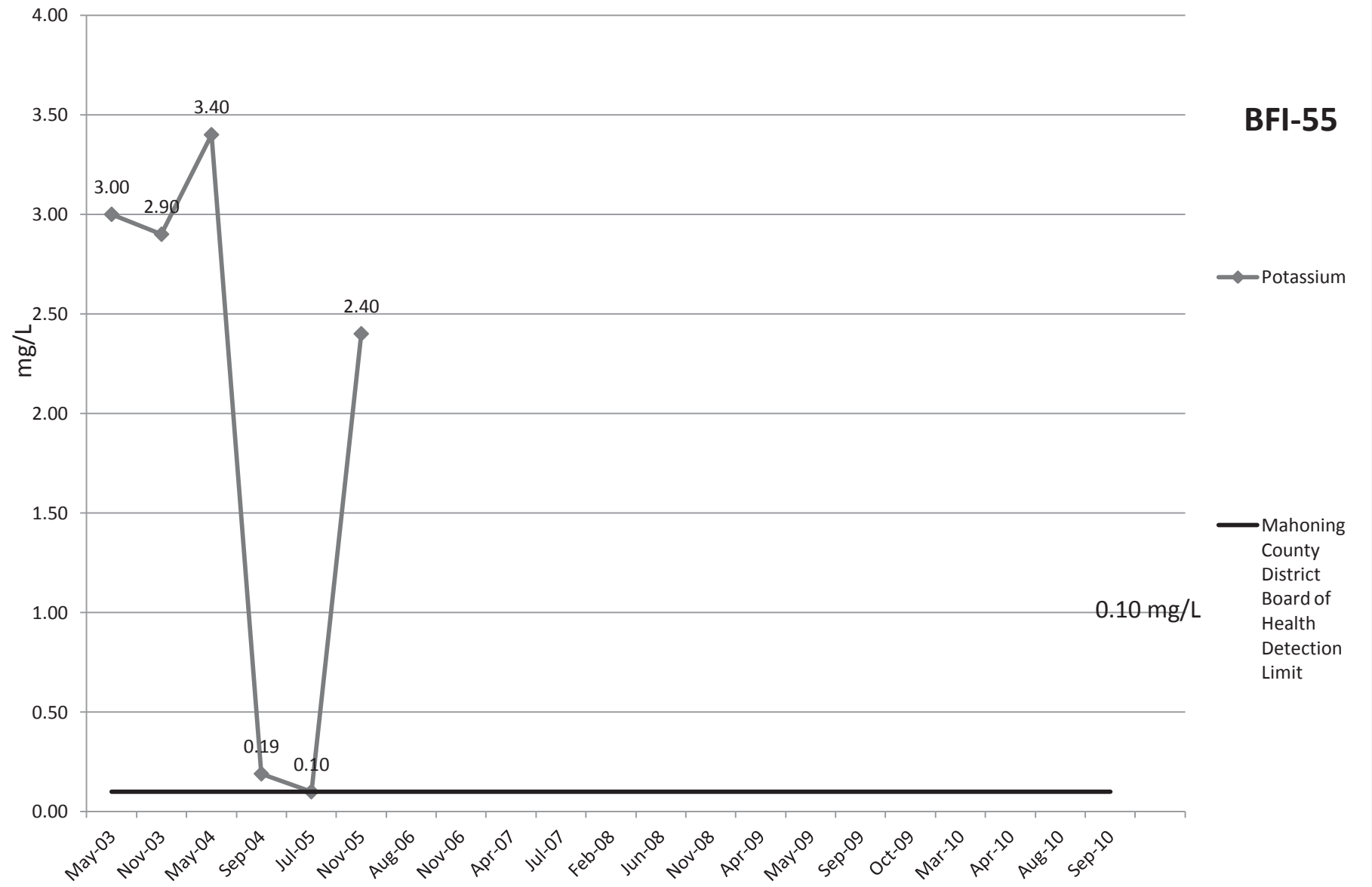
# Zinc



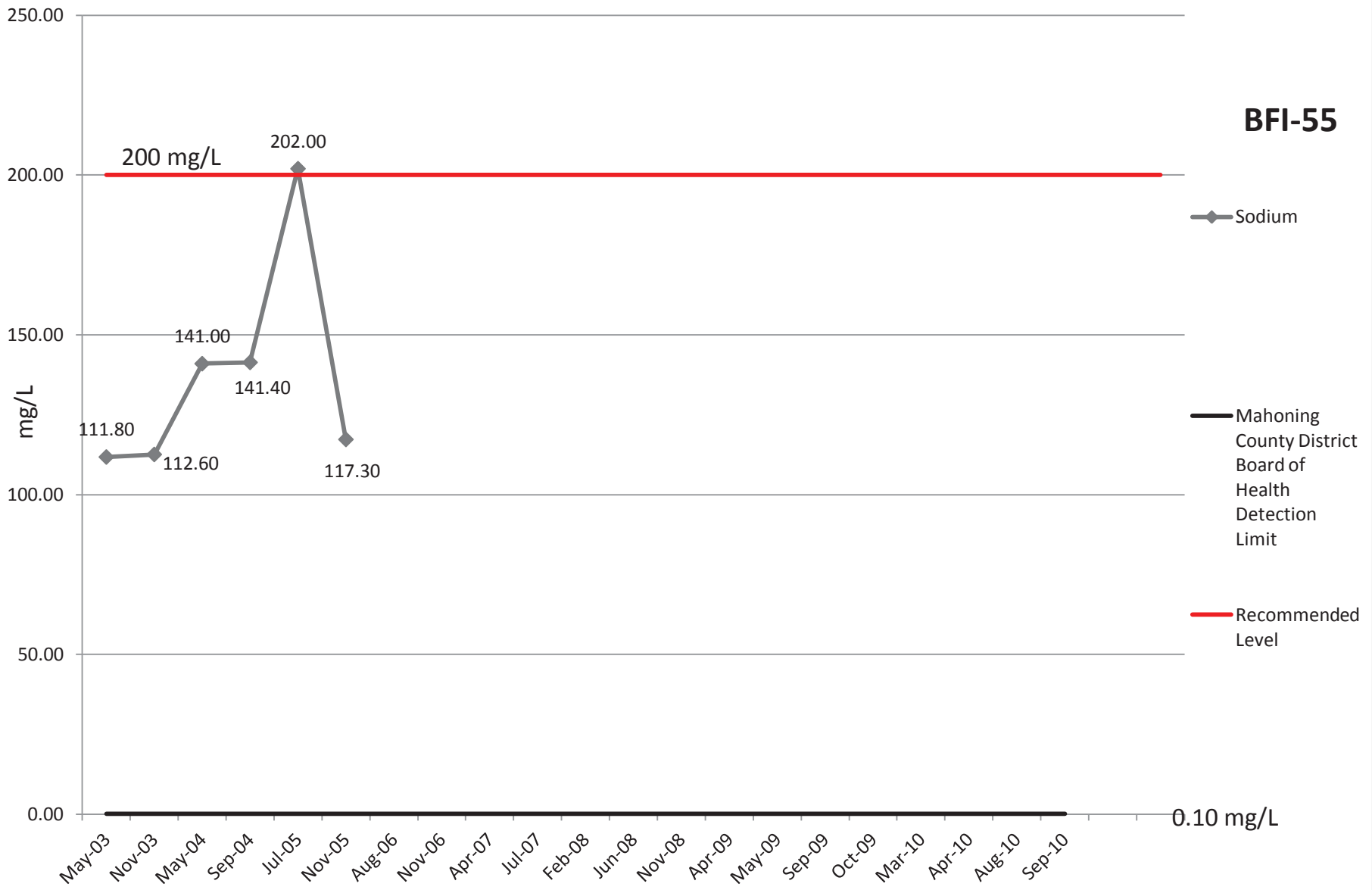
# Magnesium



# Potassium

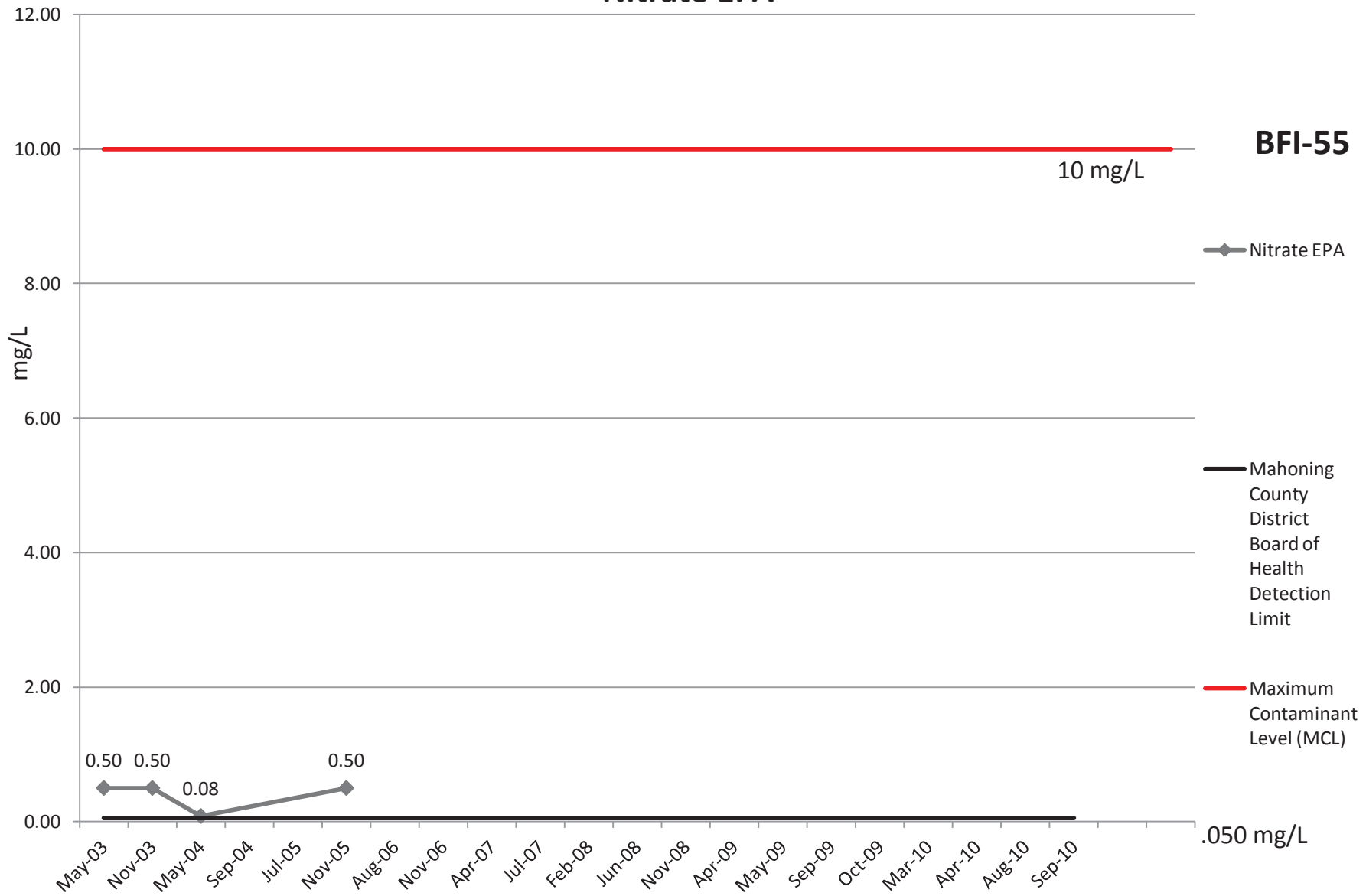


# Sodium



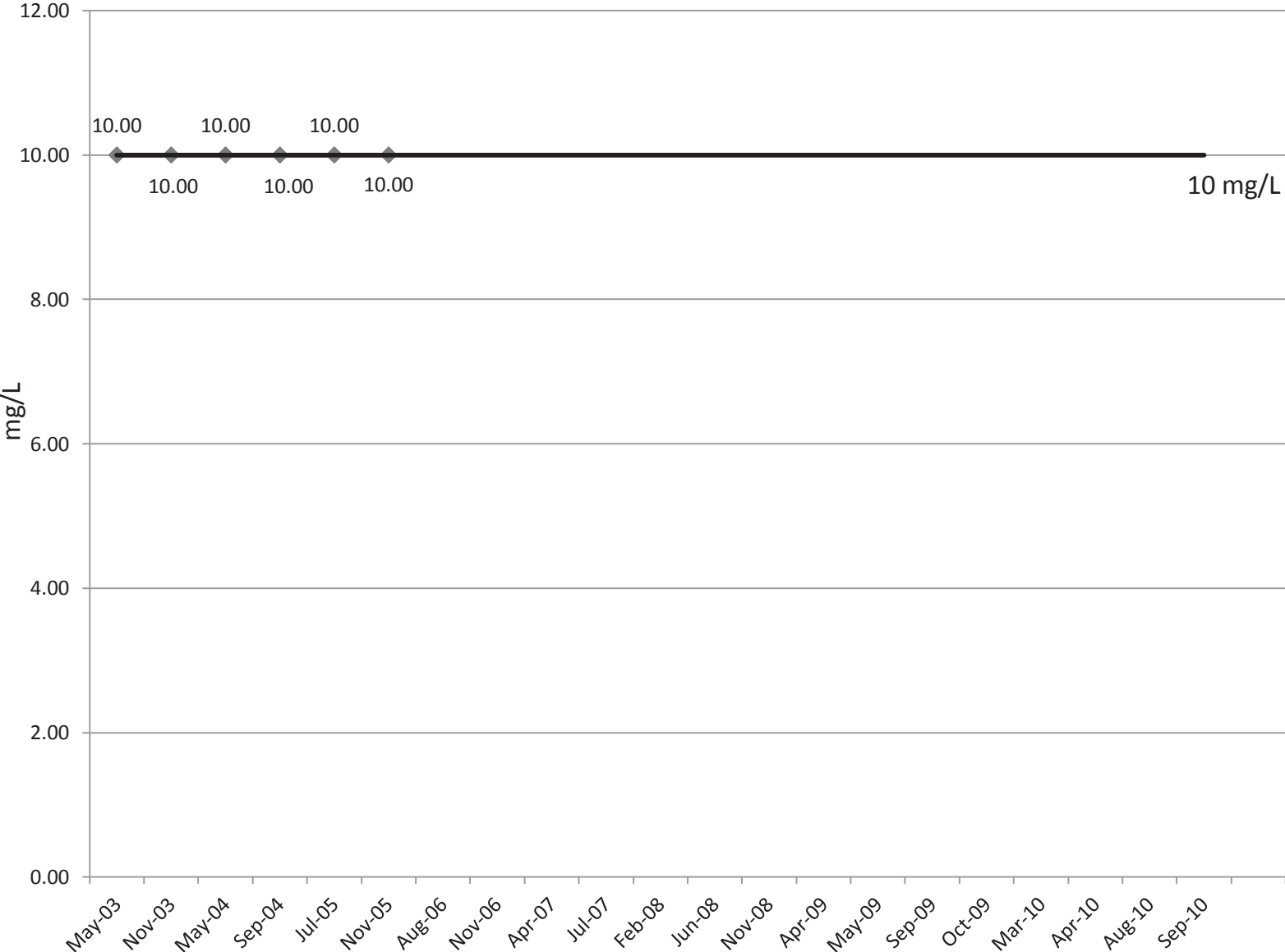


# Nitrate EPA



# COD

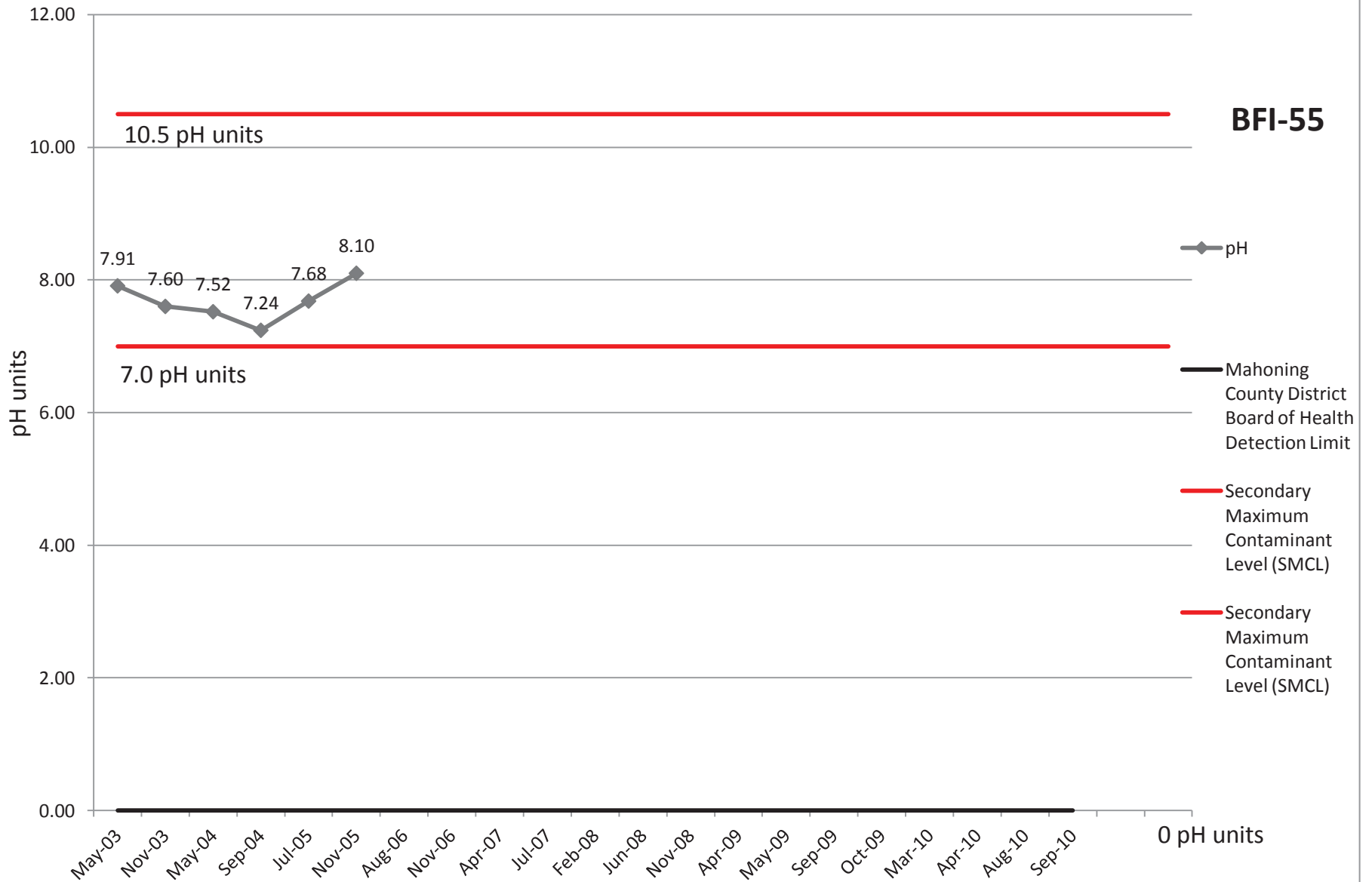
**BFI-55**



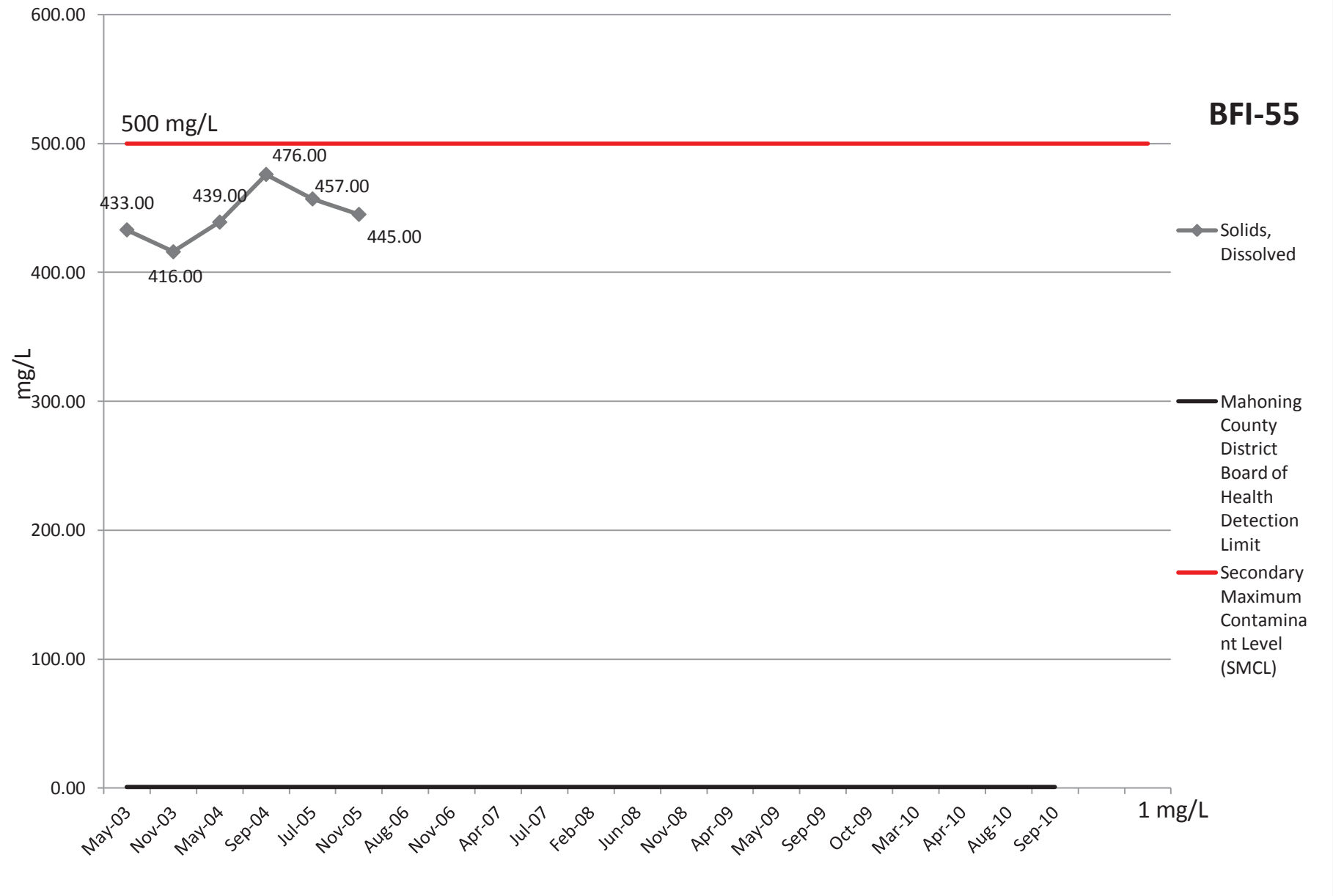
—◆— COD

— Mahoning County District Board of Health Detection Limit

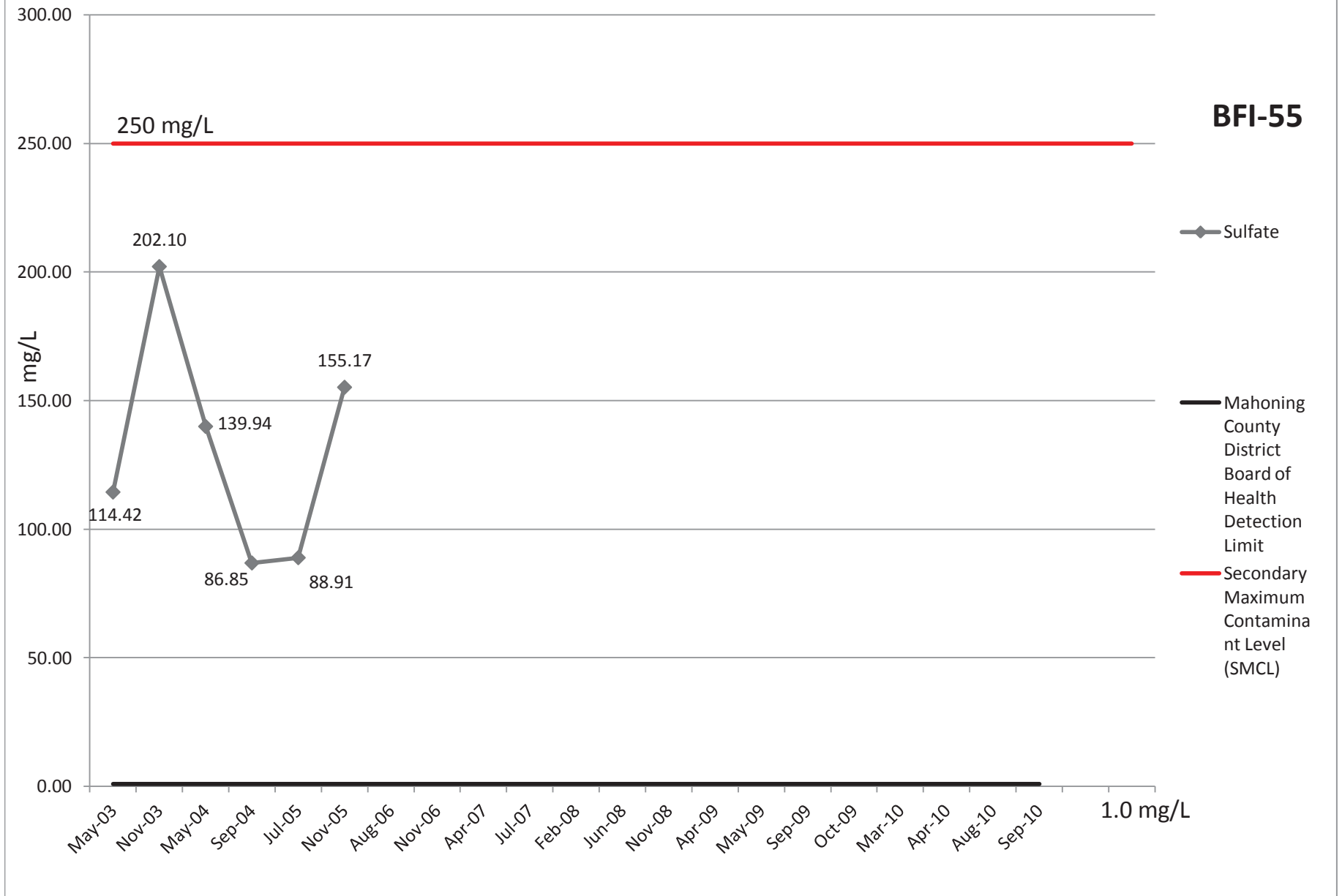
# pH



# Solids, Dissolved



# Sulfate



# Bacteria

positive (1)

**BFI-55**

Positive/Negative

◆ Bacteria

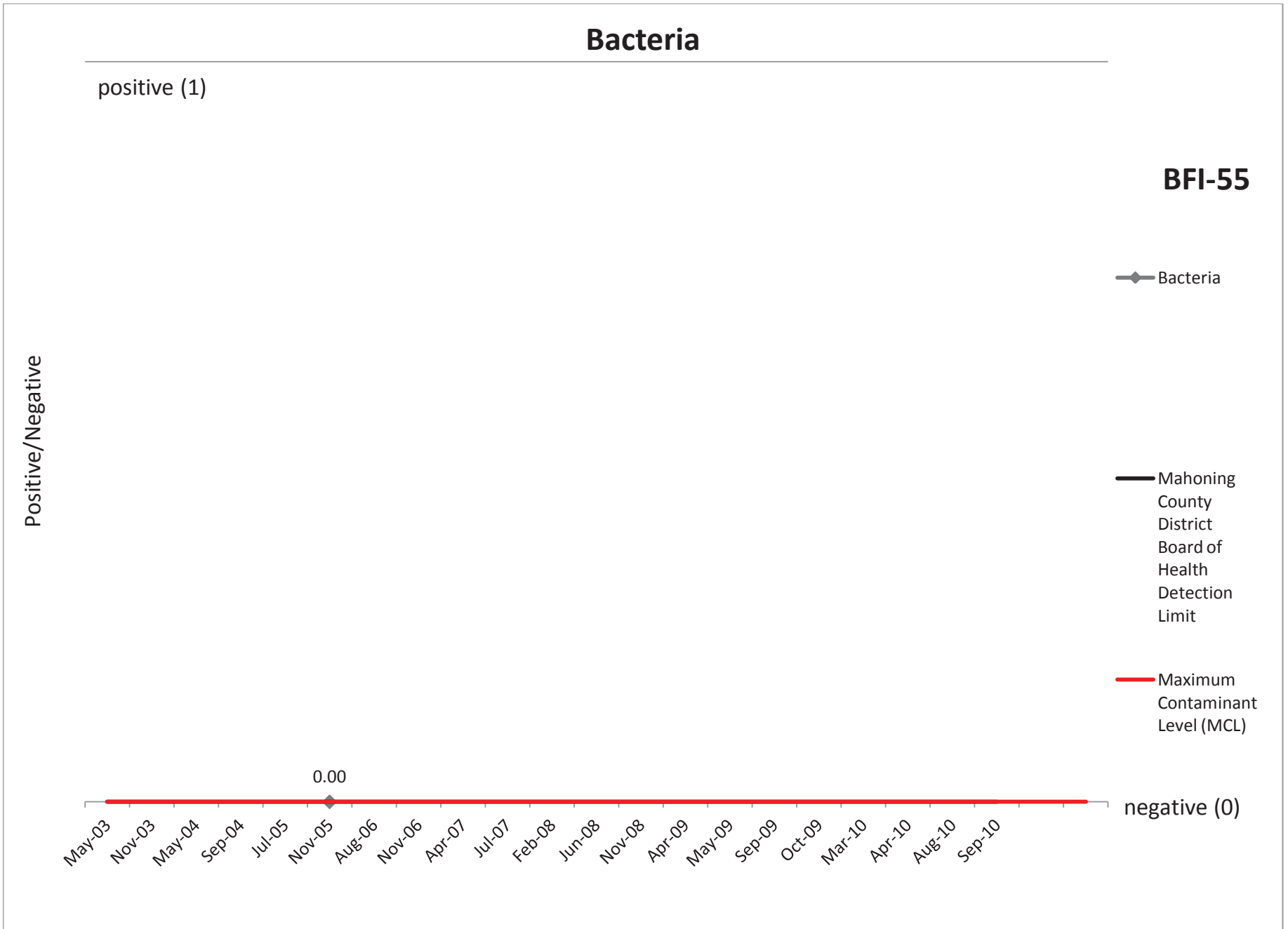
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

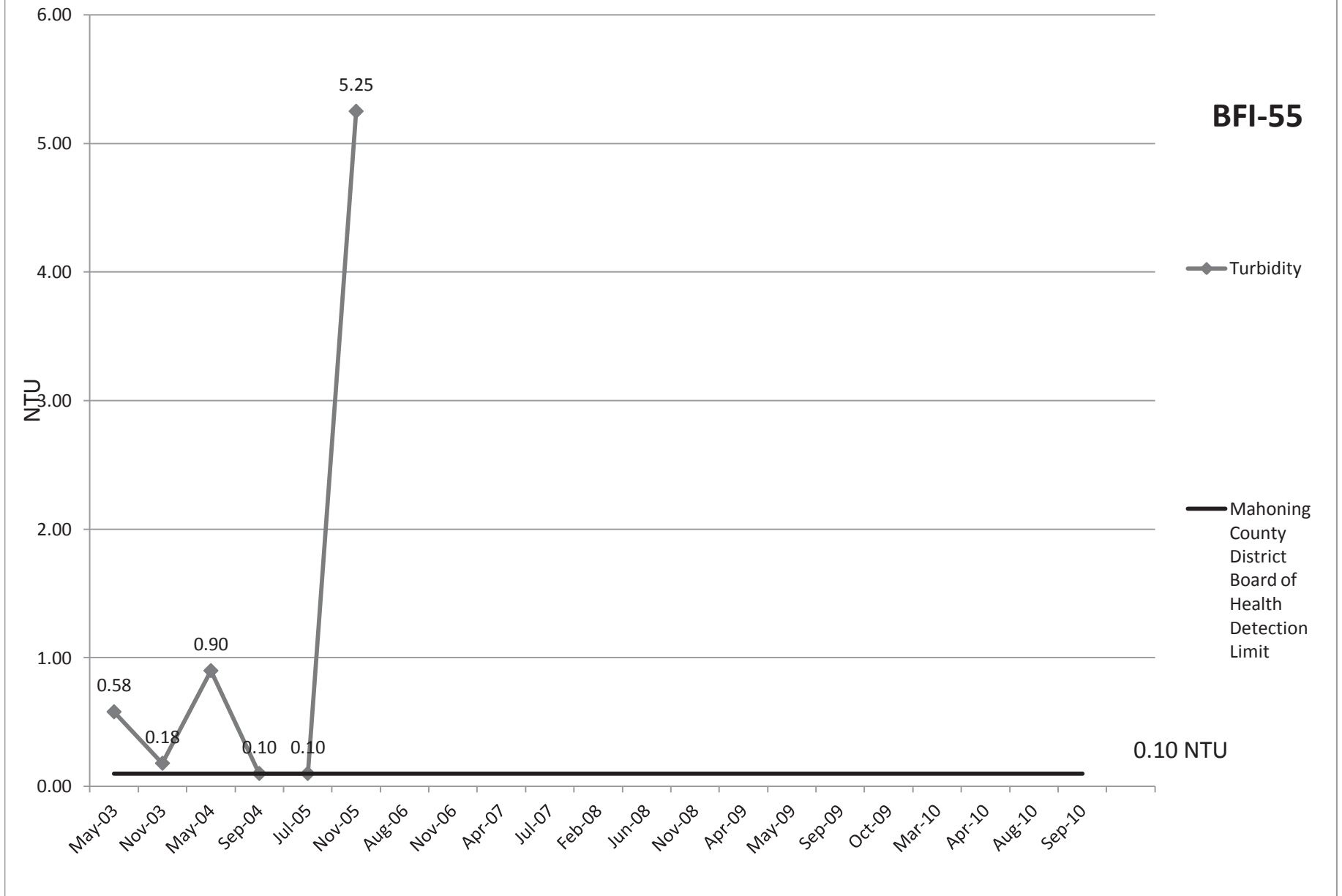
0.00

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

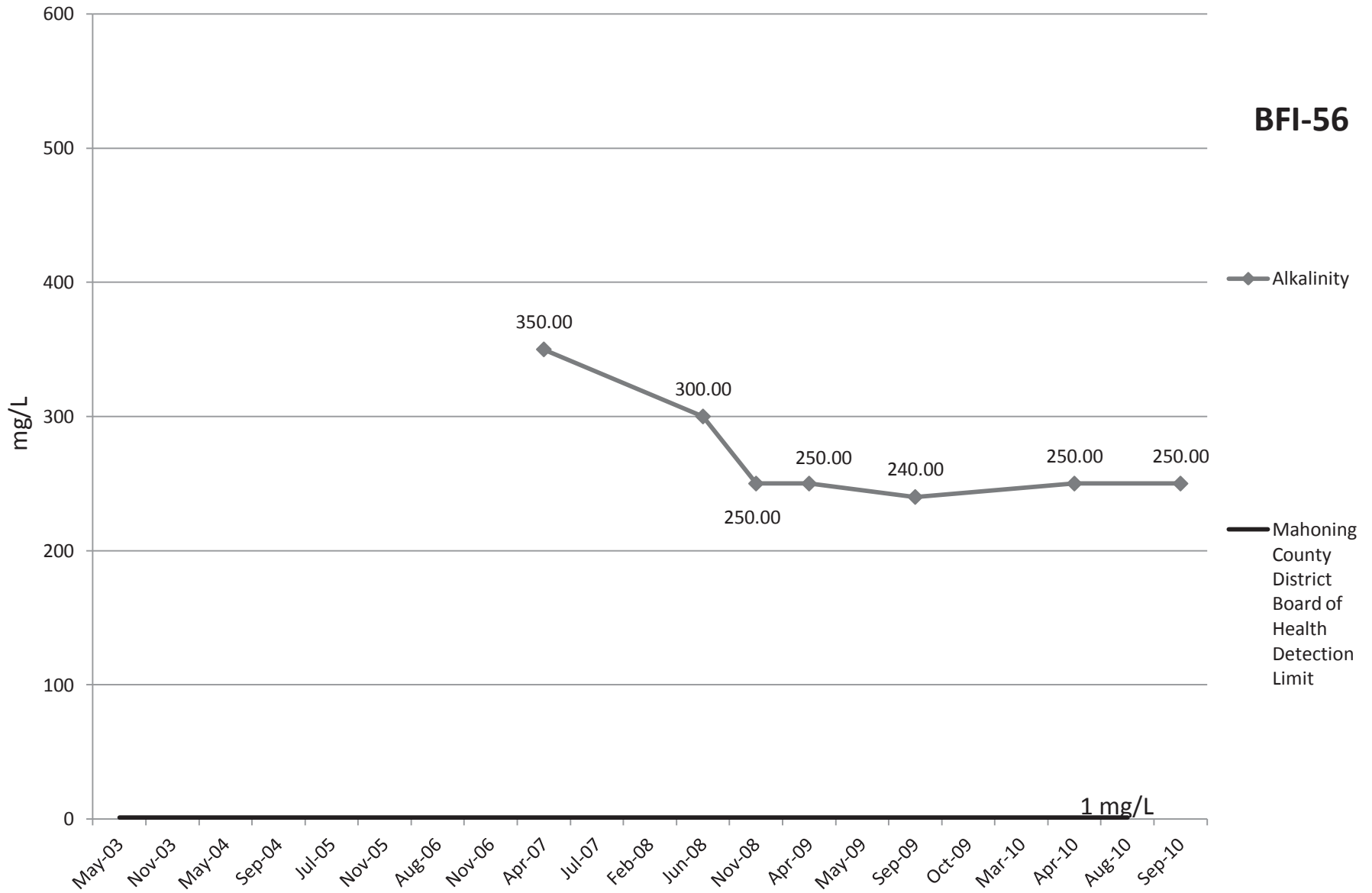


# Turbidity



# Alkalinity

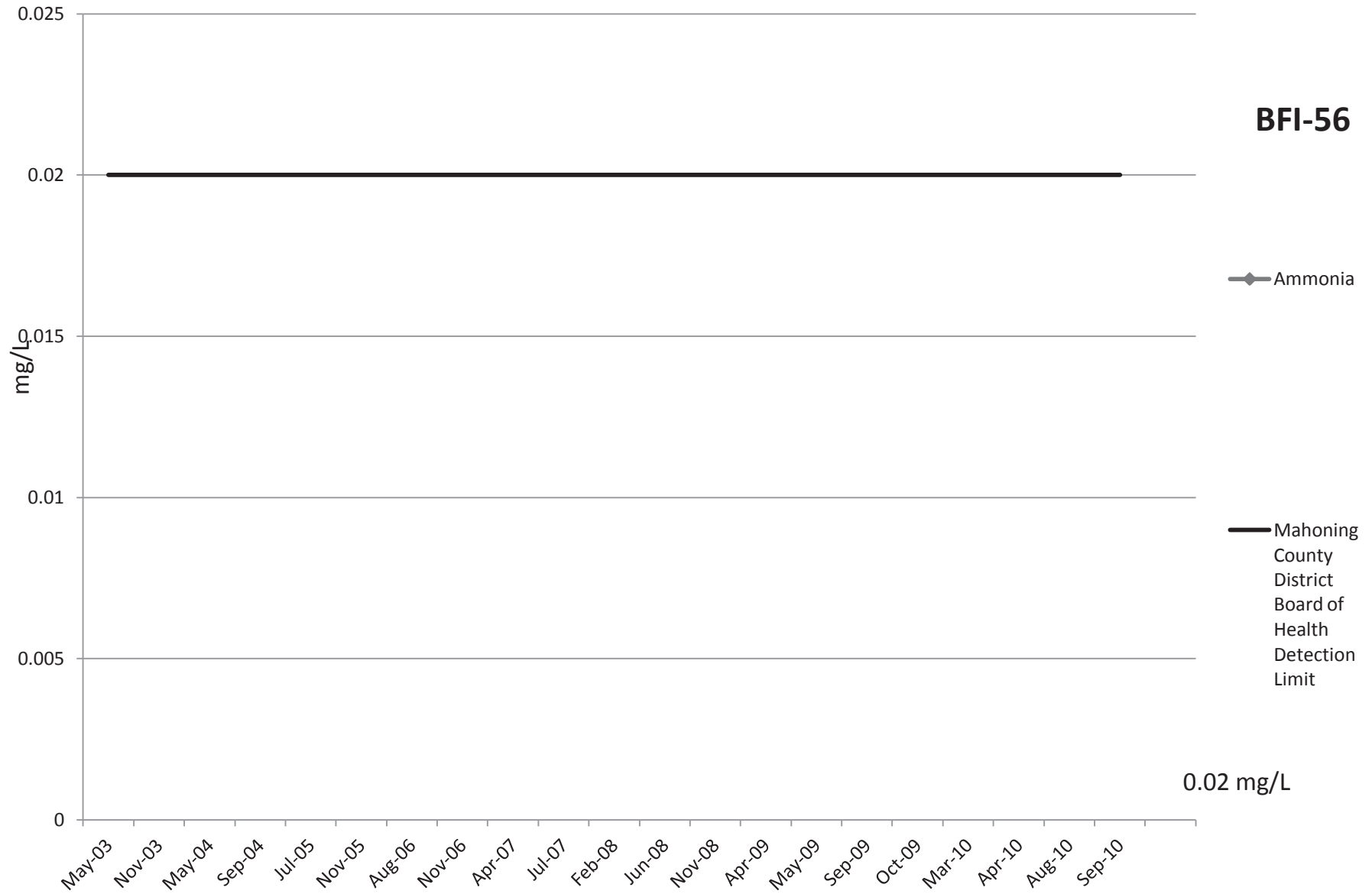
**BFI-56**





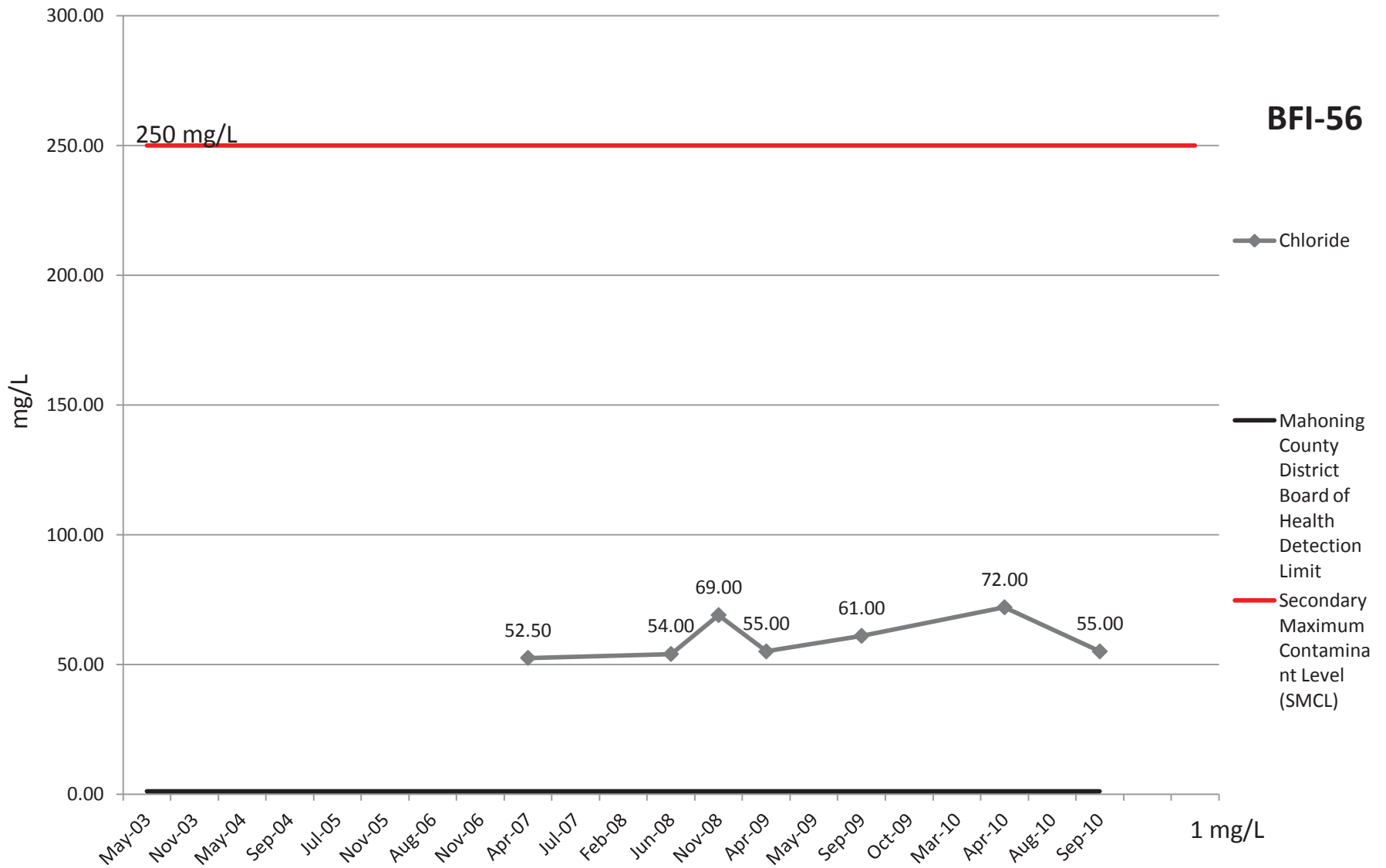
# Ammonia

**BFI-56**



0.02 mg/L

# Chloride



**BFI-56**

◆ Chloride

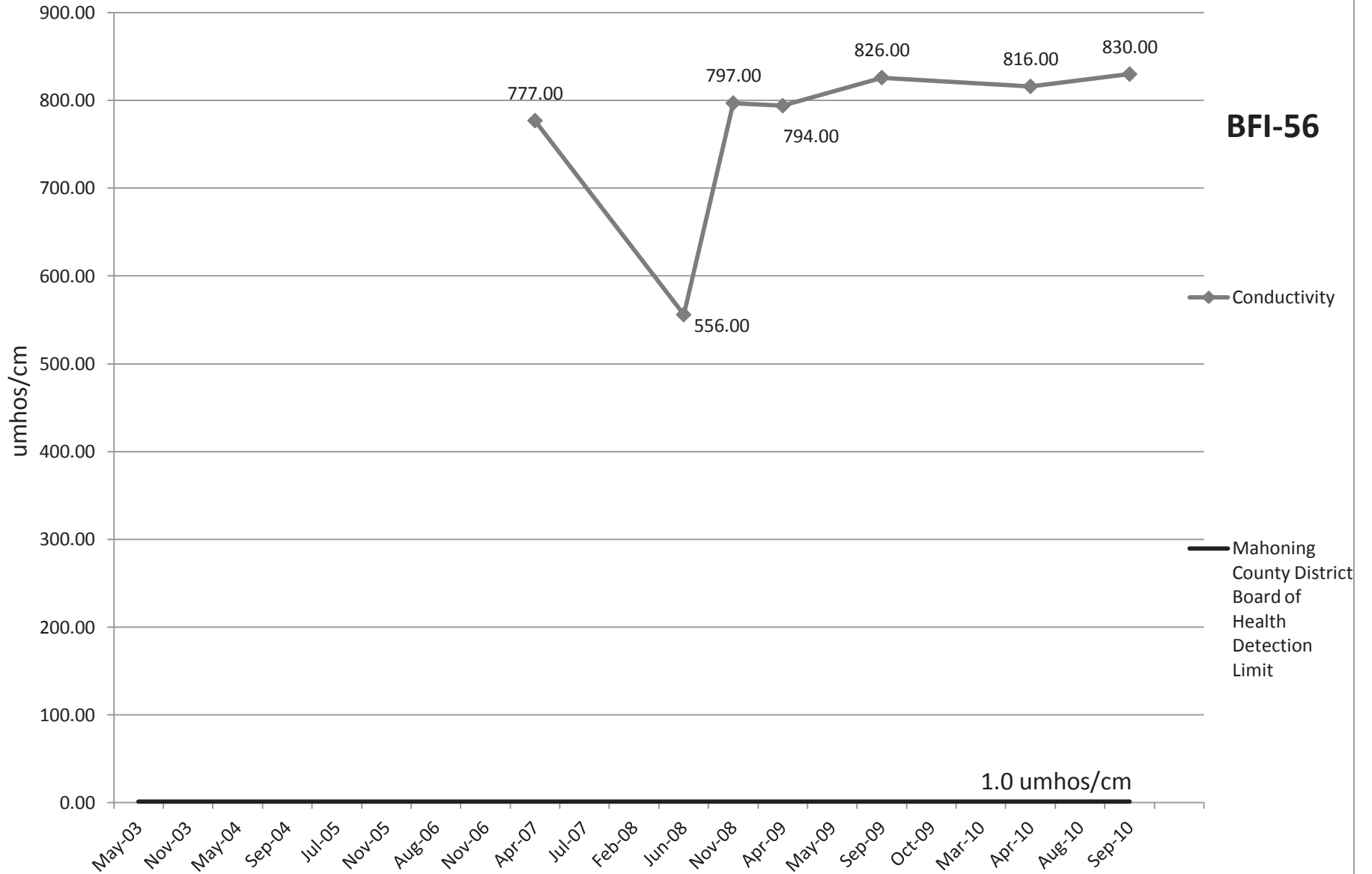
— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

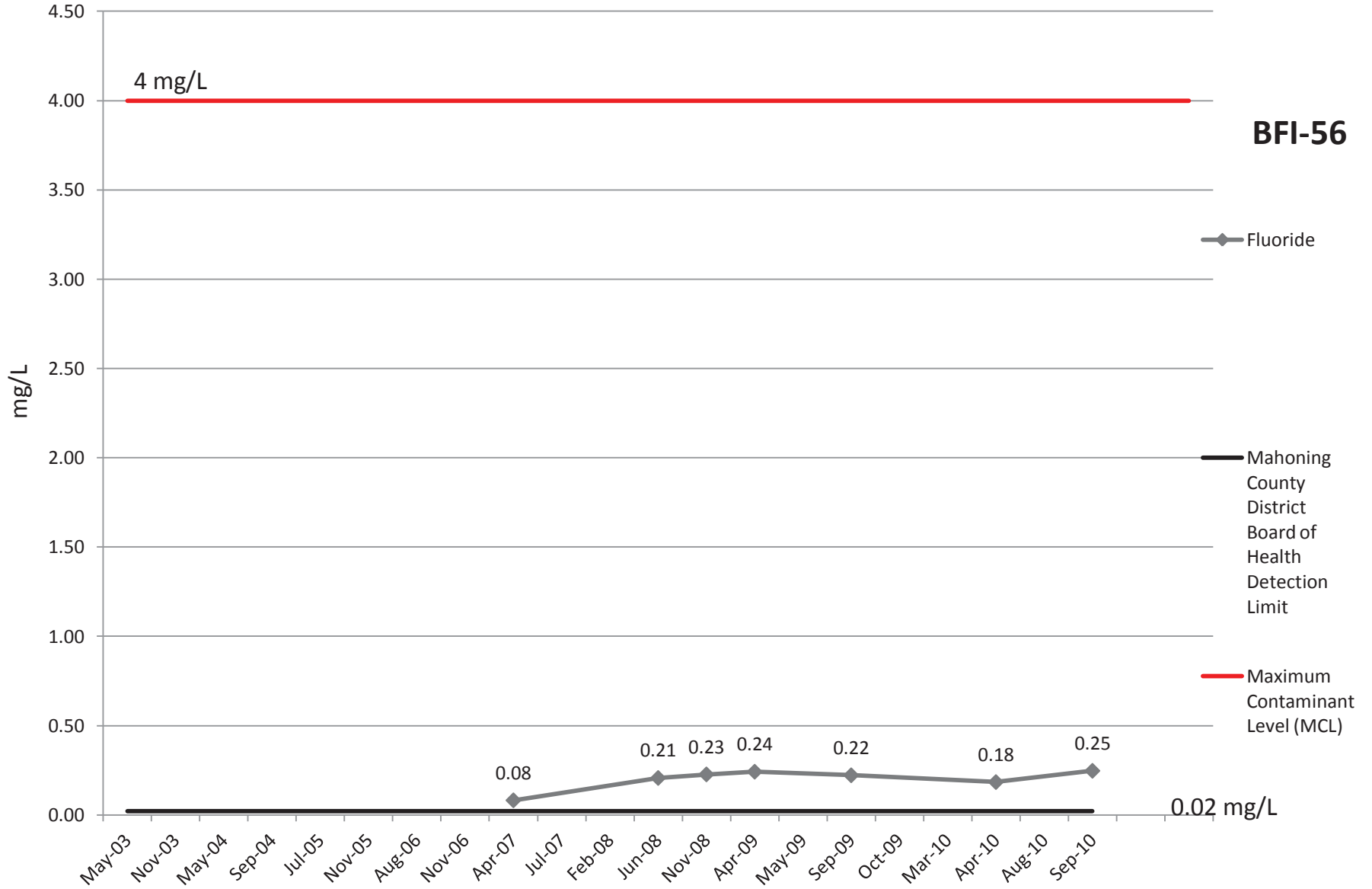
1 mg/L

# Conductivity

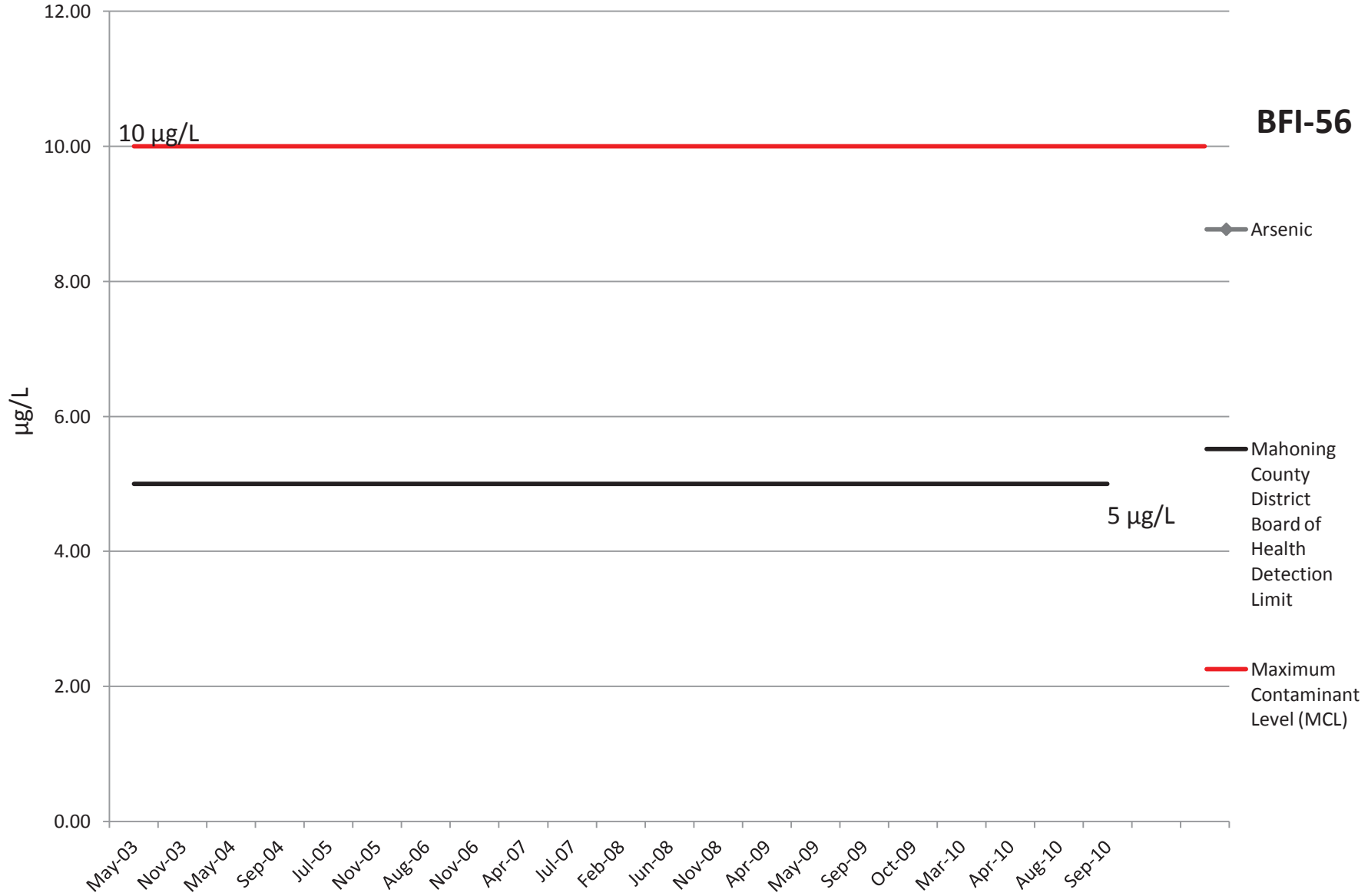
**BFI-56**



# Fluoride

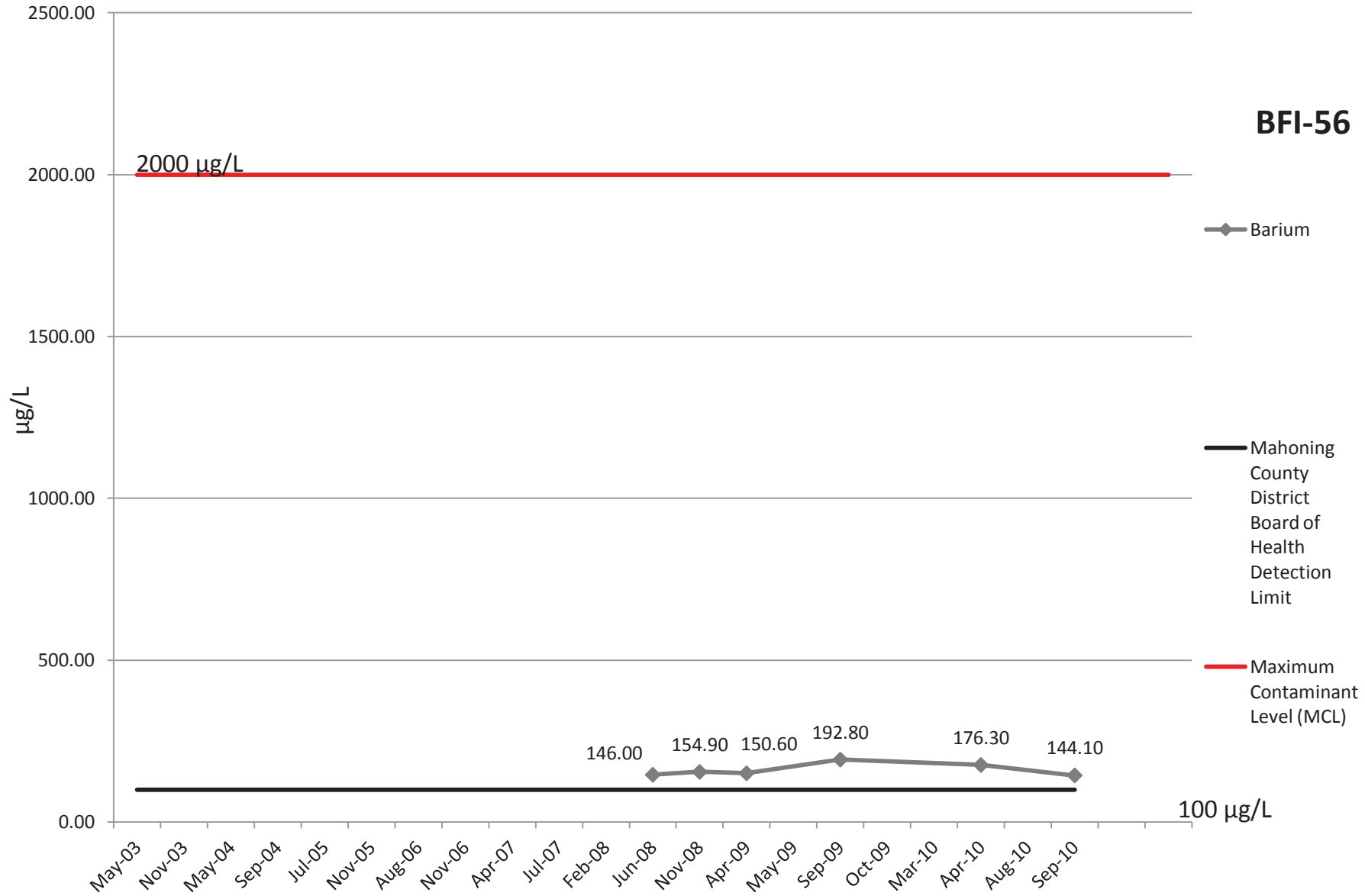


# Arsenic



# Barium

**BFI-56**



# Cadmium

**BFI-56**

10 µg/L

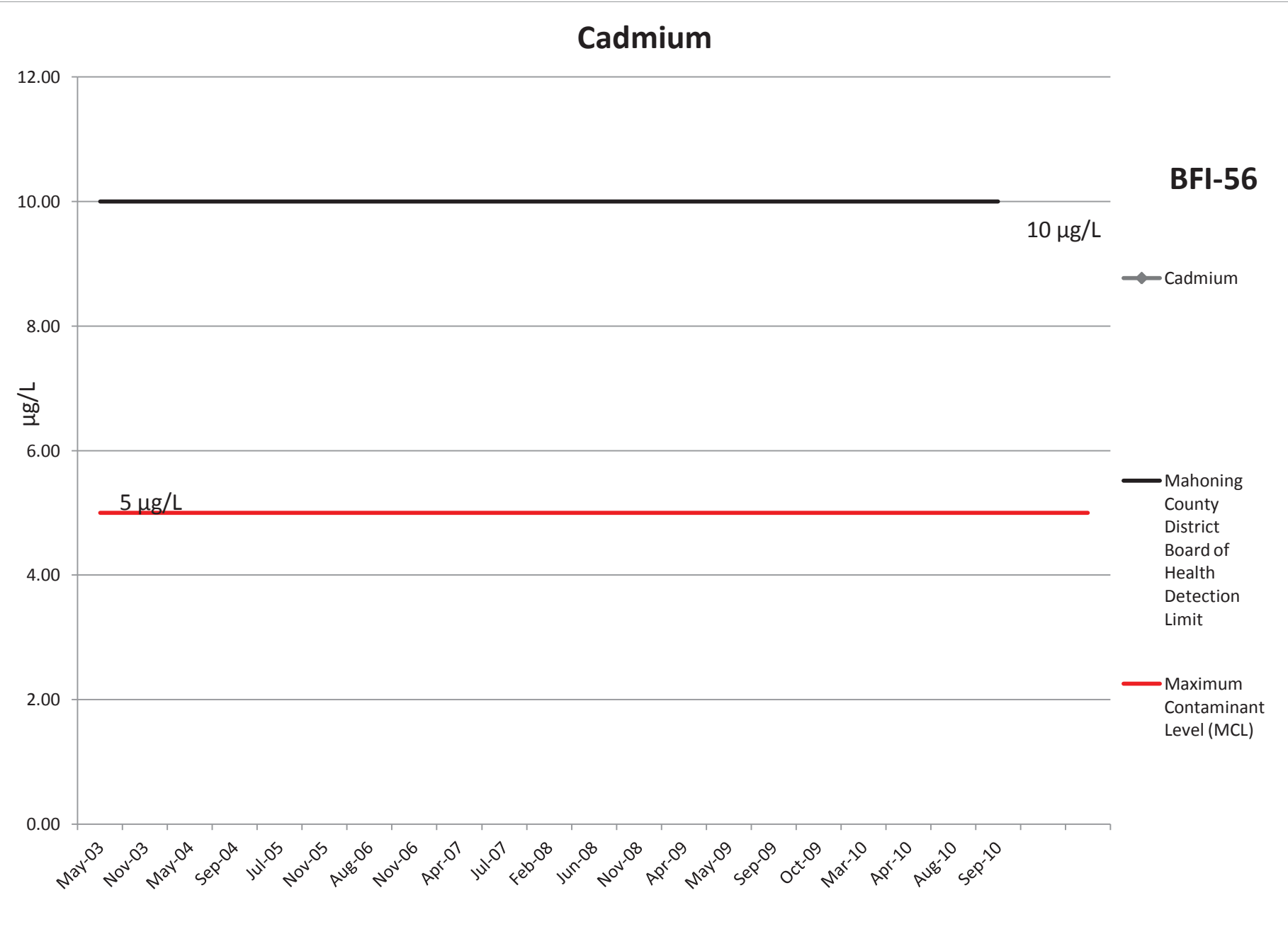
12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

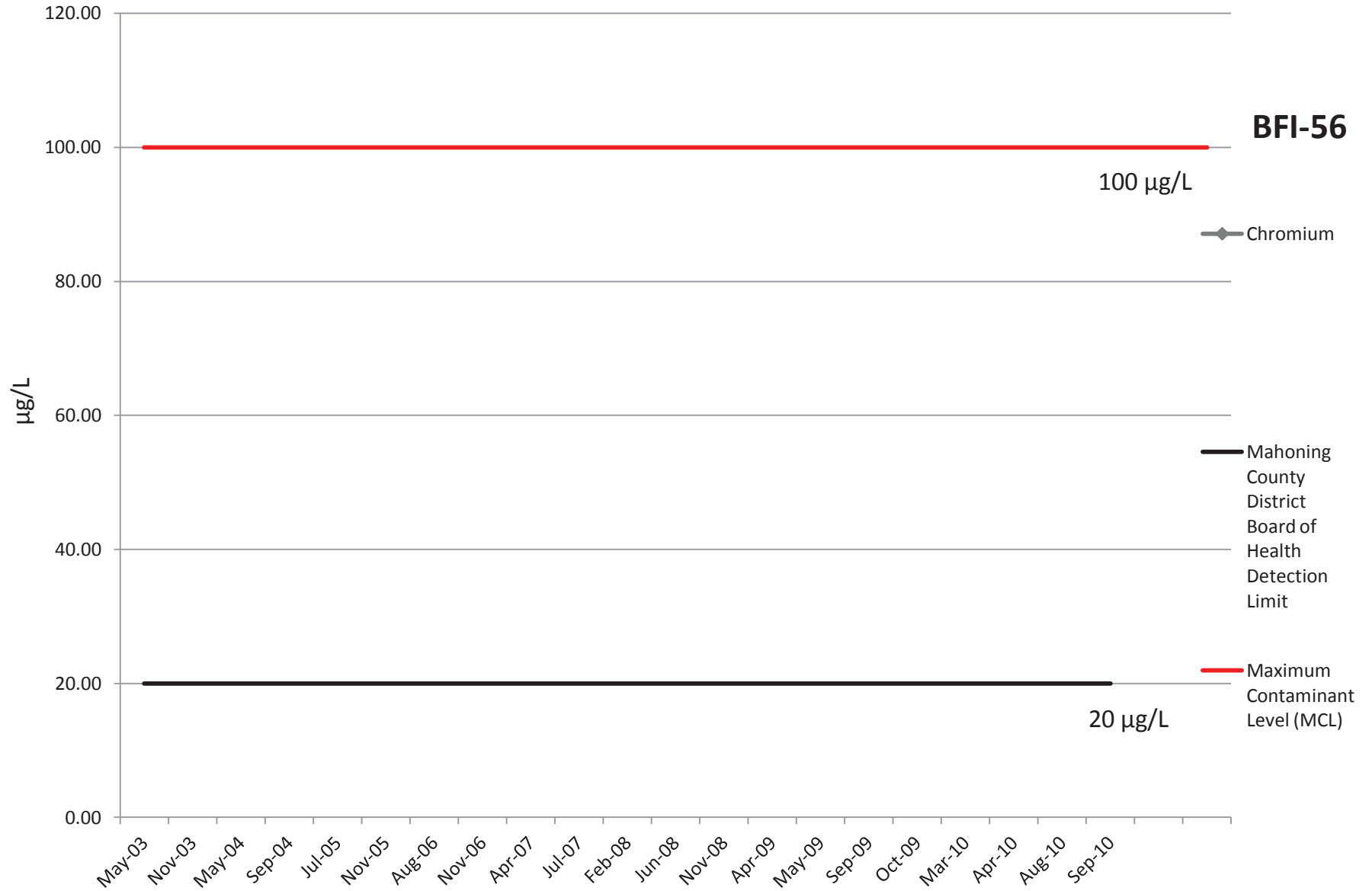
5 µg/L

- ◆ Cadmium
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

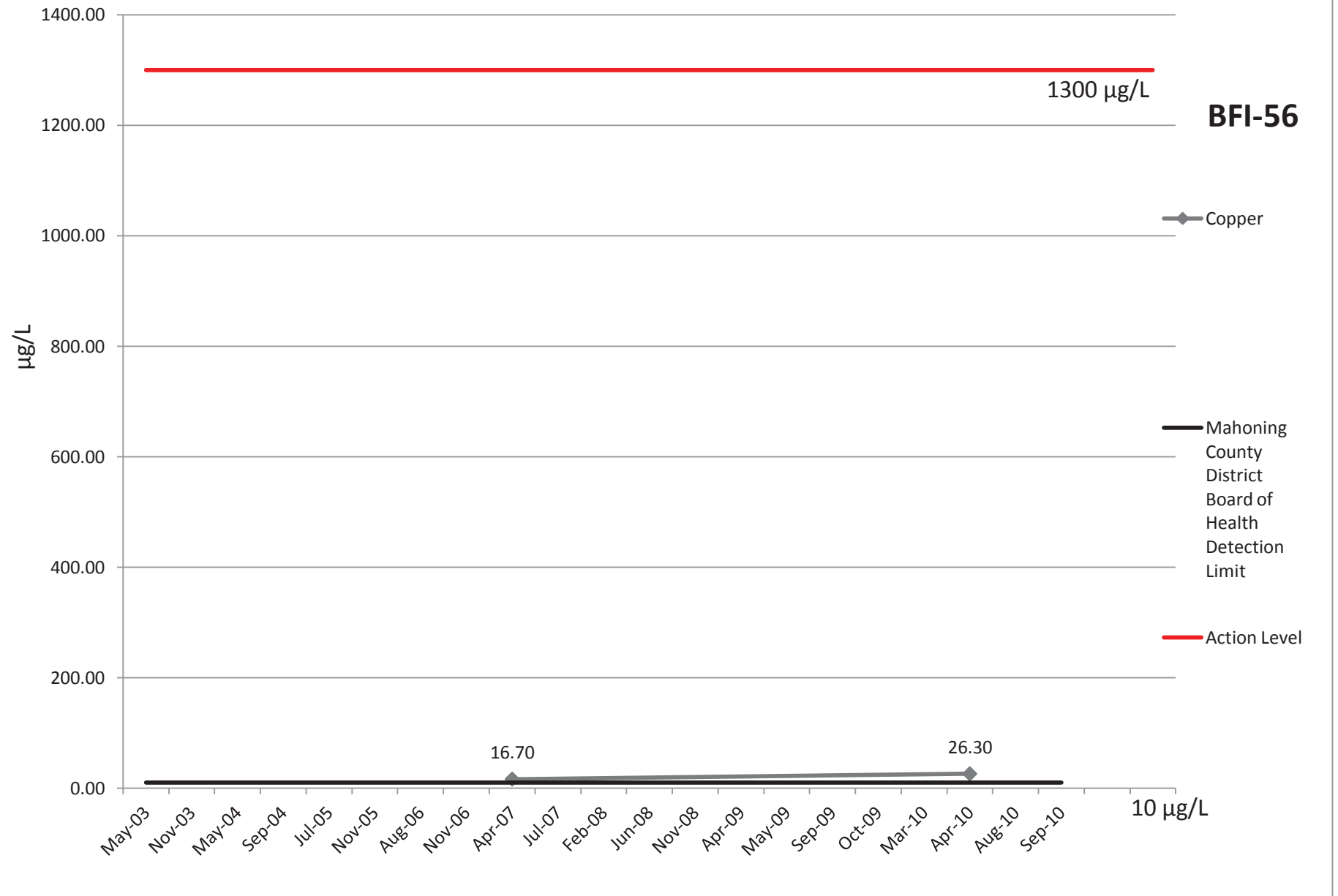


# Chromium

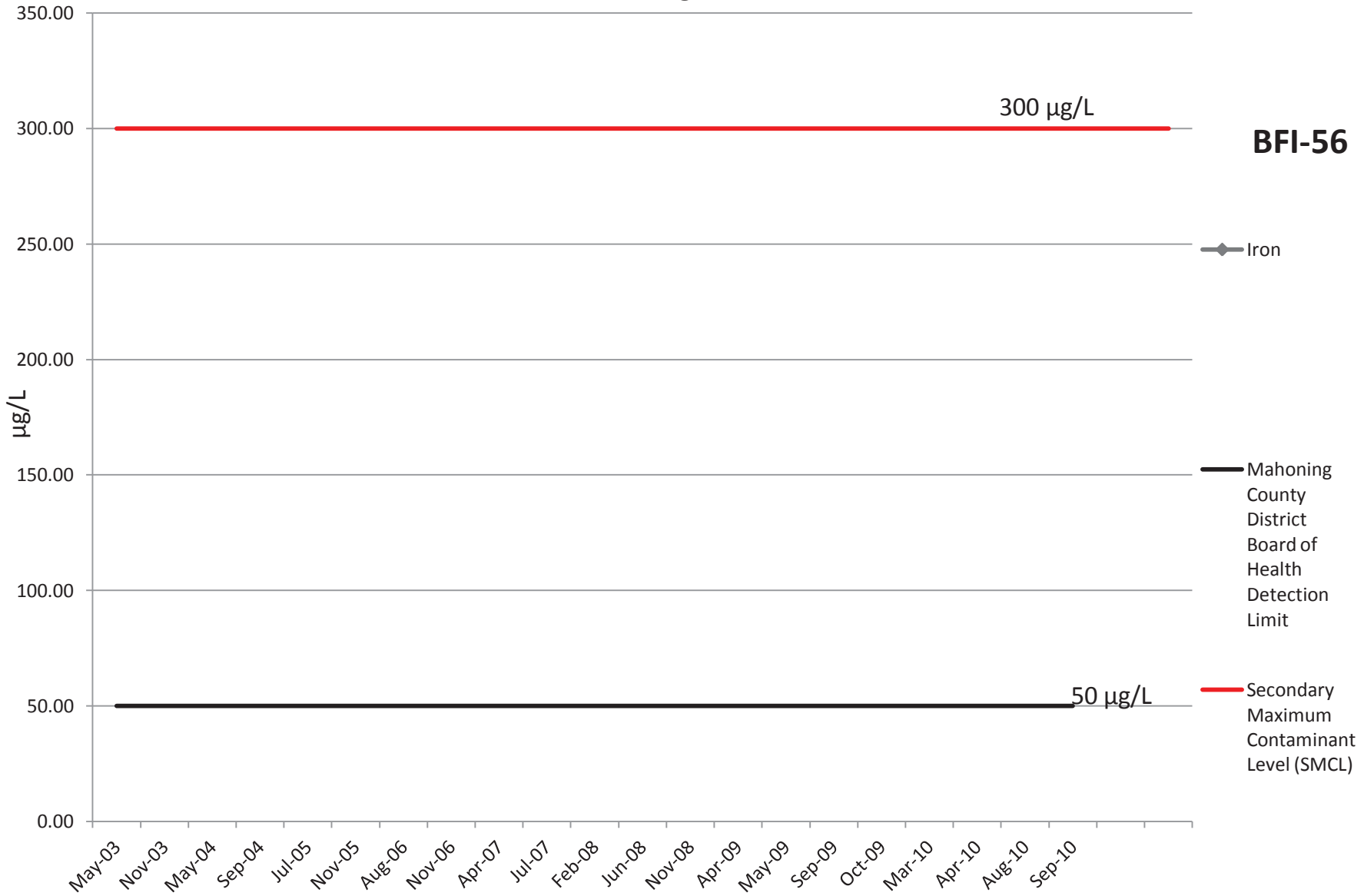




# Copper



# Iron



**BFI-56**

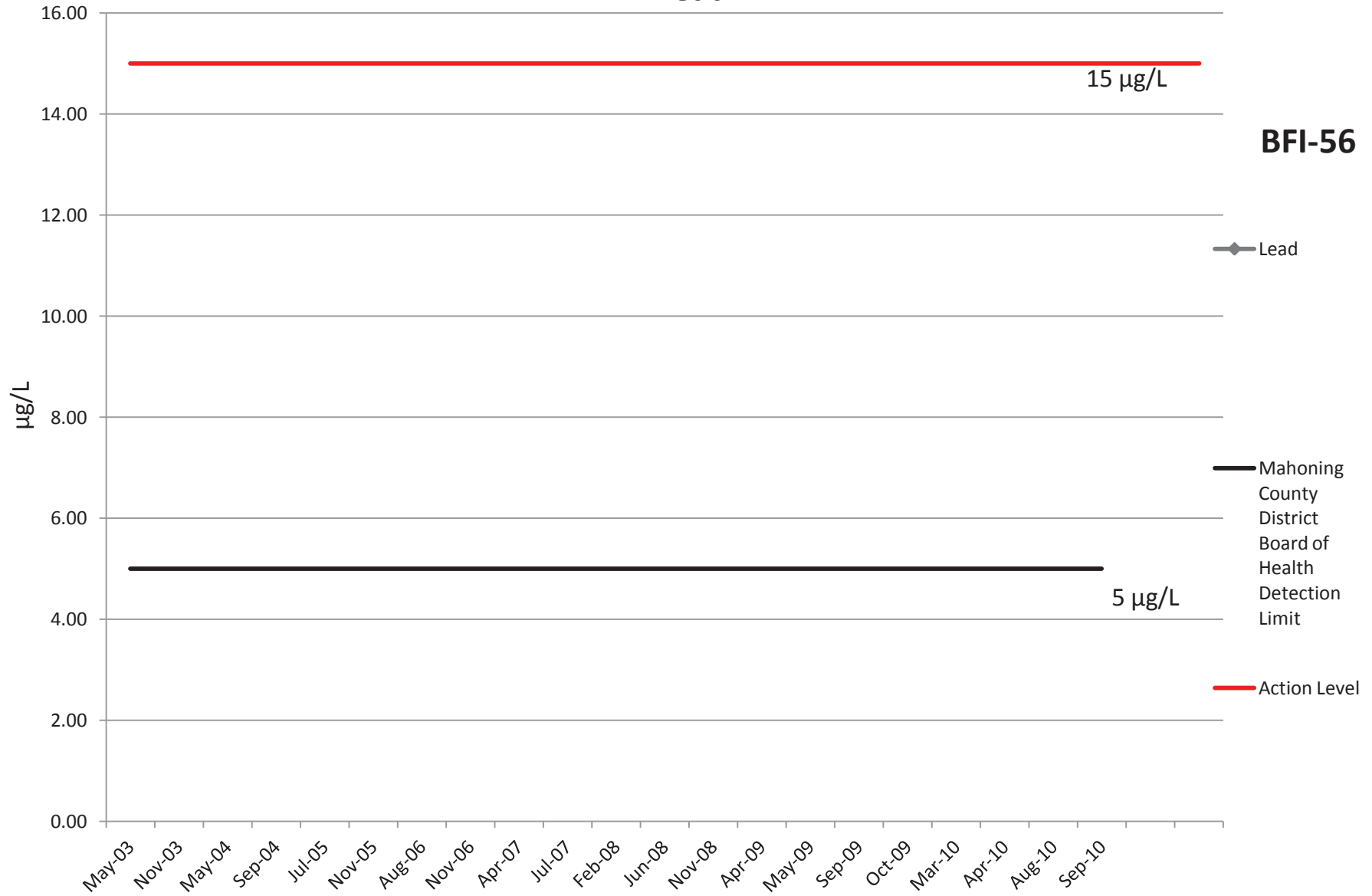
Iron

Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Secondary  
Maximum  
Contaminant  
Level (SMCL)

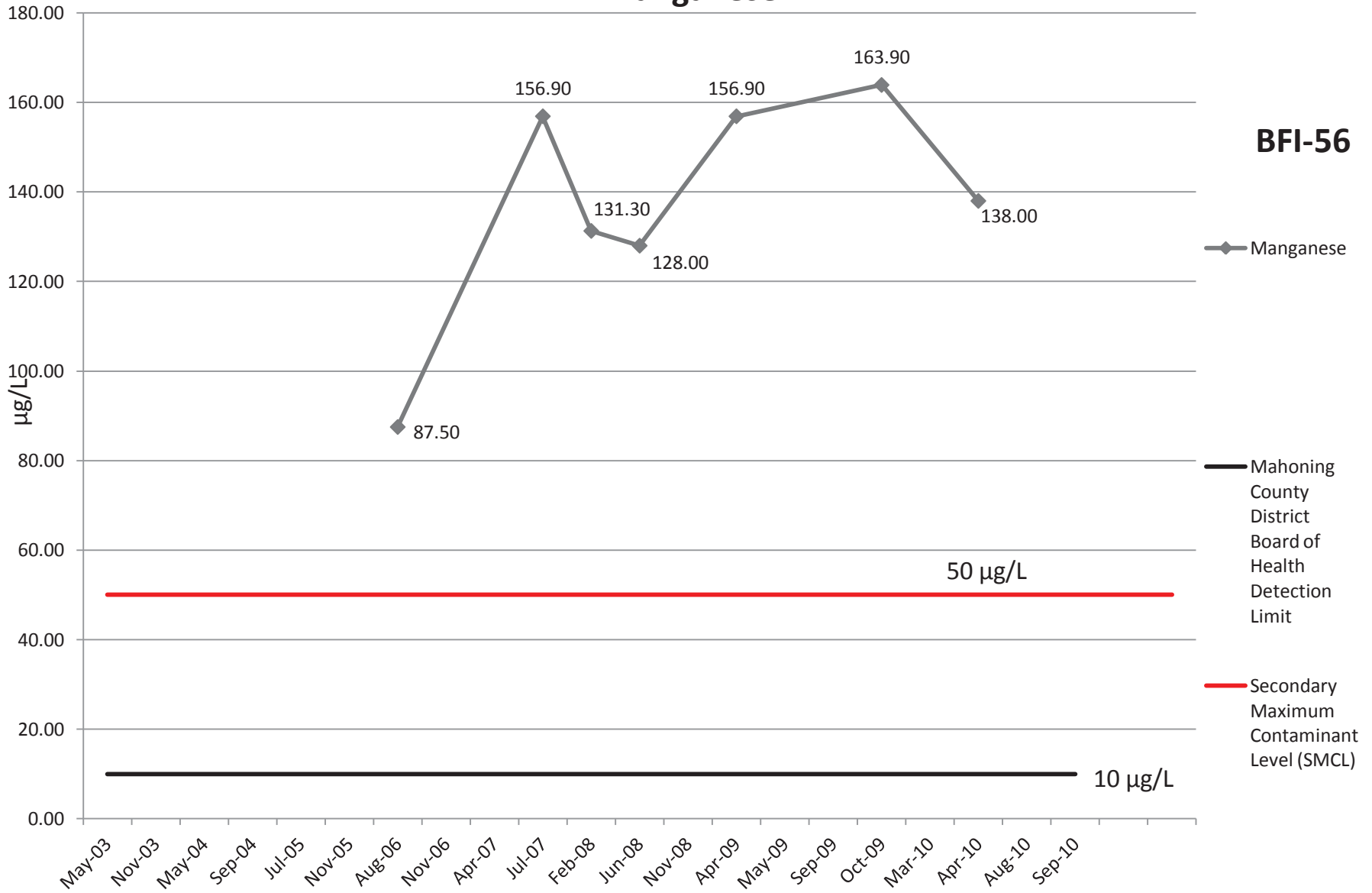
# Lead

**BFI-56**



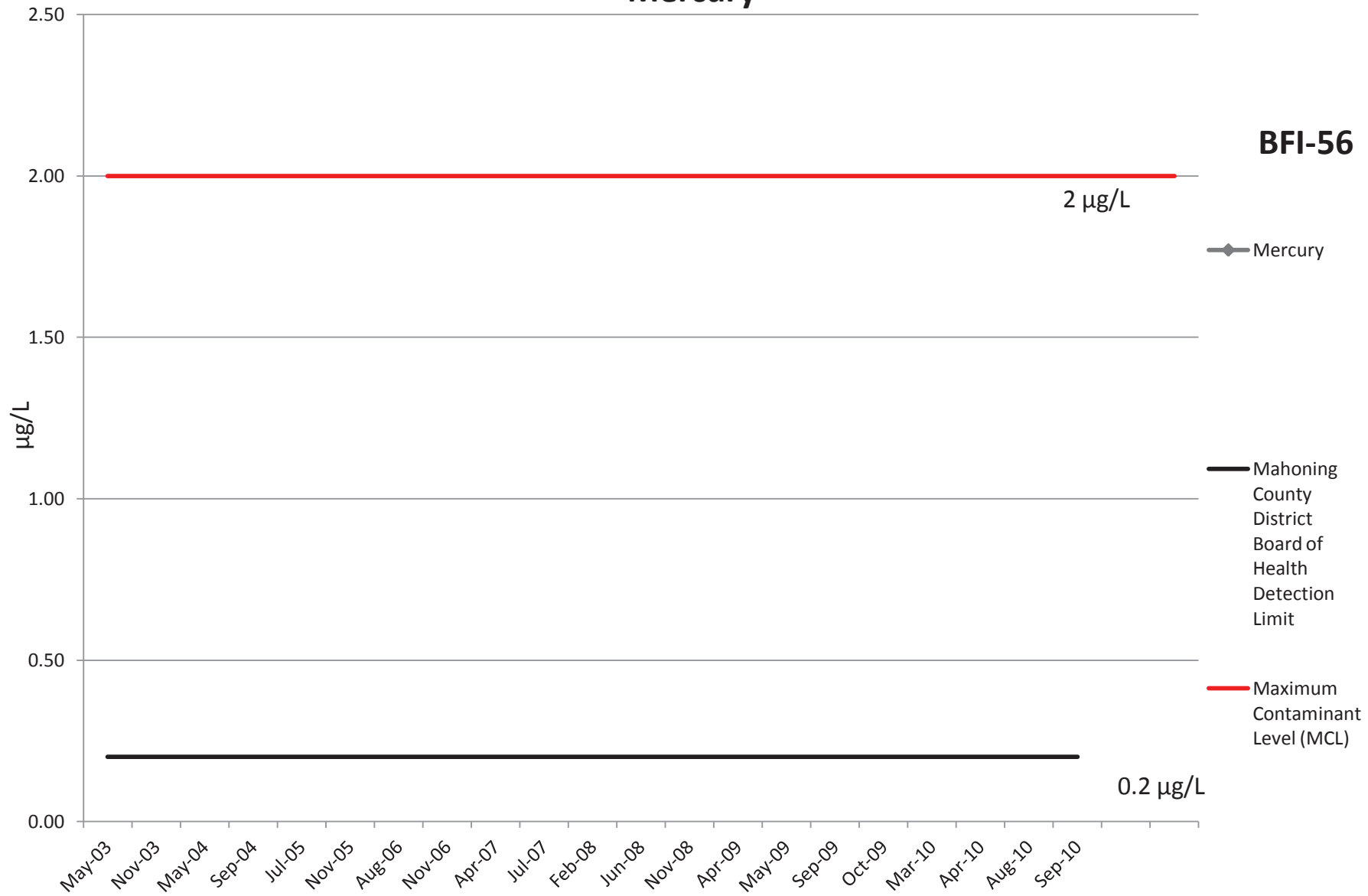
# Manganese

**BFI-56**

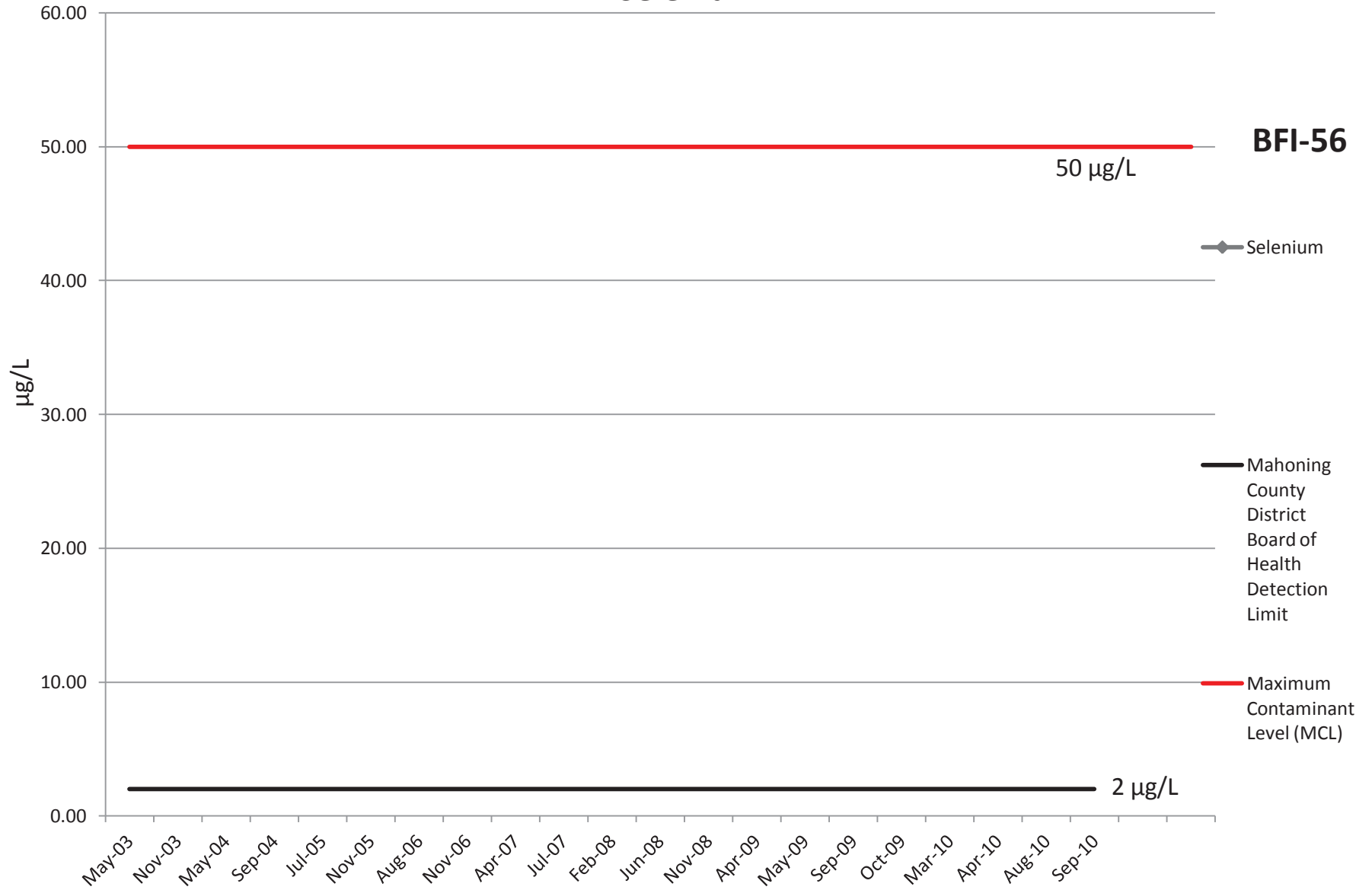


# Mercury

**BFI-56**

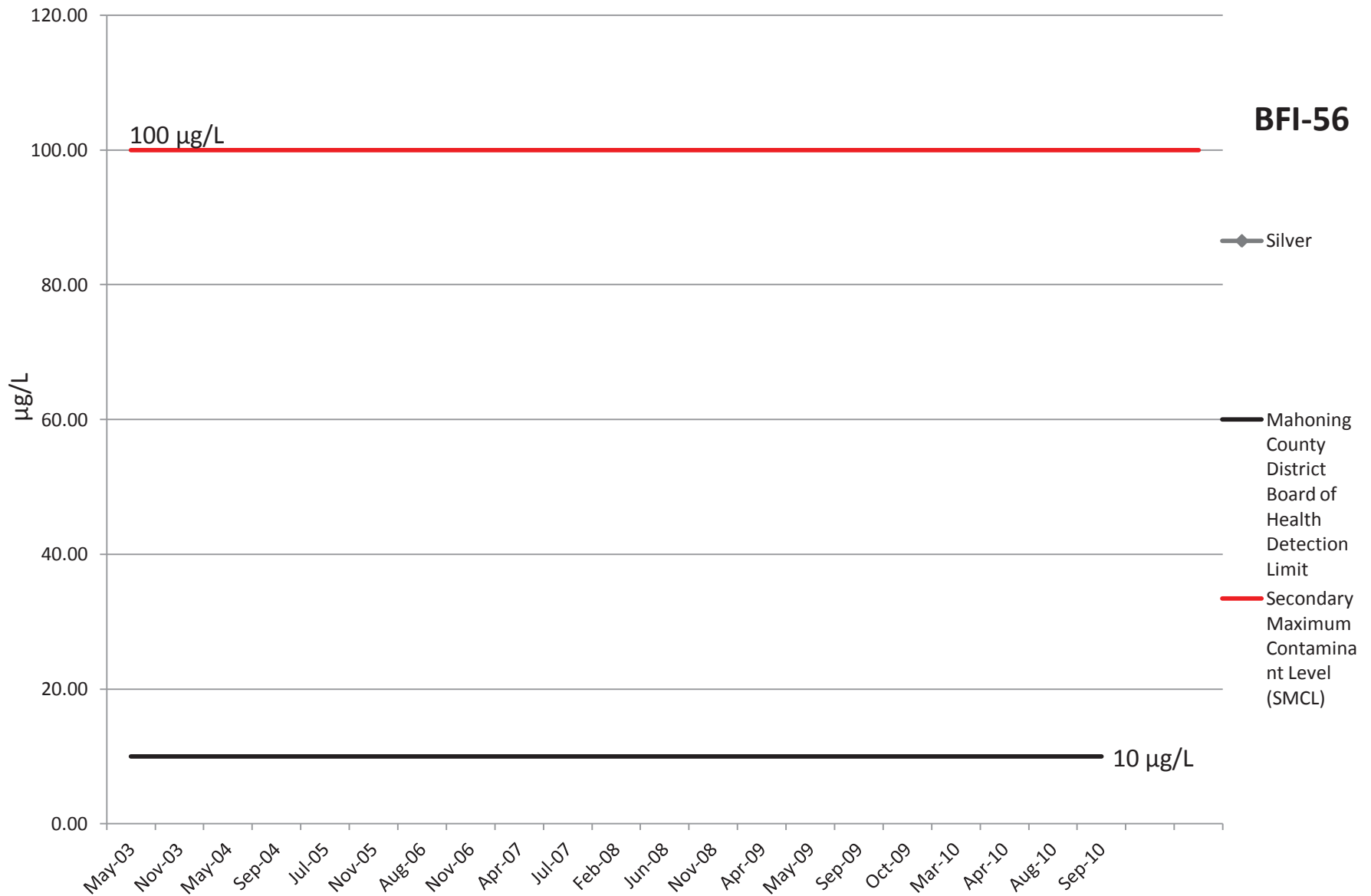


# Selenium

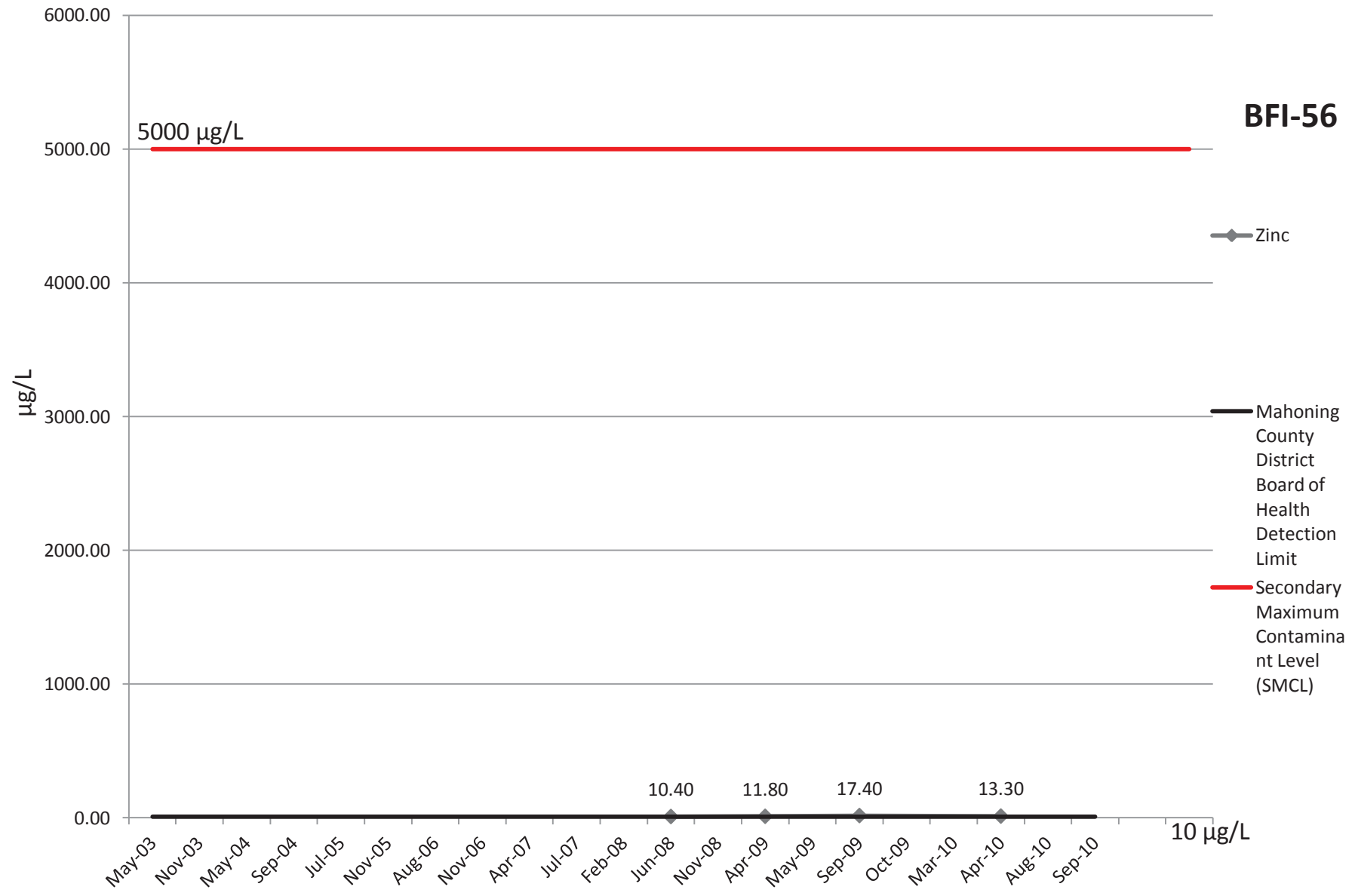


# Silver

**BFI-56**



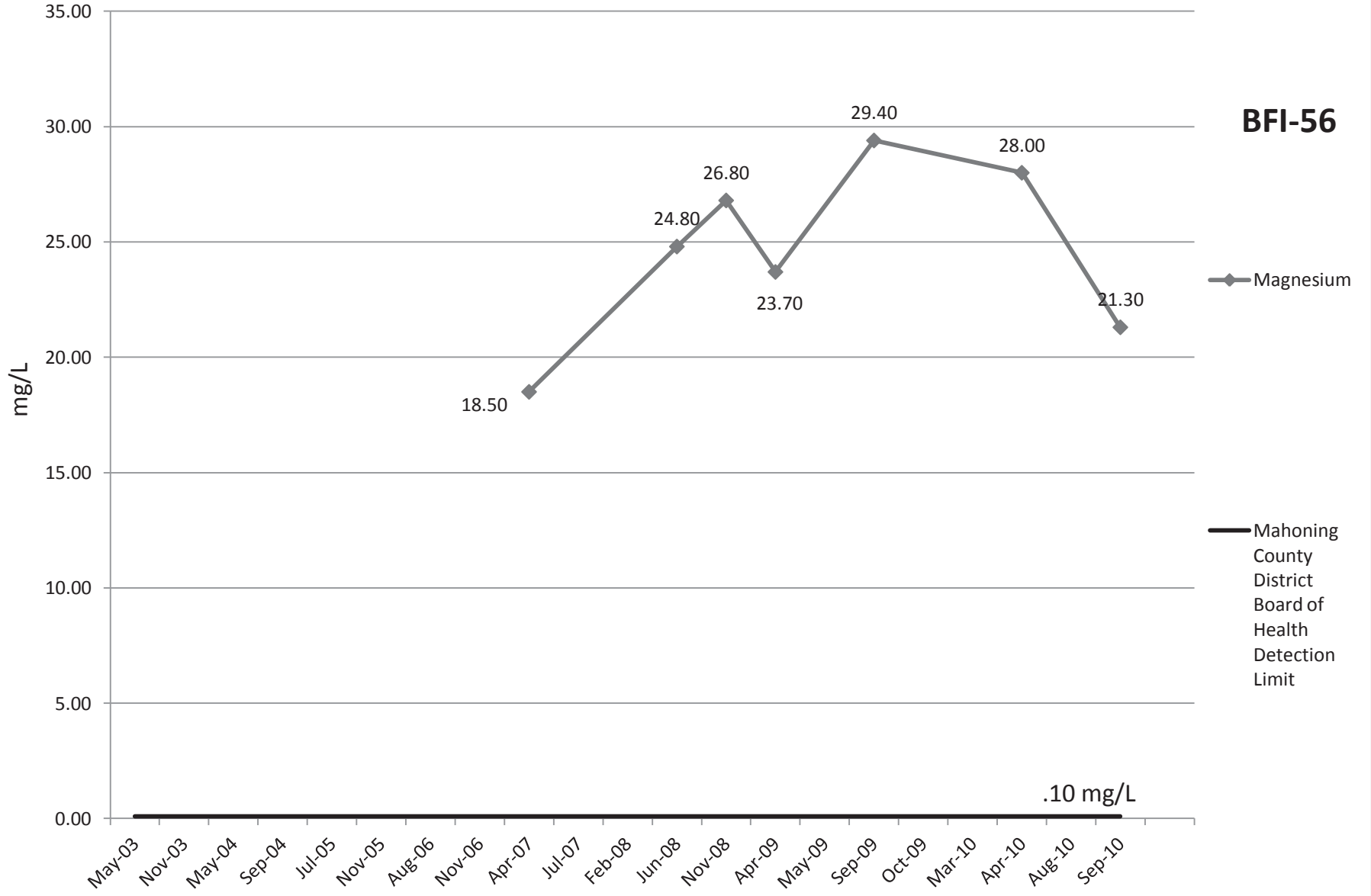
# Zinc





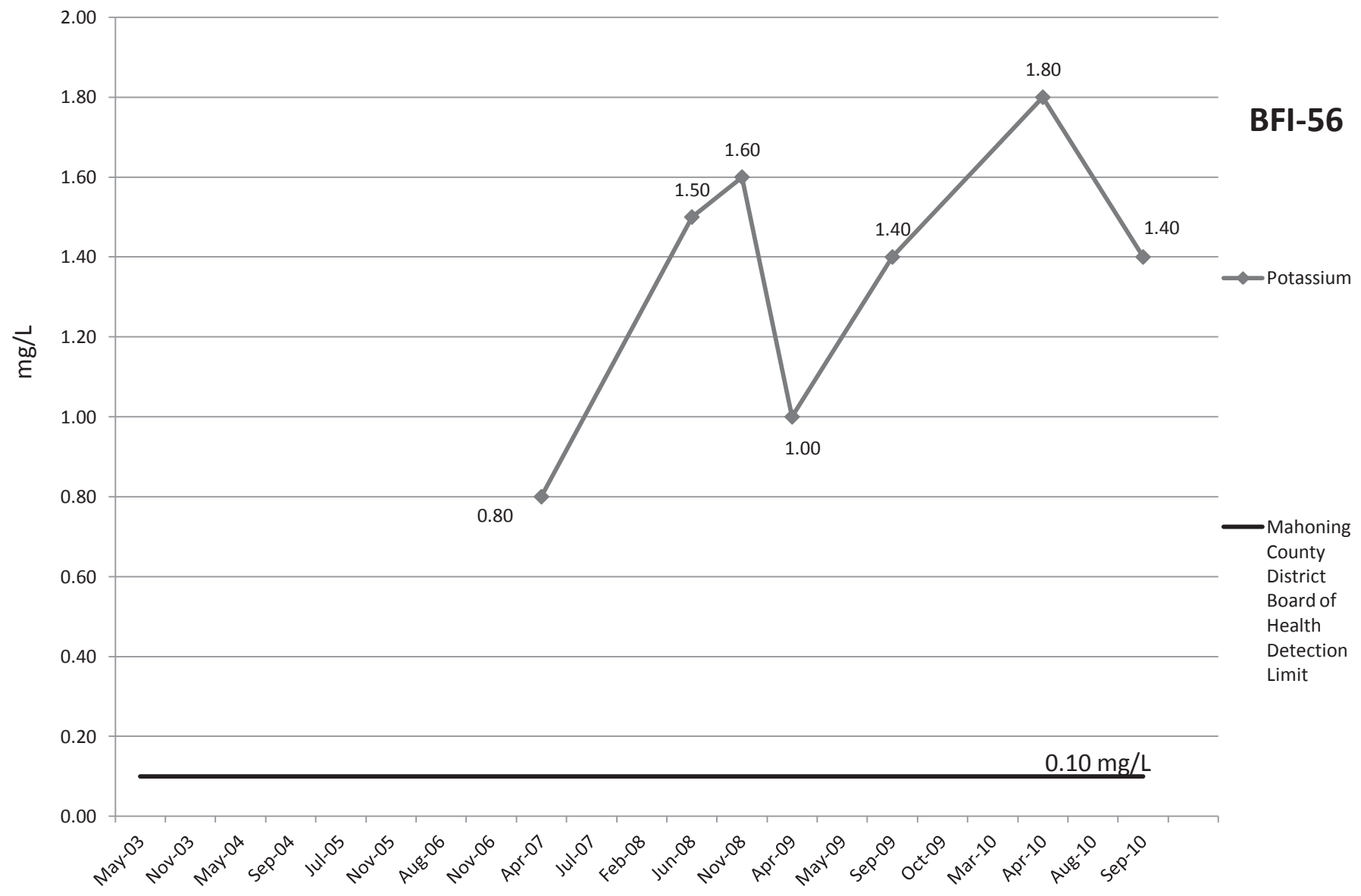
# Magnesium

**BFI-56**



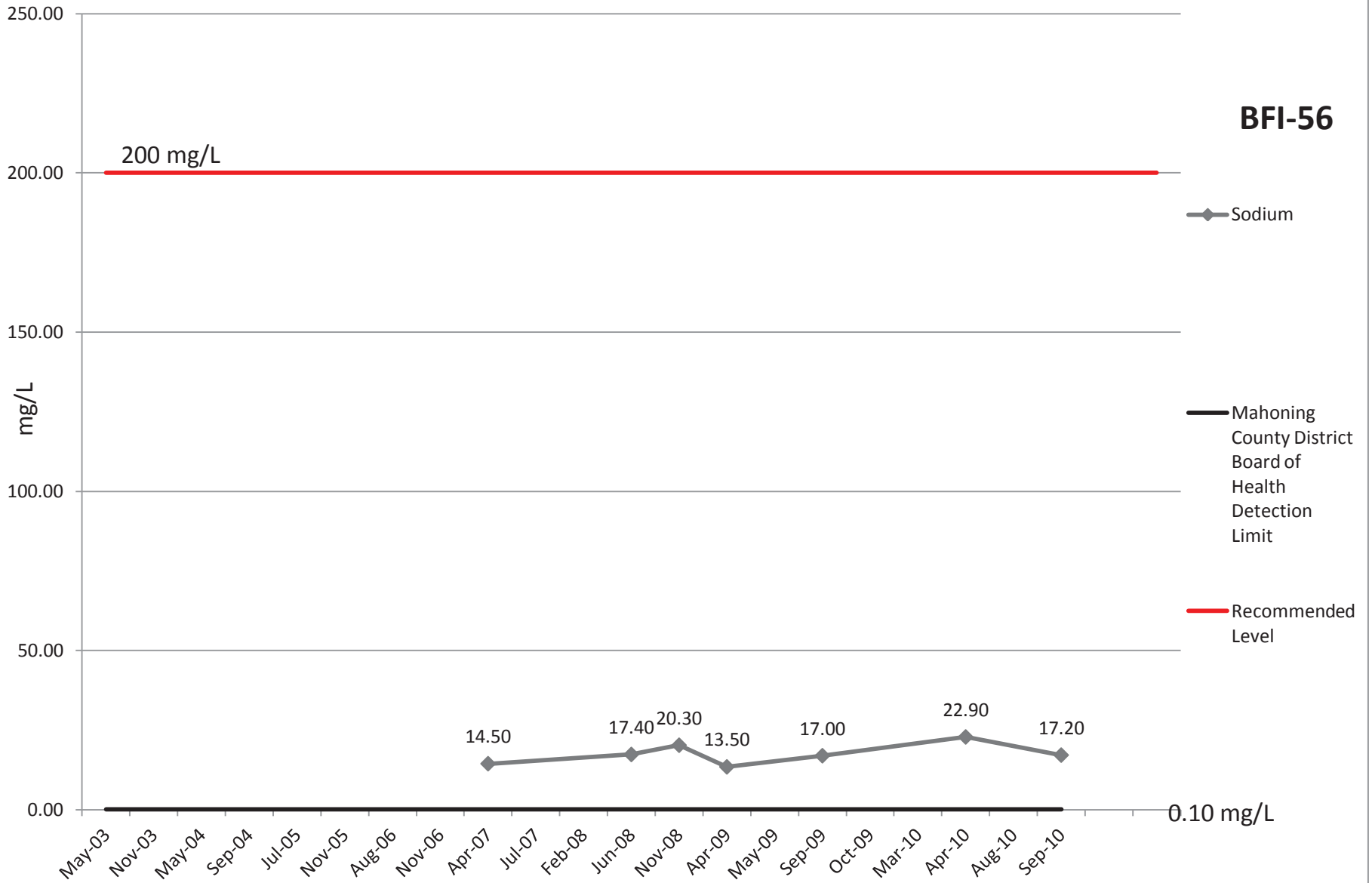
# Potassium

**BFI-56**

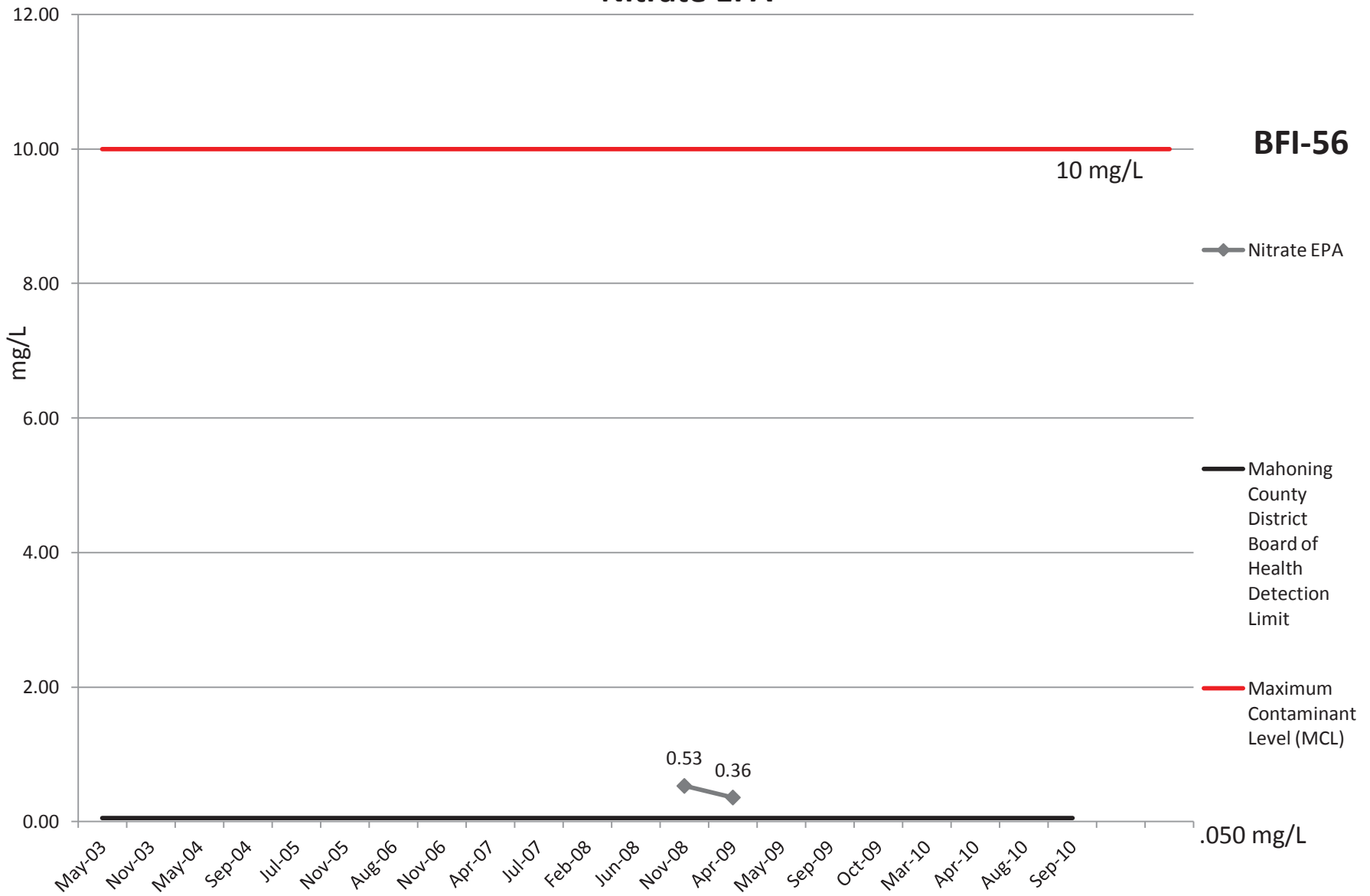


# Sodium

**BFI-56**



# Nitrate EPA



**BFI-56**

◆ Nitrate EPA

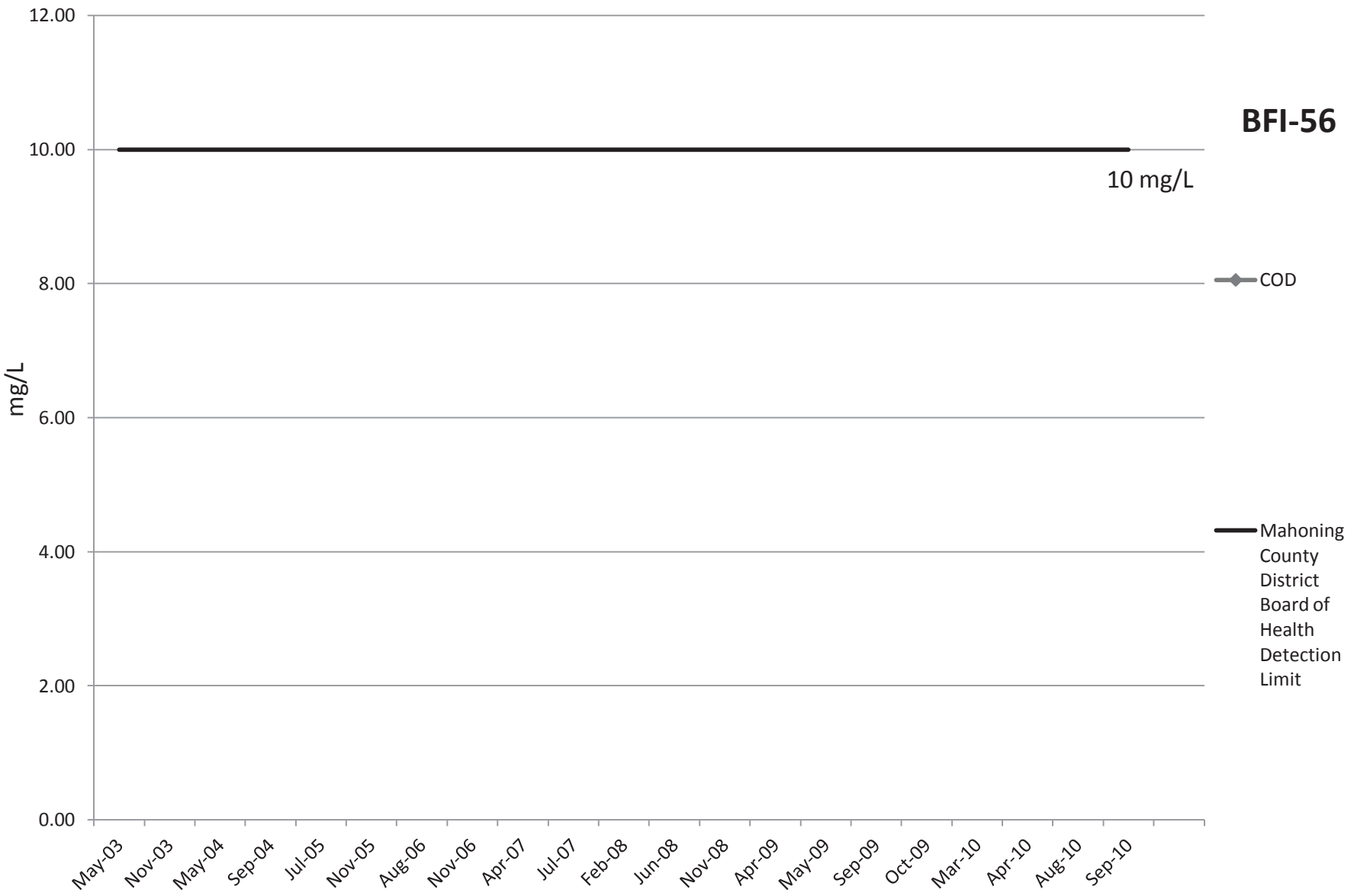
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

0.050 mg/L

# COD

**BFI-56**

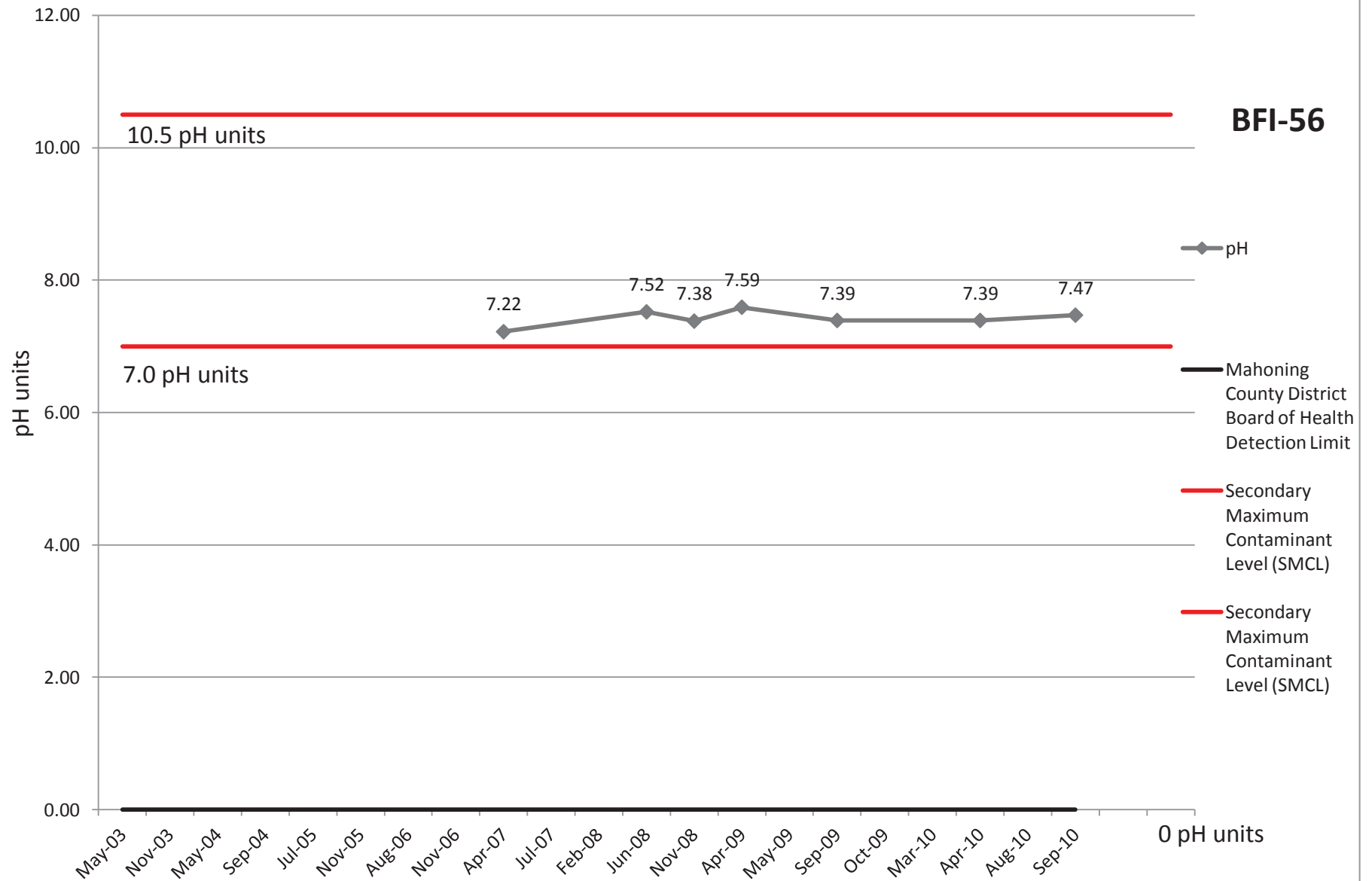


10 mg/L

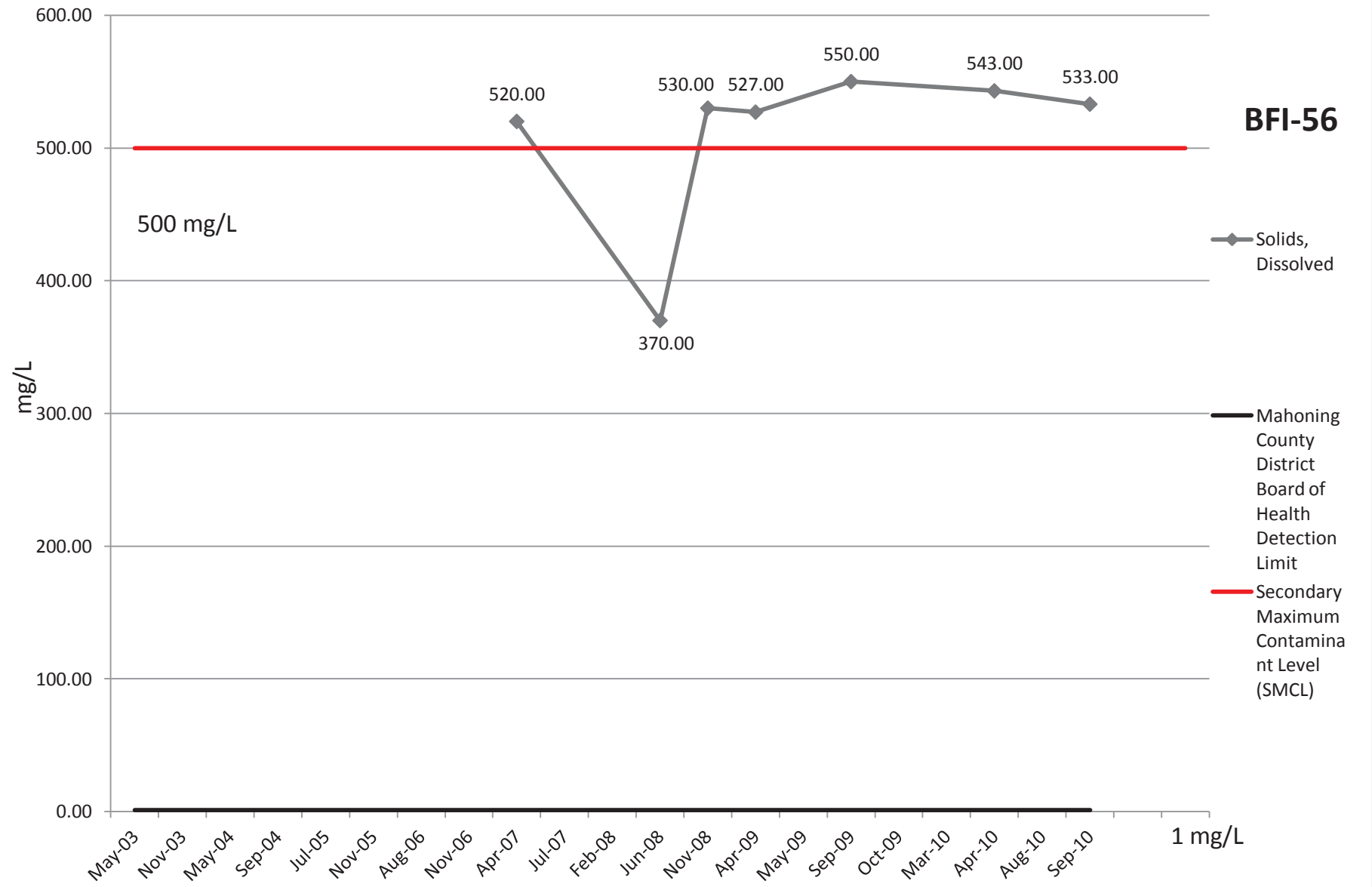
◆ COD

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

# pH



# Solids, Dissolved



**BFI-56**

◆ Solids, Dissolved

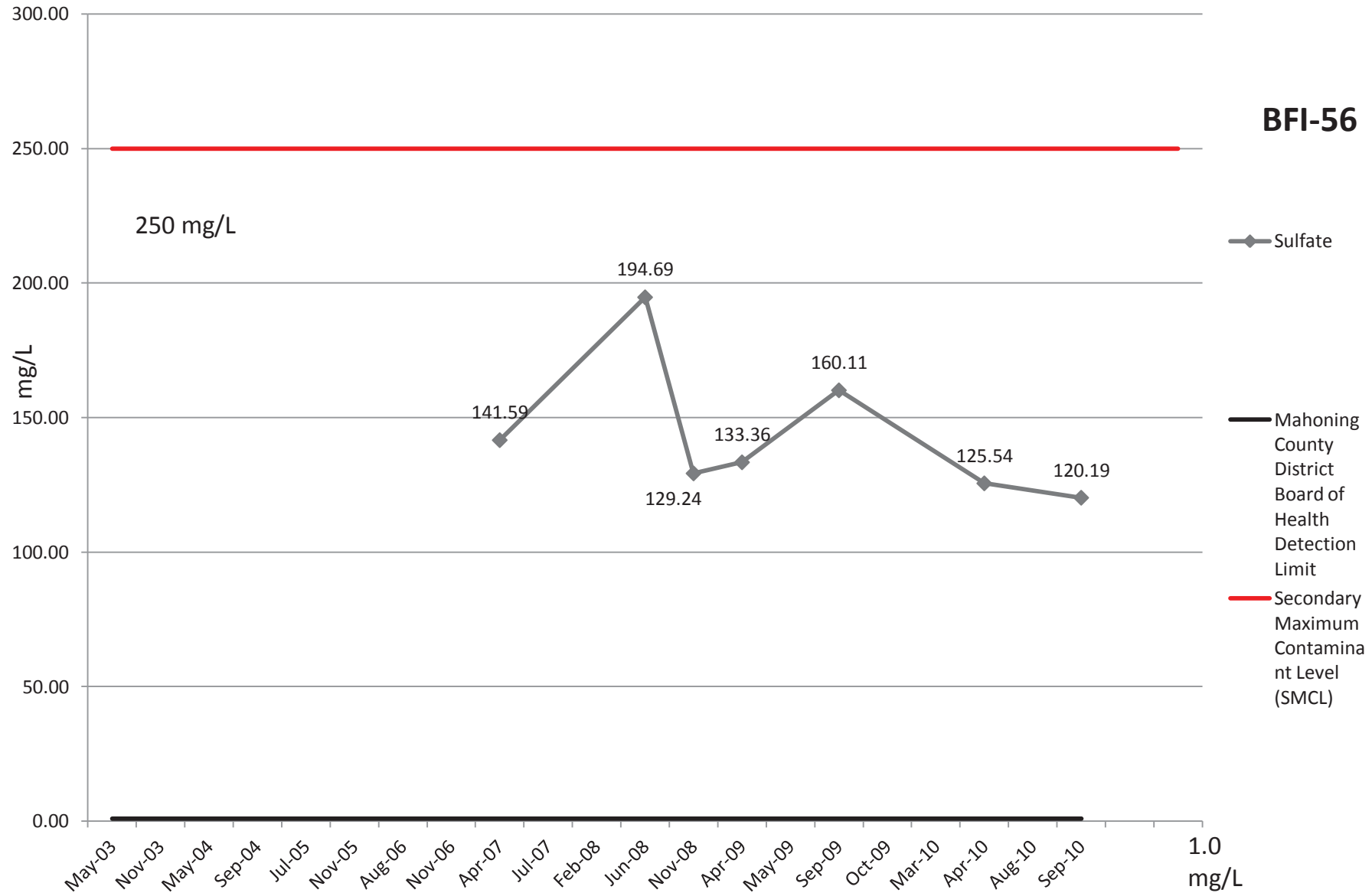
— Mahoning County District Board of Health Detection Limit  
— Secondary Maximum Contaminant Level (SMCL)

500 mg/L

1 mg/L

# Sulfate

**BFI-56**





# Bacteria

**BFI-56**

Positive/Negative

◆ Bacteria

positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

0.00

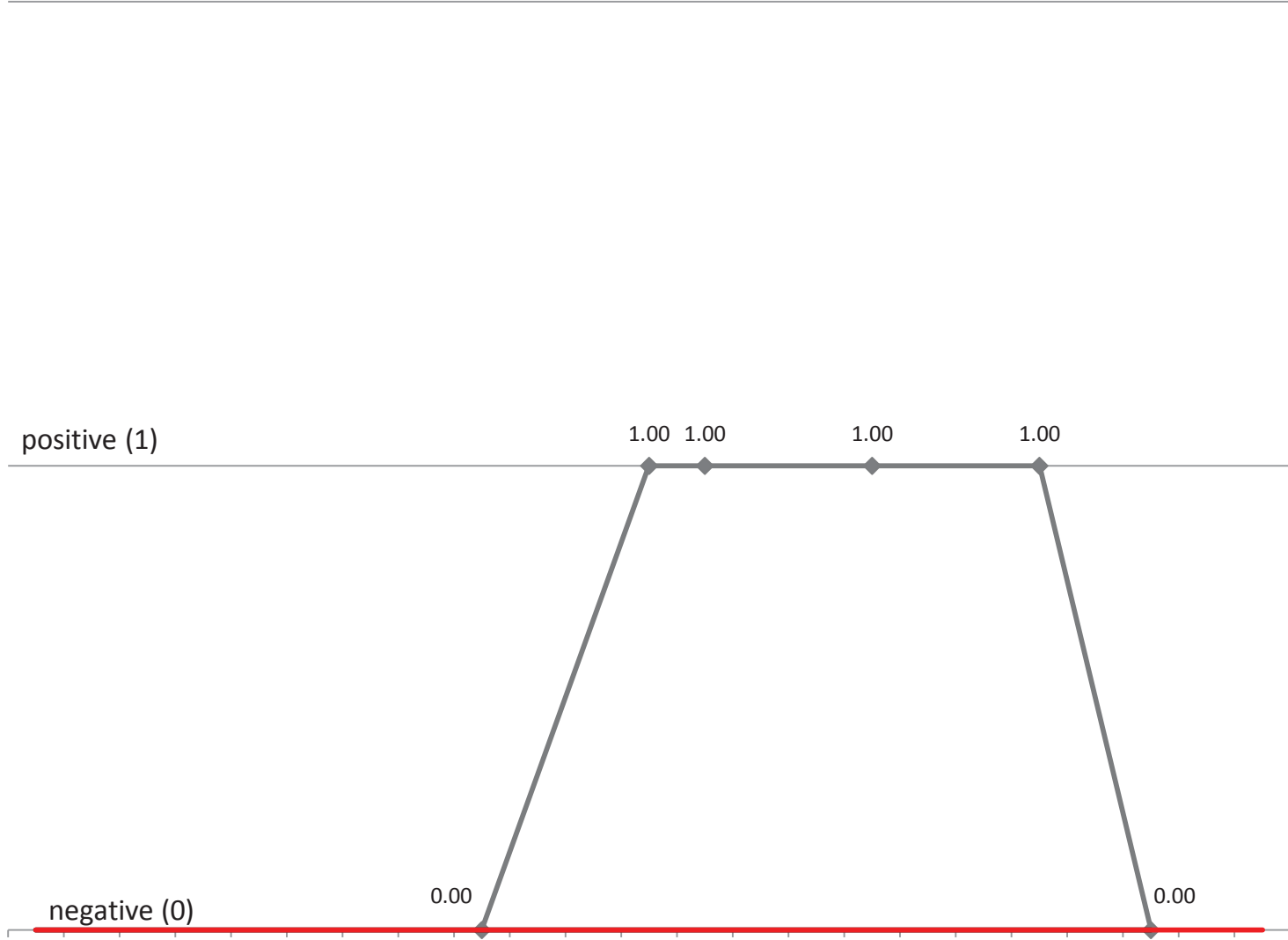
1.00

1.00

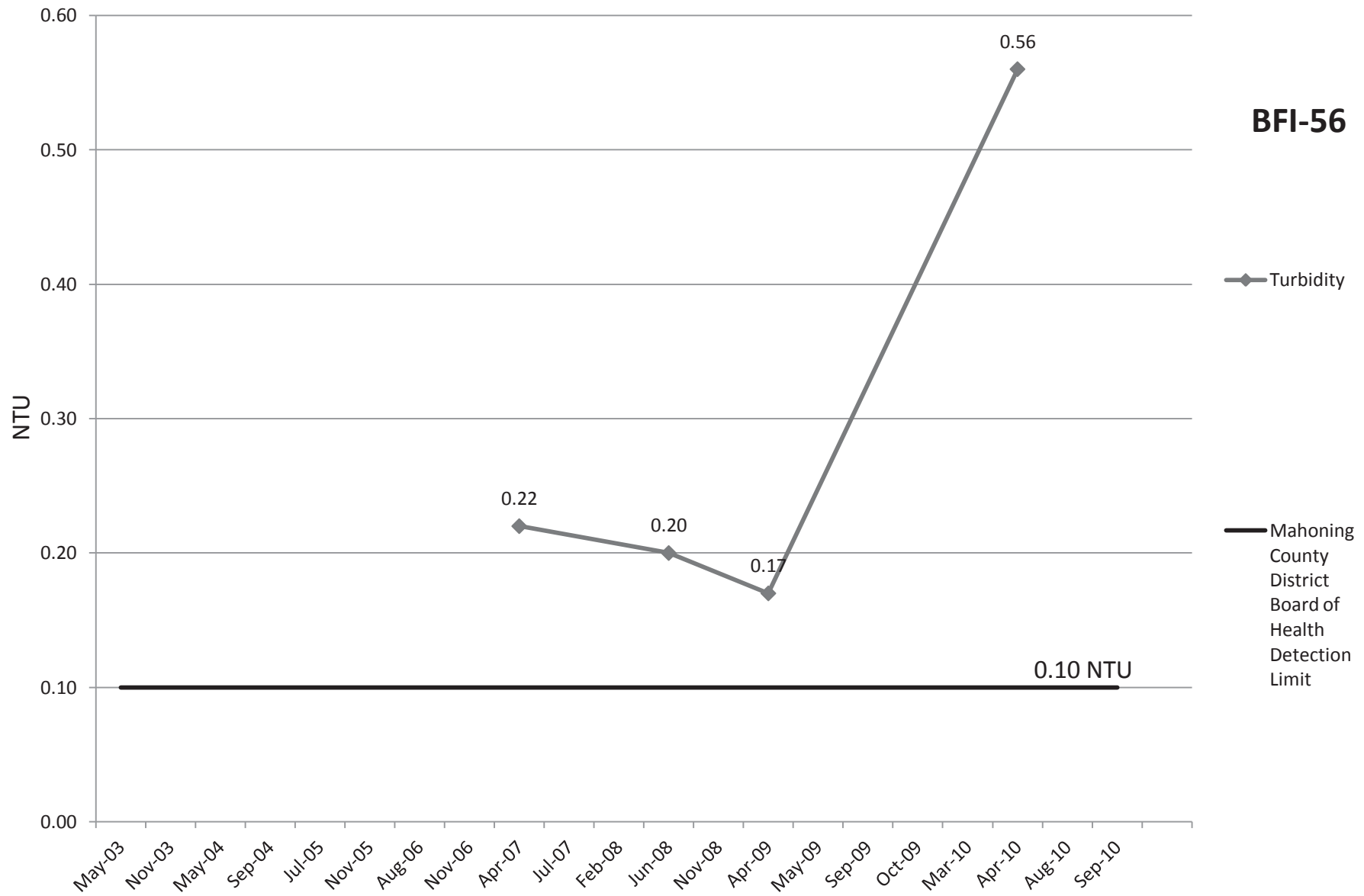
1.00

1.00

0.00

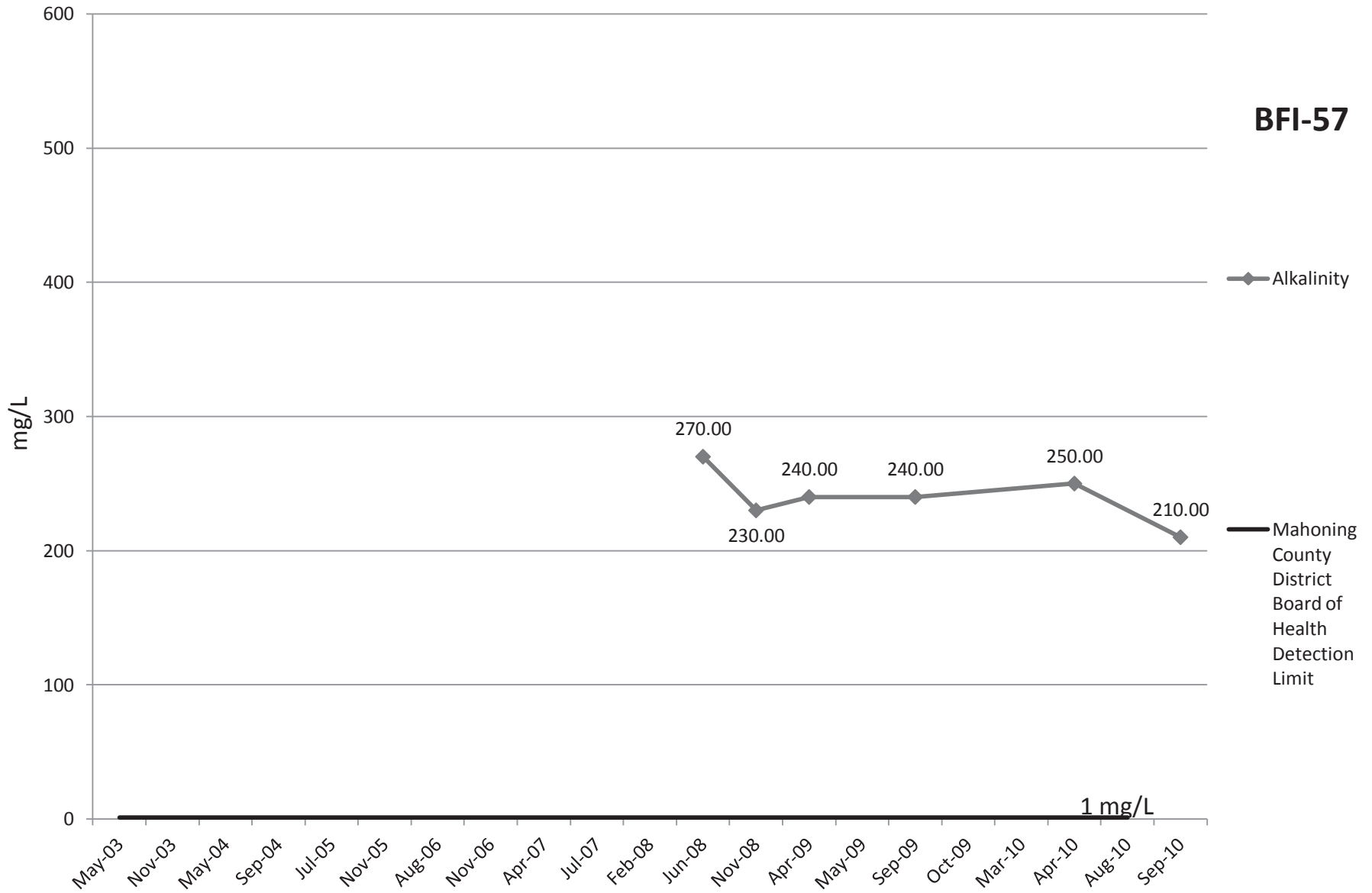


# Turbidity

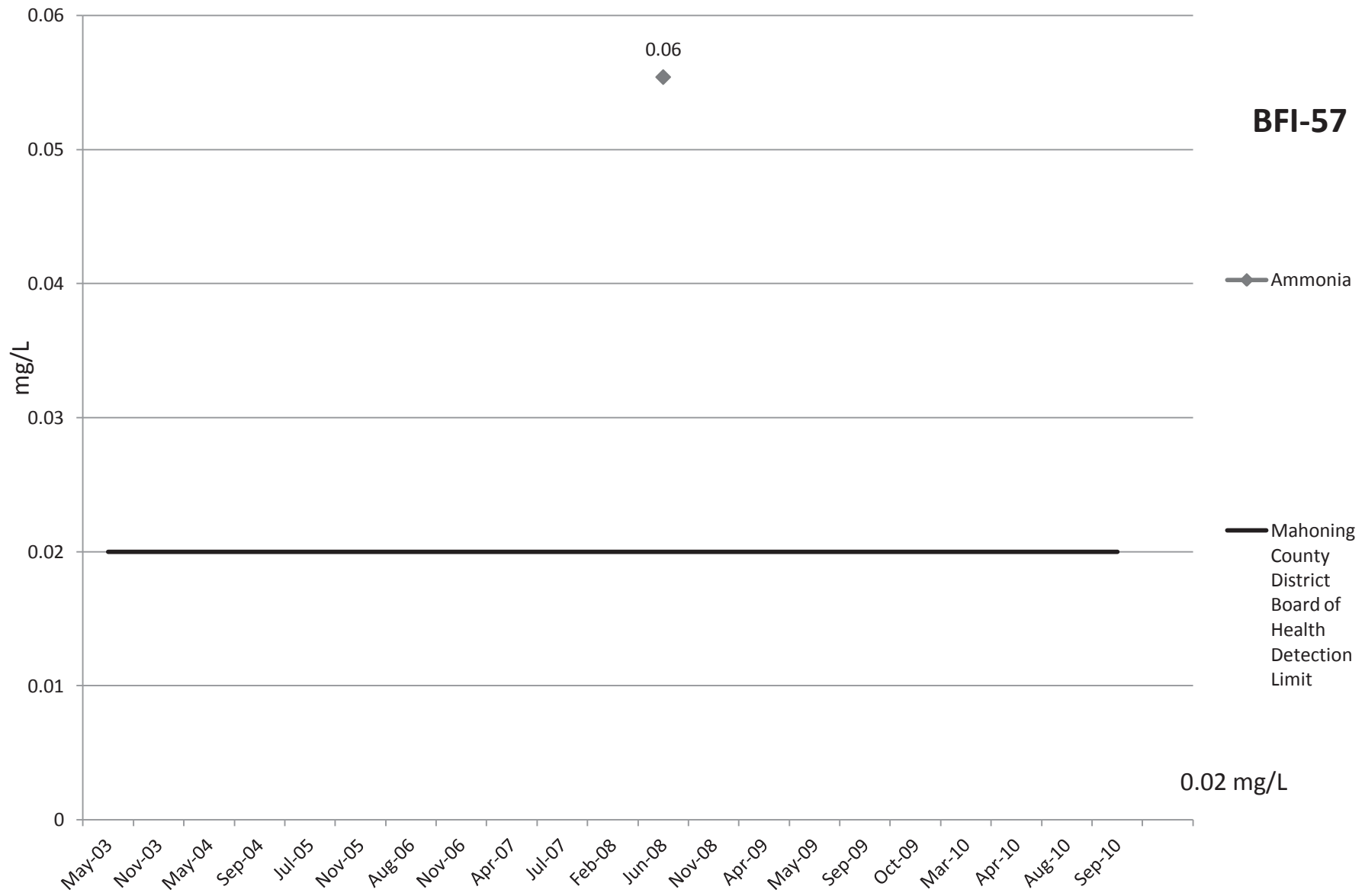


# Alkalinity

**BFI-57**



# Ammonia



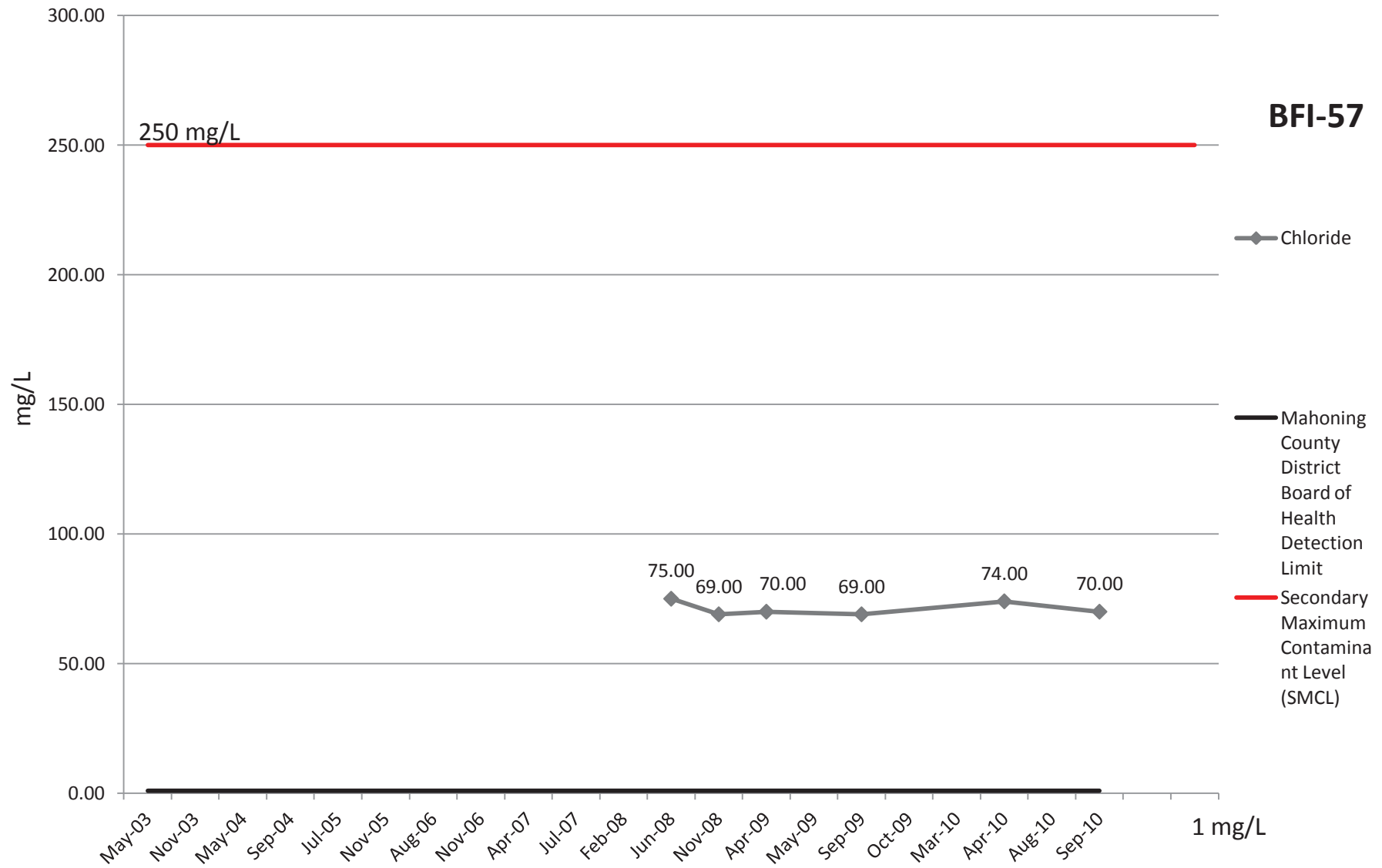
**BFI-57**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

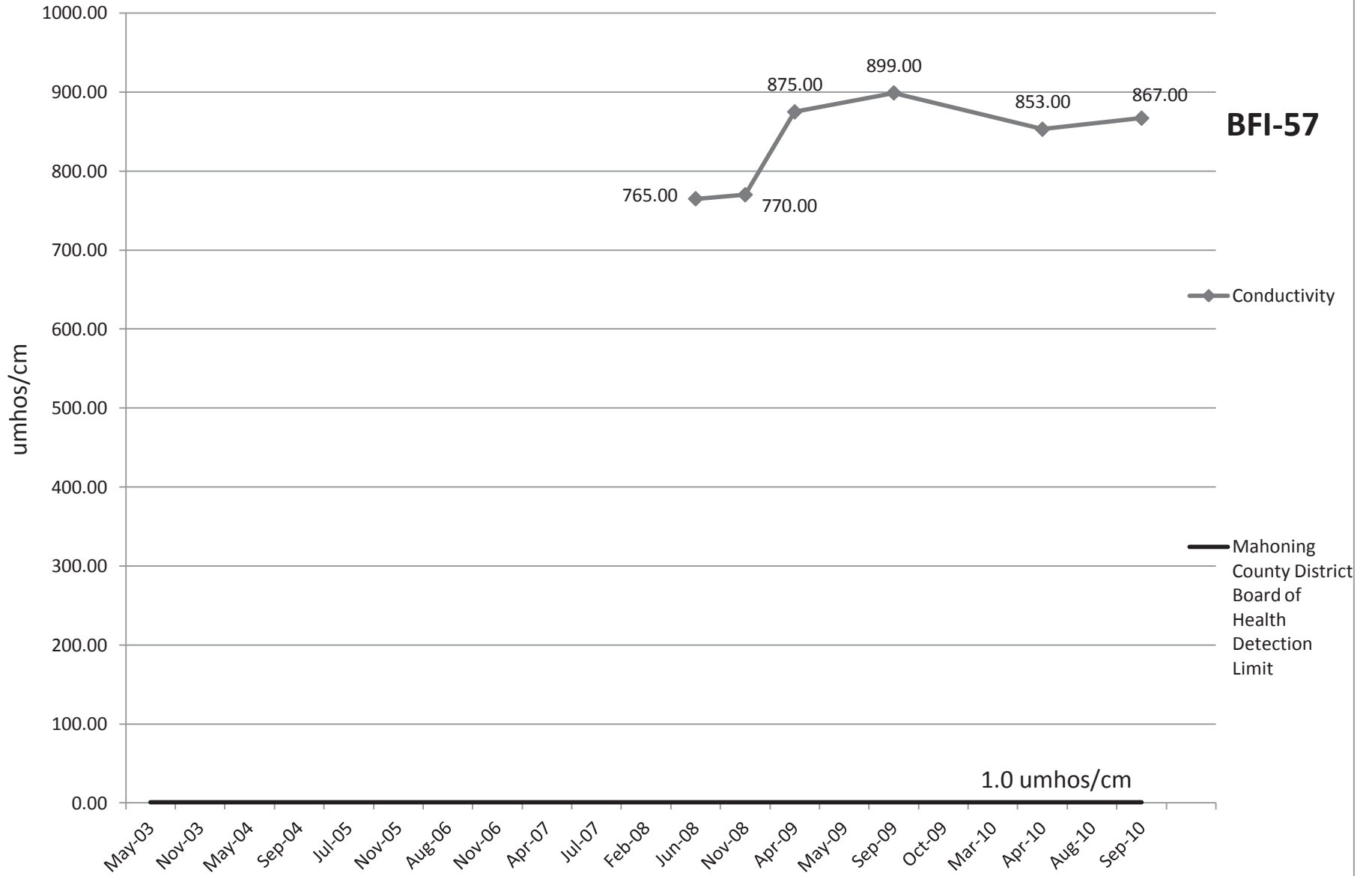
0.02 mg/L

# Chloride

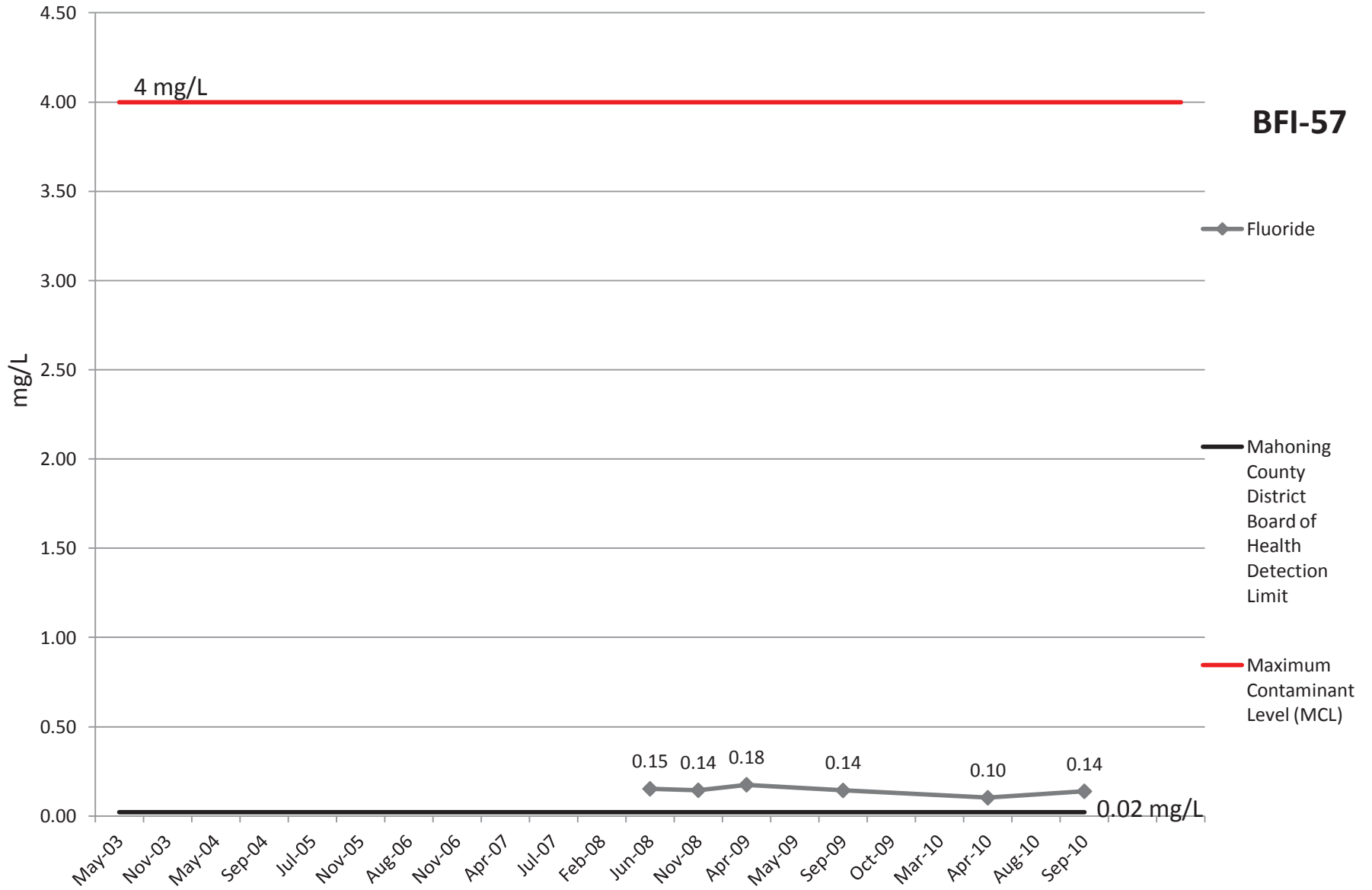


# Conductivity

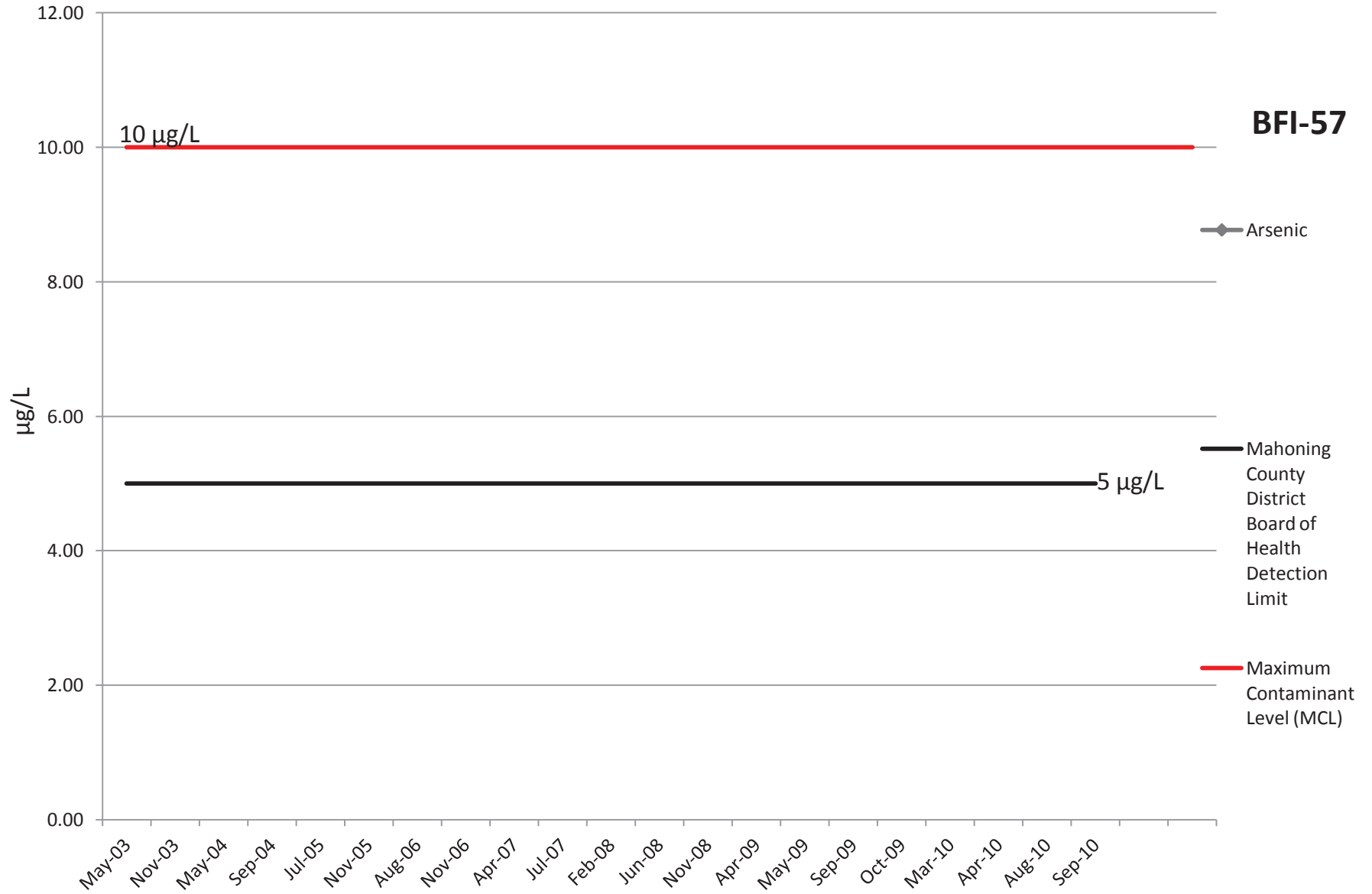
**BFI-57**



# Fluoride



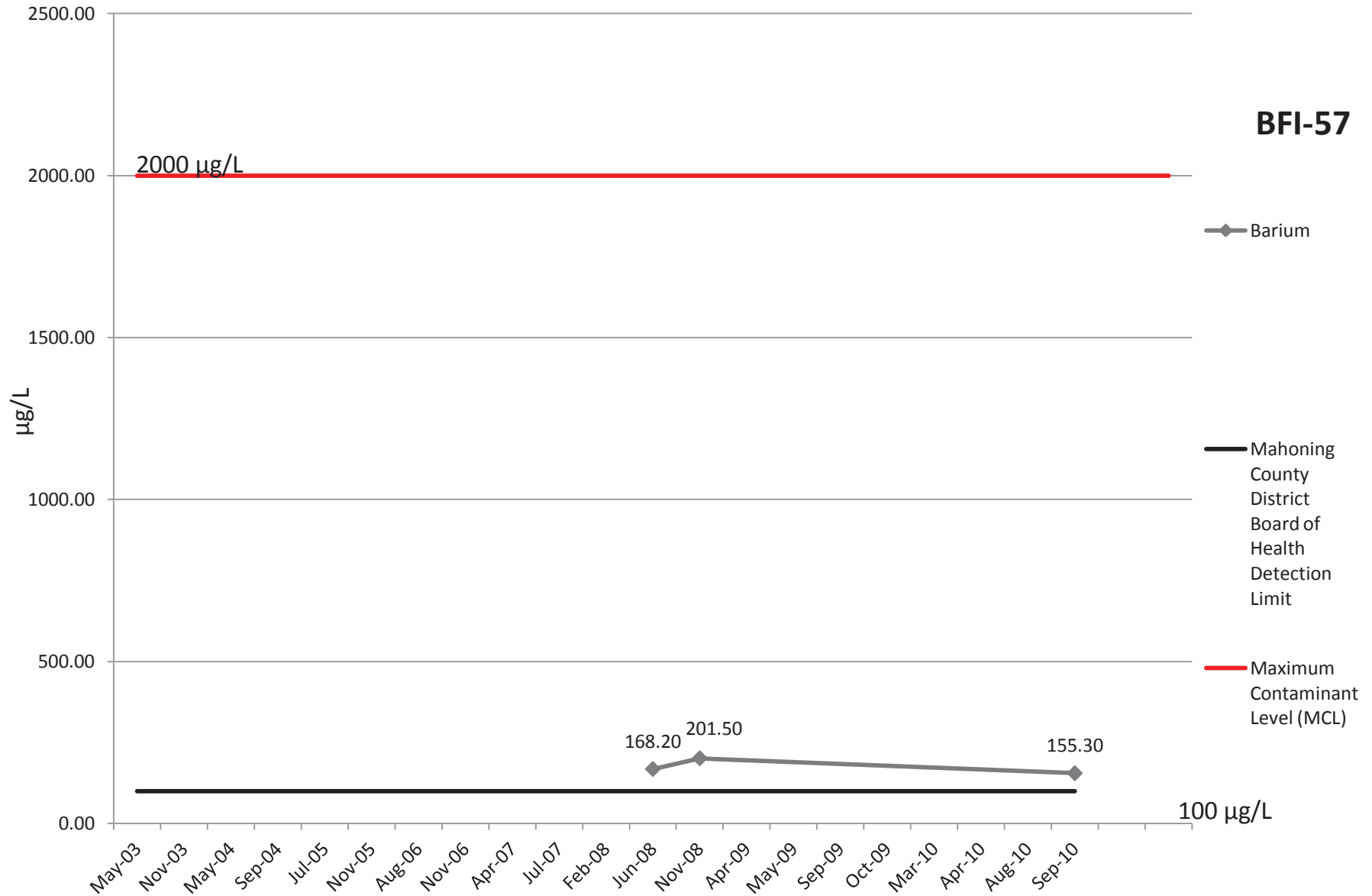
# Arsenic





# Barium

**BFI-57**



# Cadmium

**BFI-57**

10 µg/L

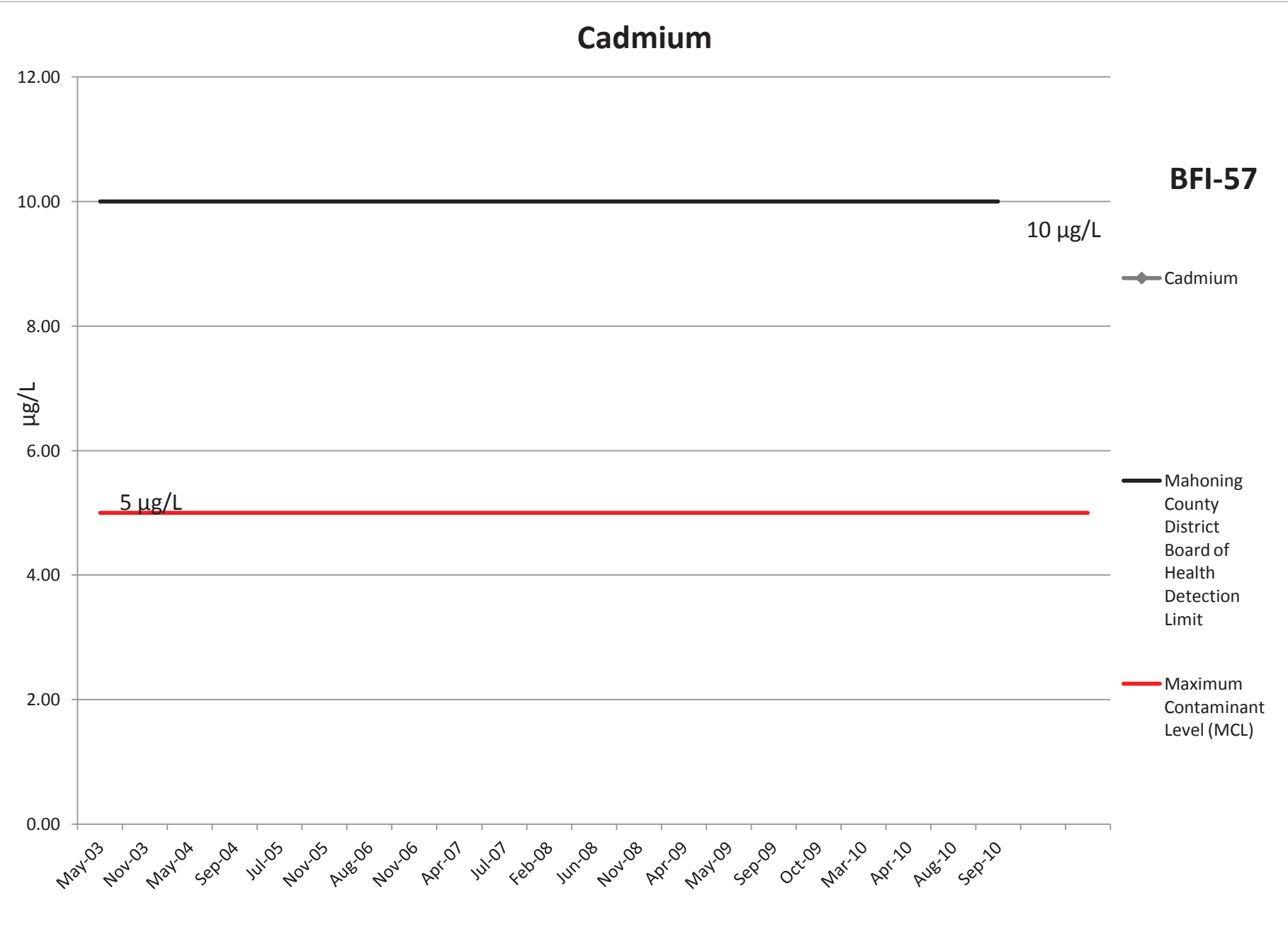
12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

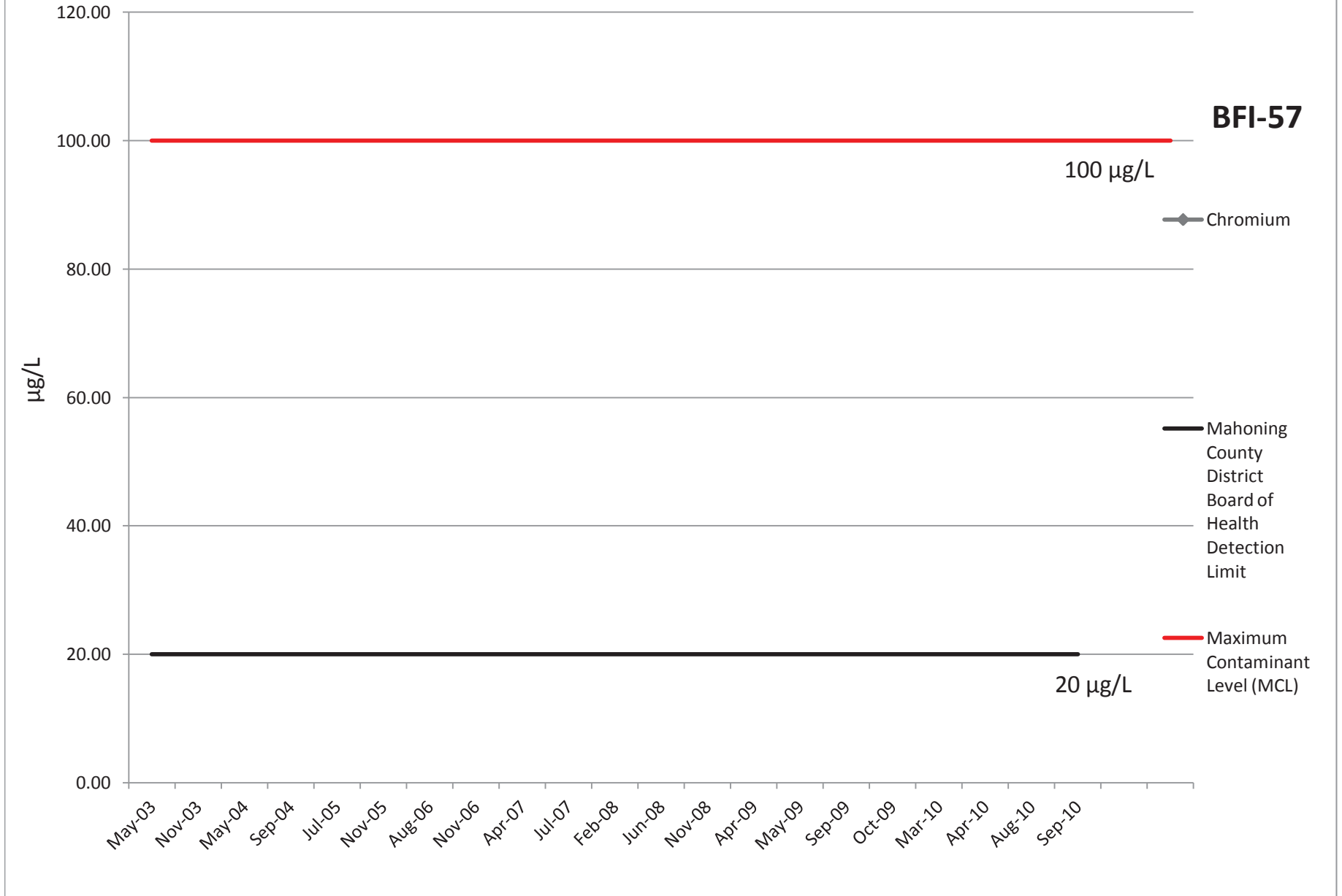
5 µg/L

- ◆ Cadmium
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

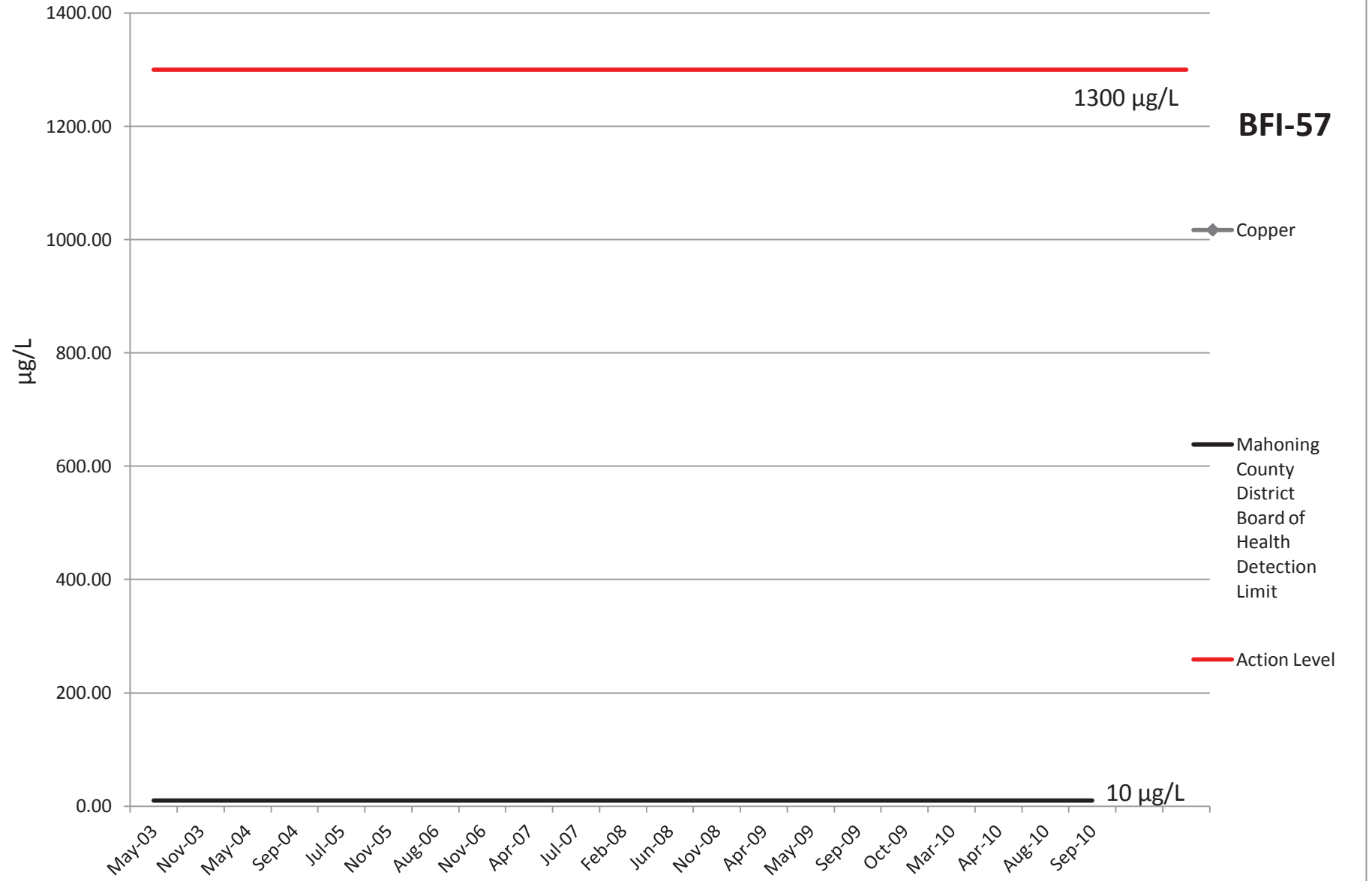
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# Chromium

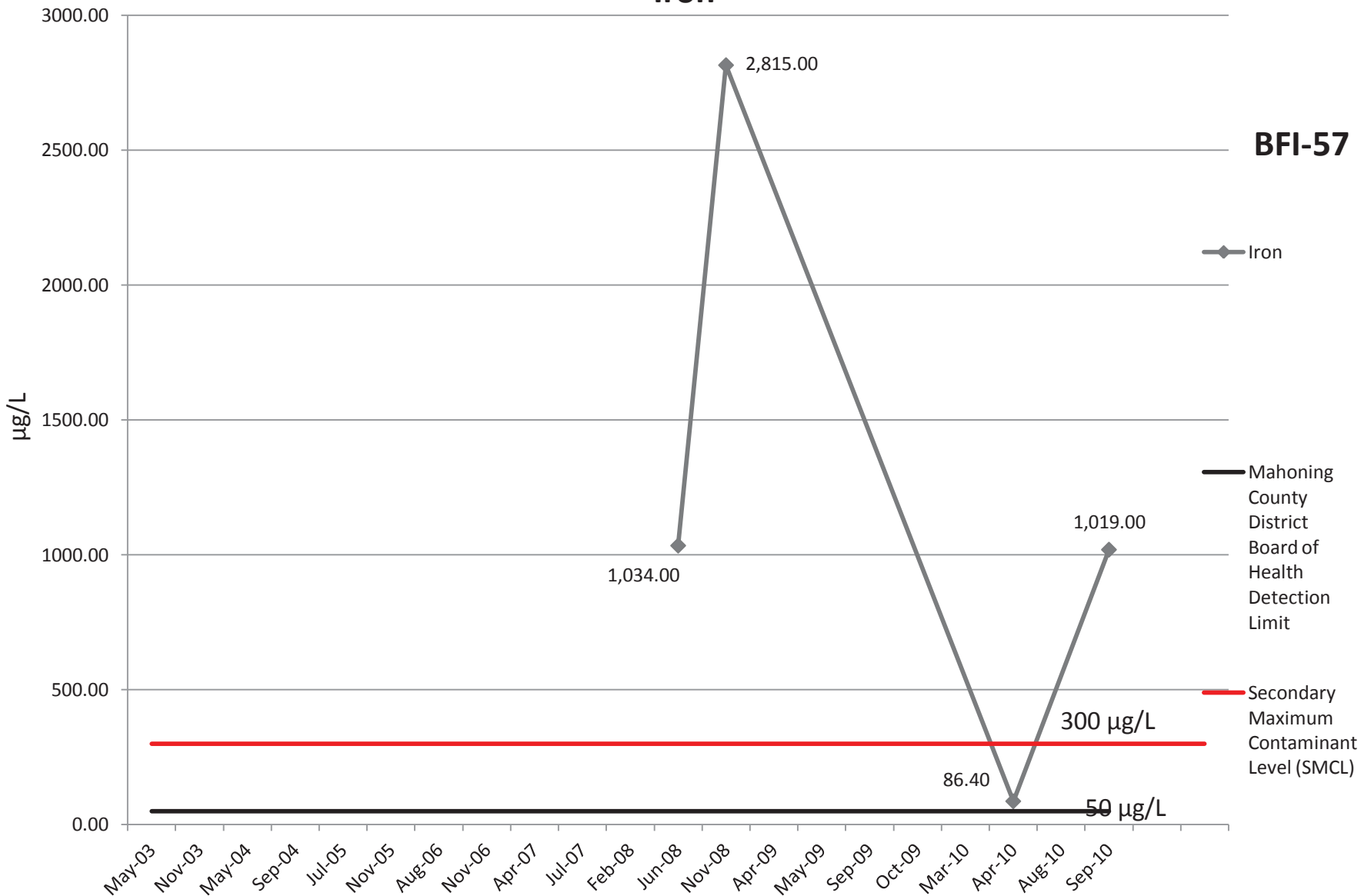


# Copper



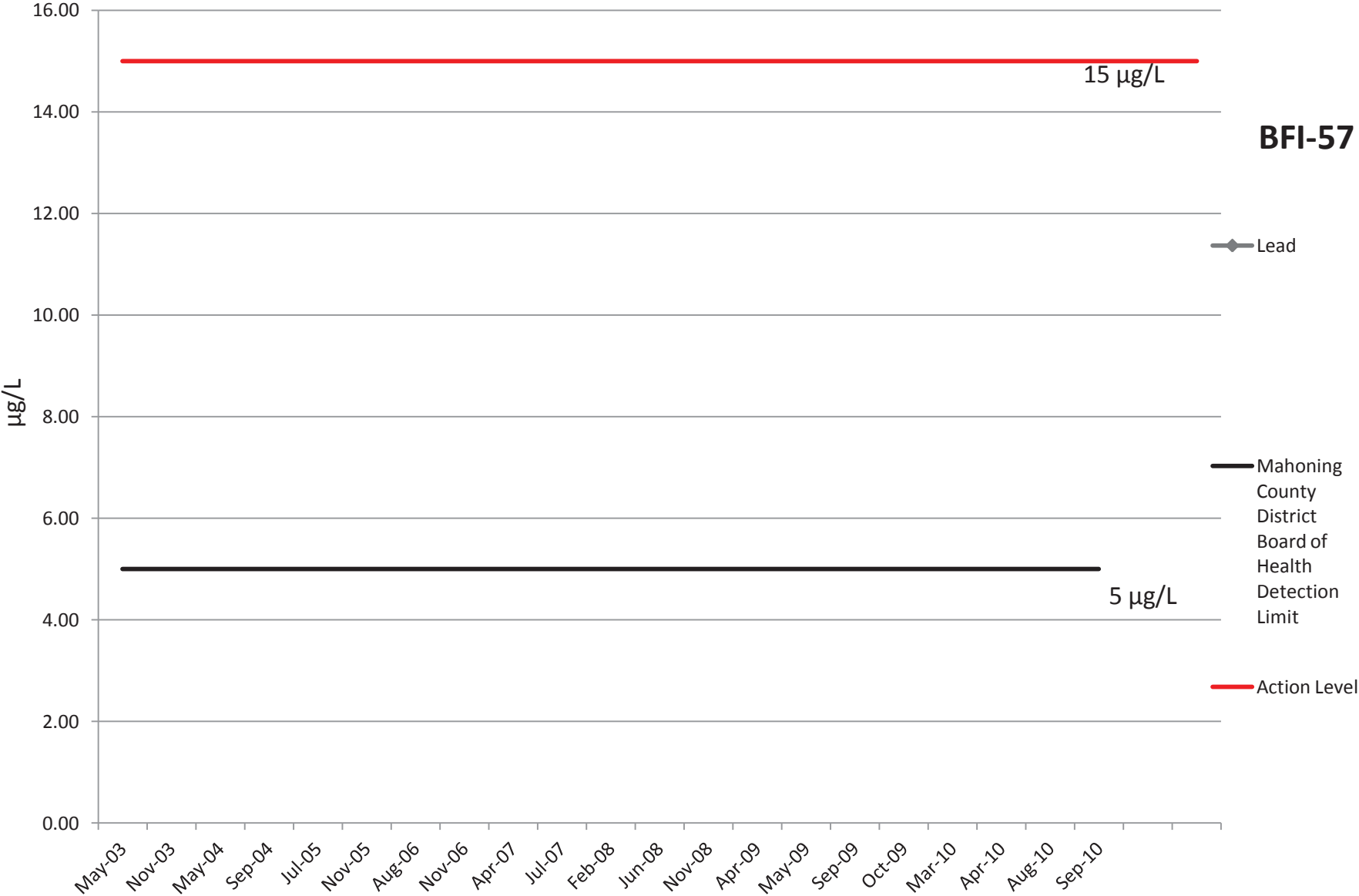
# Iron

**BFI-57**



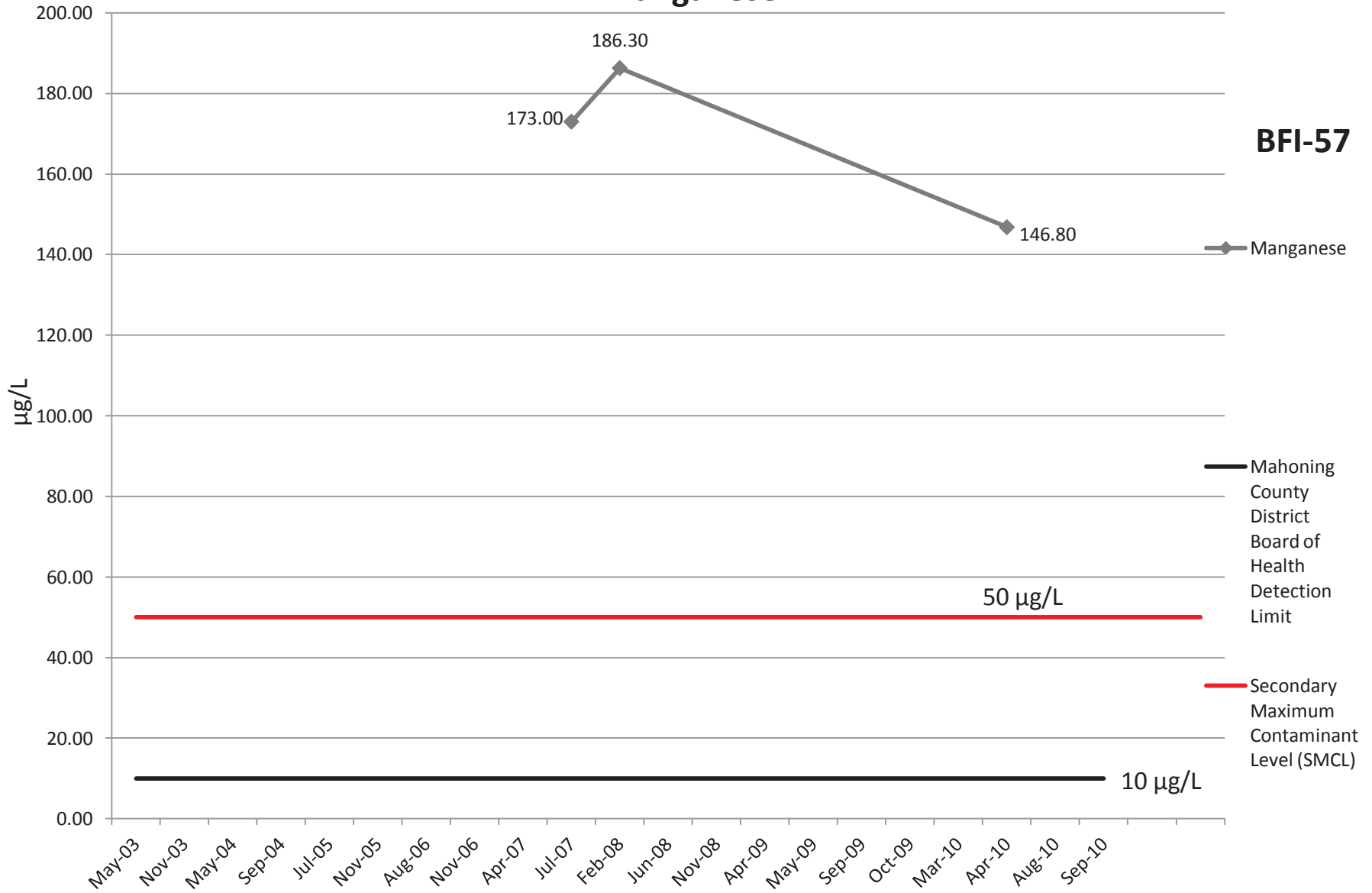
# Lead

**BFI-57**



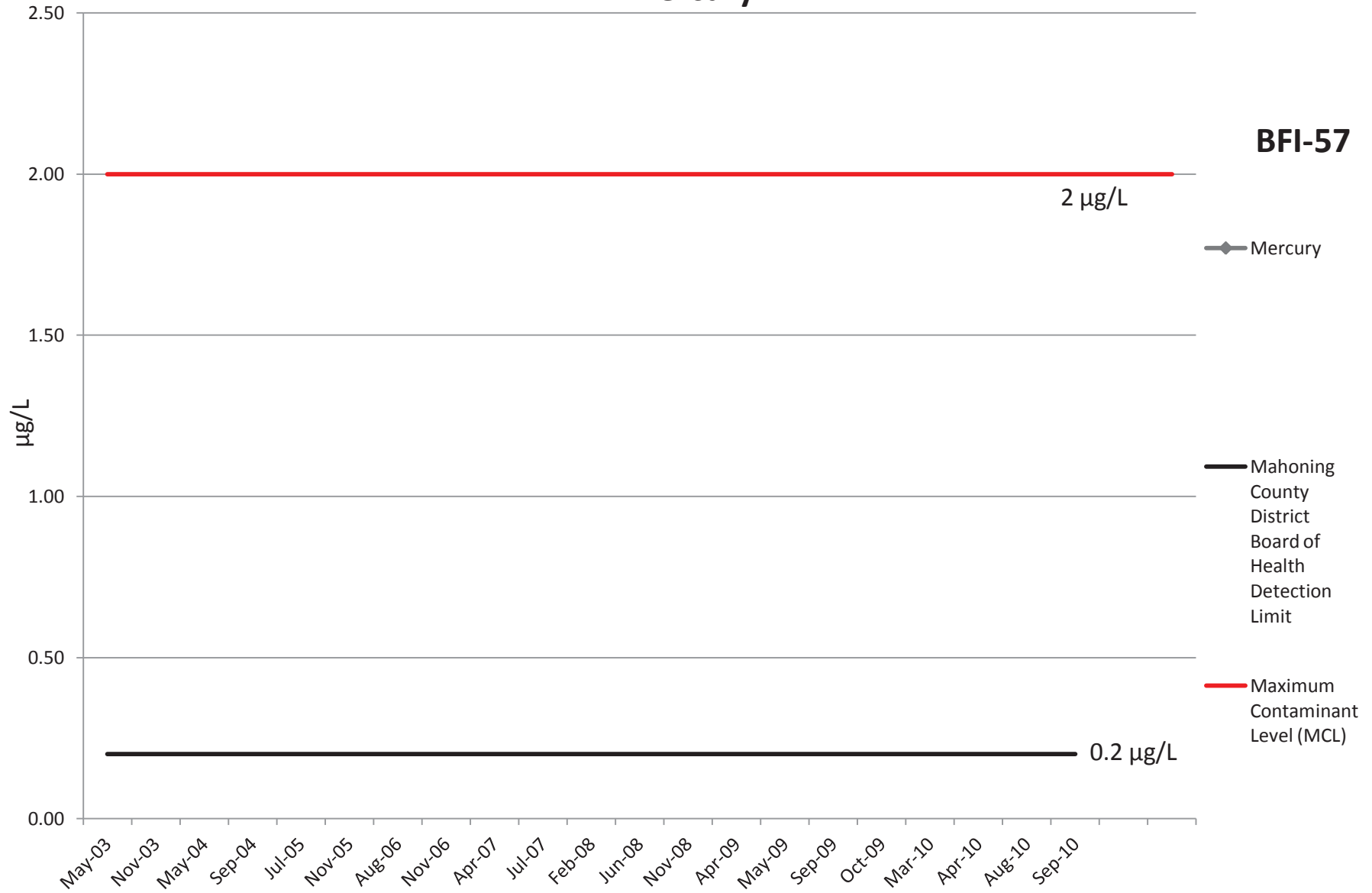
# Manganese

**BFI-57**



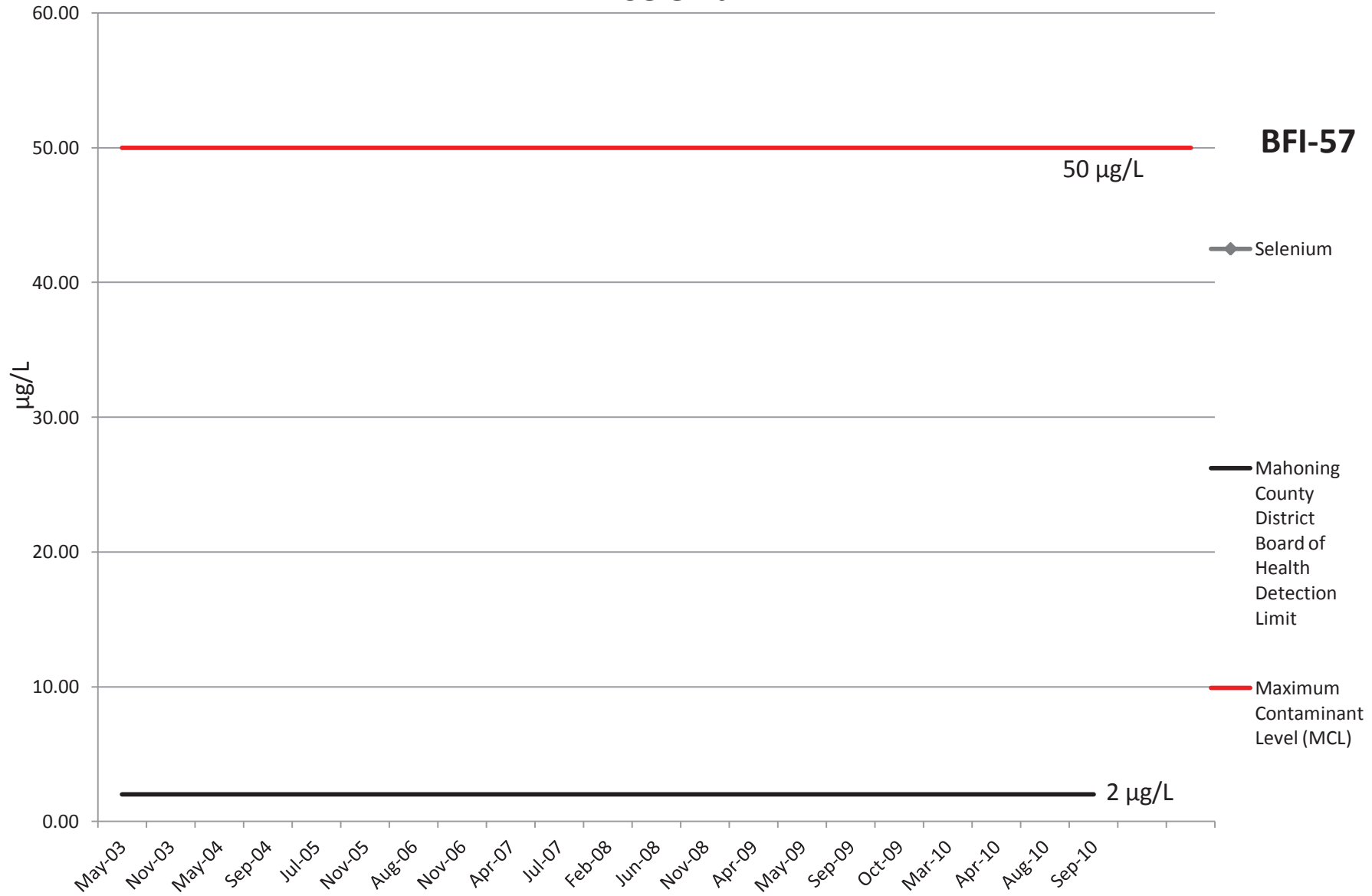
# Mercury

**BFI-57**



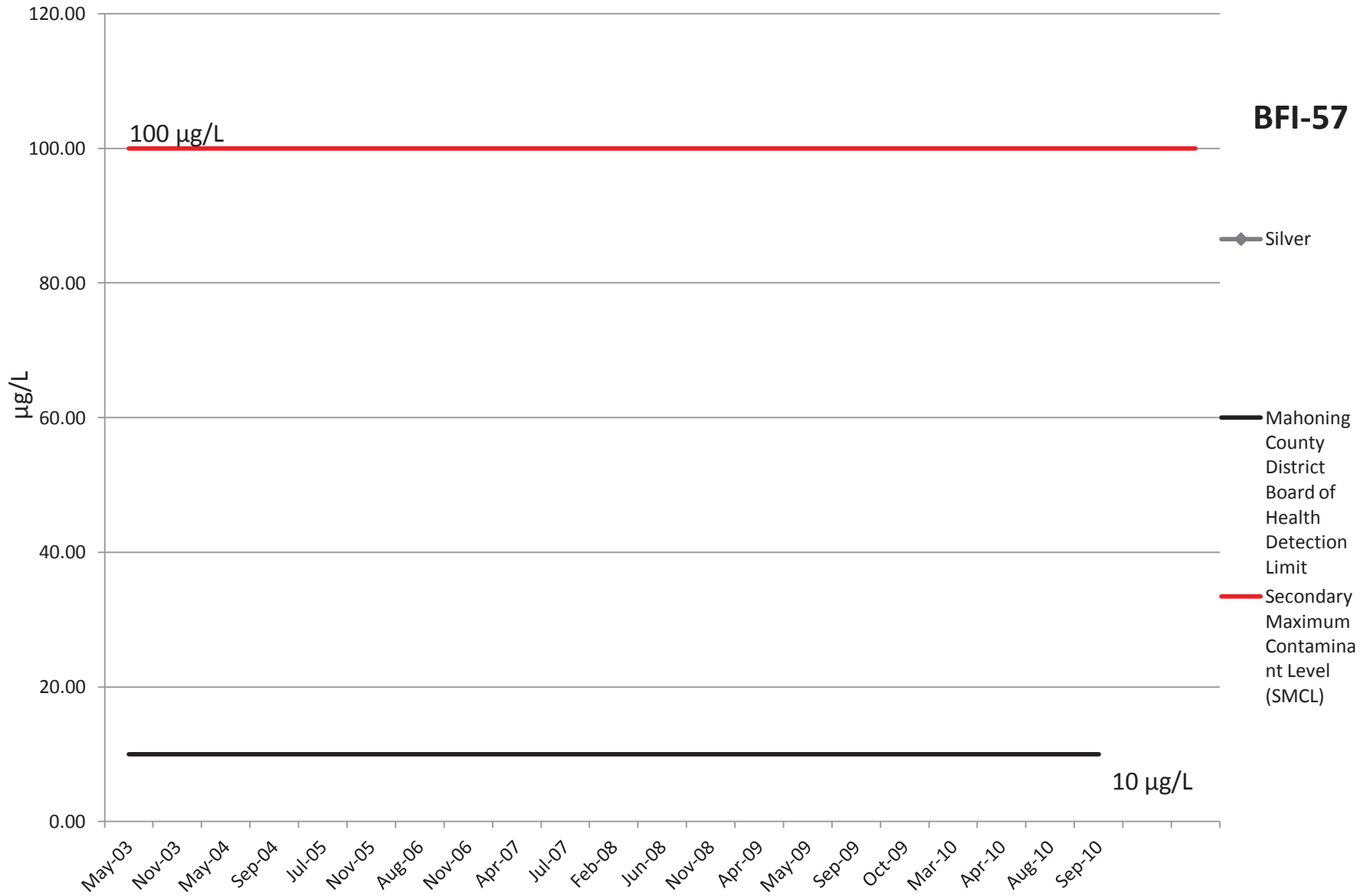


# Selenium

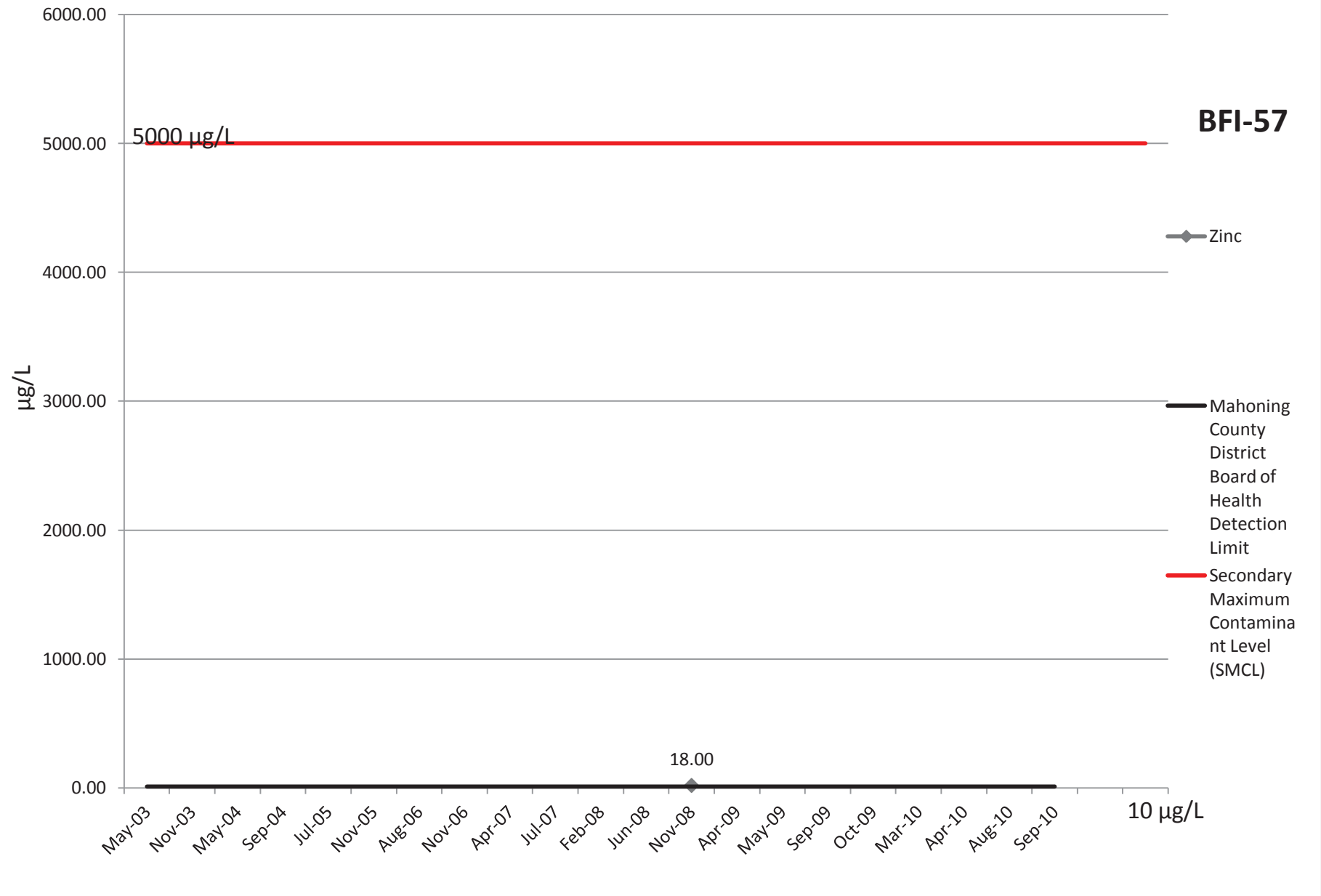


# Silver

**BFI-57**

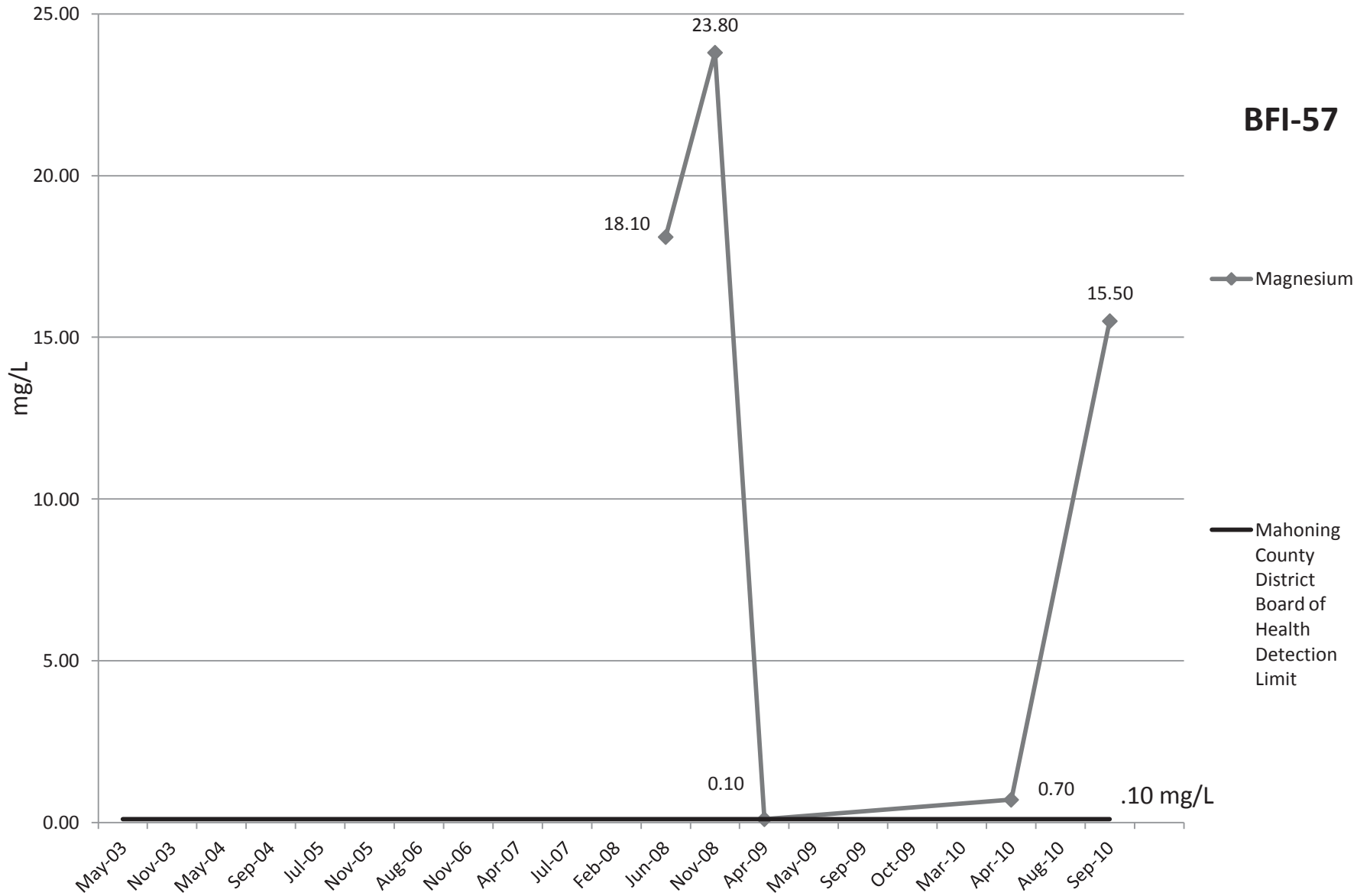


# Zinc

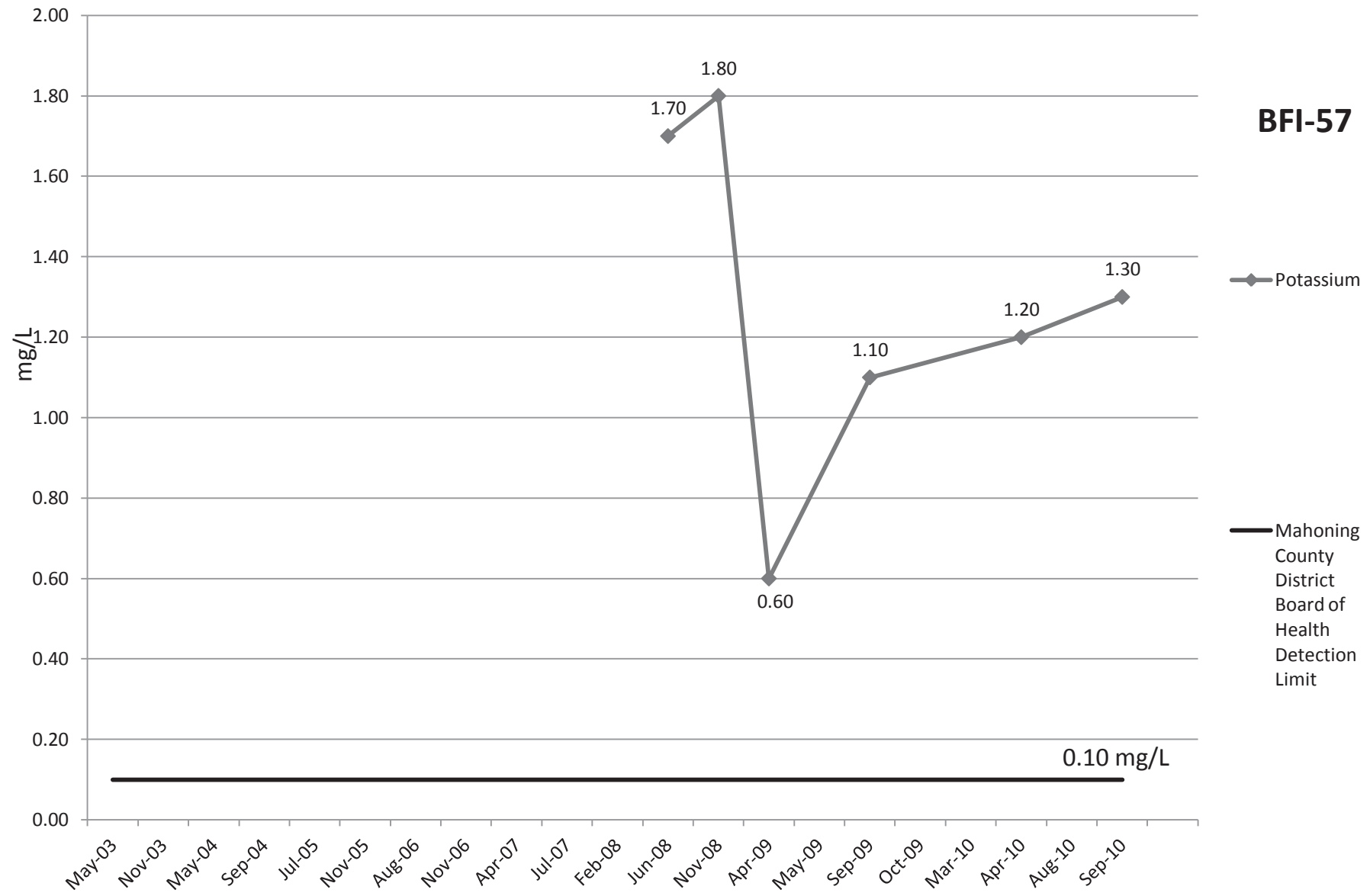


# Magnesium

**BFI-57**

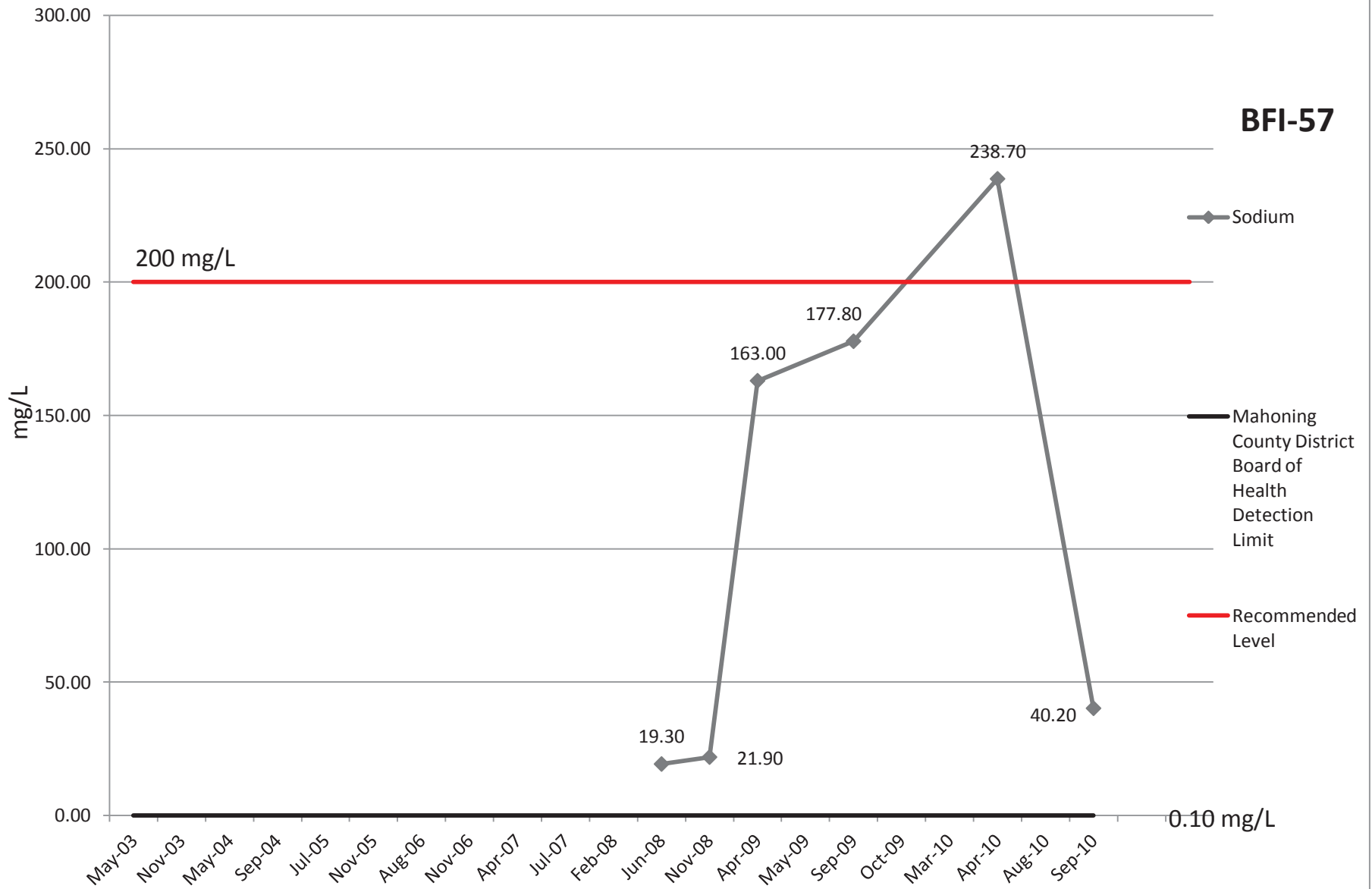


# Potassium



# Sodium

**BFI-57**



# Nitrate EPA

**BFI-57**

10 mg/L

12.00

10.00

8.00

6.00

4.00

2.00

0.00

mg/L

◆ Nitrate EPA

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

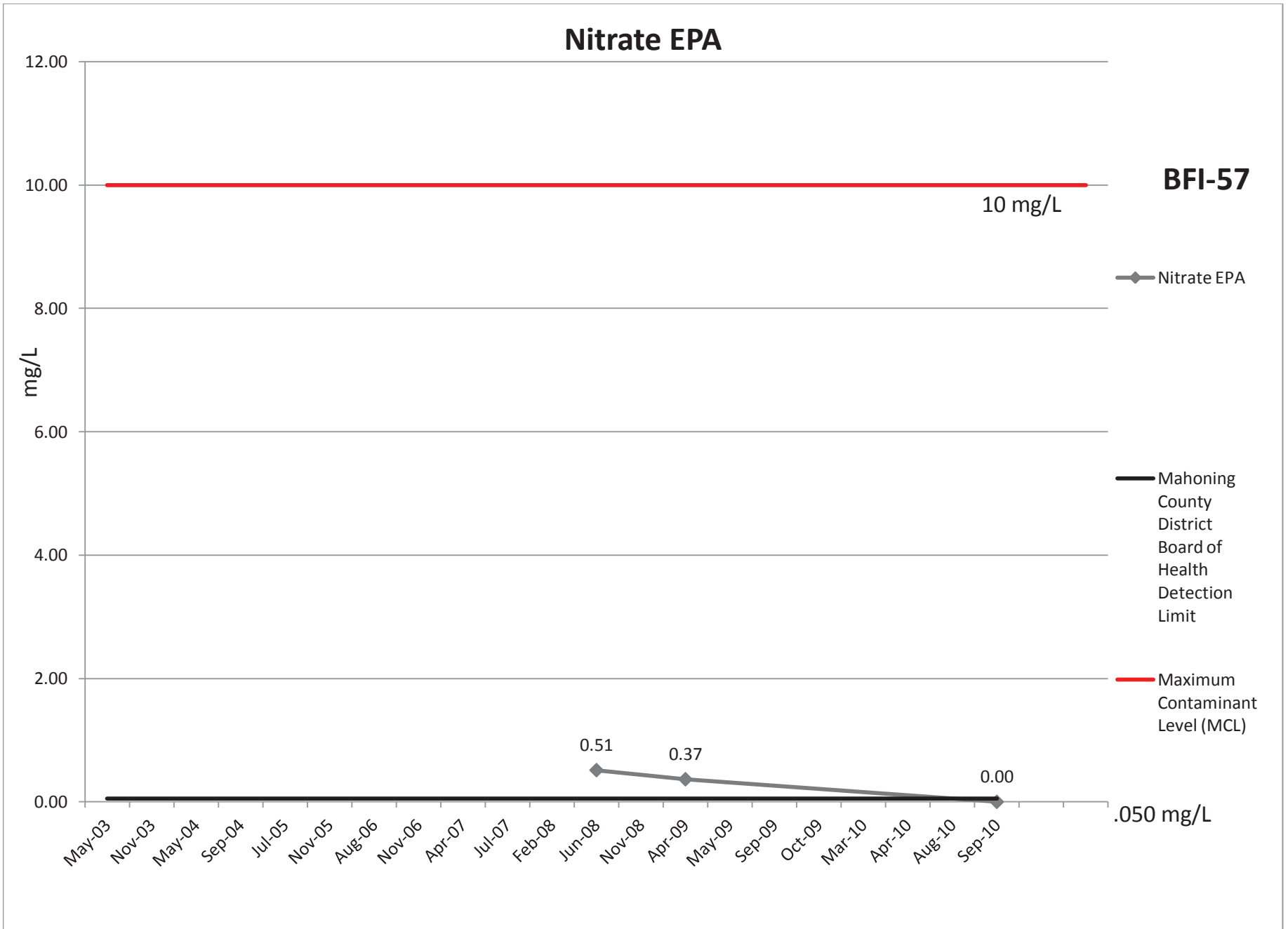
.050 mg/L

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

0.51

0.37

0.00



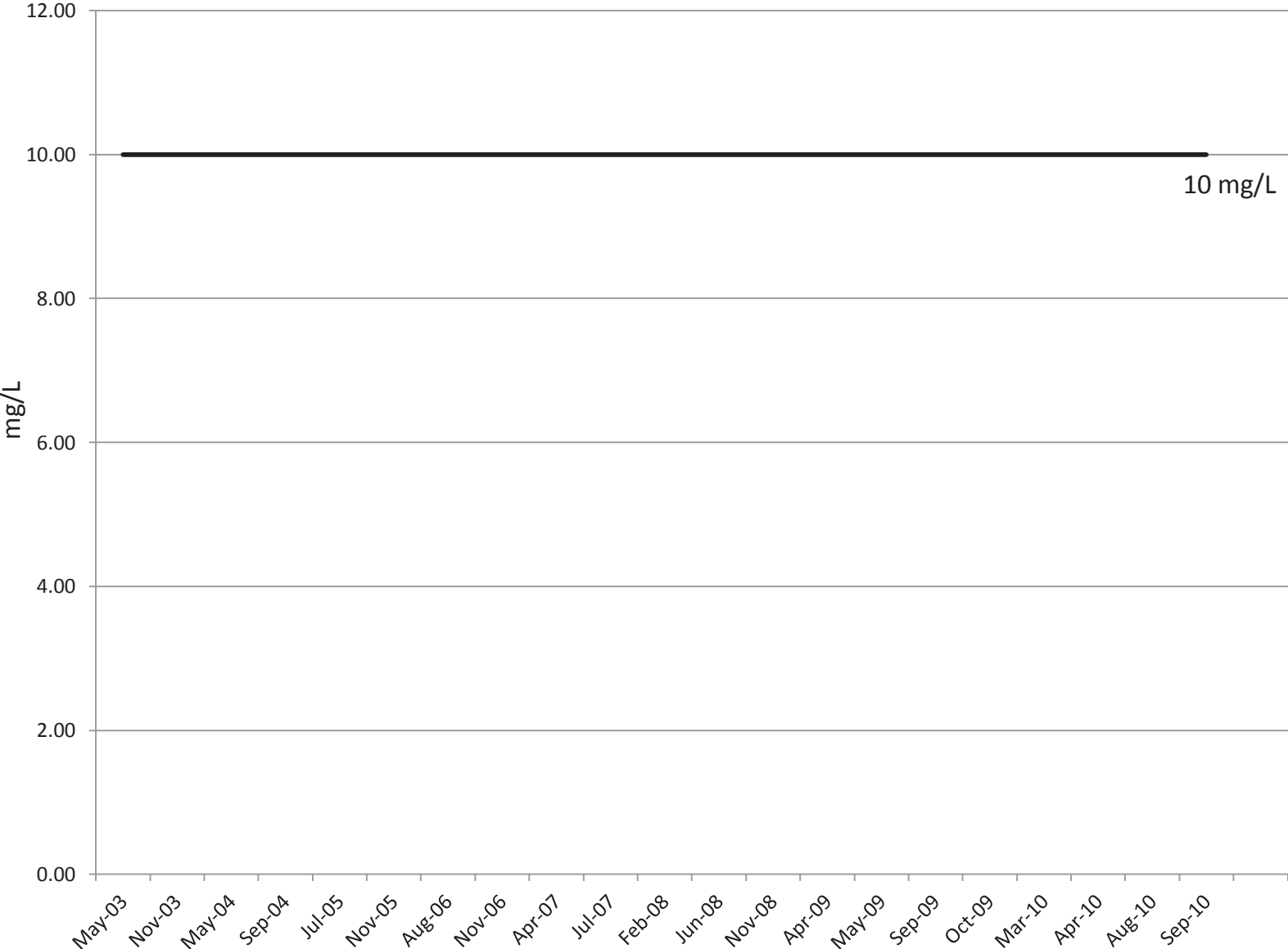
# COD

**BFI-57**

10 mg/L

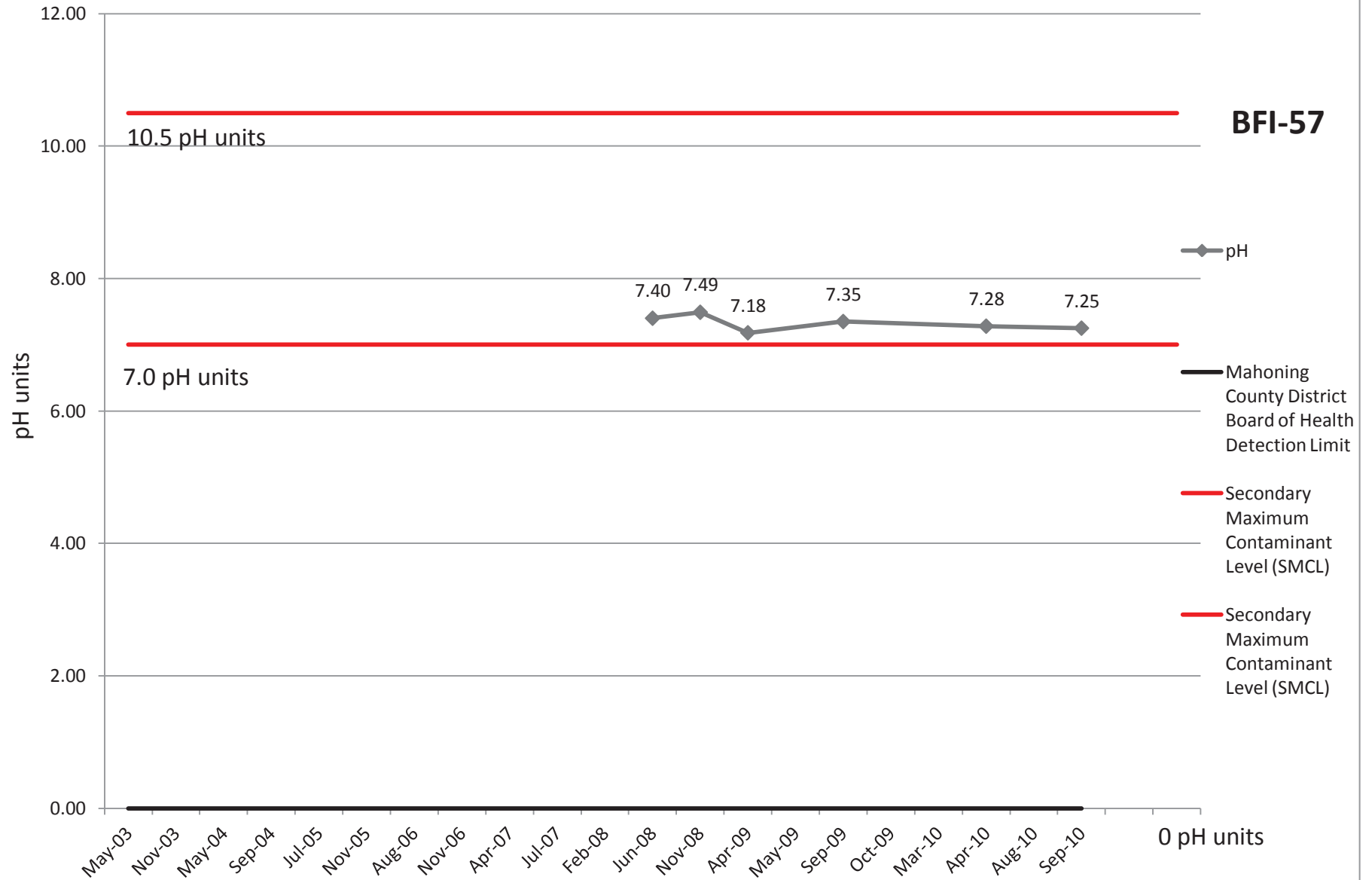
◆ COD

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit



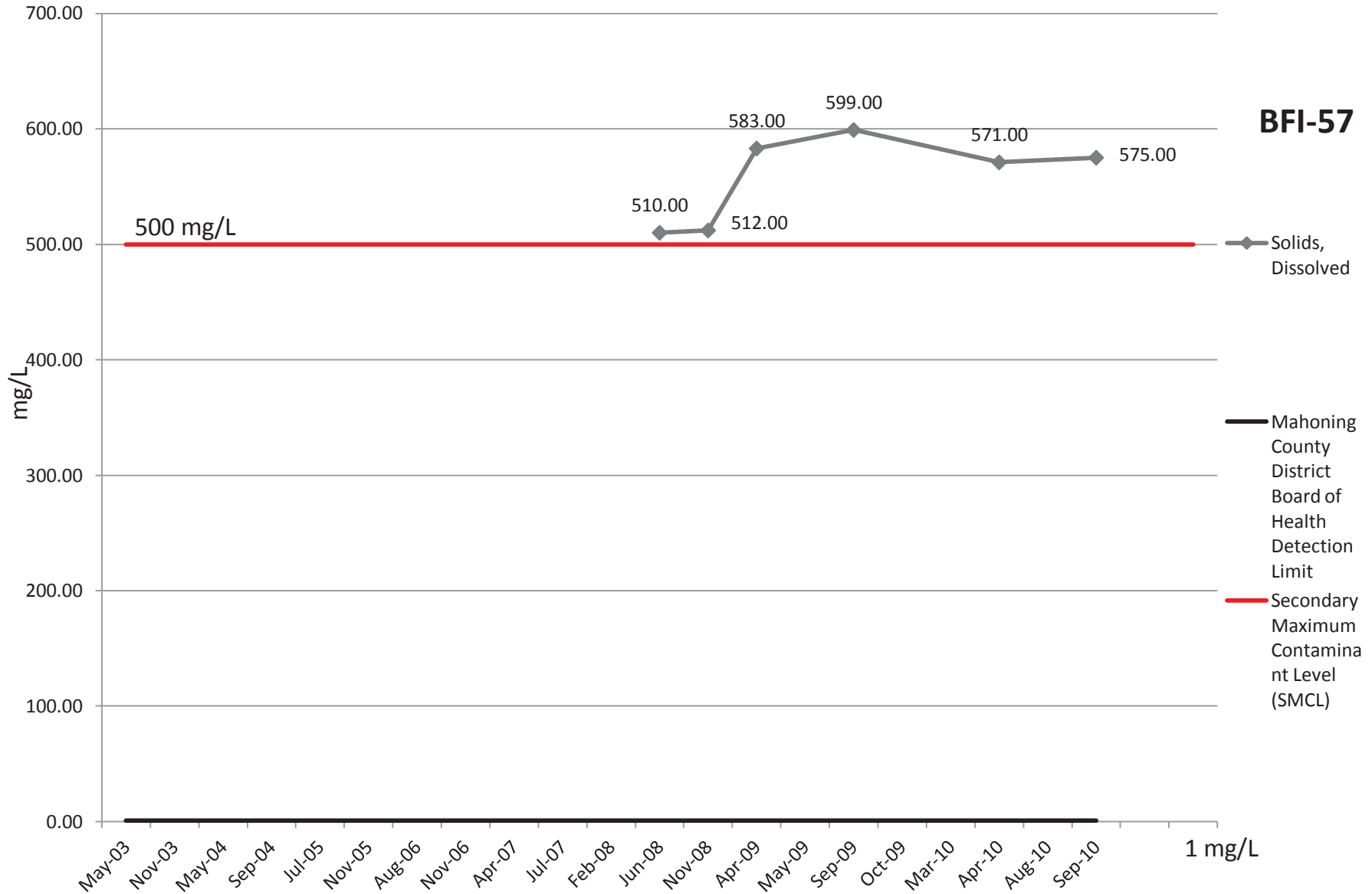


# pH



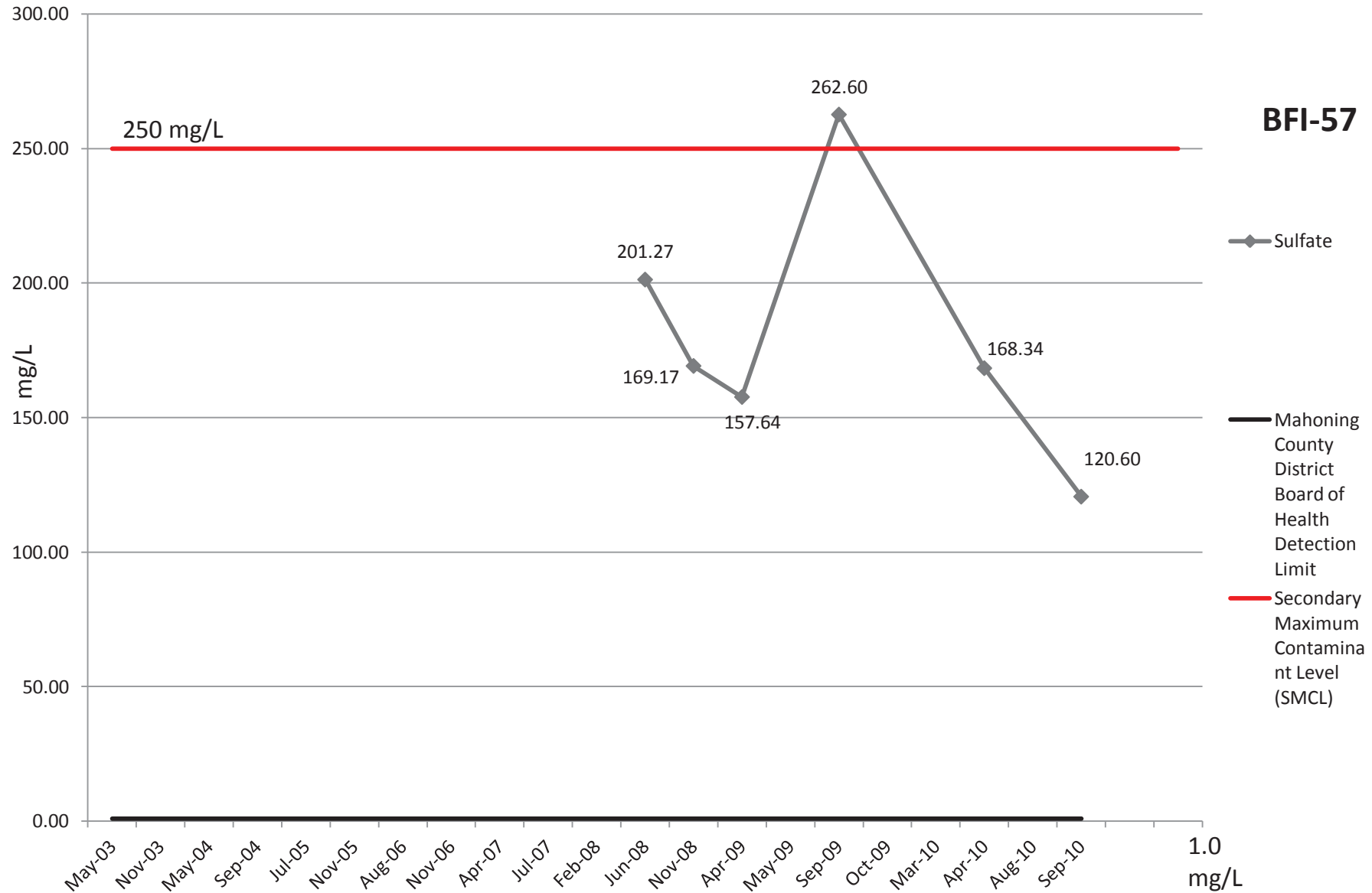
# Solids, Dissolved

**BFI-57**



# Sulfate

**BFI-57**



# Bacteria

**BFI-57**

Positive/Negative

◆ Bacteria

positive (1)

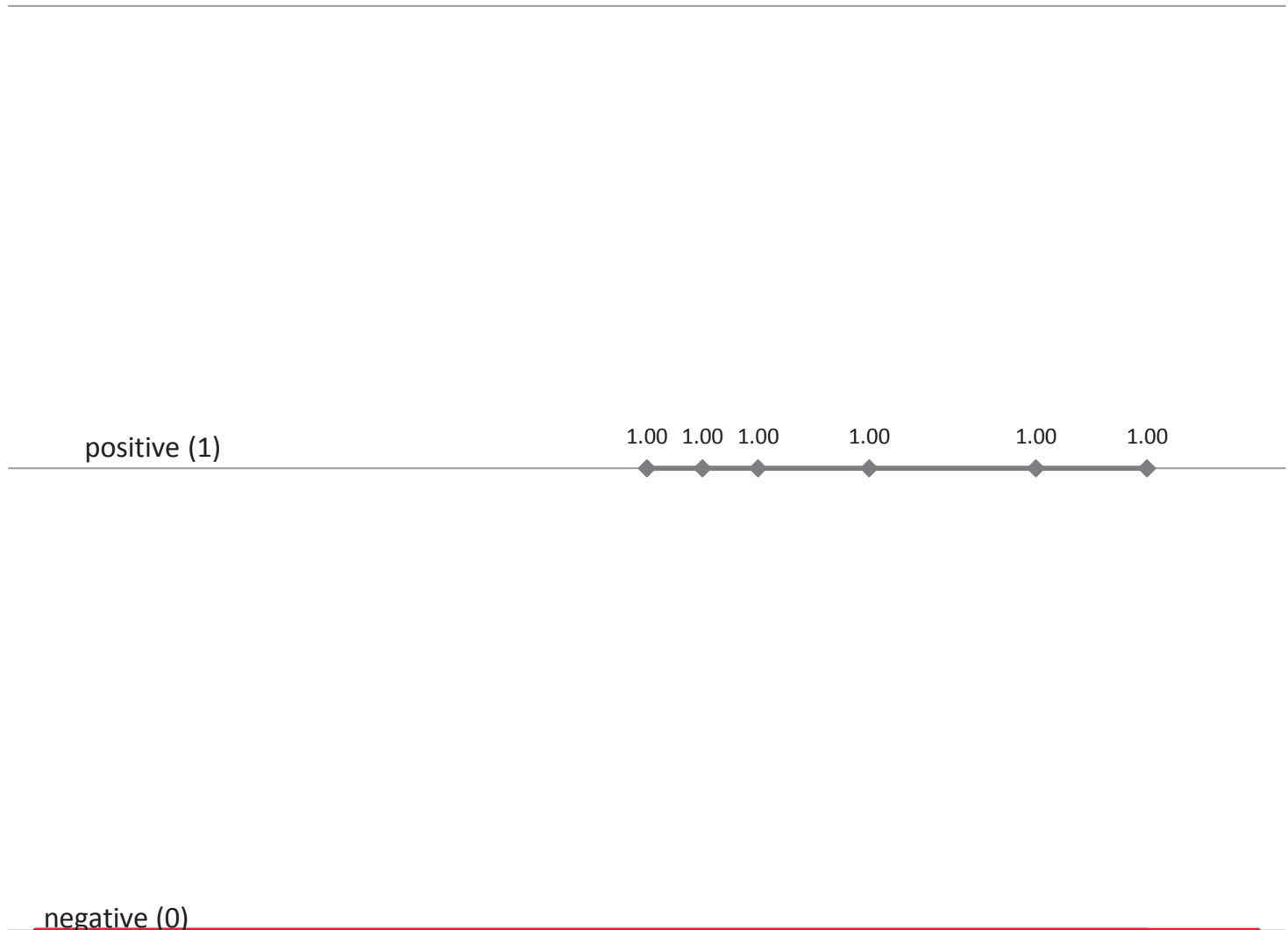
1.00 1.00 1.00 1.00 1.00 1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

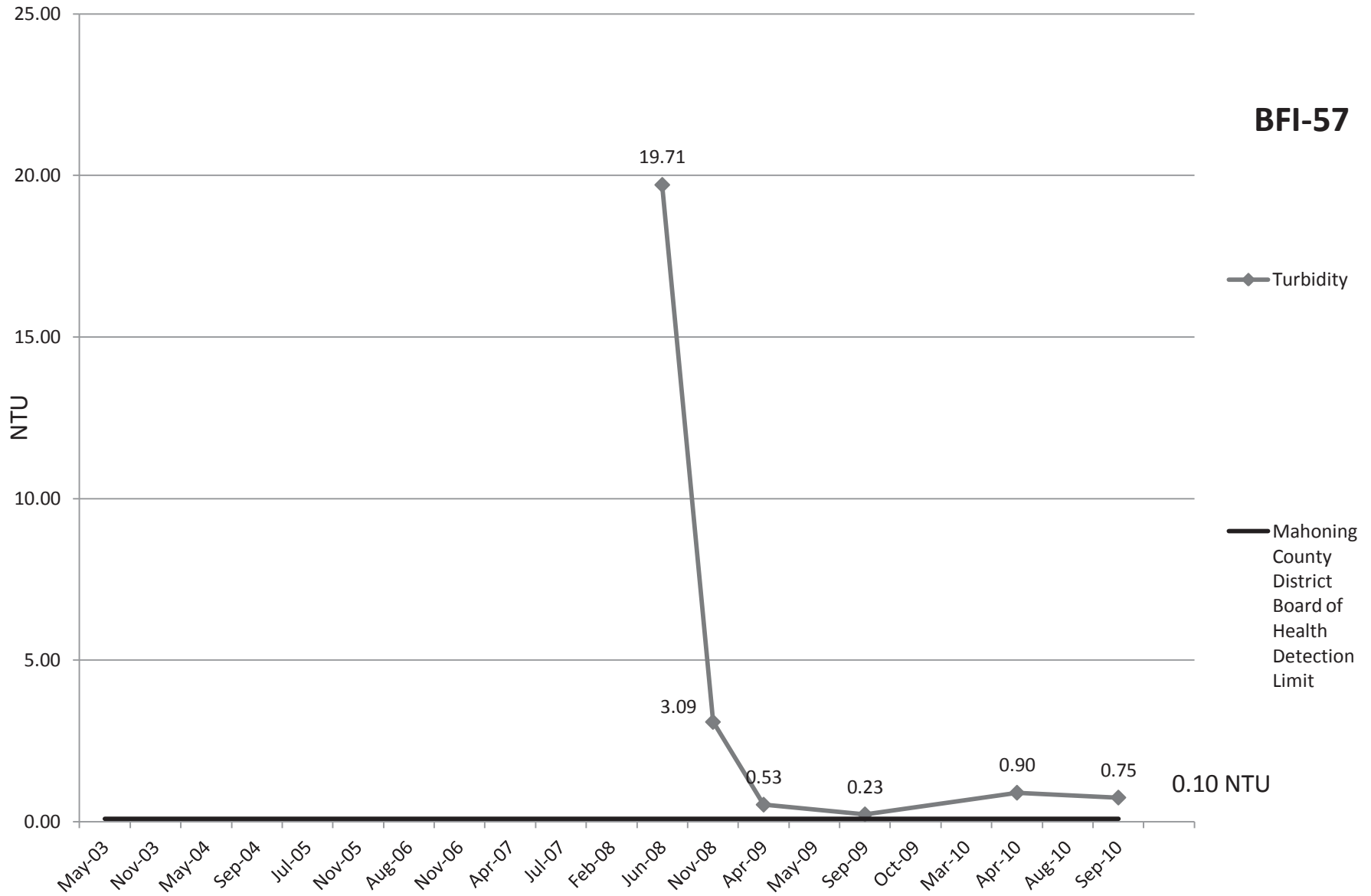
negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



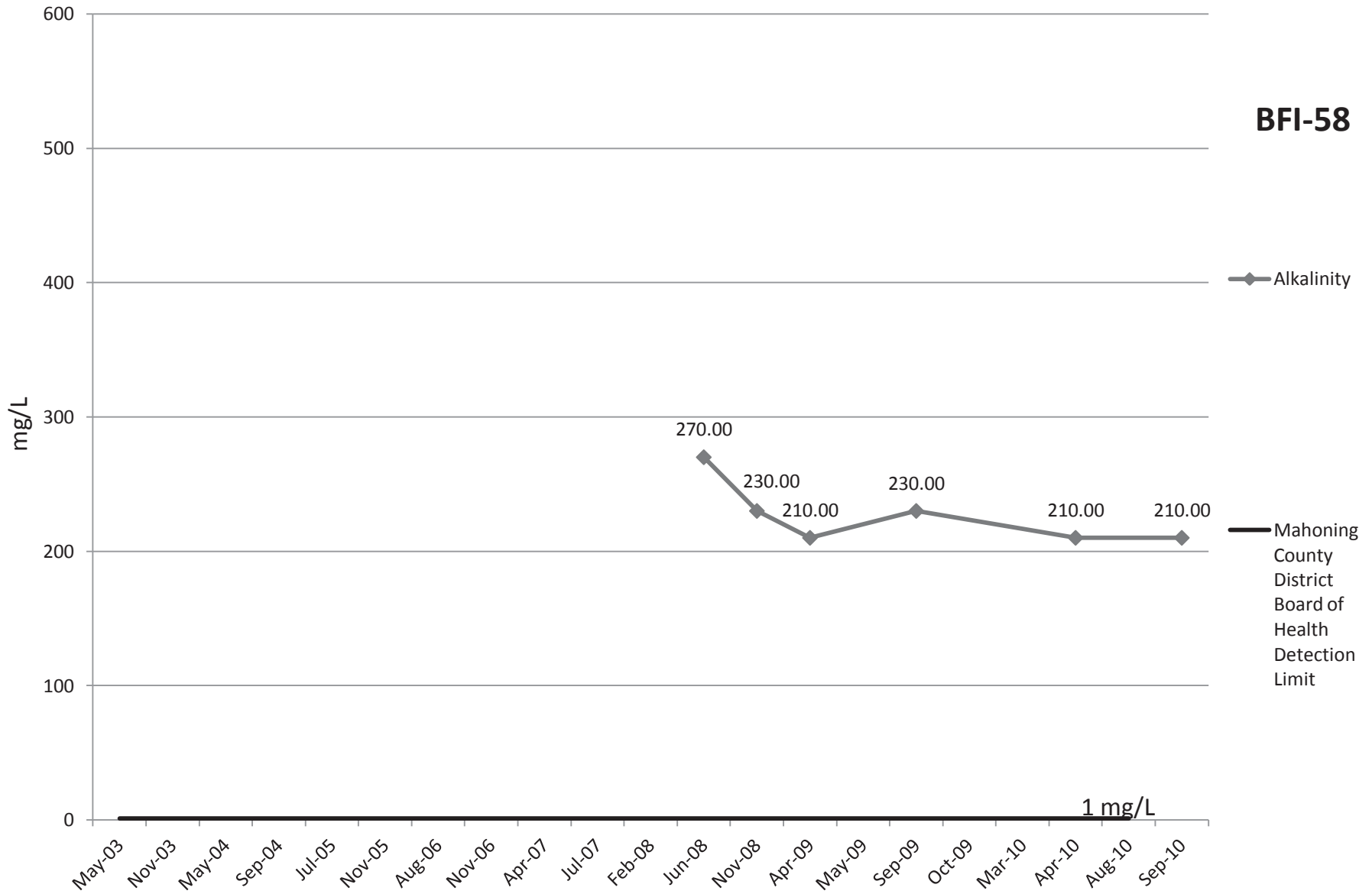
# Turbidity

**BFI-57**

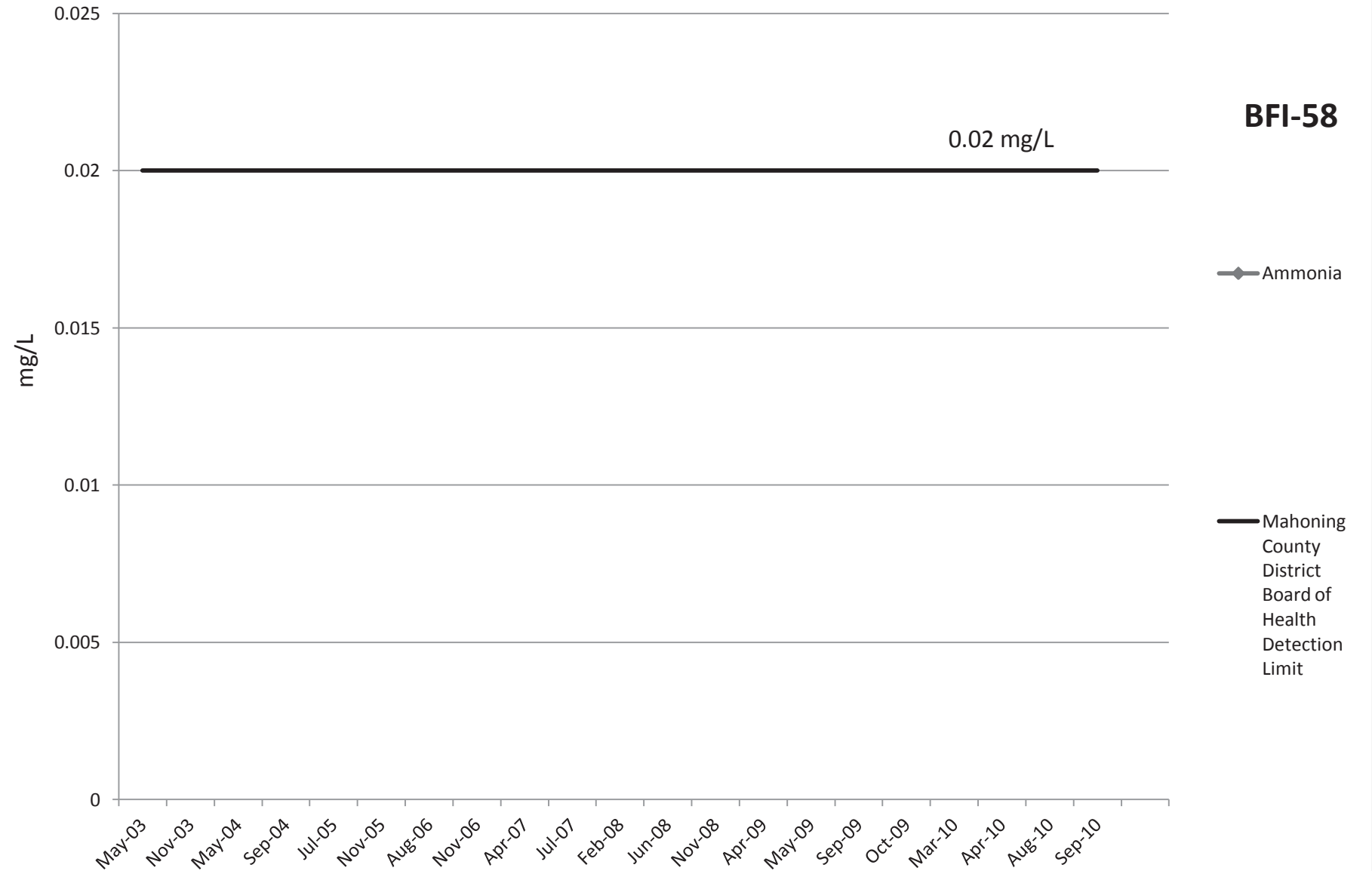


# Alkalinity

**BFI-58**



# Ammonia

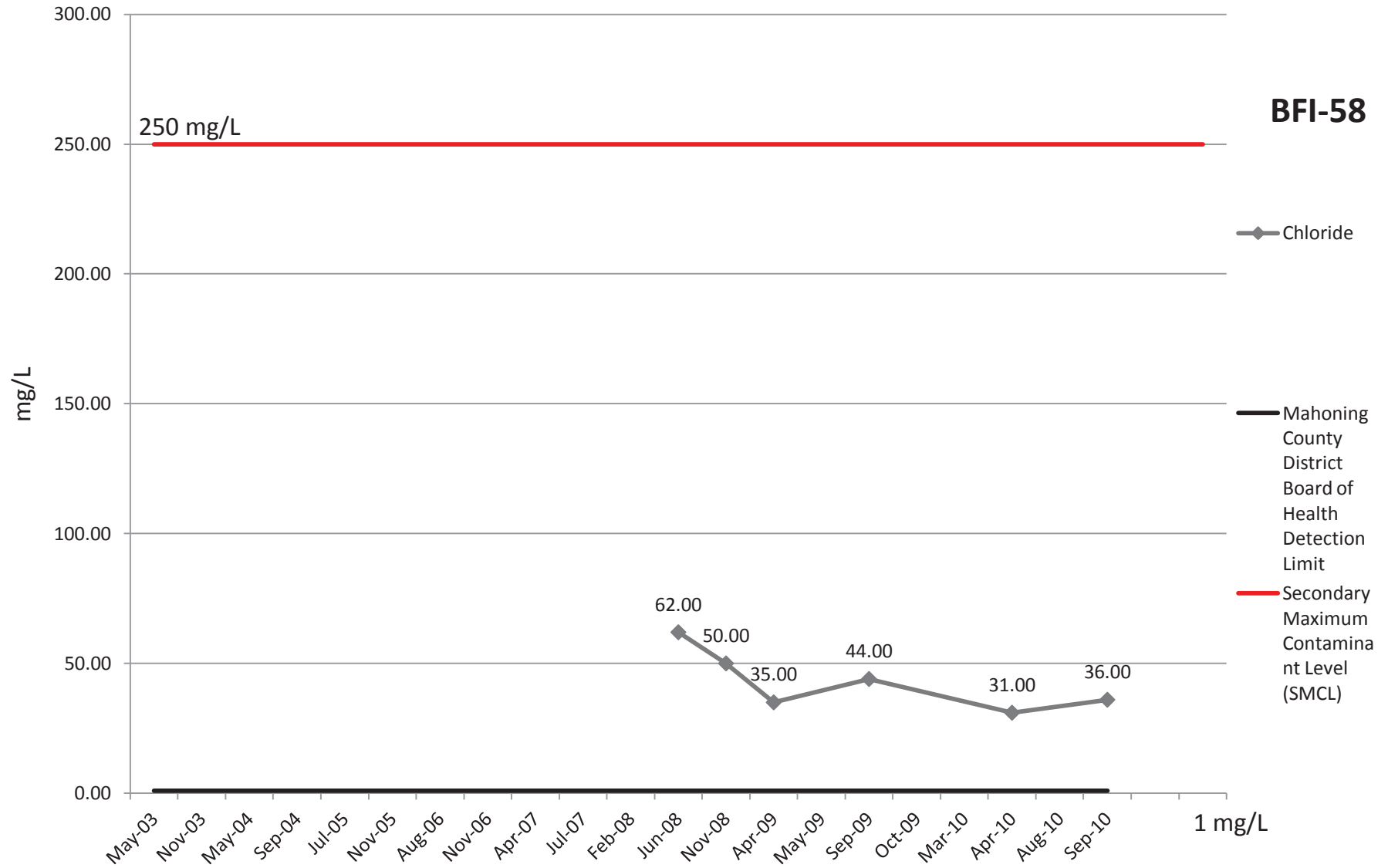


**BFI-58**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

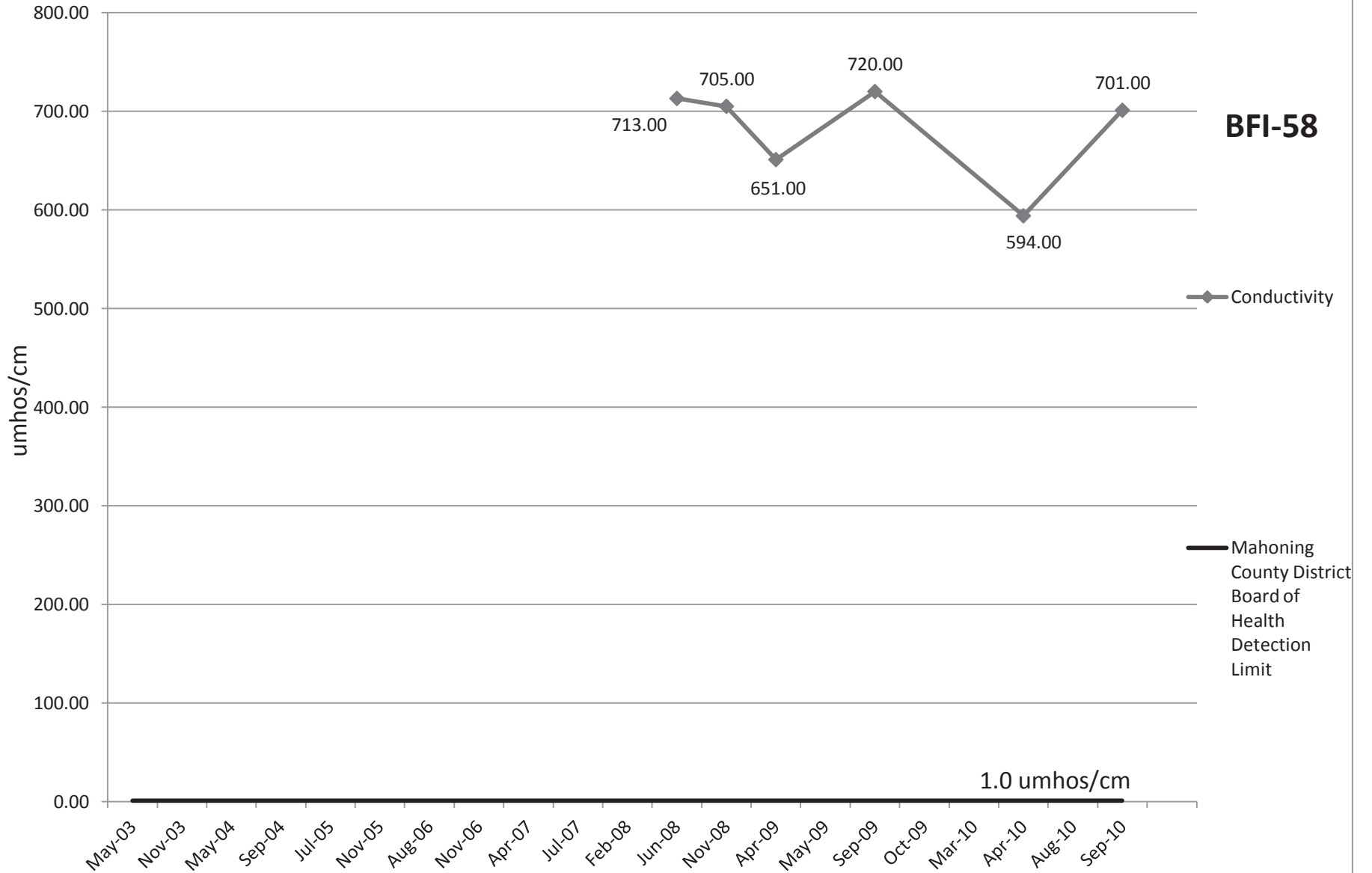
# Chloride



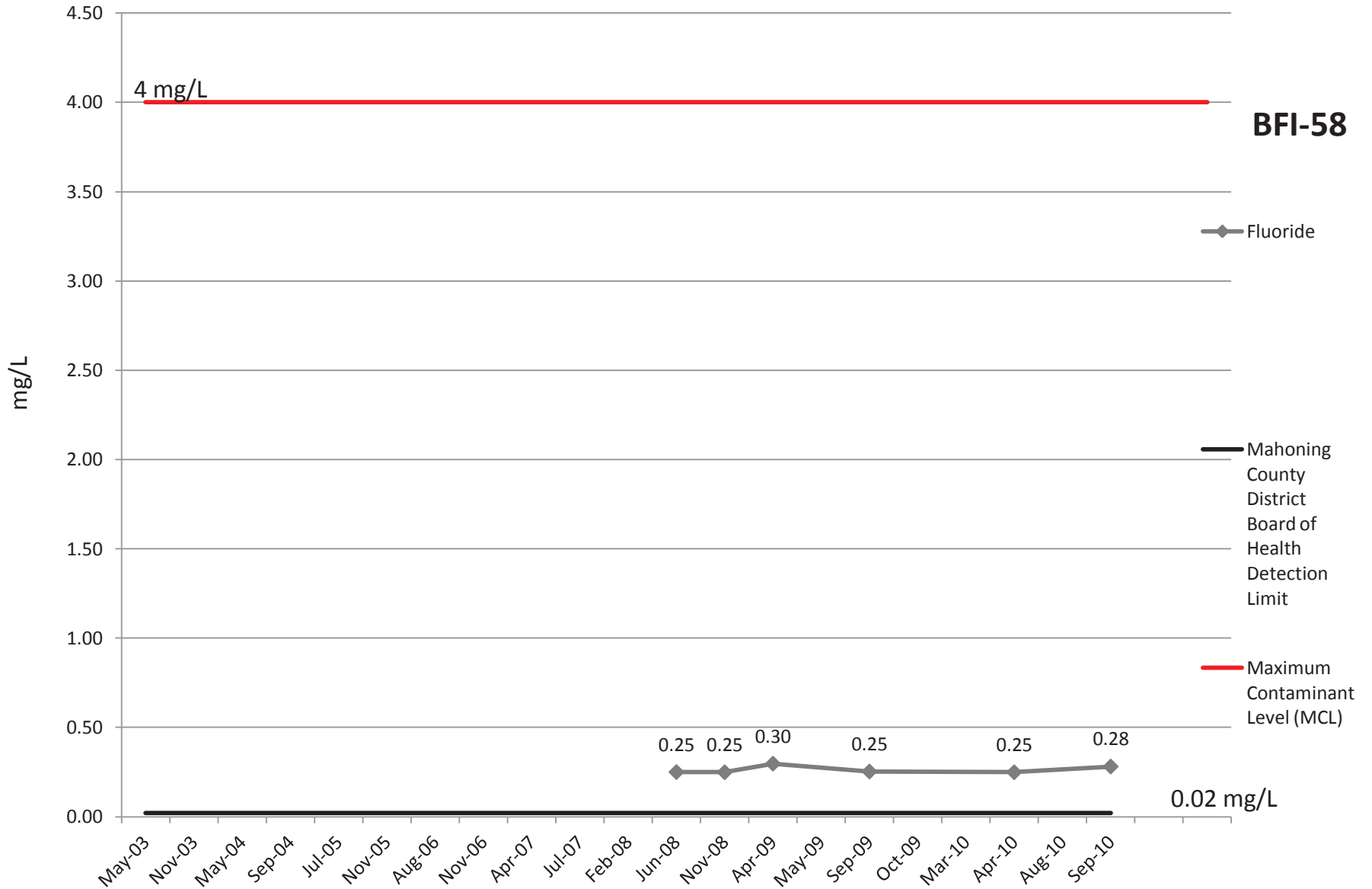


# Conductivity

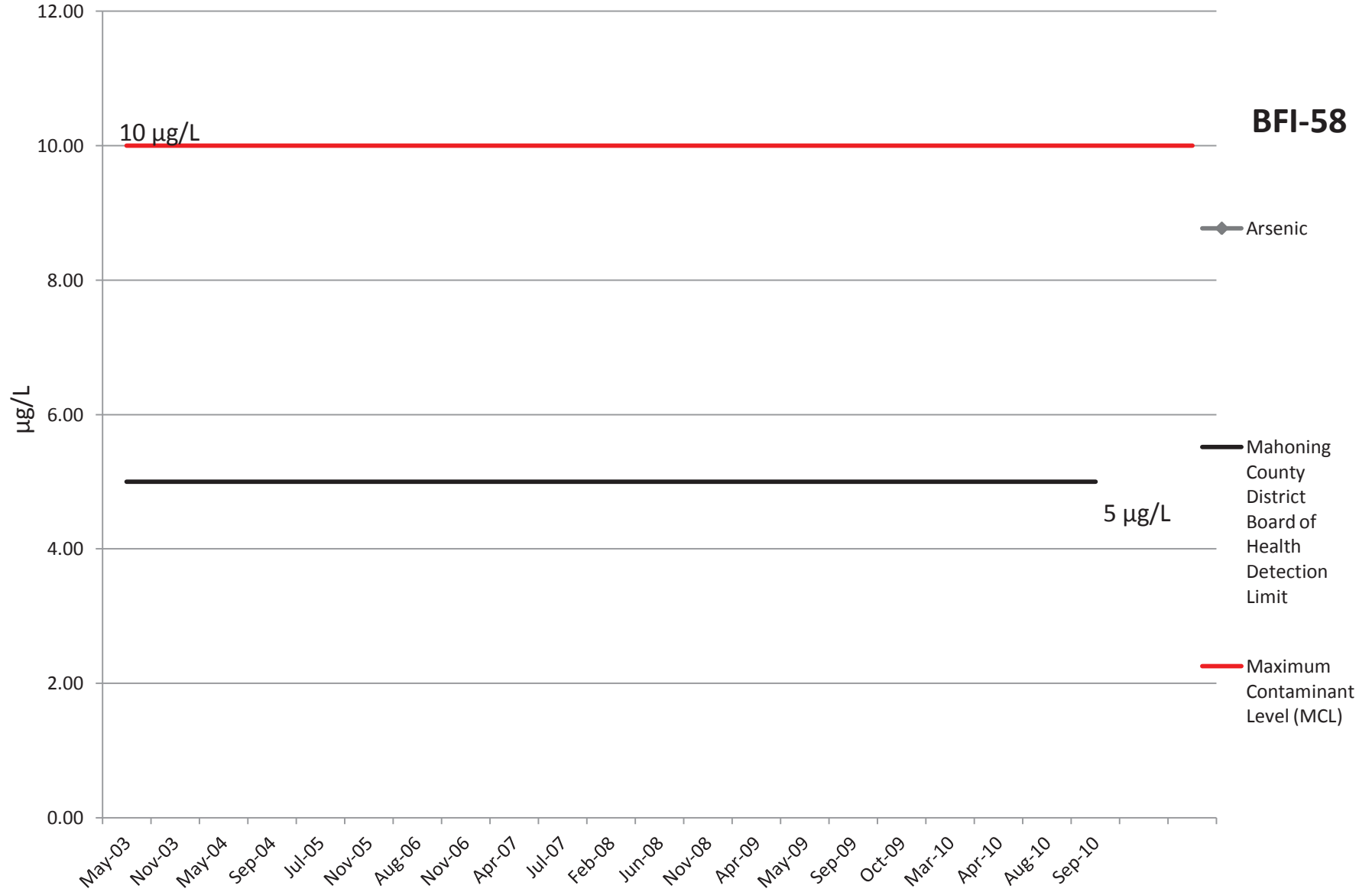
**BFI-58**



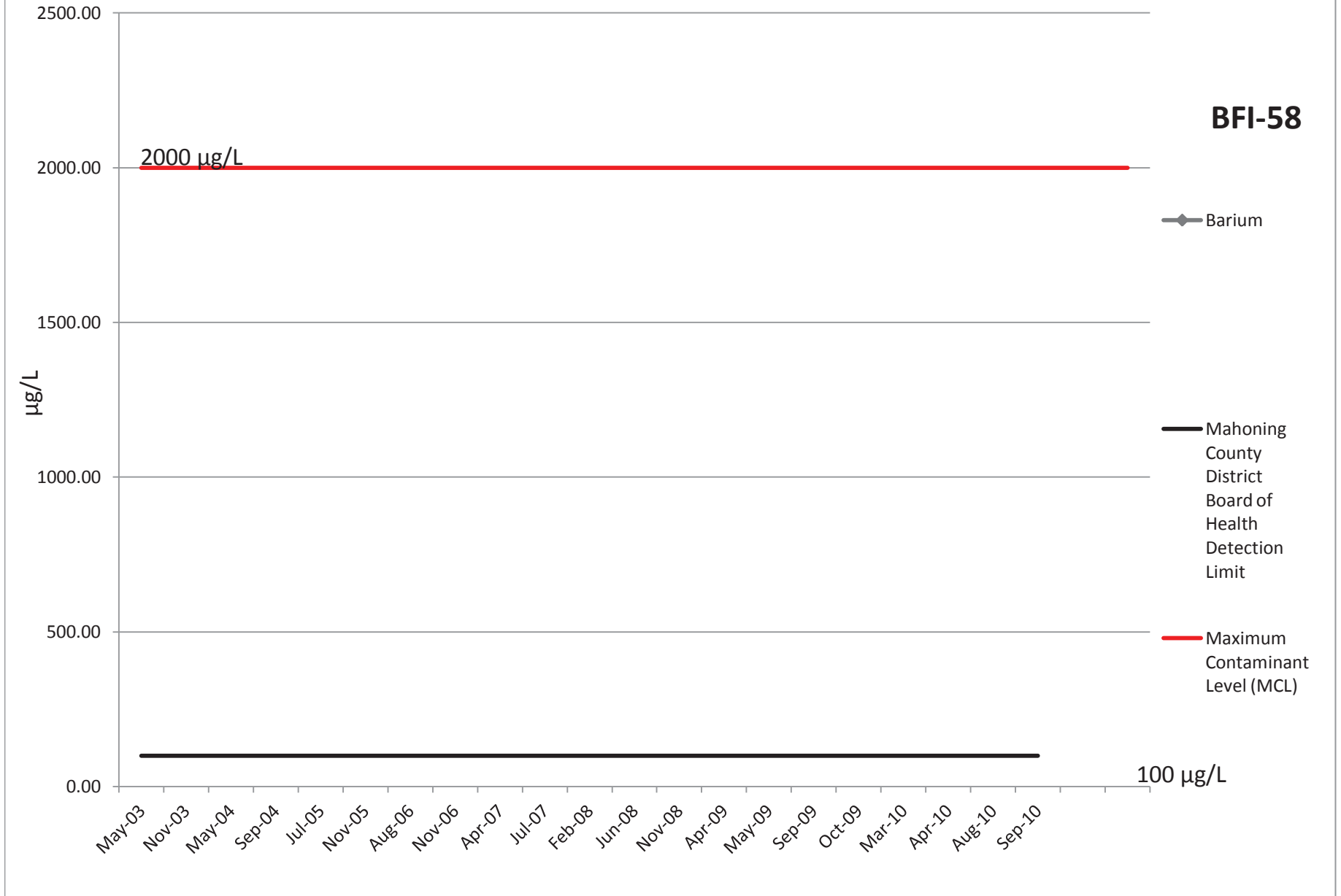
# Fluoride



# Arsenic



# Barium



# Cadmium

**BFI-58**

10 µg/L

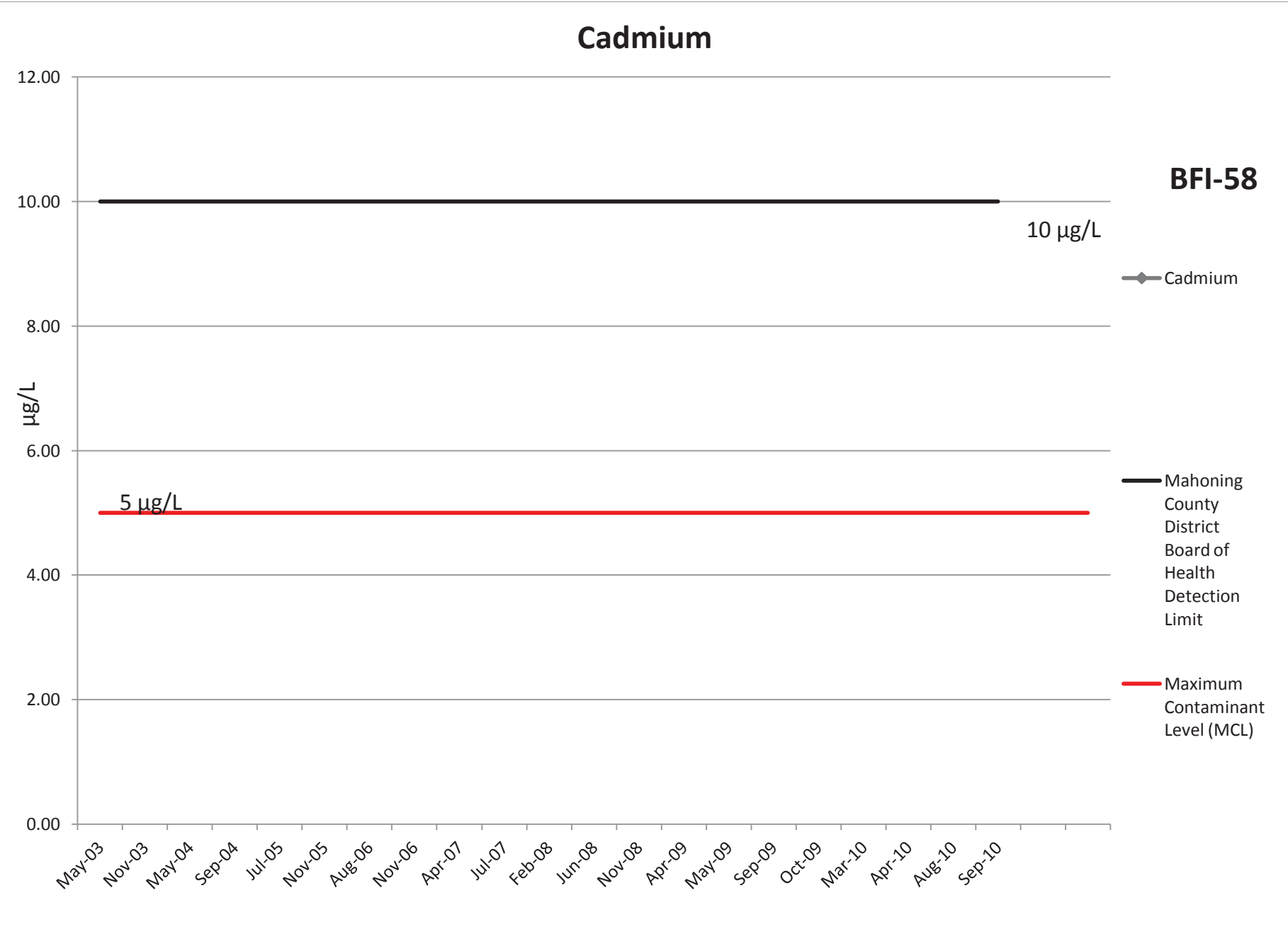
12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

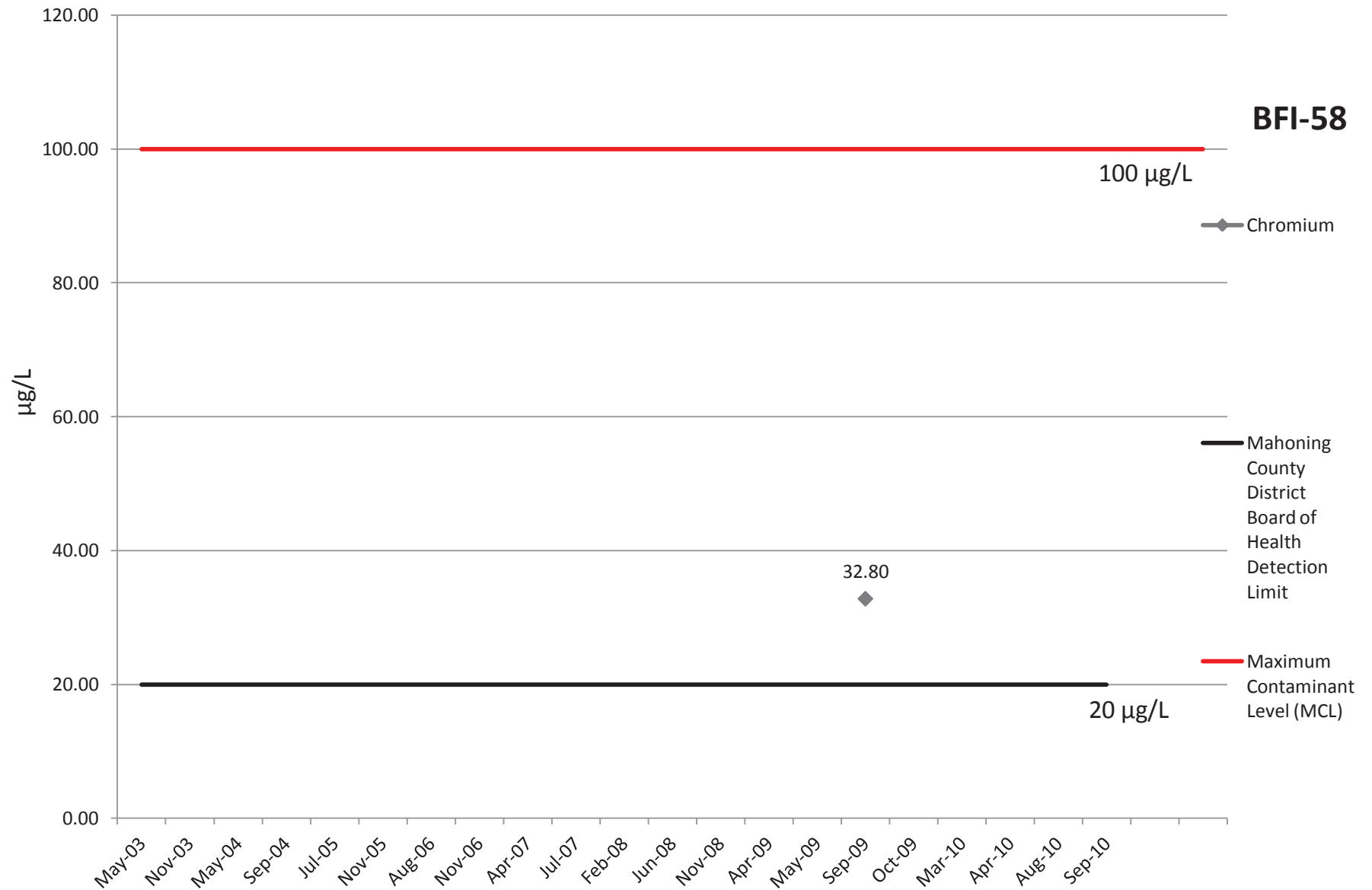
5 µg/L

- ◆ Cadmium
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

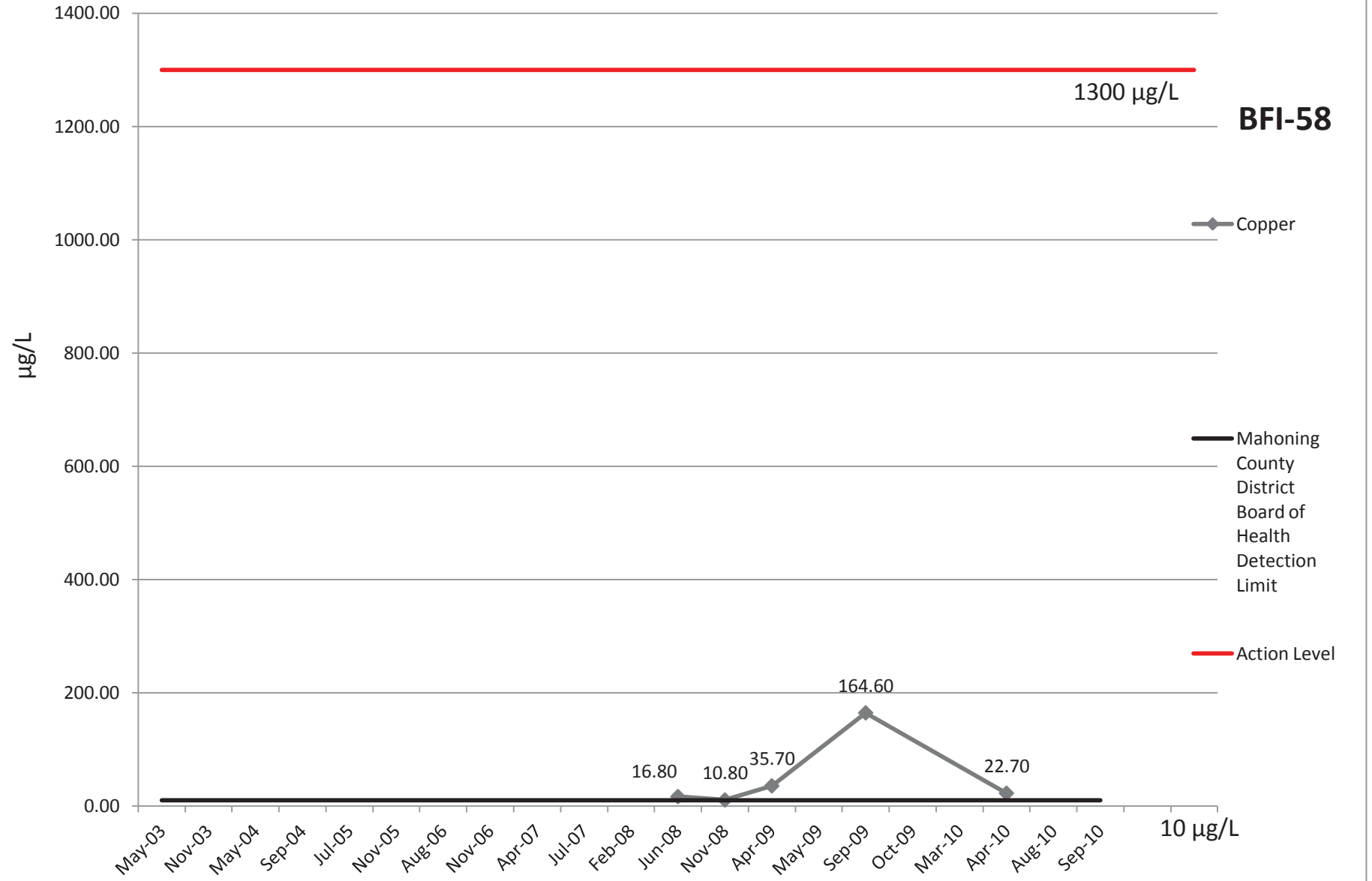
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



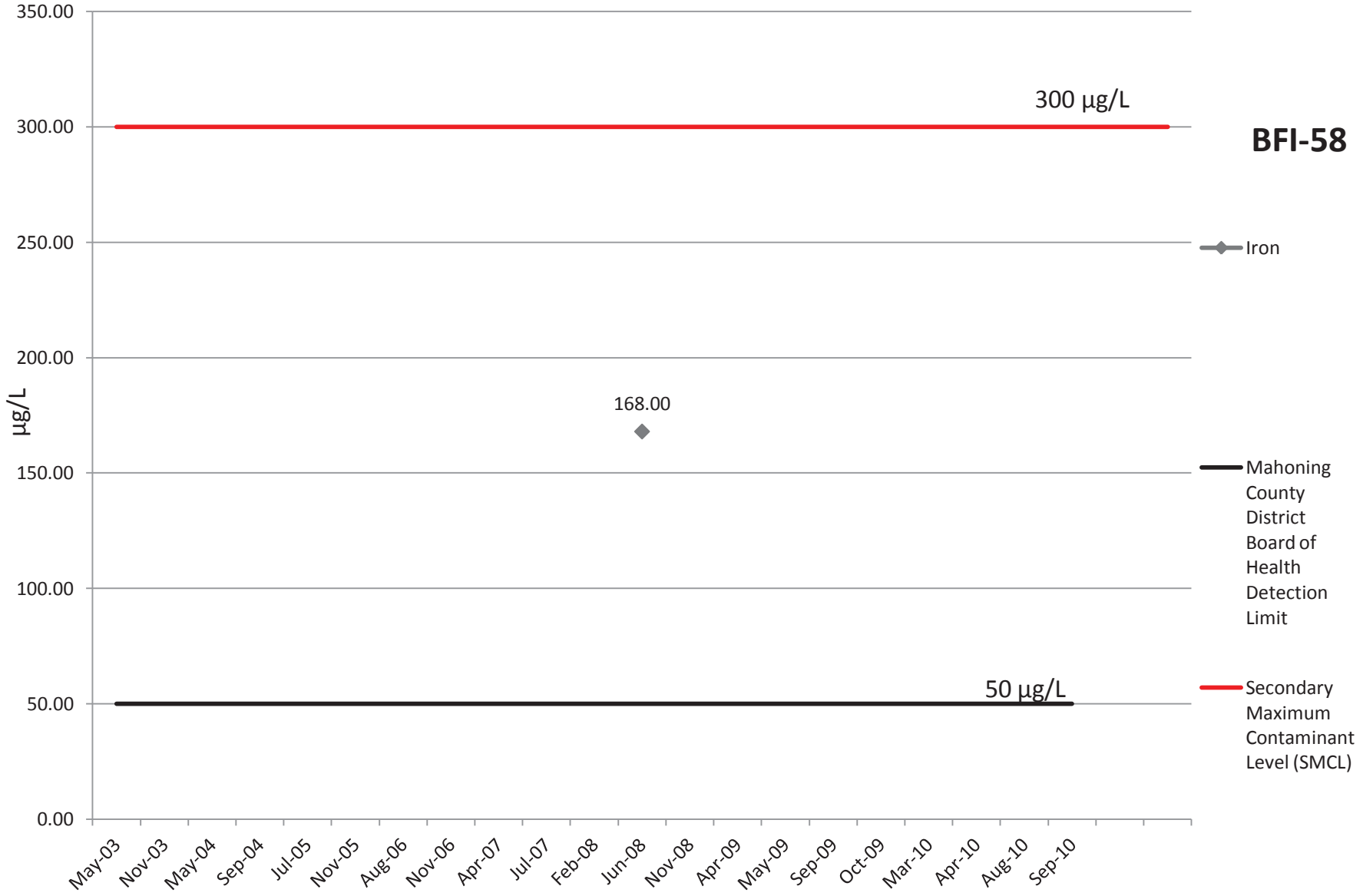
# Chromium



# Copper



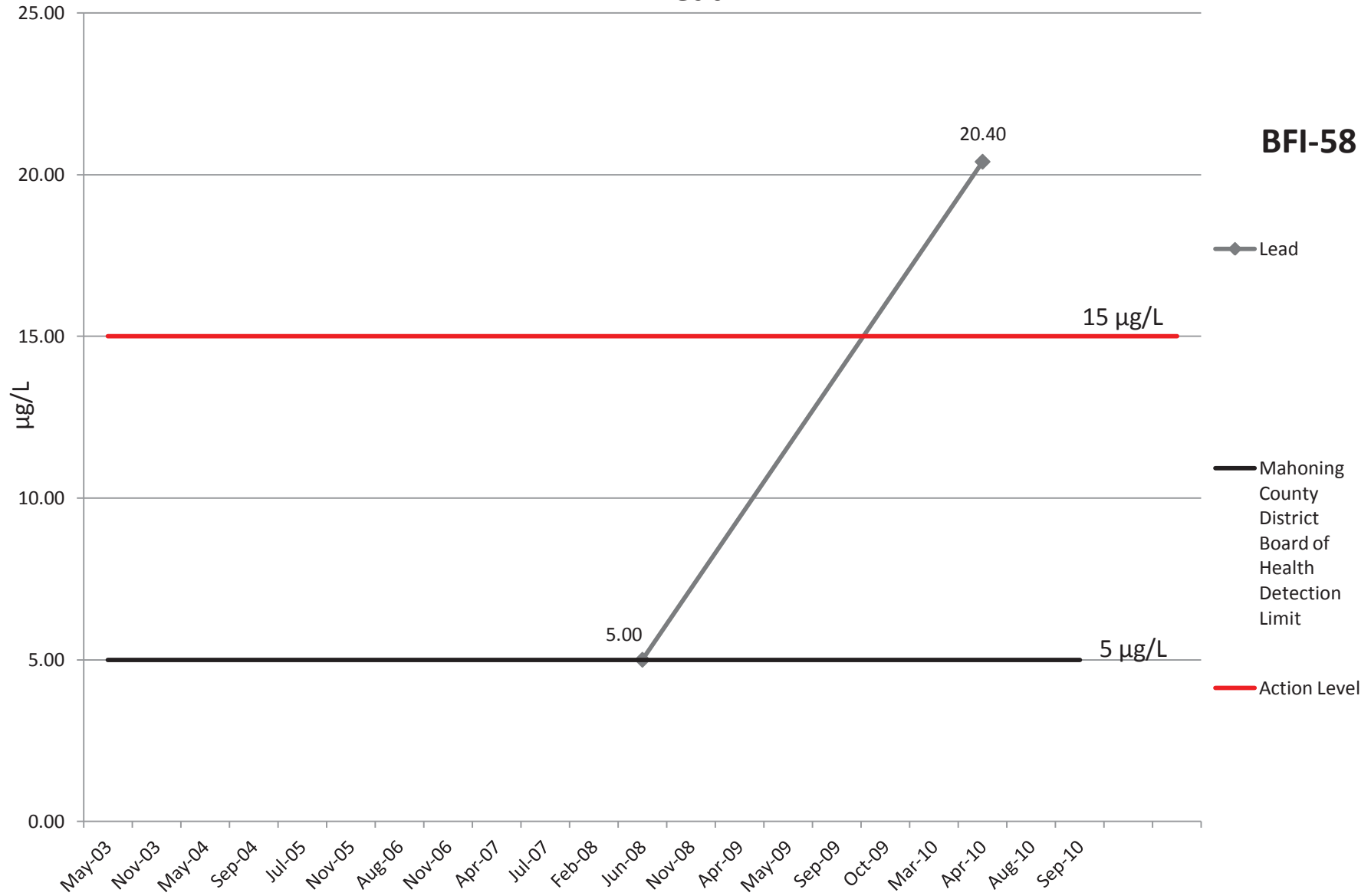
# Iron



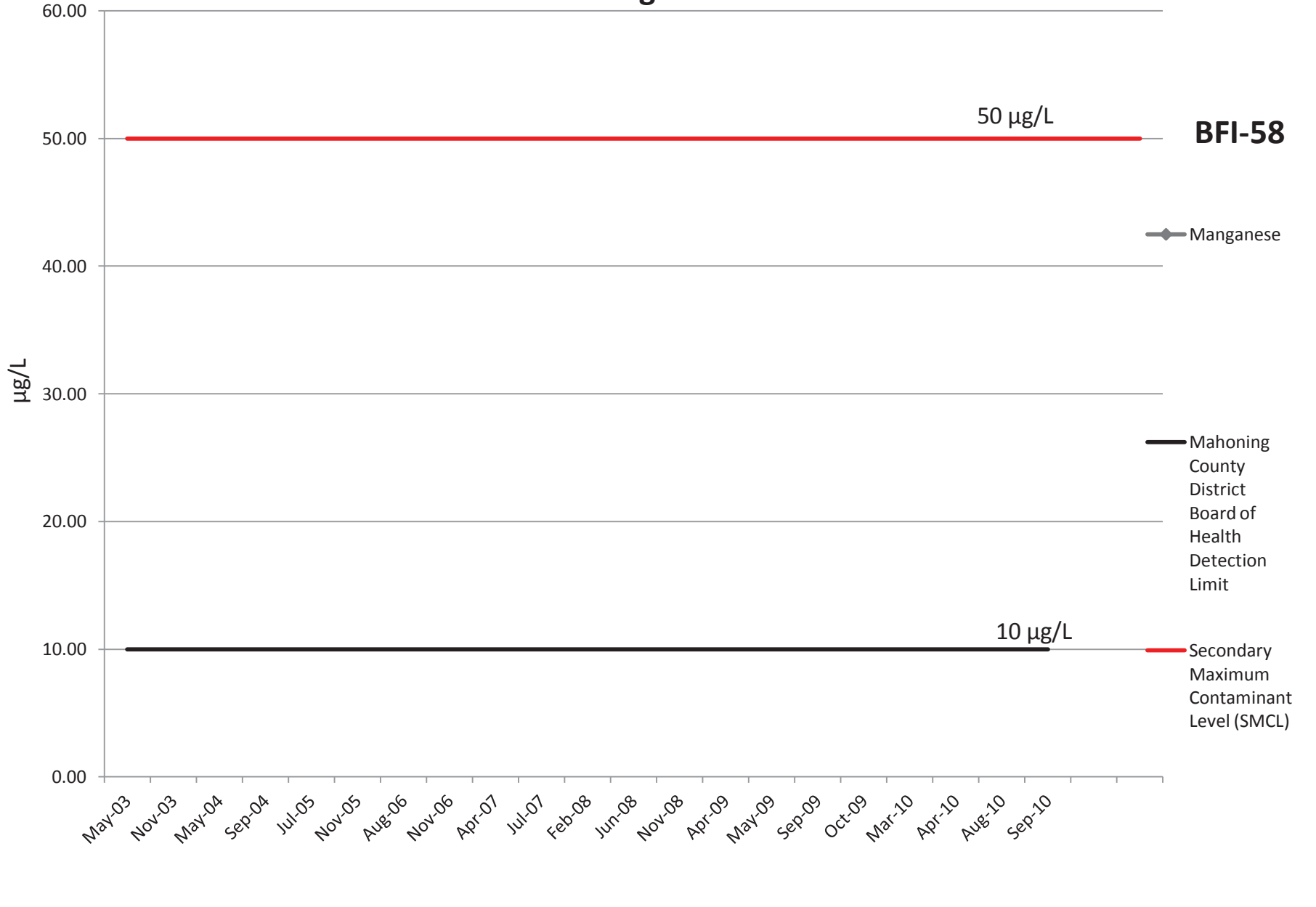


# Lead

**BFI-58**



# Manganese

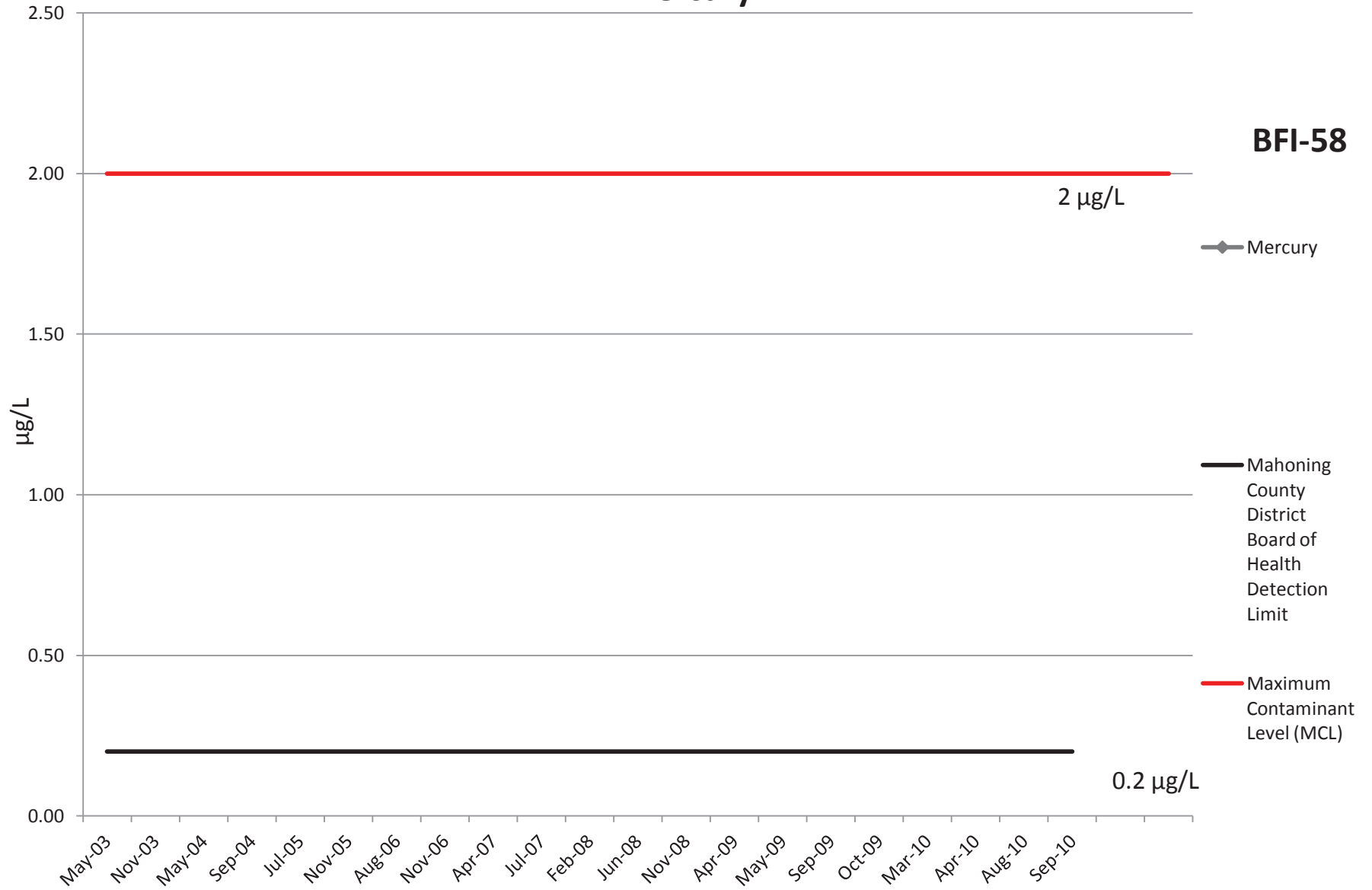


# Mercury

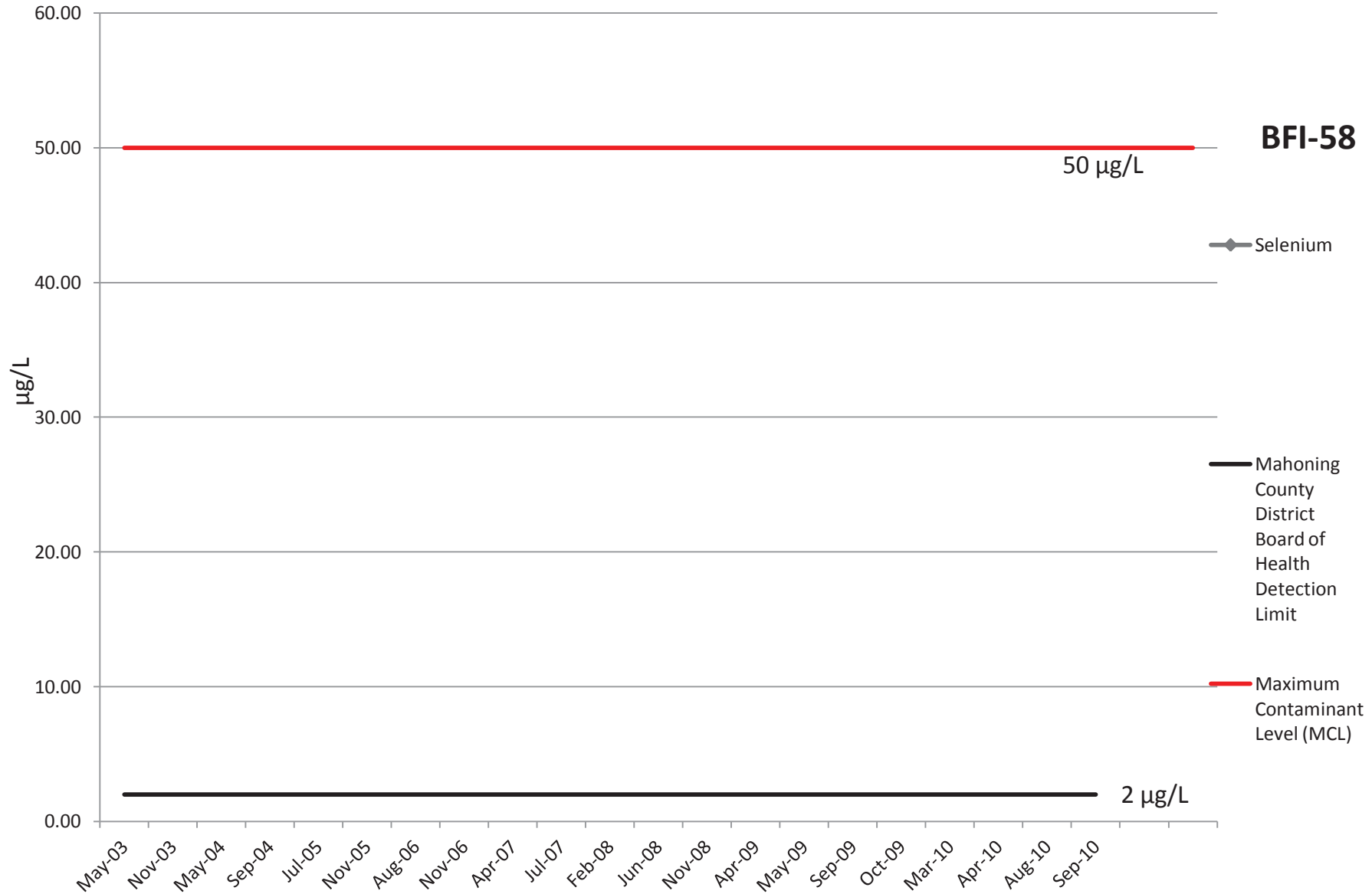
**BFI-58**

2 µg/L

0.2 µg/L

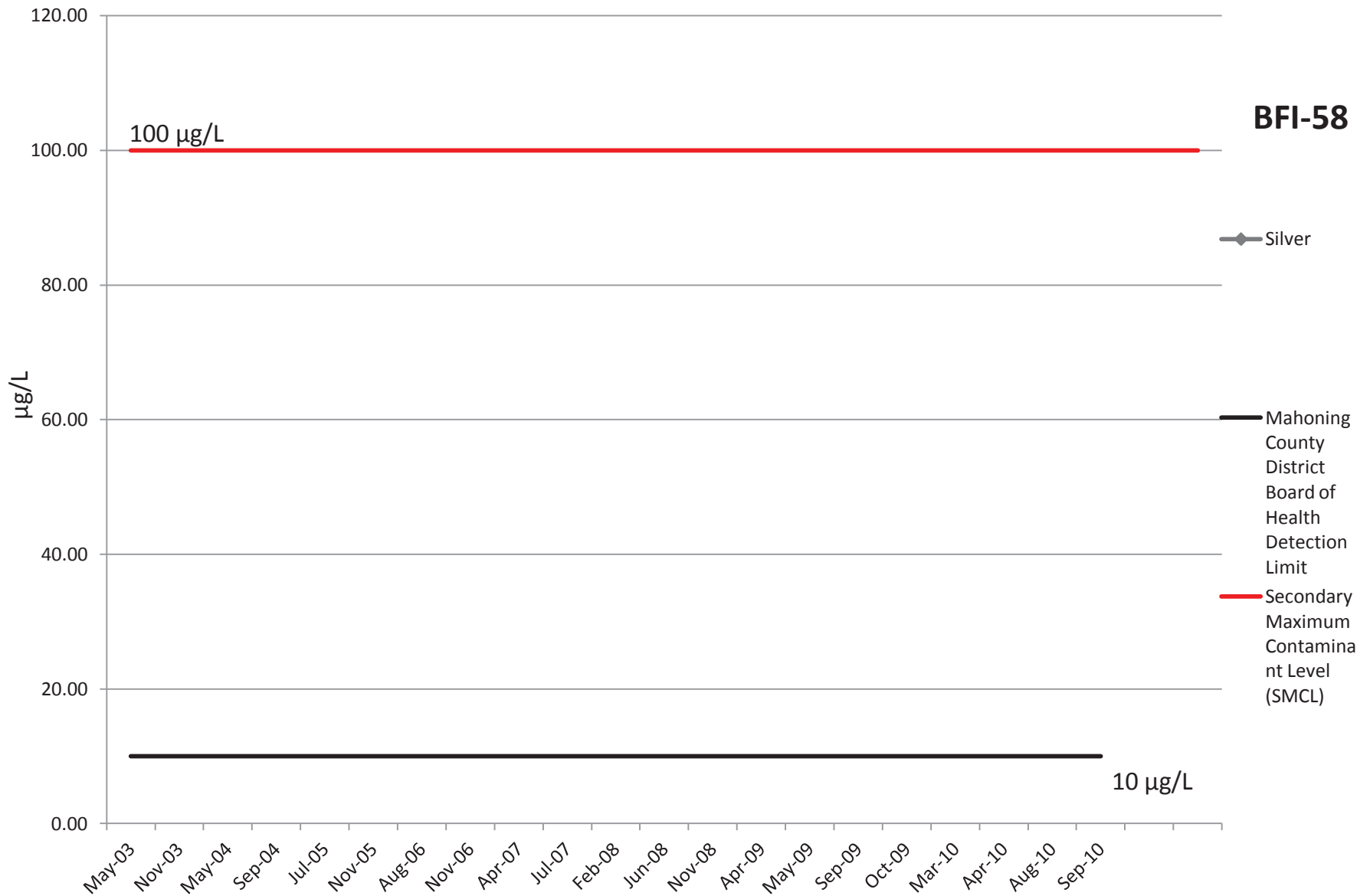


# Selenium

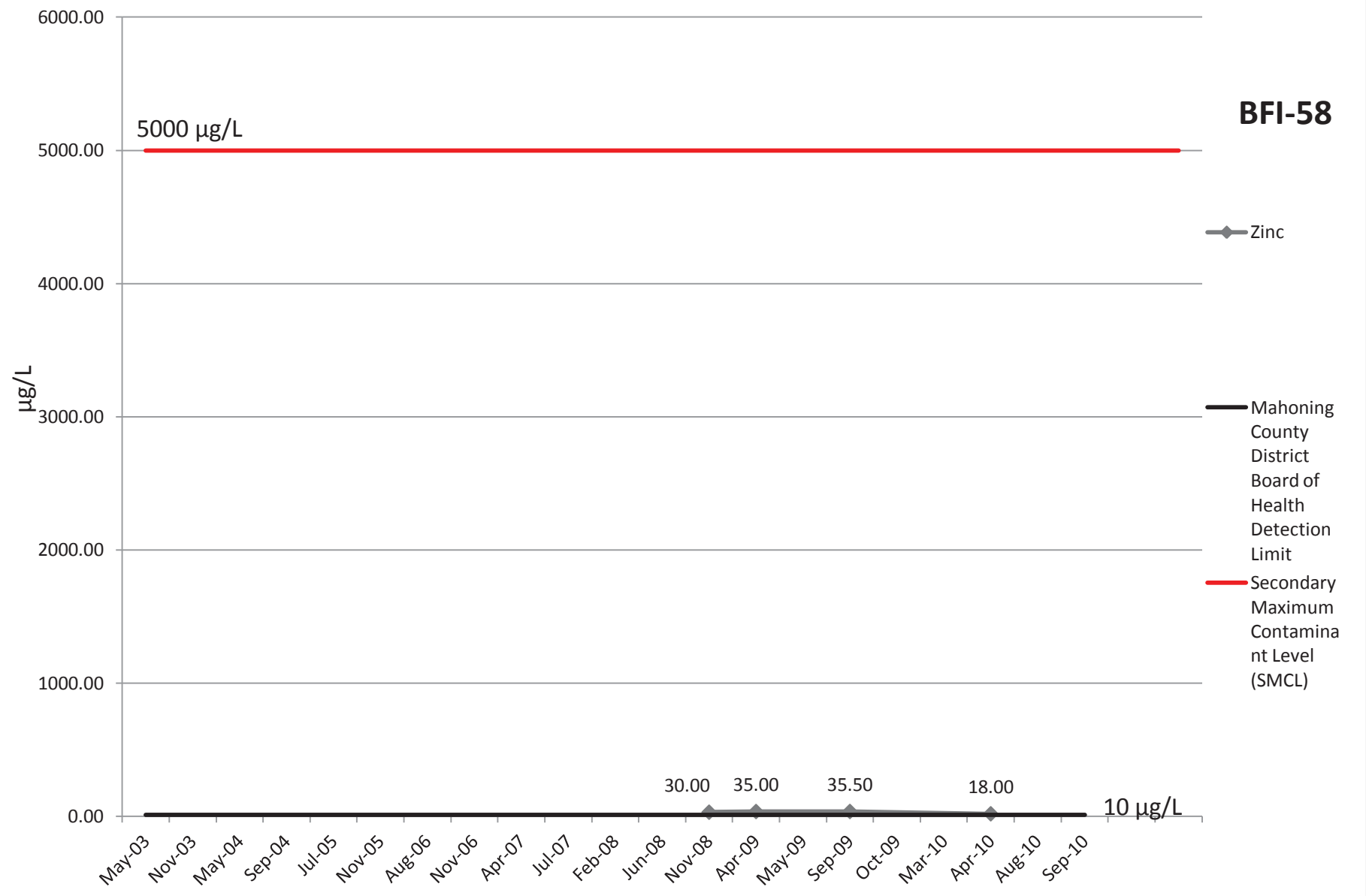


# Silver

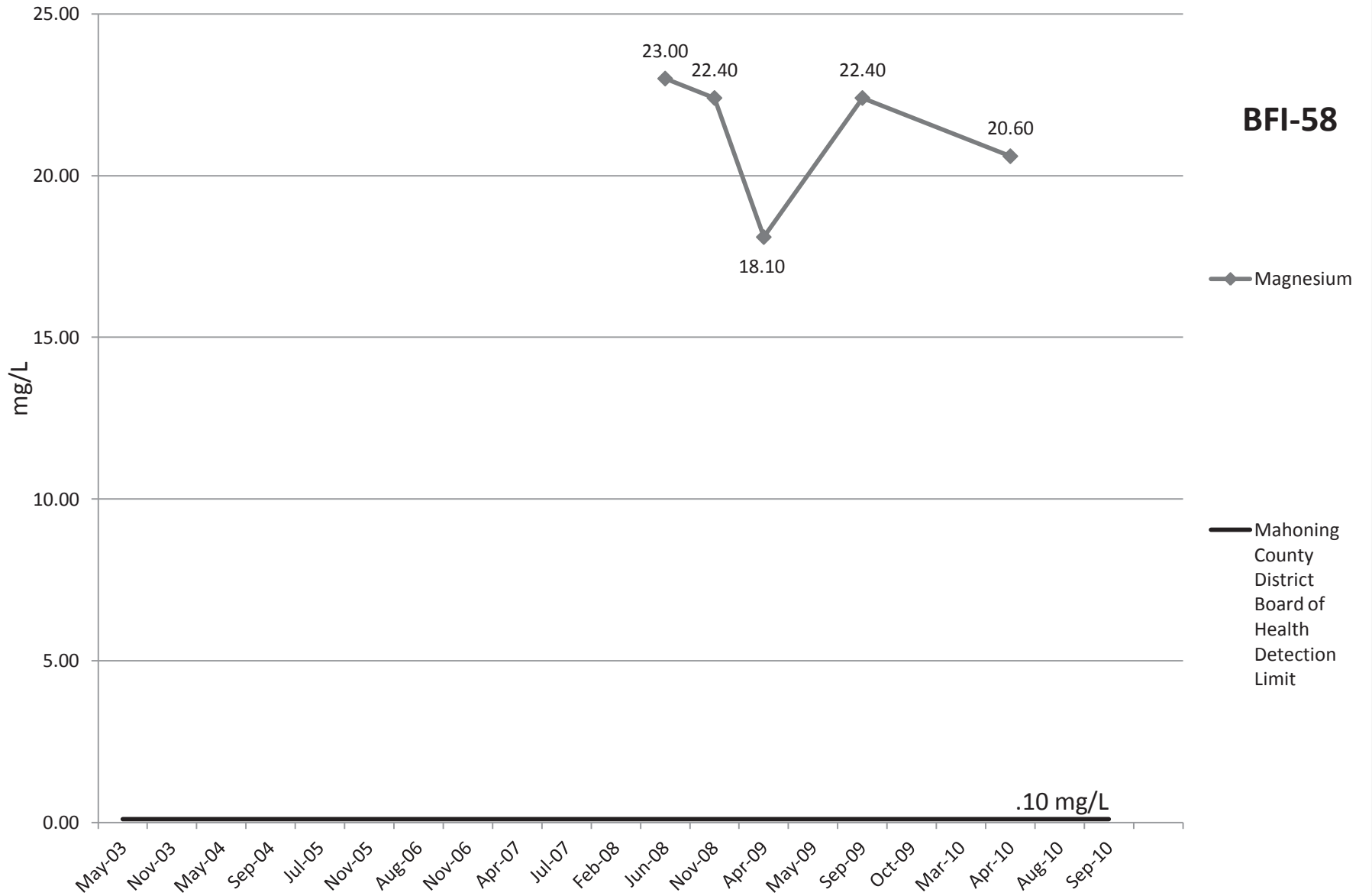
**BFI-58**



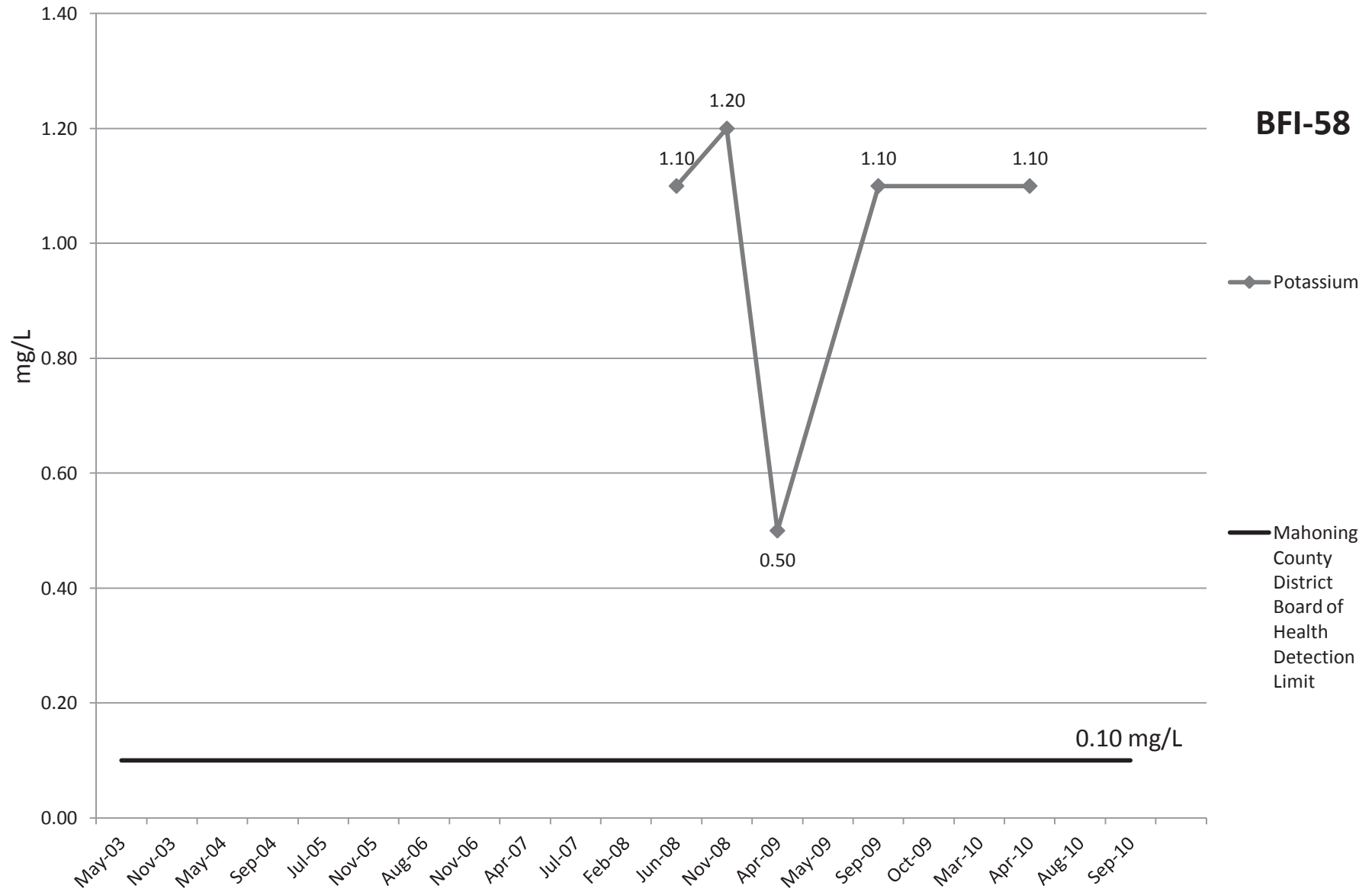
# Zinc



# Magnesium



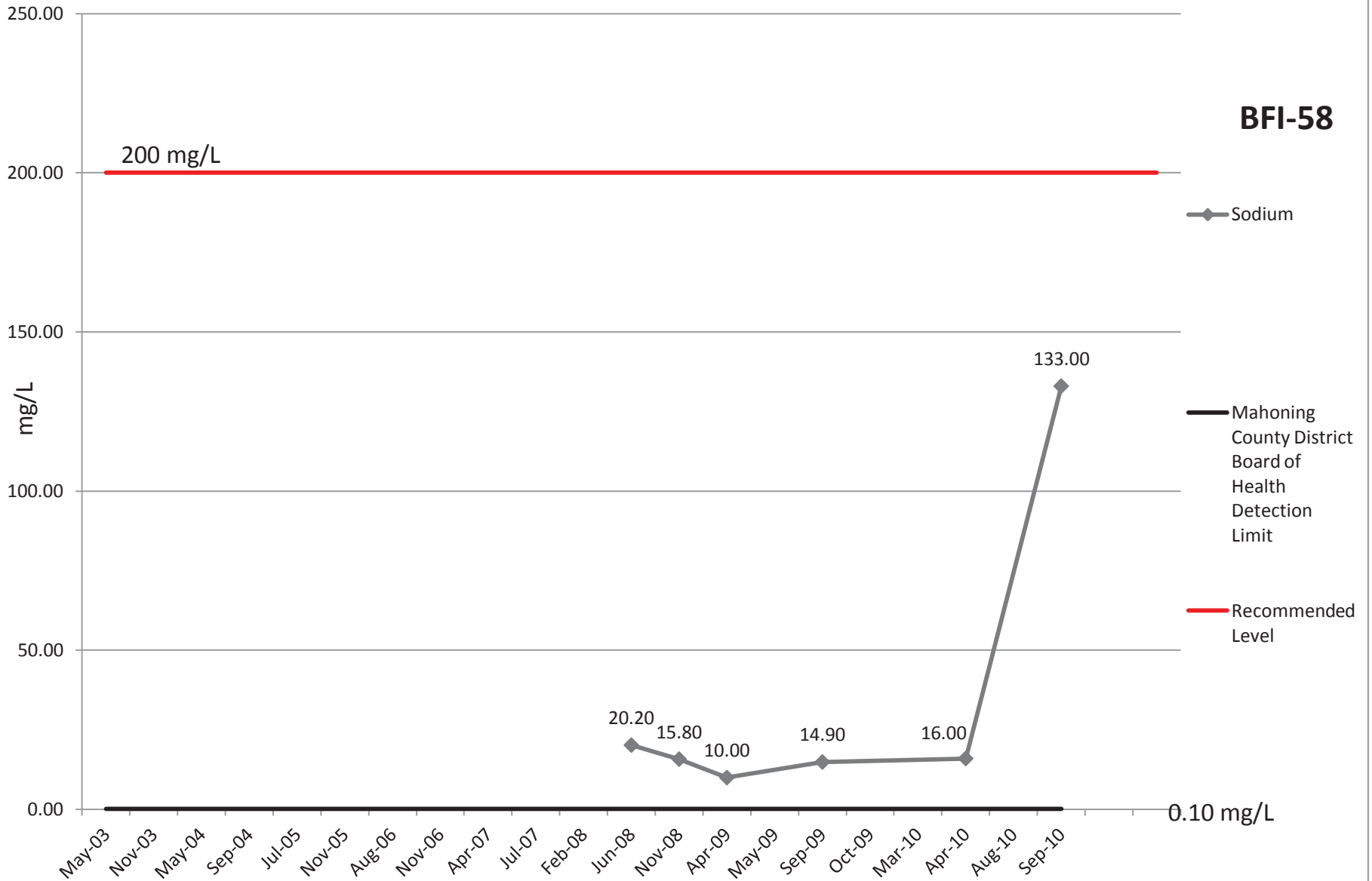
# Potassium



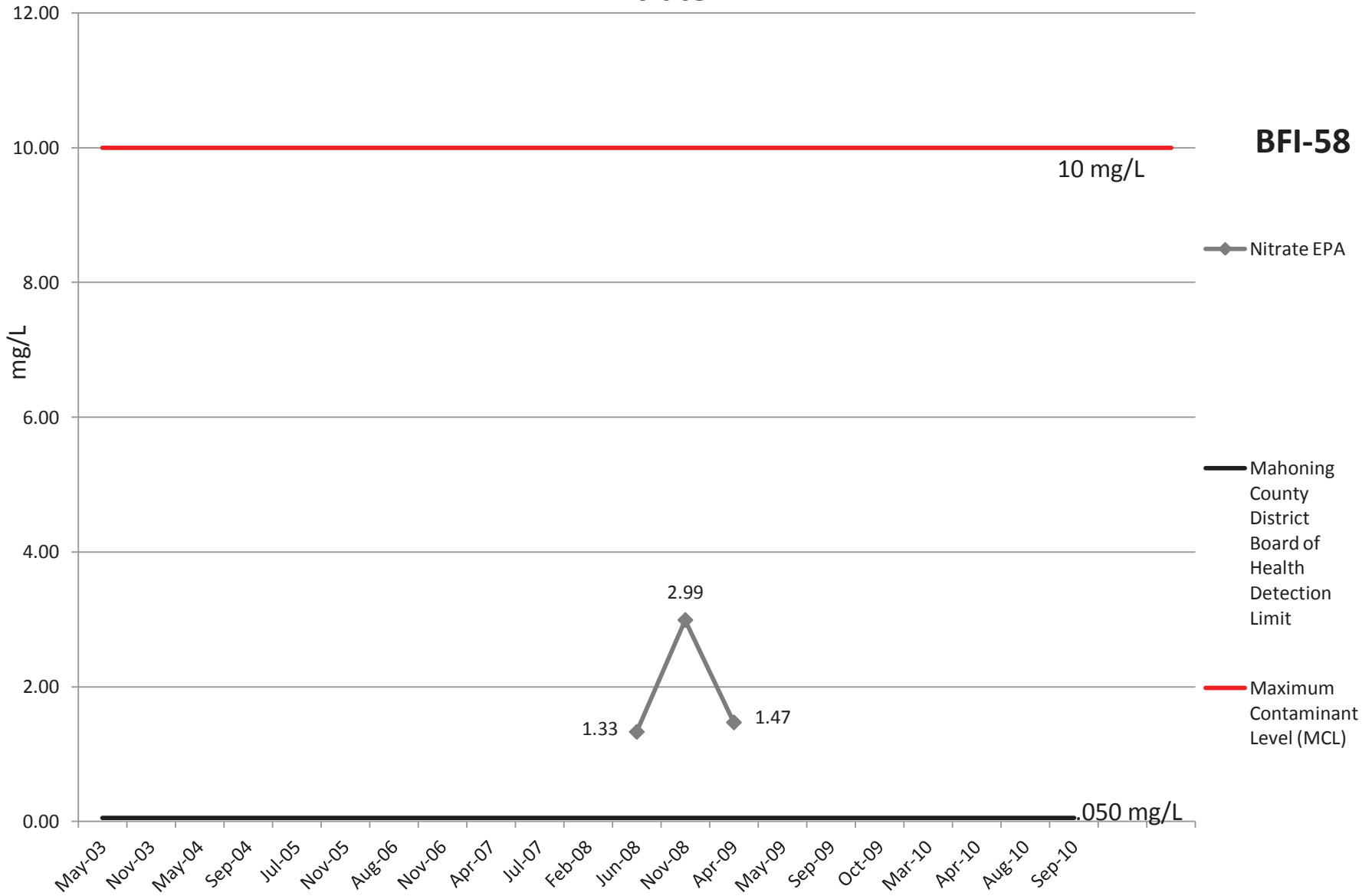


# Sodium

**BFI-58**



# Nitrate EPA



**BFI-58**

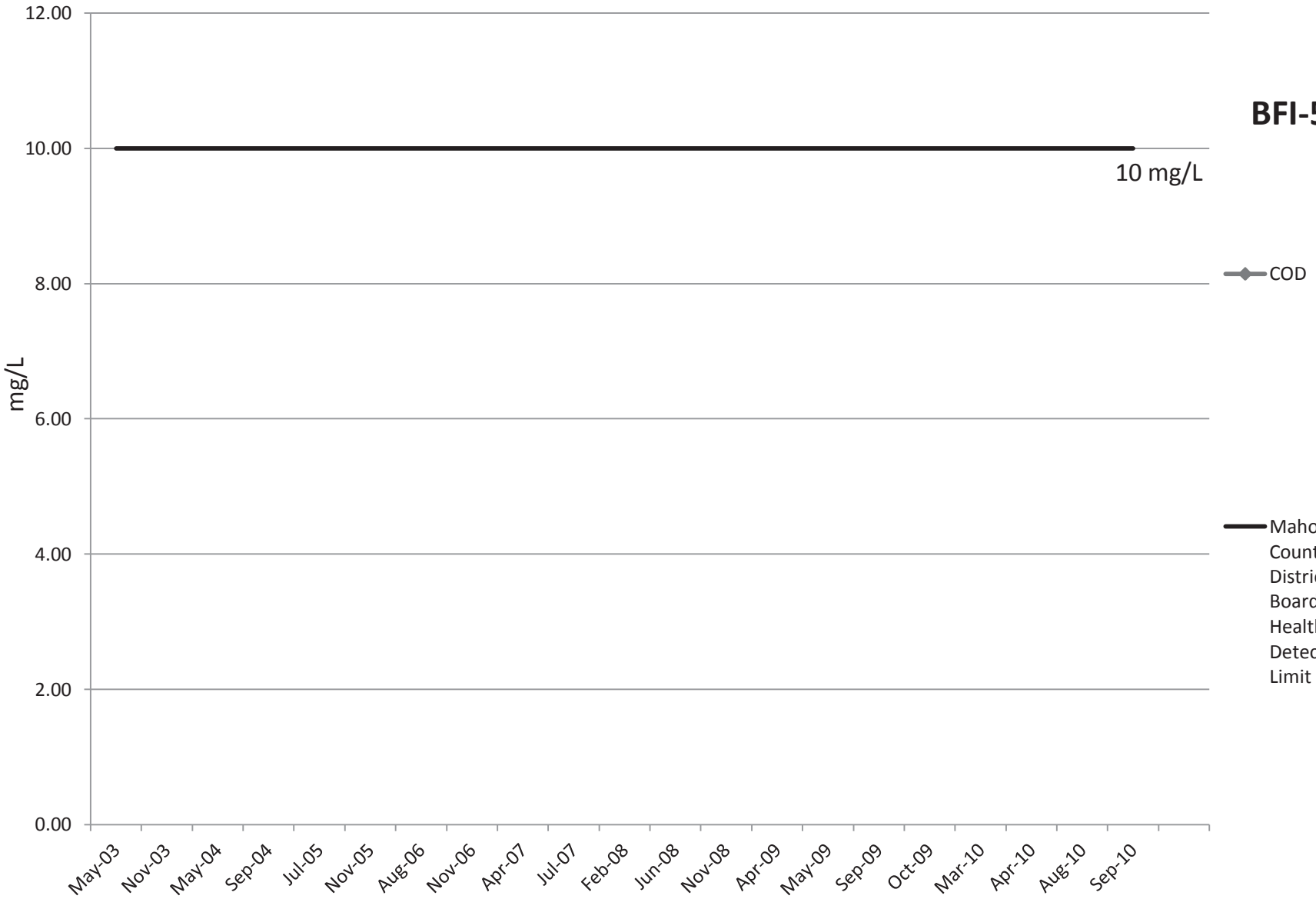
◆ Nitrate EPA

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

# COD

**BFI-58**



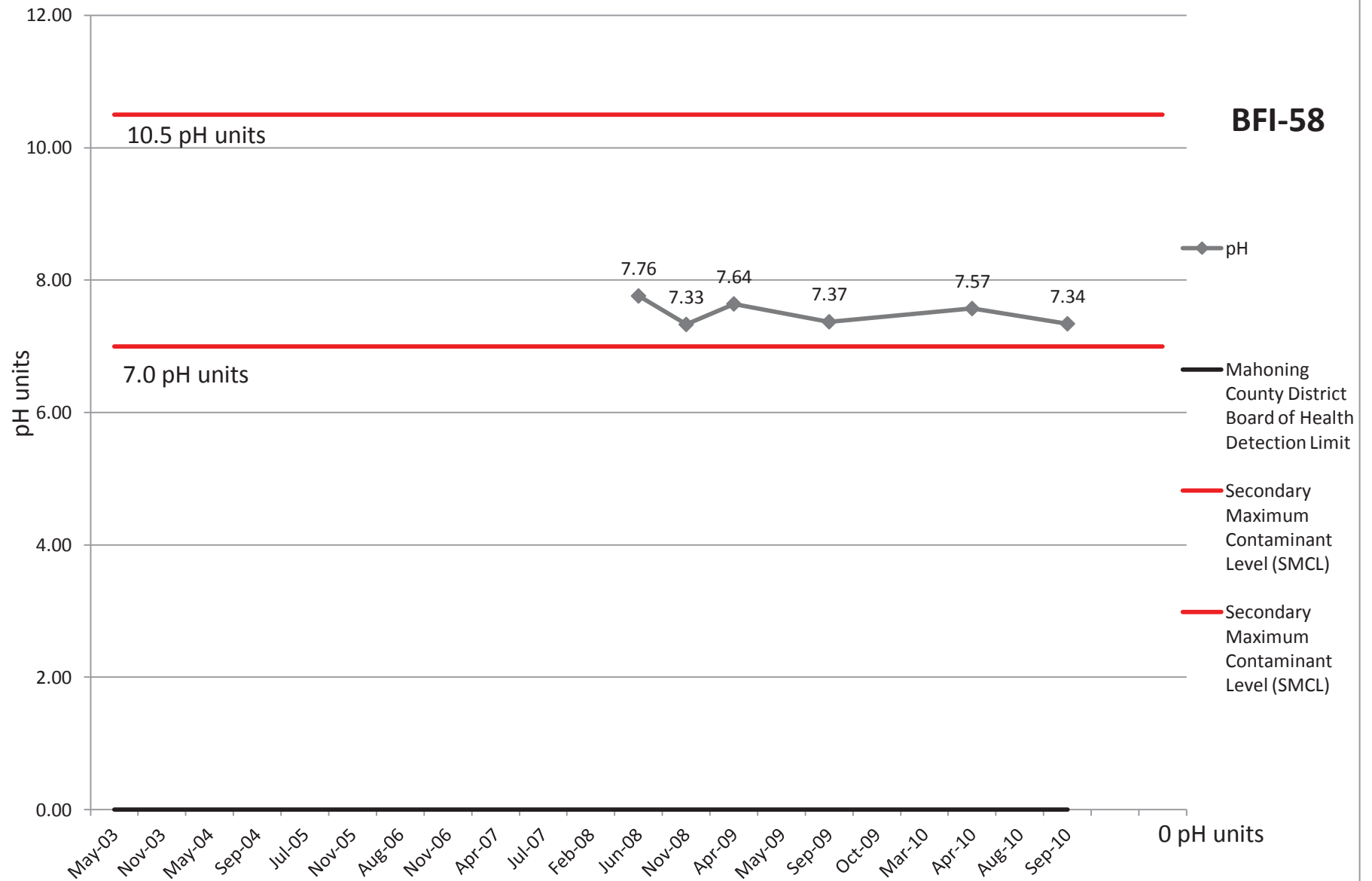
10 mg/L

◆ COD

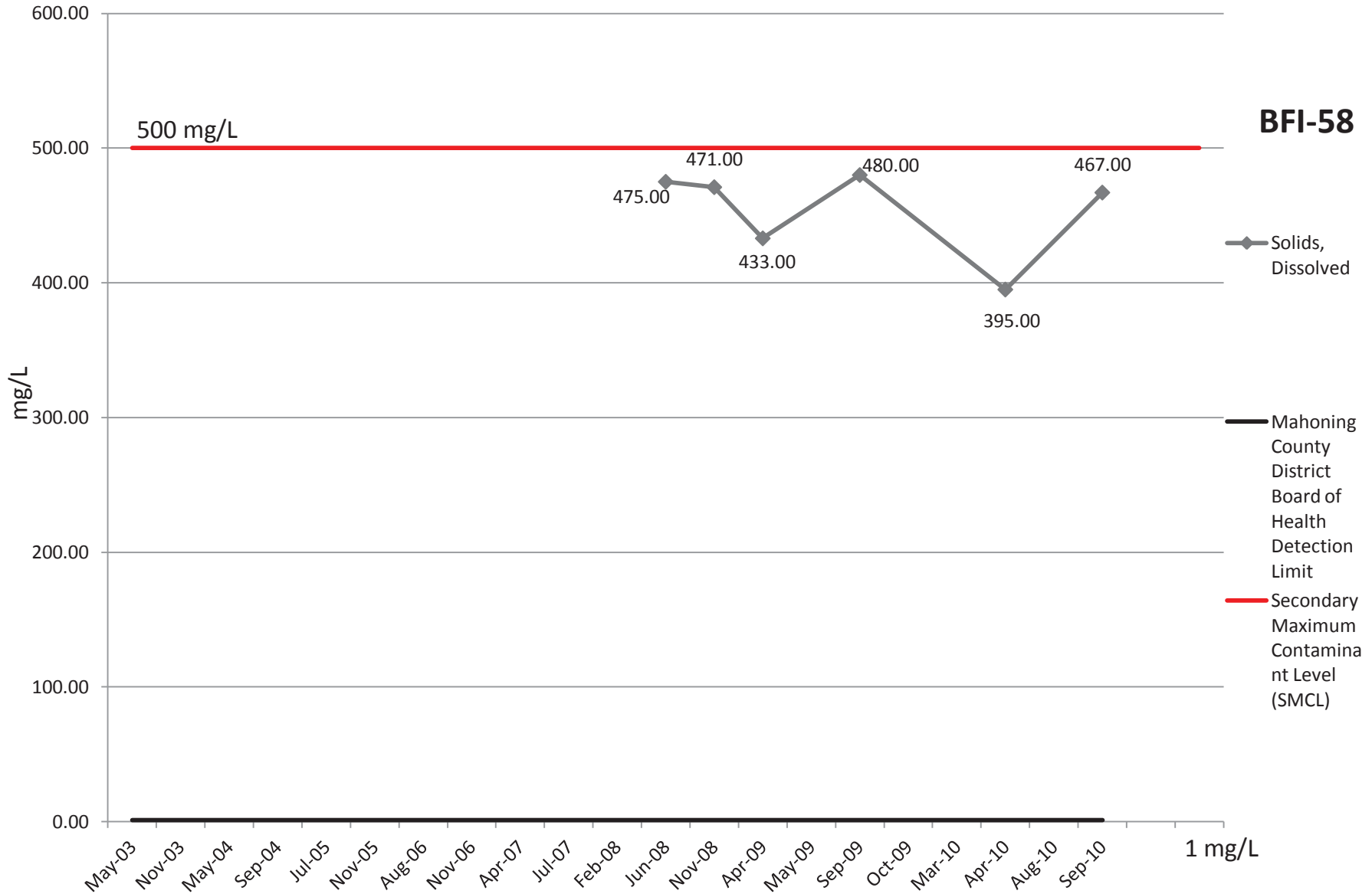
— Mahoning County District Board of Health Detection Limit

# pH

**BFI-58**



# Solids, Dissolved



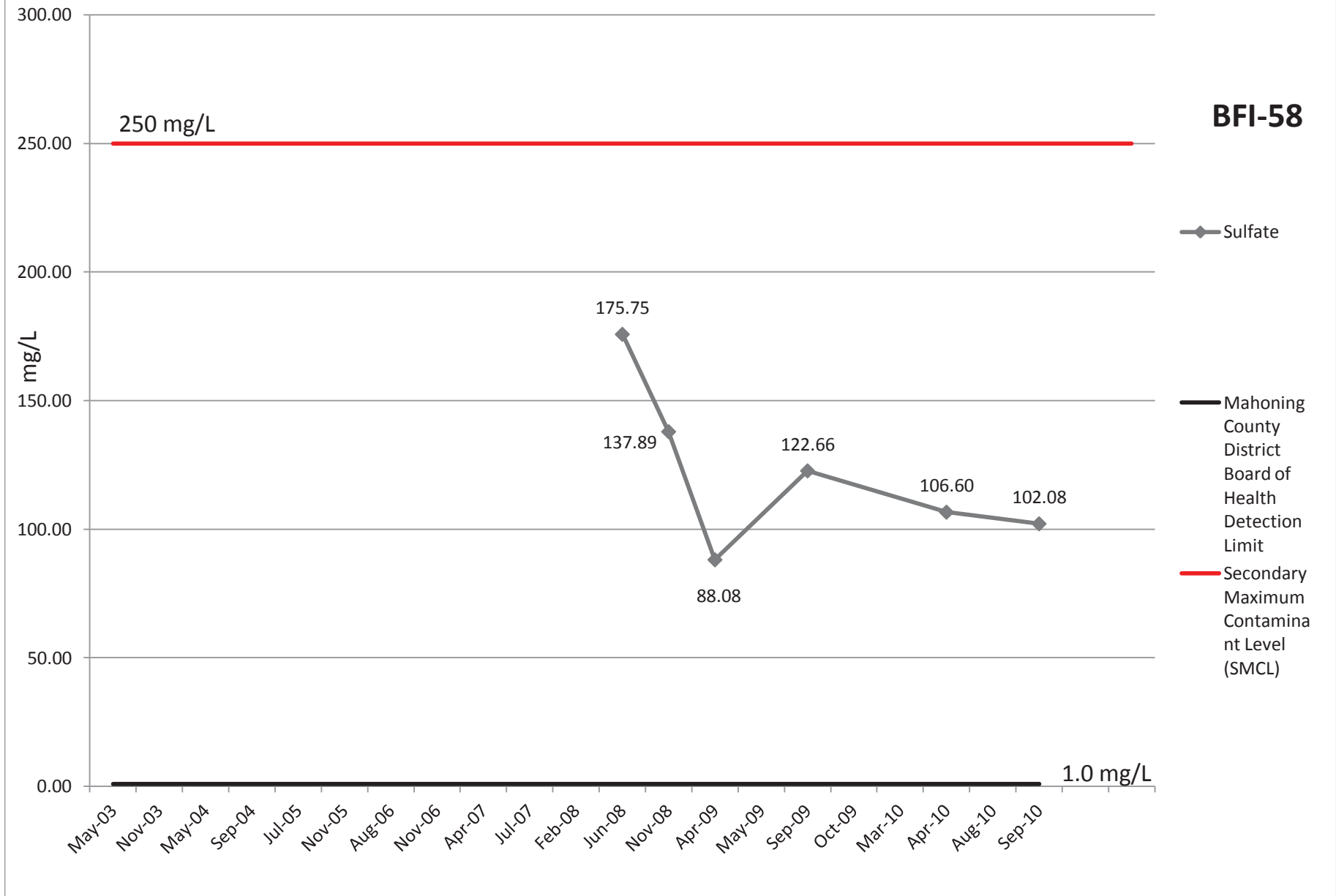
**BFI-58**

◆ Solids, Dissolved

— Mahoning County District Board of Health Detection Limit  
— Secondary Maximum Contaminant Level (SMCL)

1 mg/L

# Sulfate



# Bacteria

positive (1)

**BFI-58**

Positive/Negative

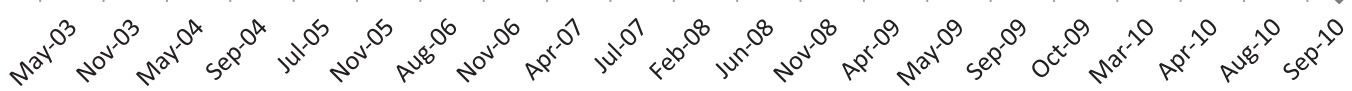
—◆— Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

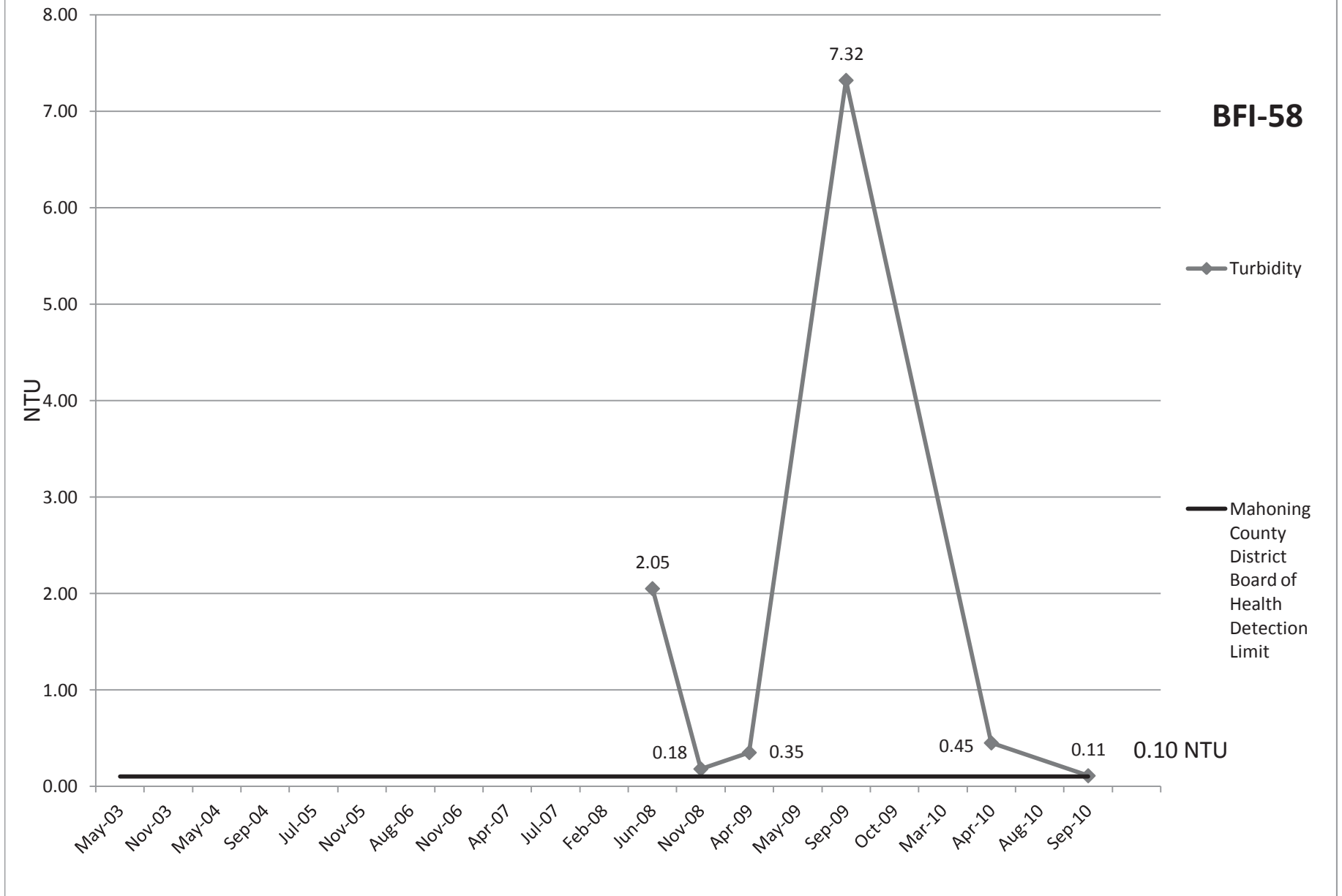
— Maximum  
Contaminant  
Level (MCL)

0.00

negative (0)

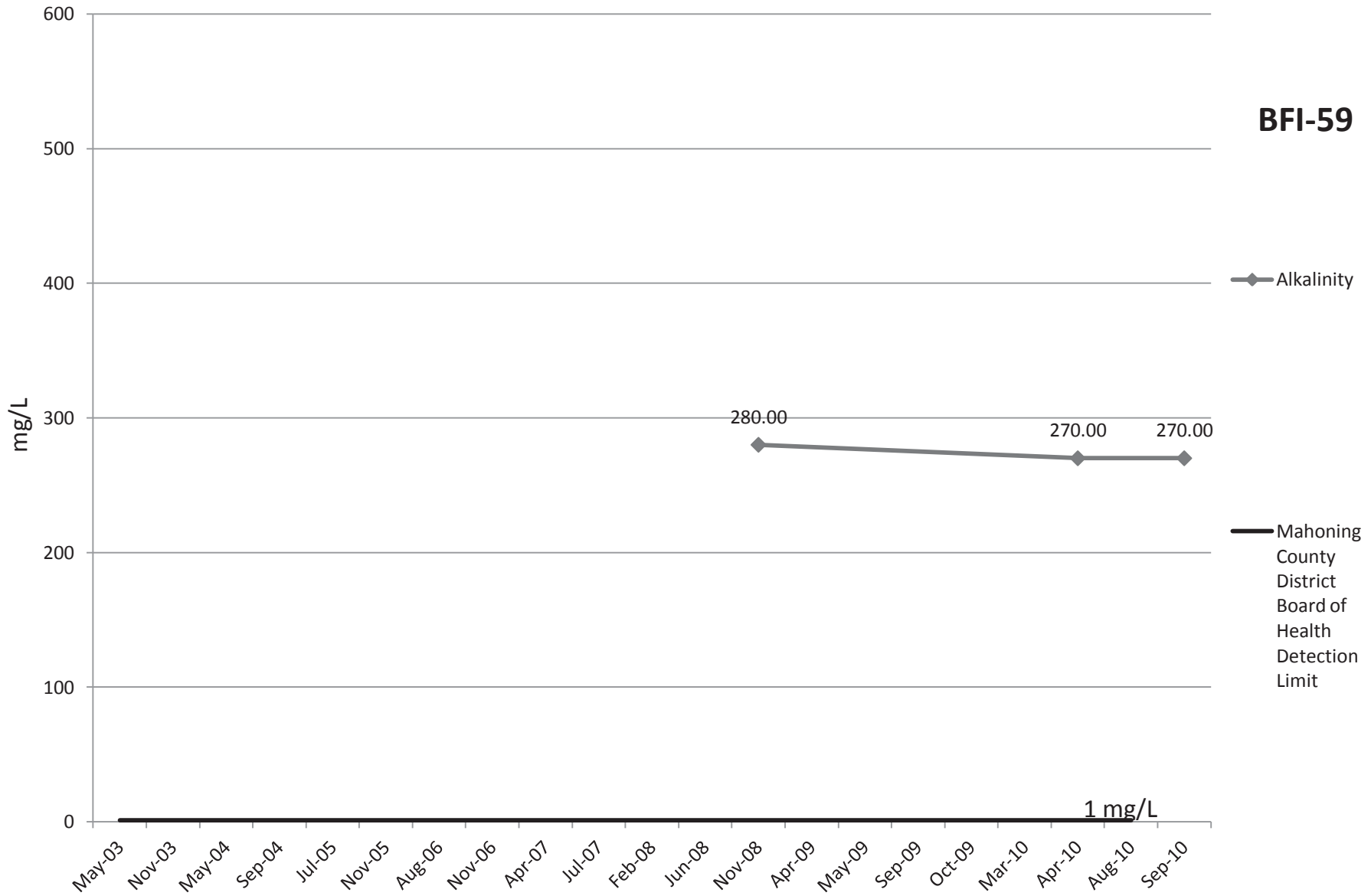


# Turbidity

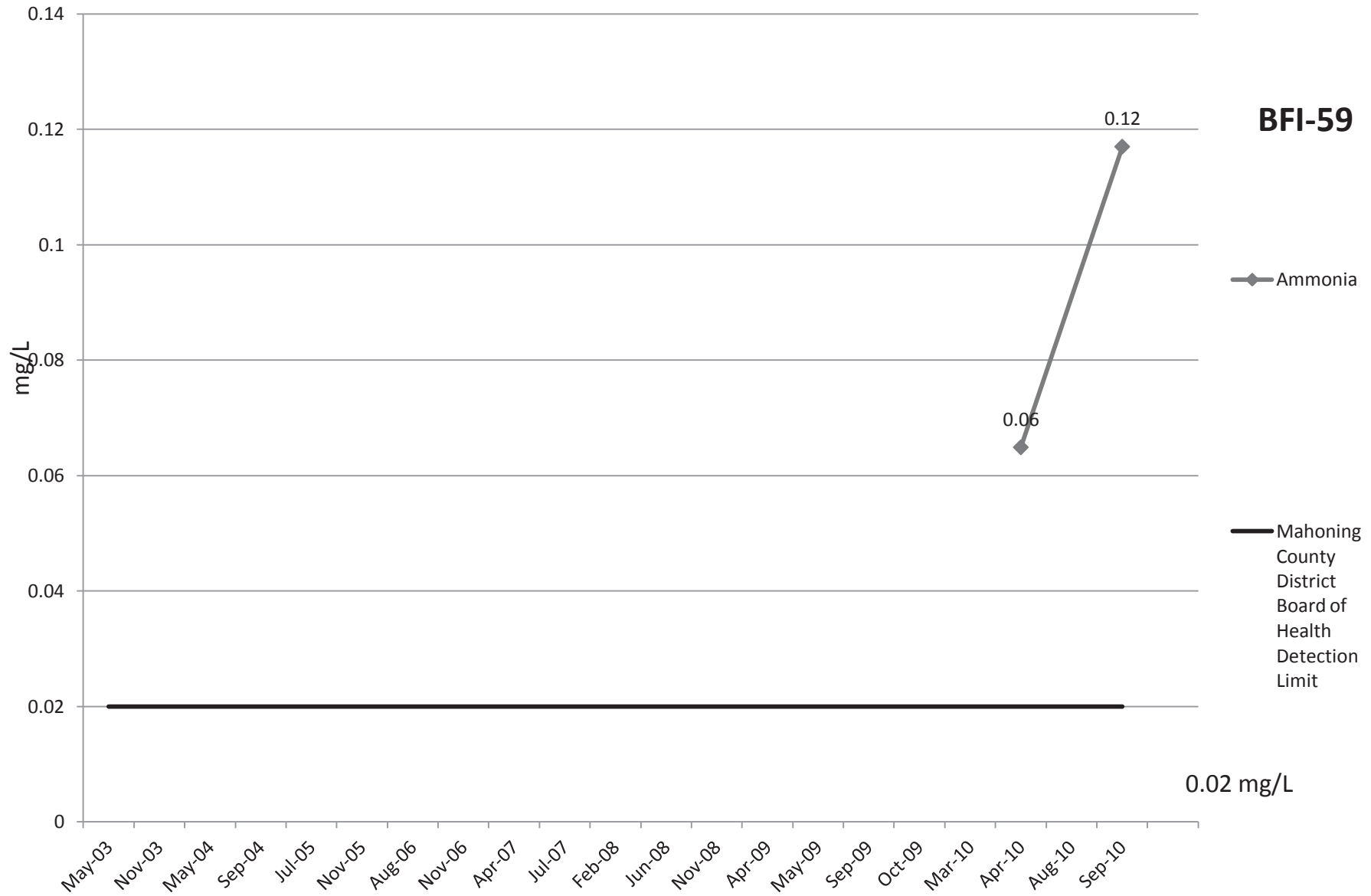




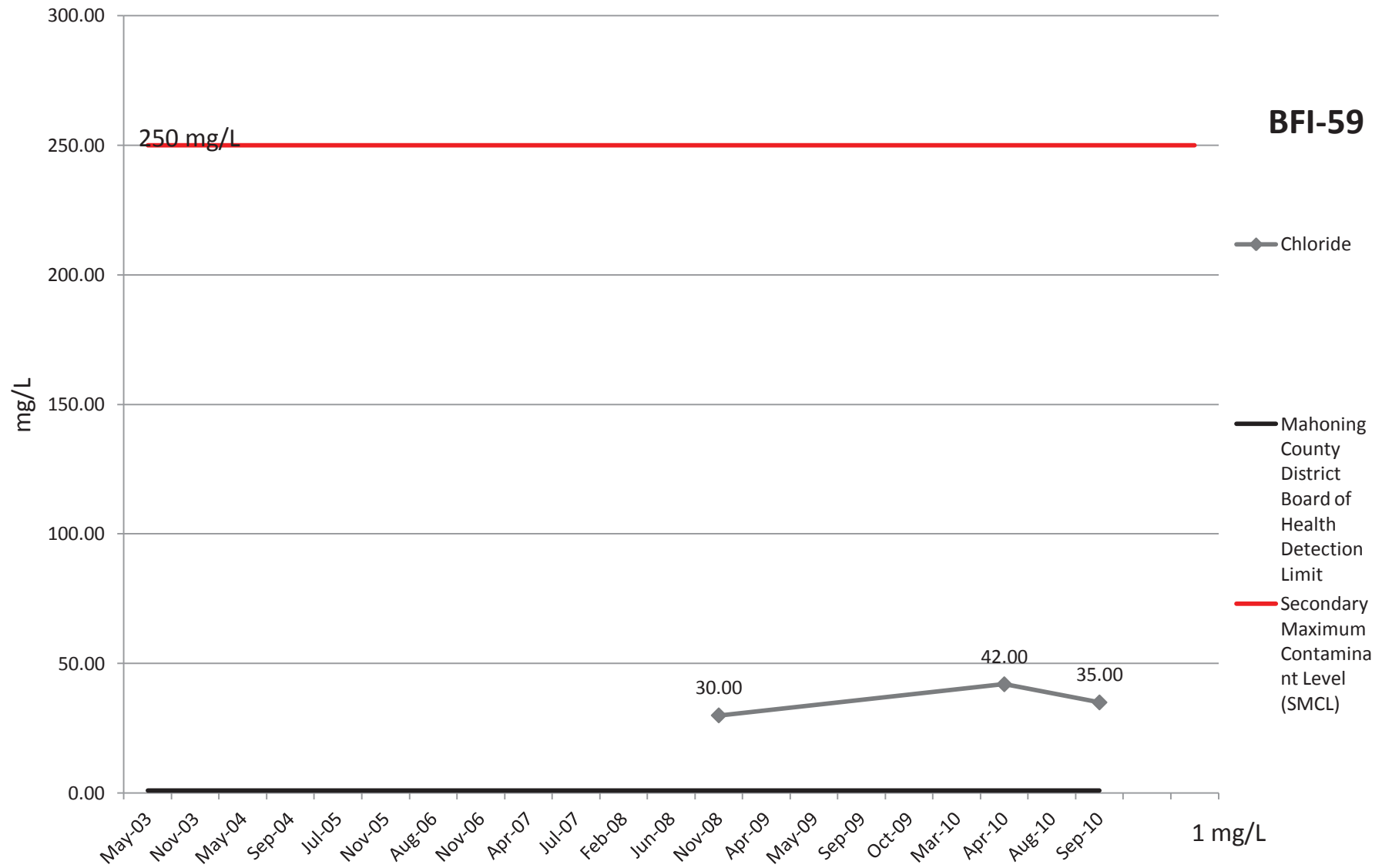
# Alkalinity



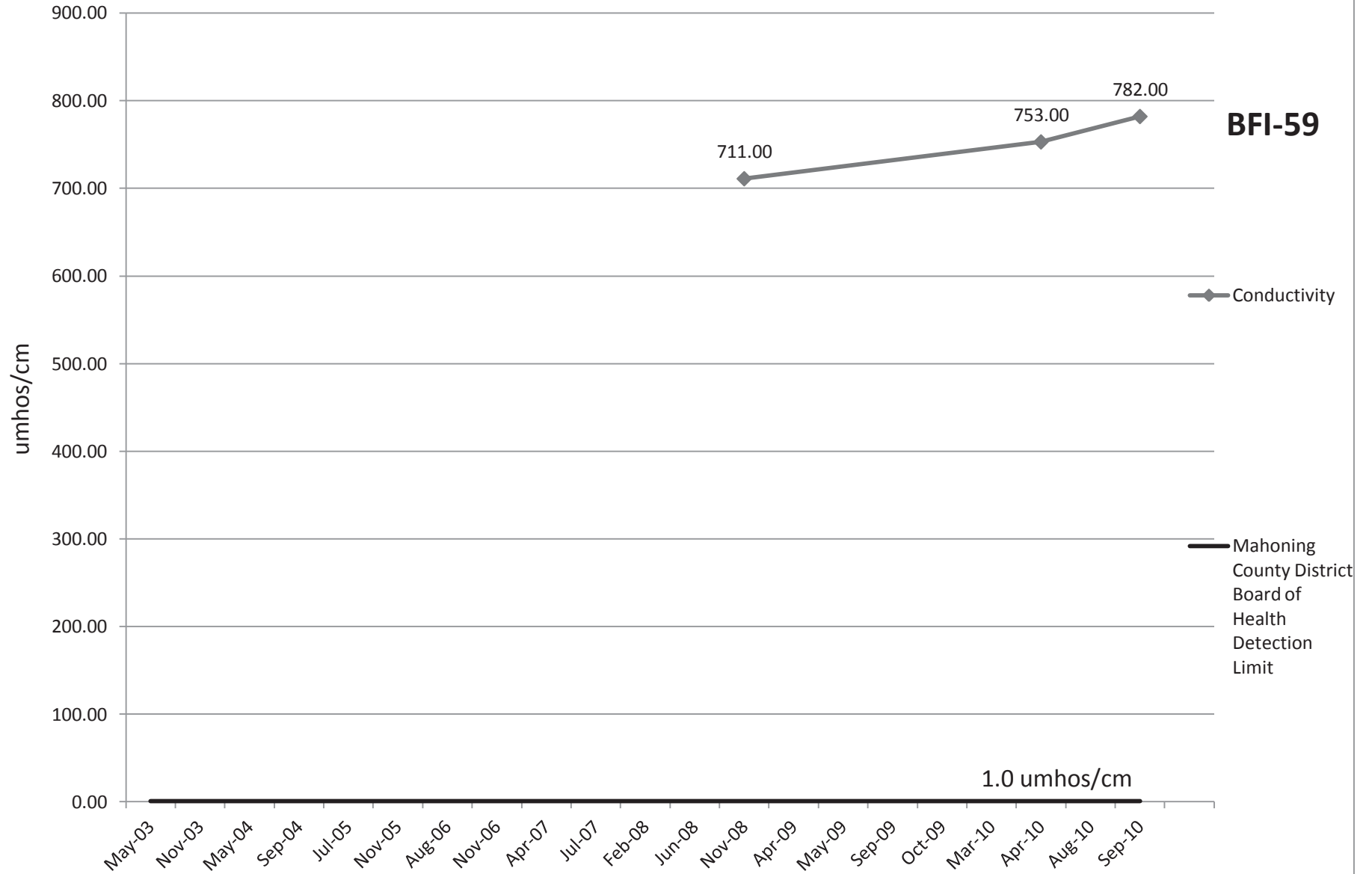
# Ammonia



# Chloride



# Conductivity



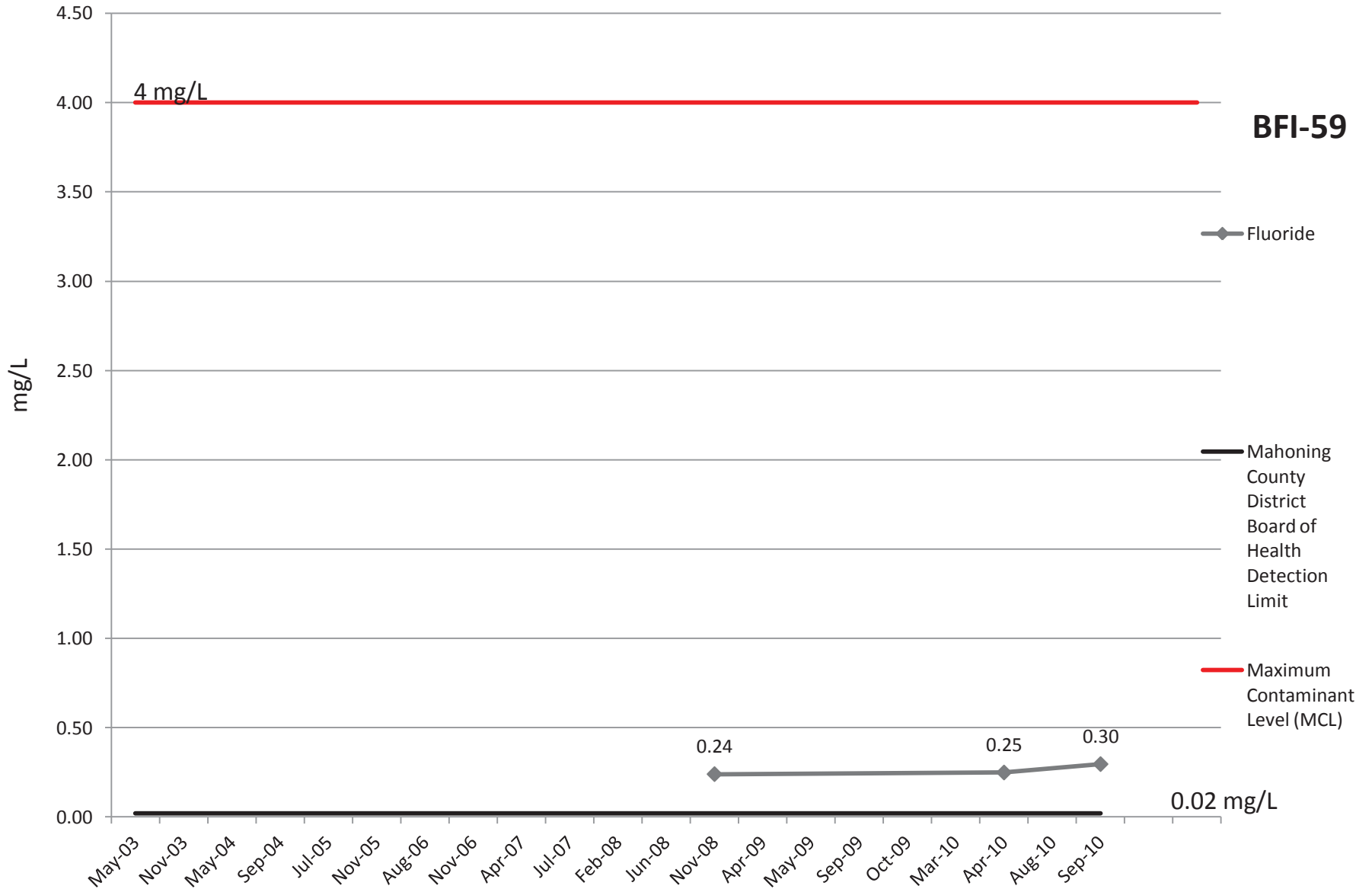
**BFI-59**

◆ Conductivity

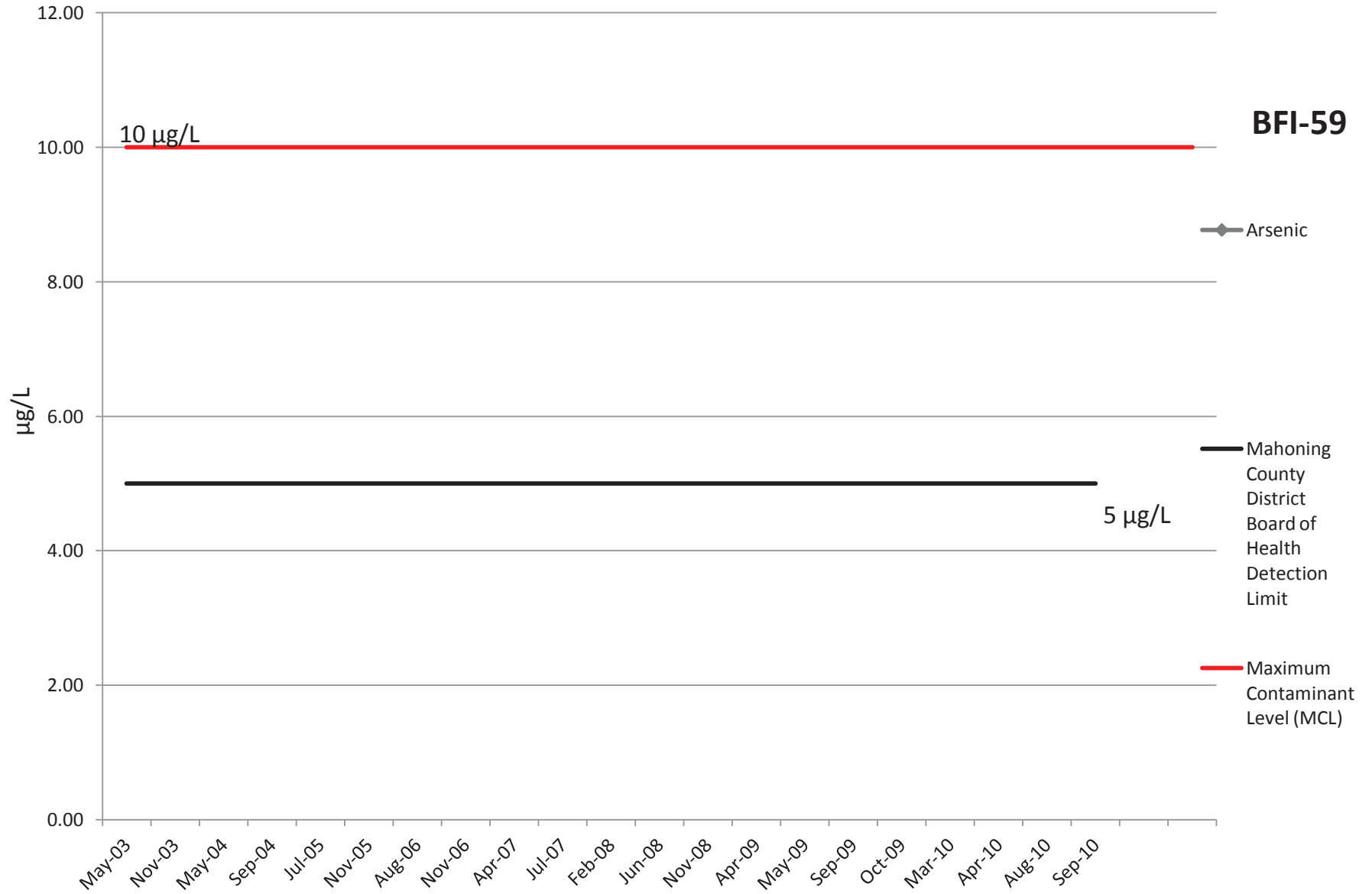
— Mahoning  
County District  
Board of  
Health  
Detection  
Limit

1.0 umhos/cm

# Fluoride

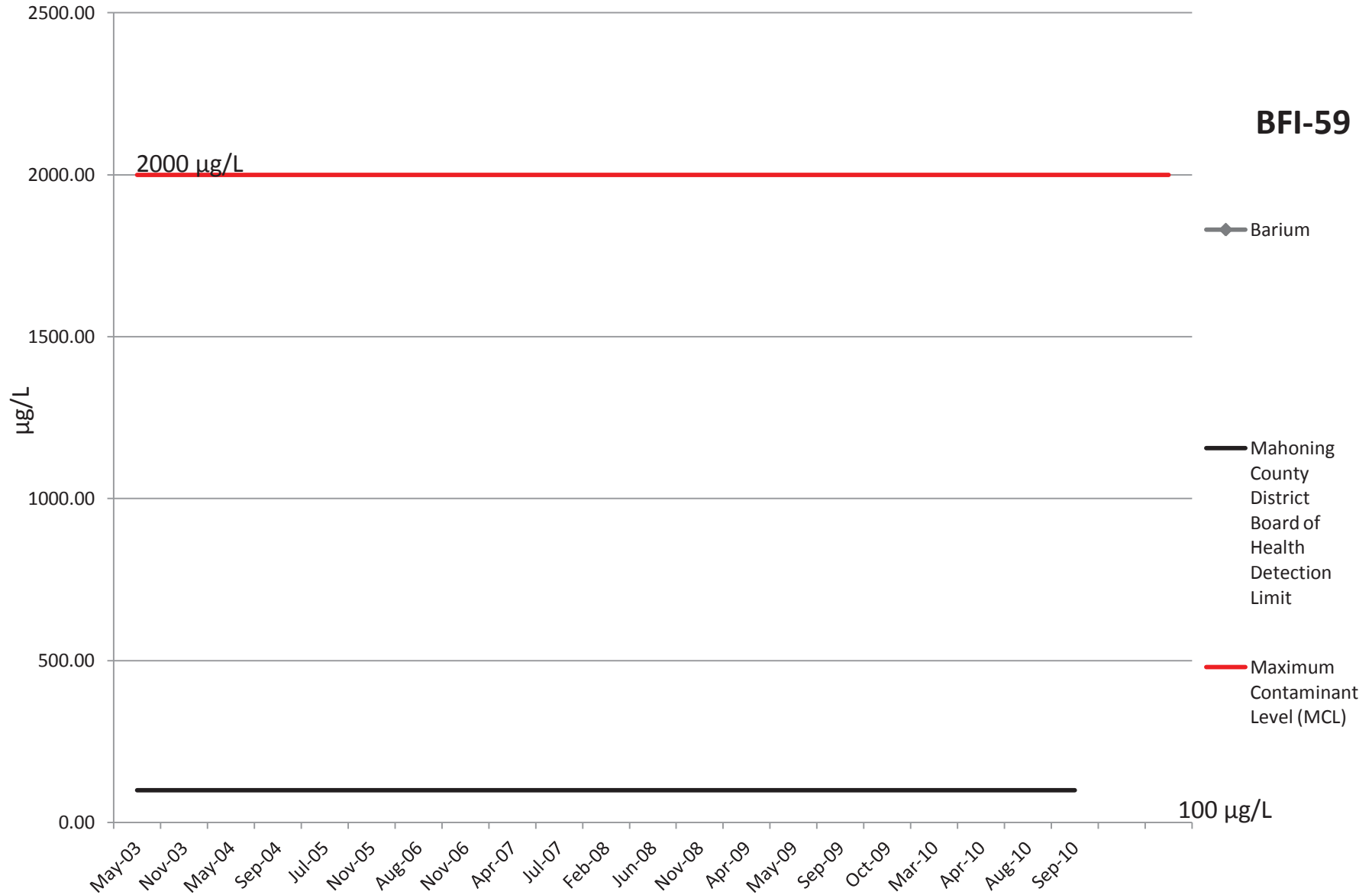


# Arsenic



# Barium

**BFI-59**



# Cadmium

**BFI-59**

10 µg/L

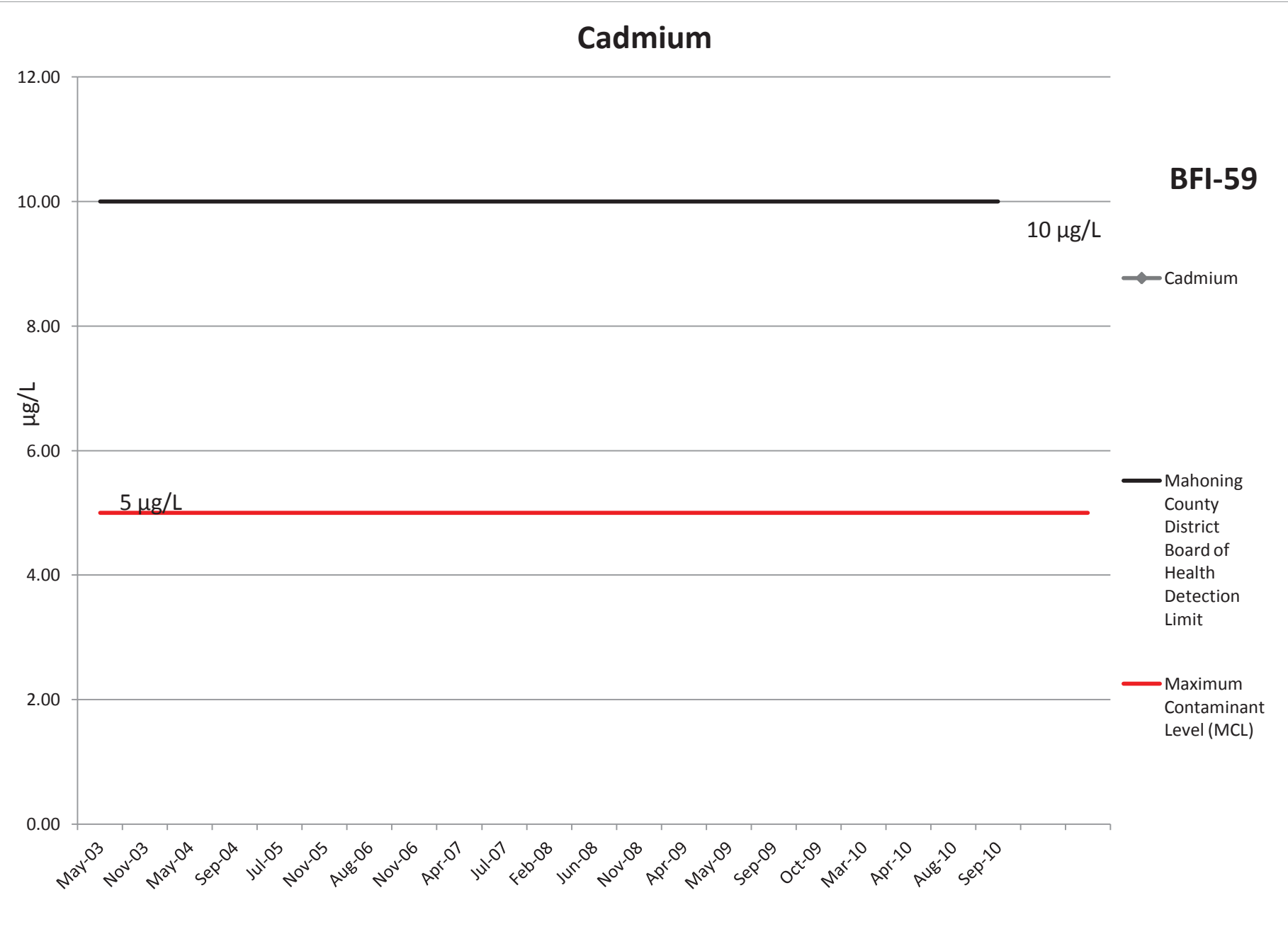
12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

5 µg/L

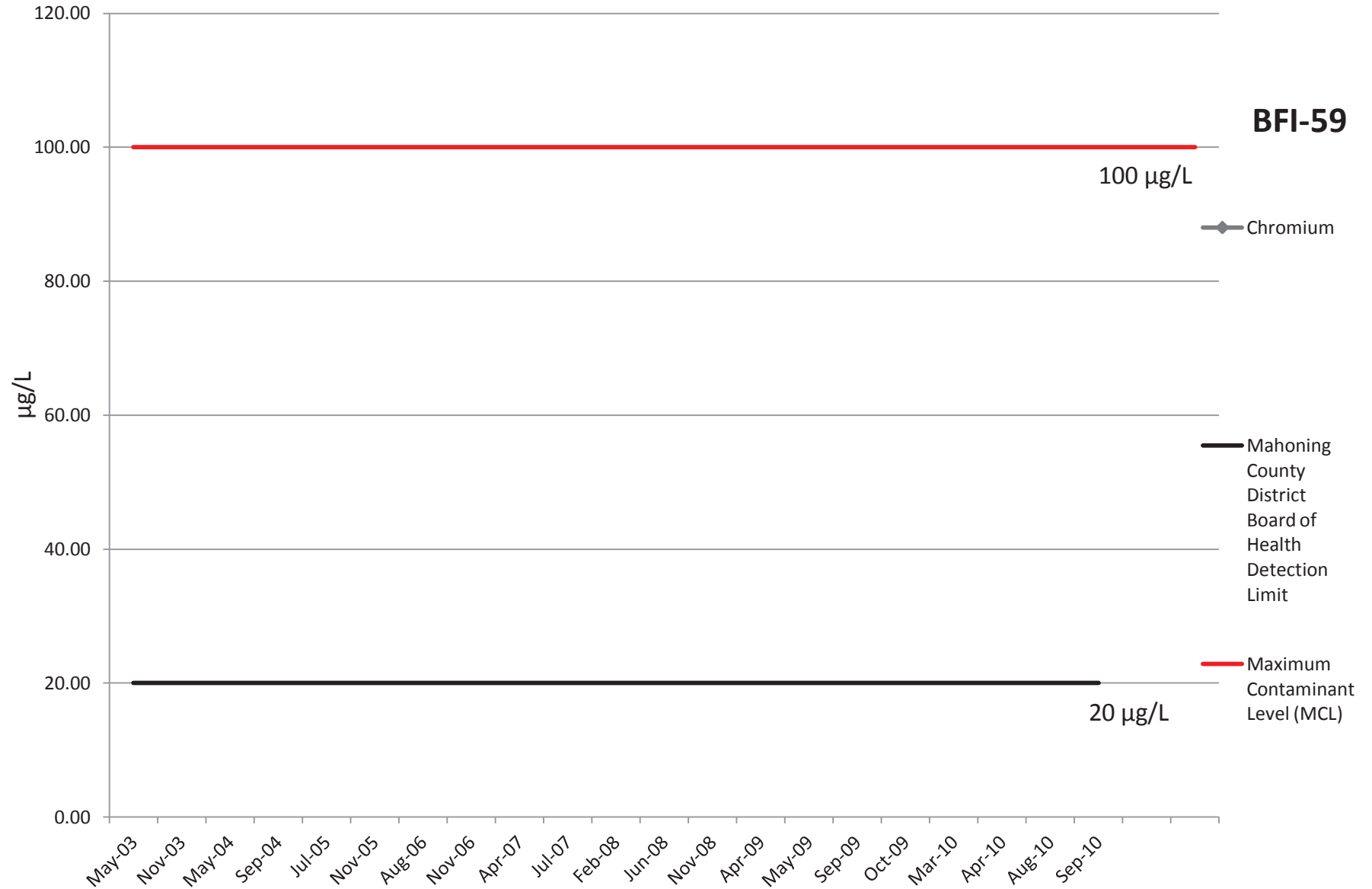
- ◆ Cadmium
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

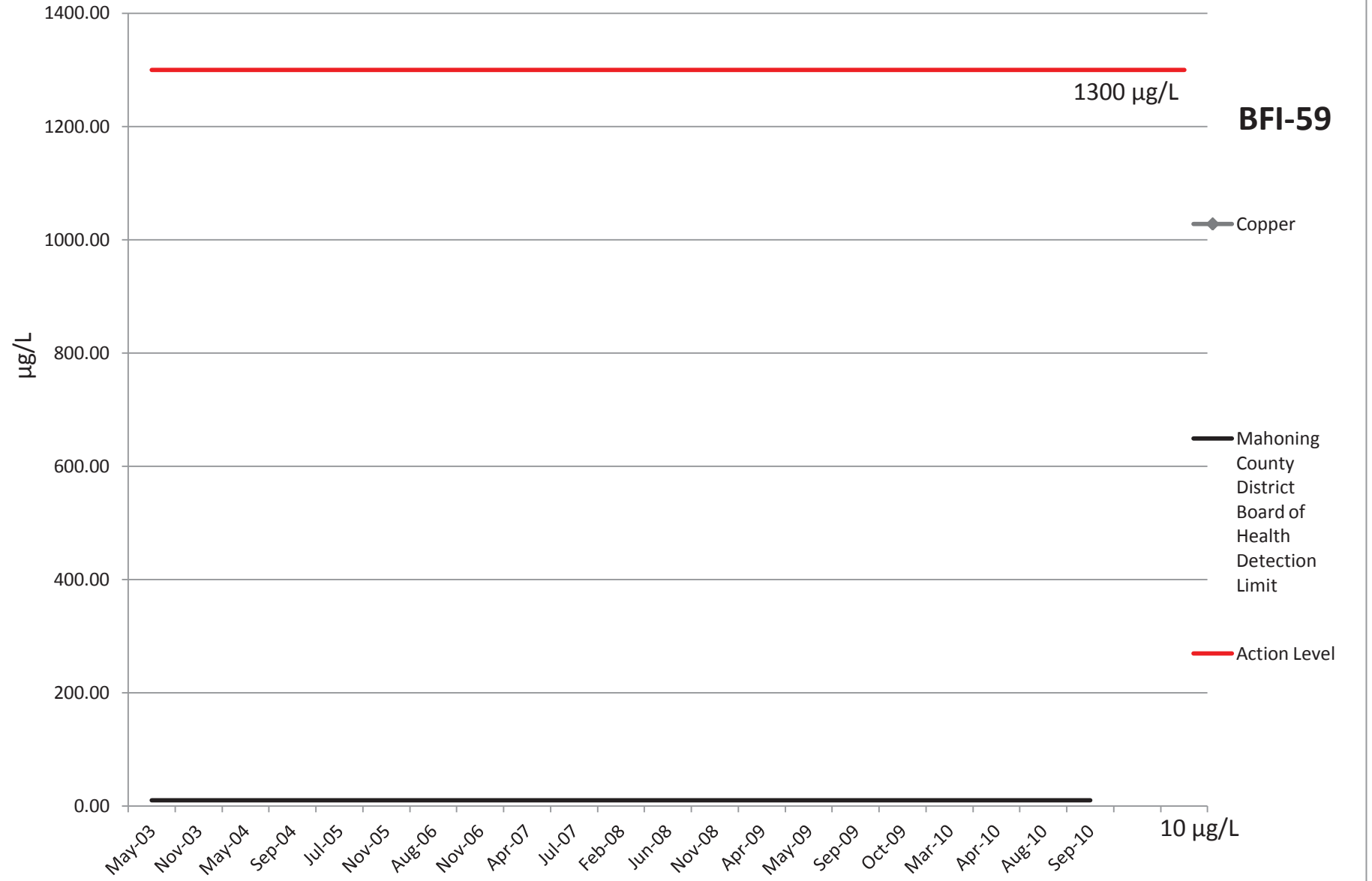




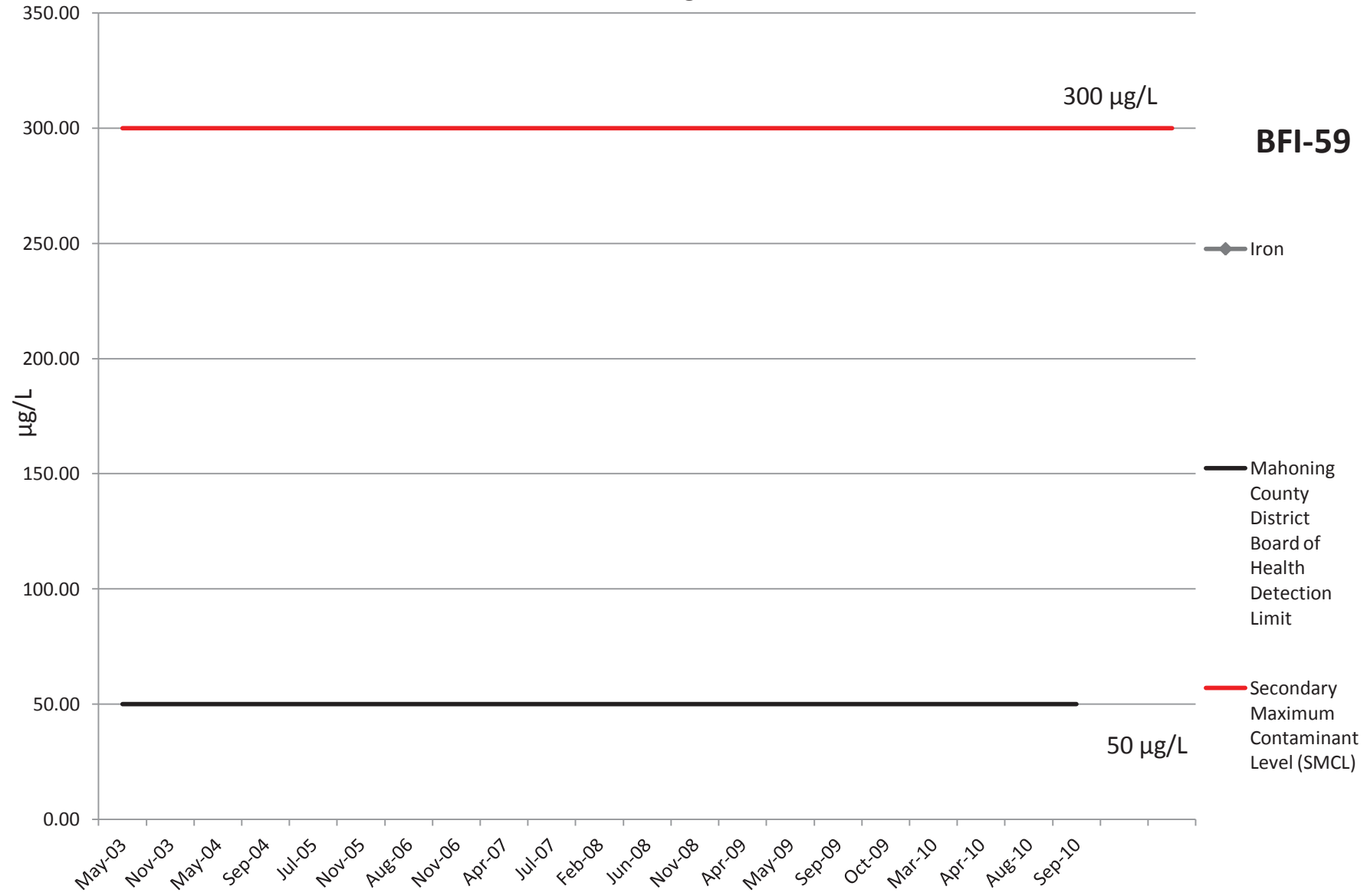
# Chromium



# Copper

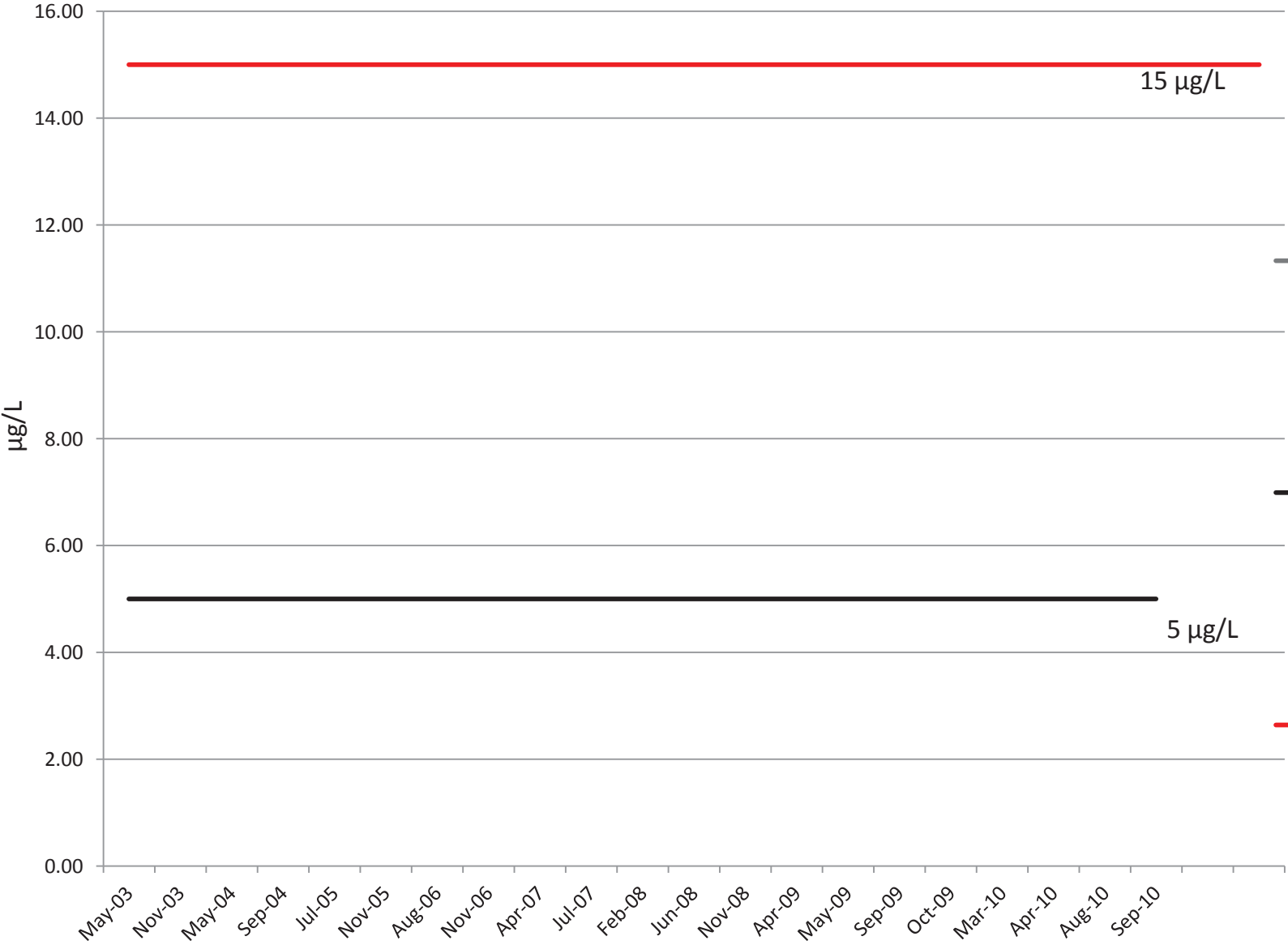


# Iron



# Lead

**BFI-59**

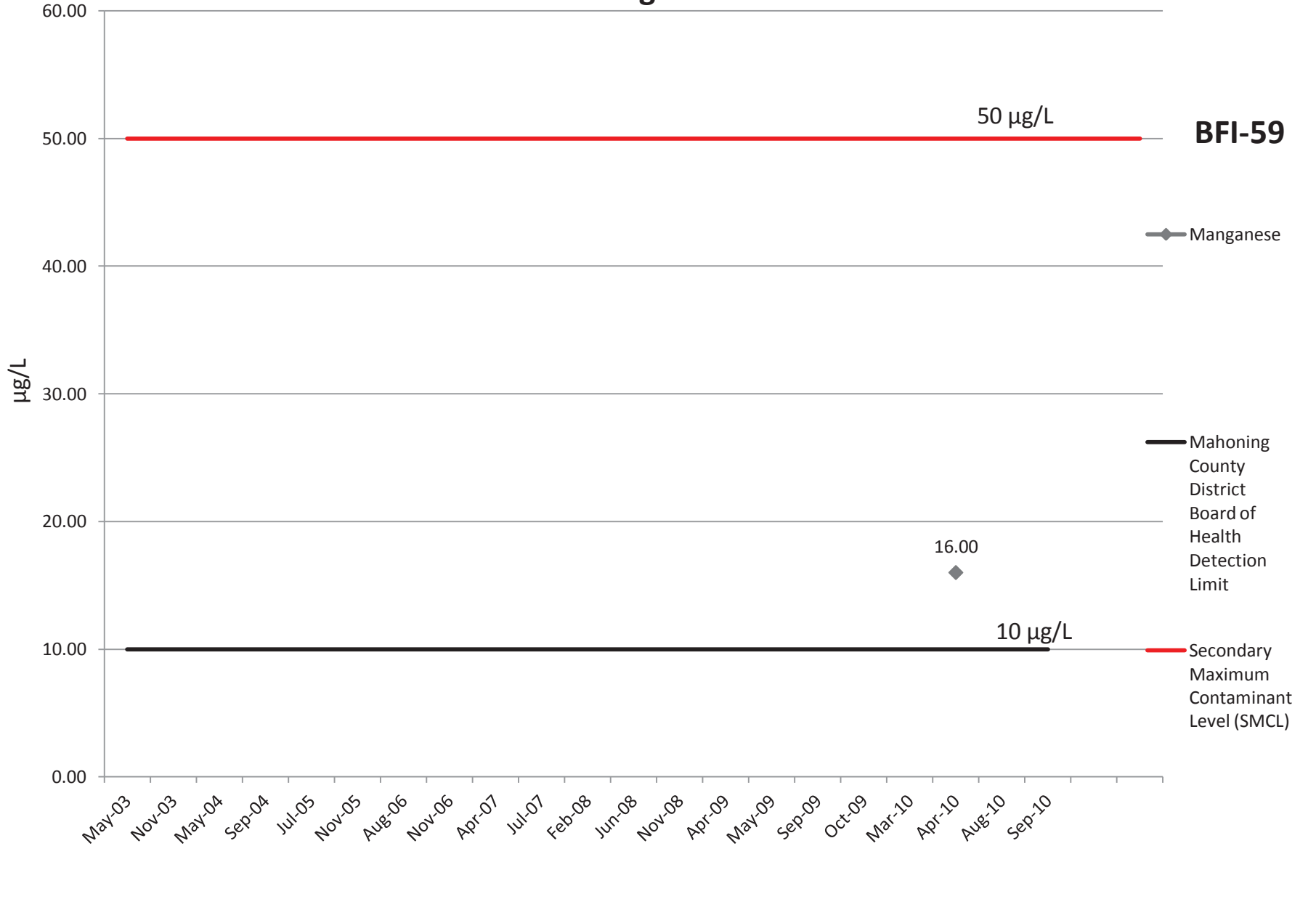


Lead

Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

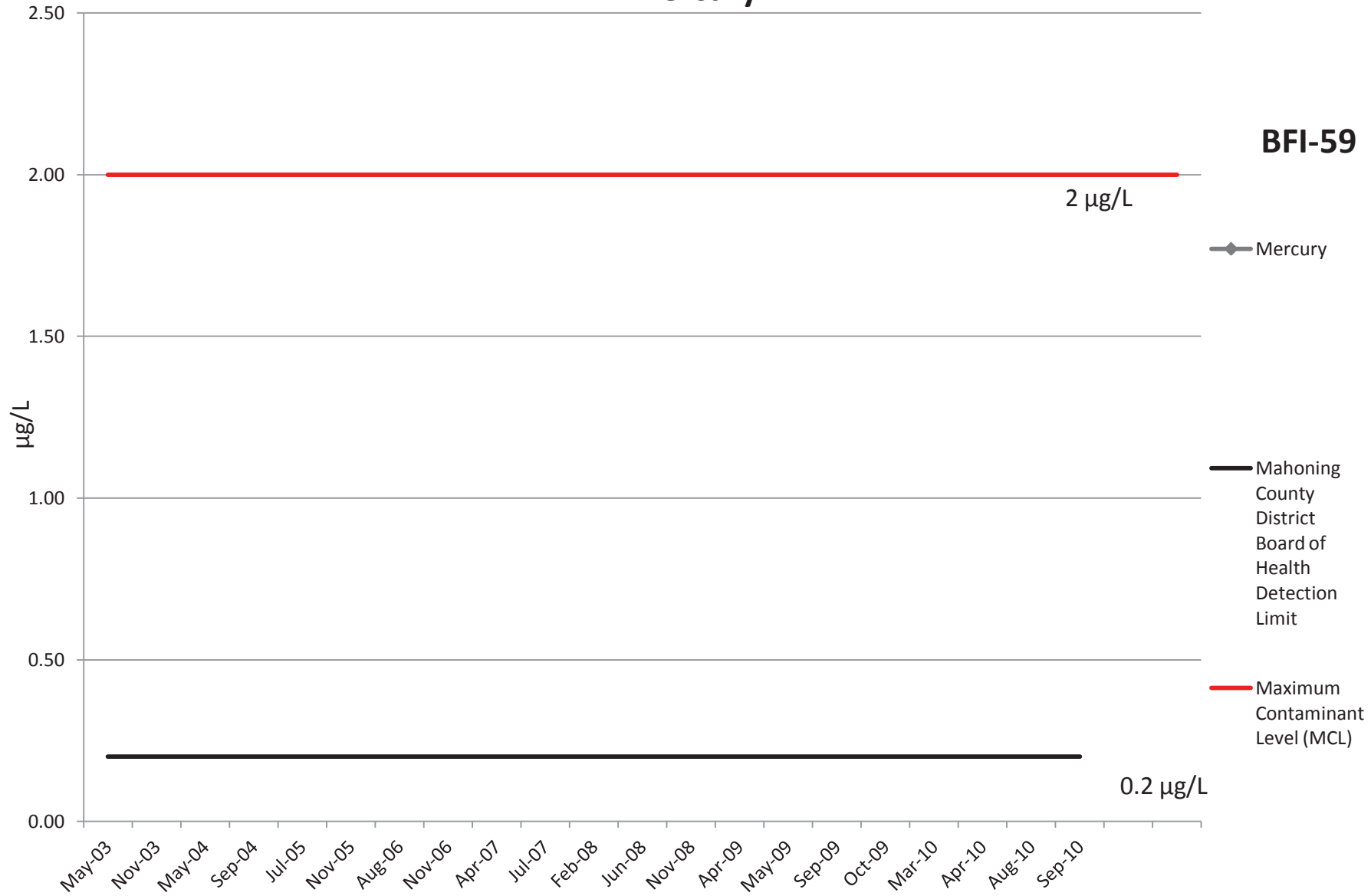
Action Level

# Manganese

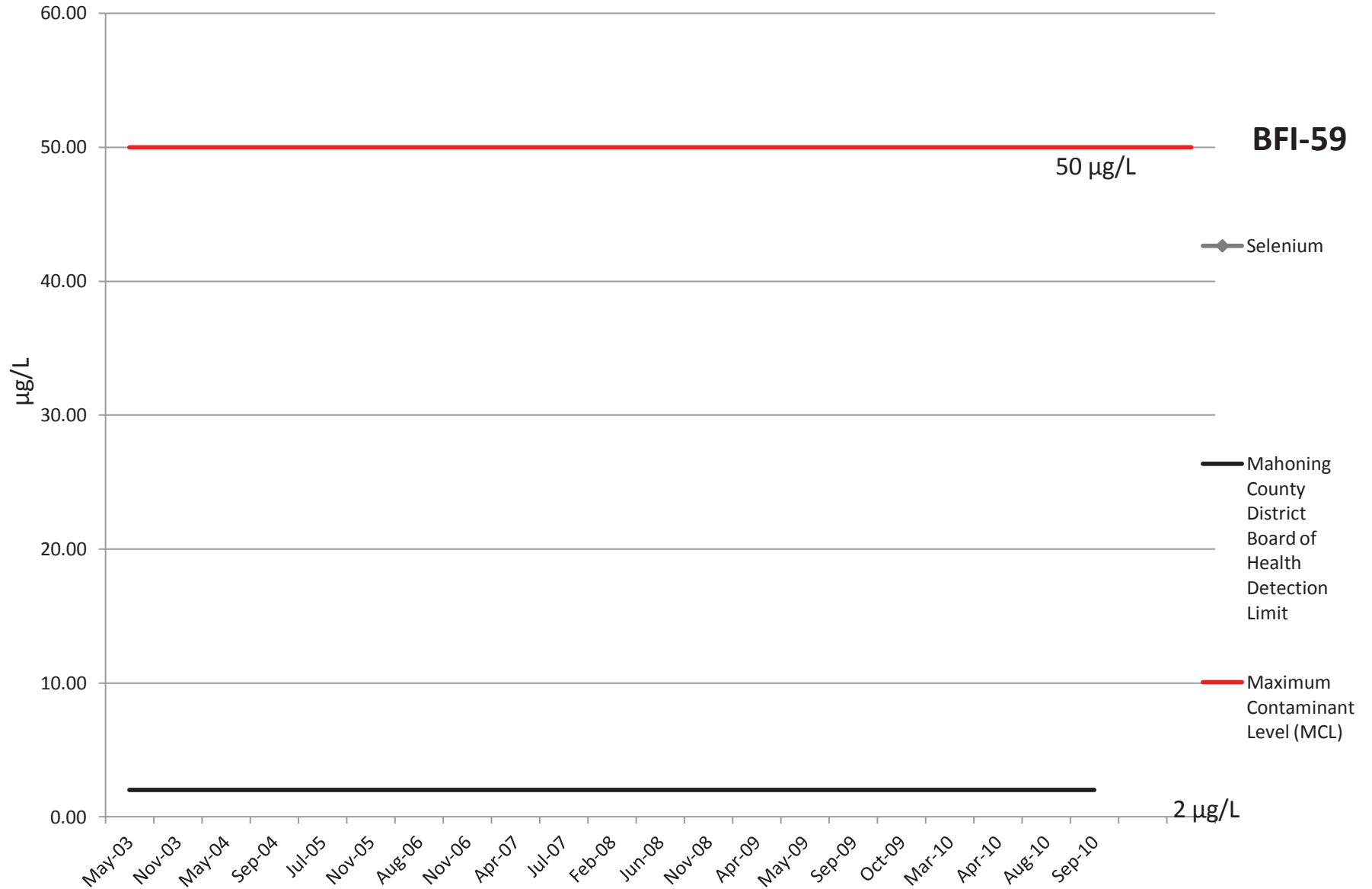


# Mercury

**BFI-59**

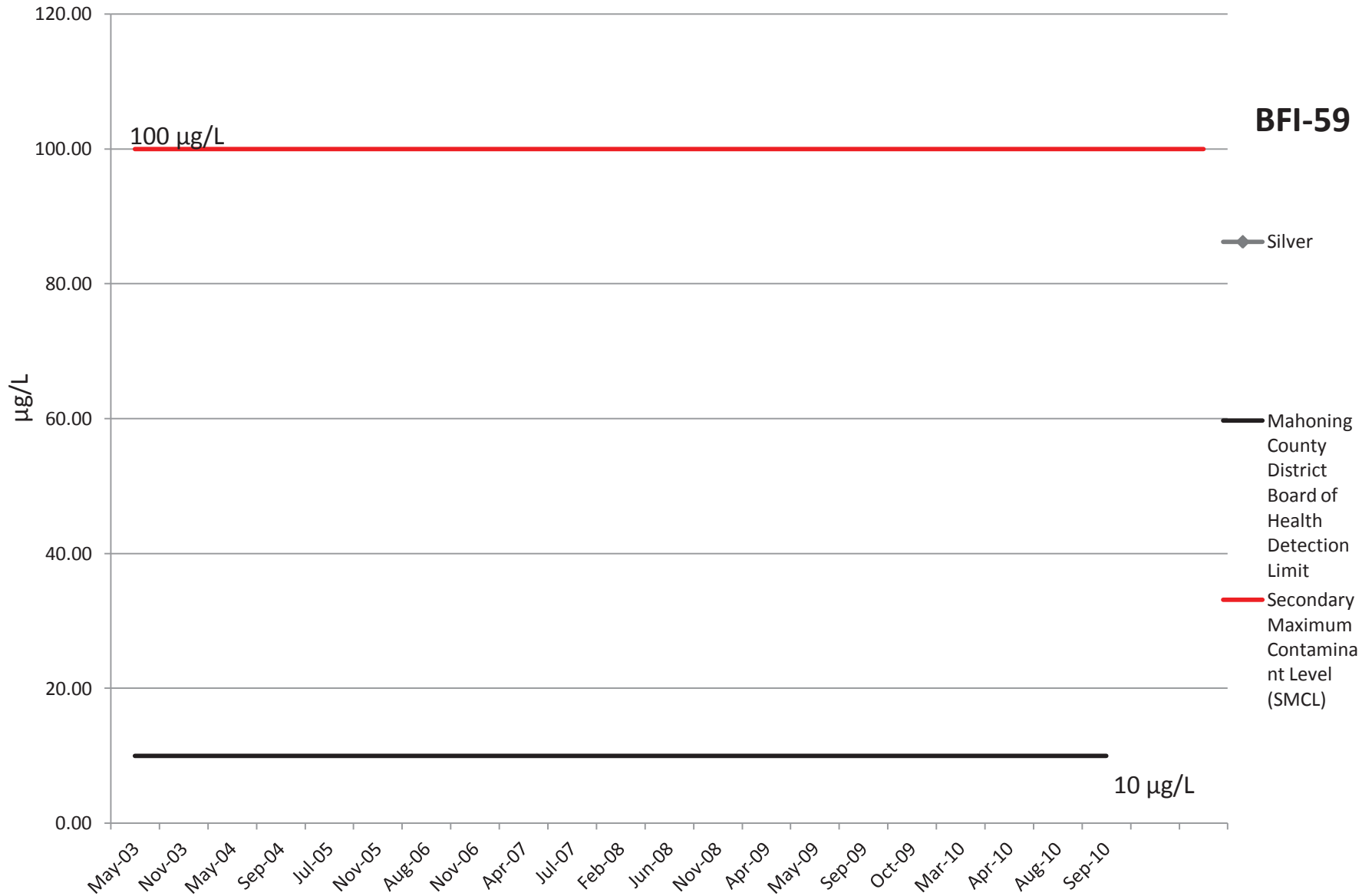


# Selenium



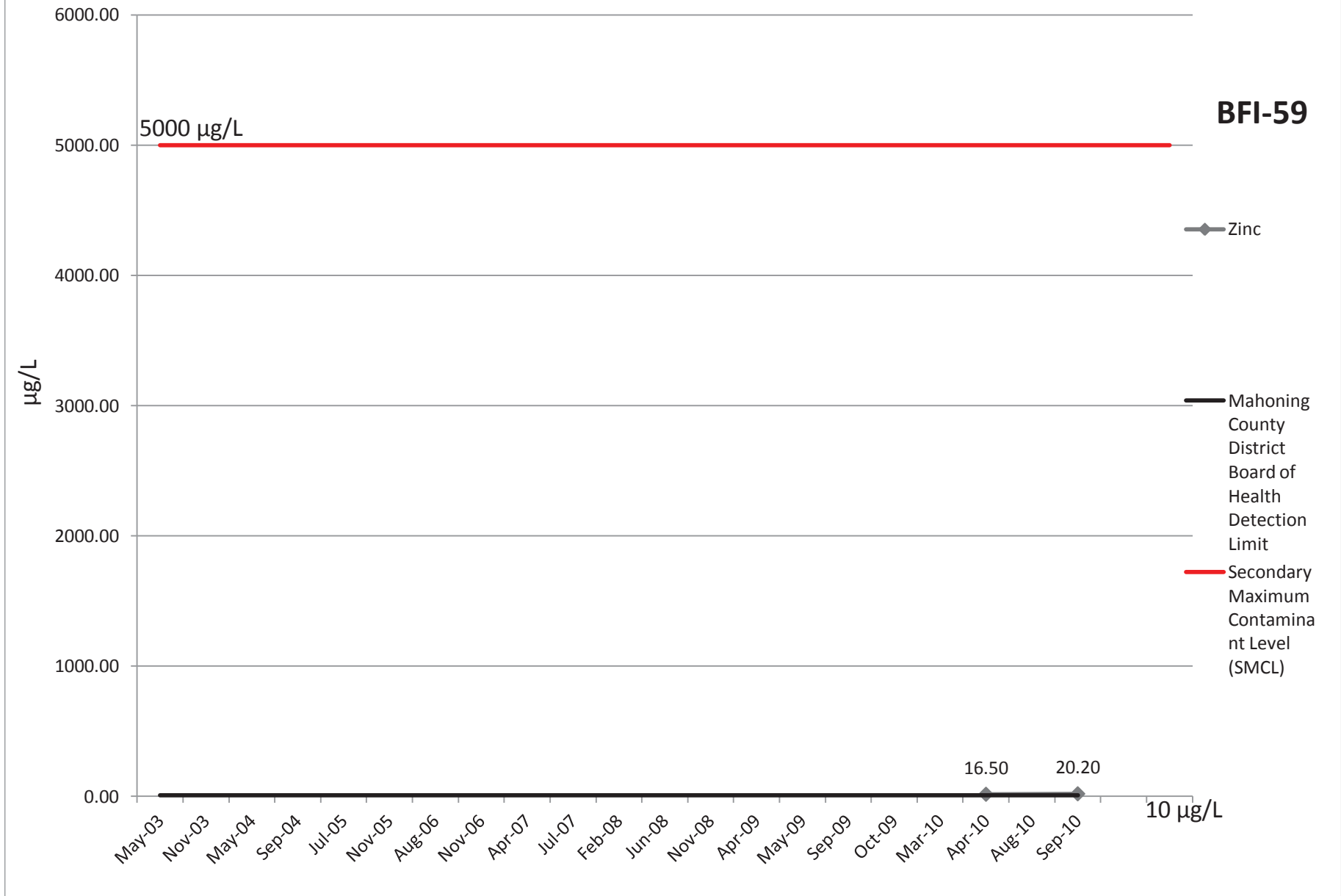
# Silver

**BFI-59**

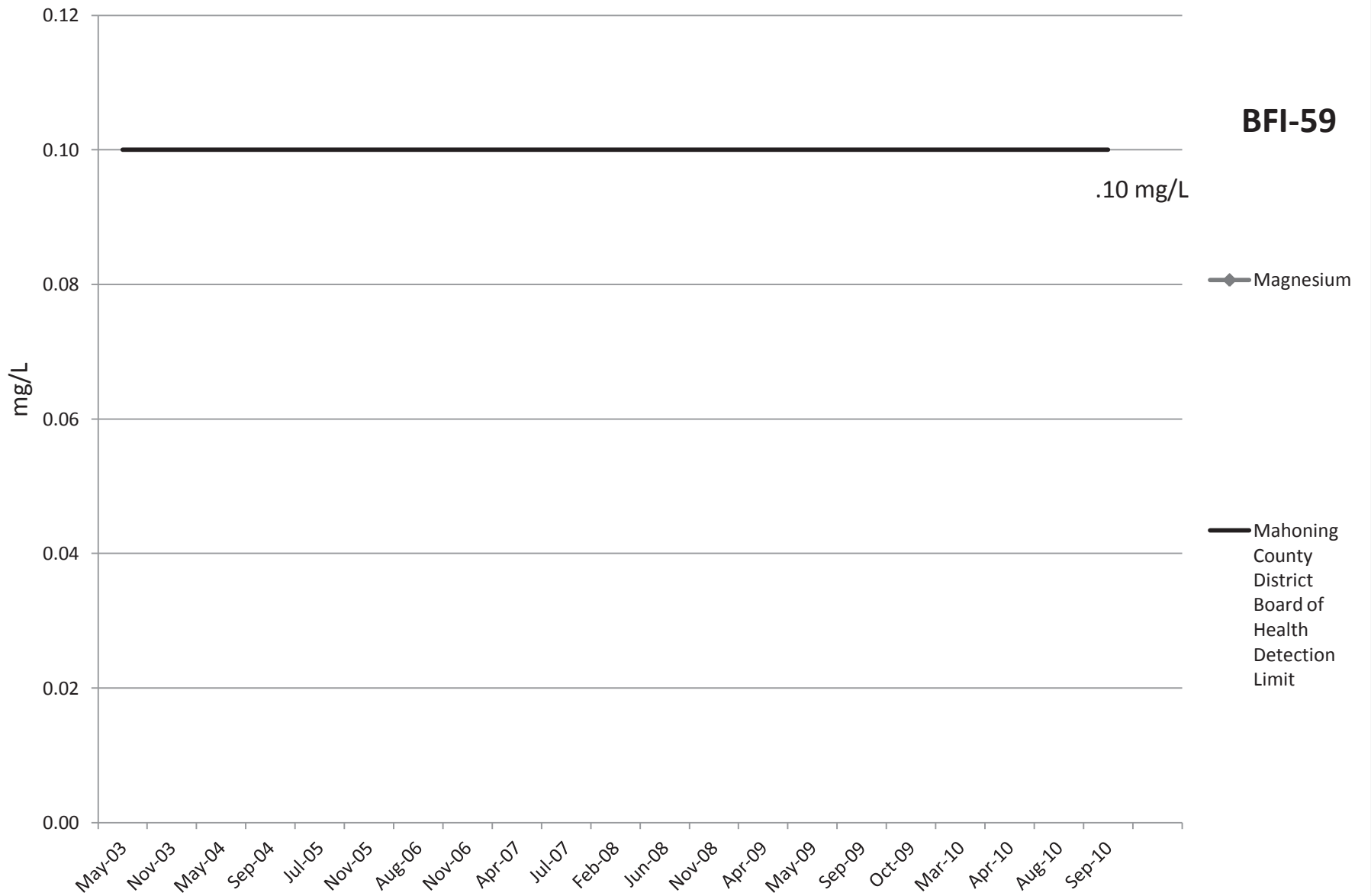




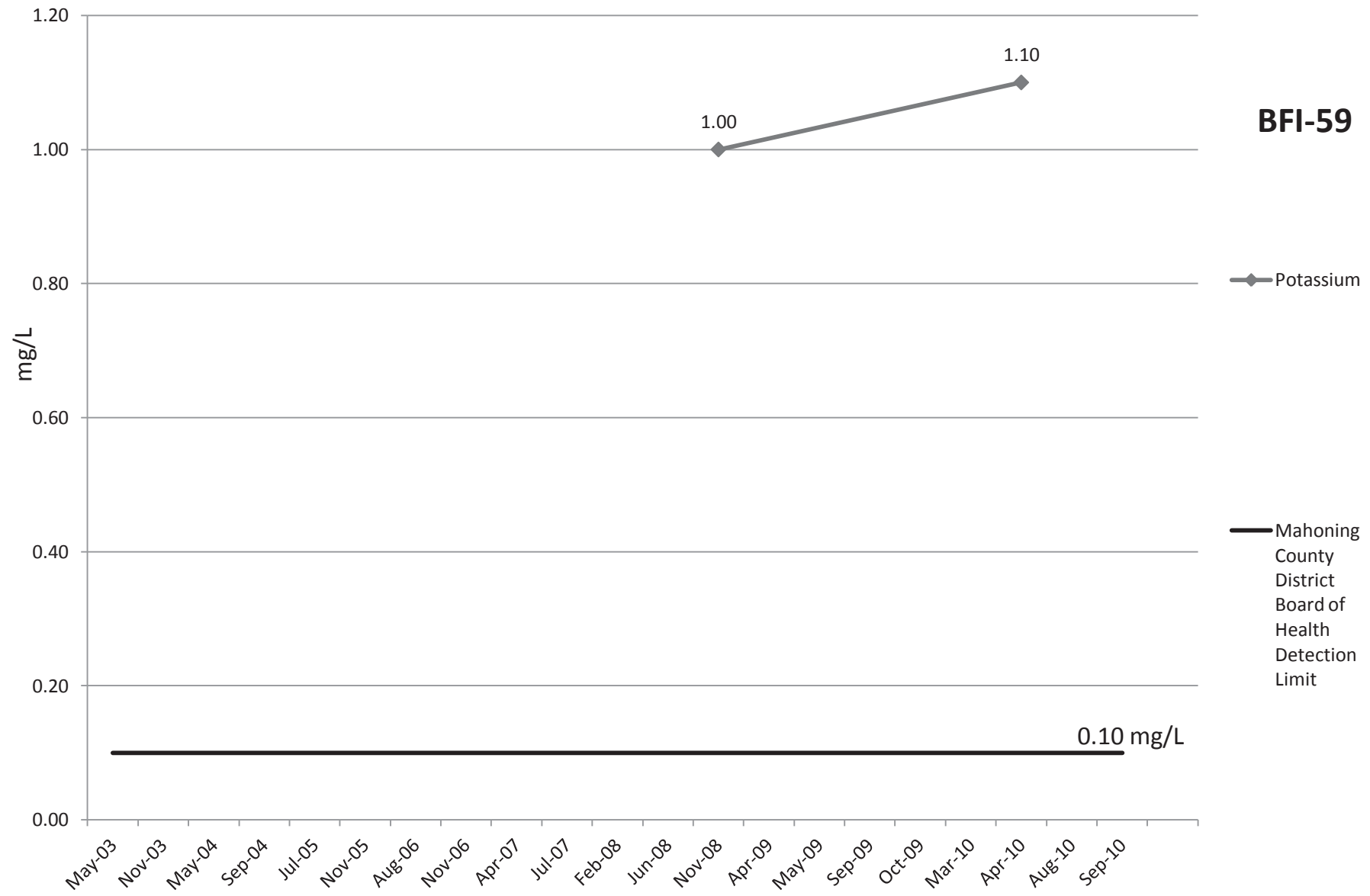
# Zinc



# Magnesium



# Potassium



**BFI-59**

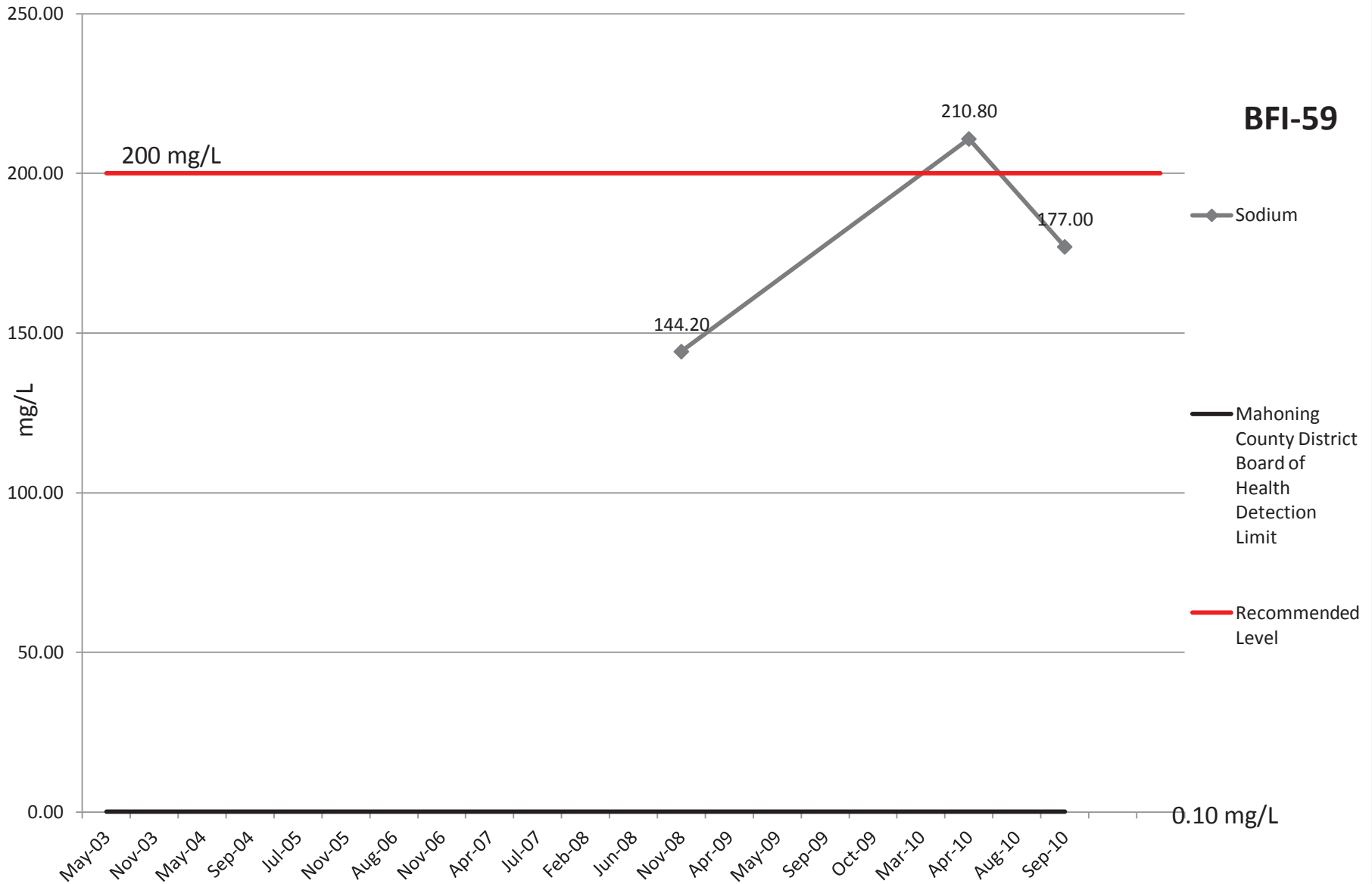
◆ Potassium

— Mahoning County District Board of Health Detection Limit

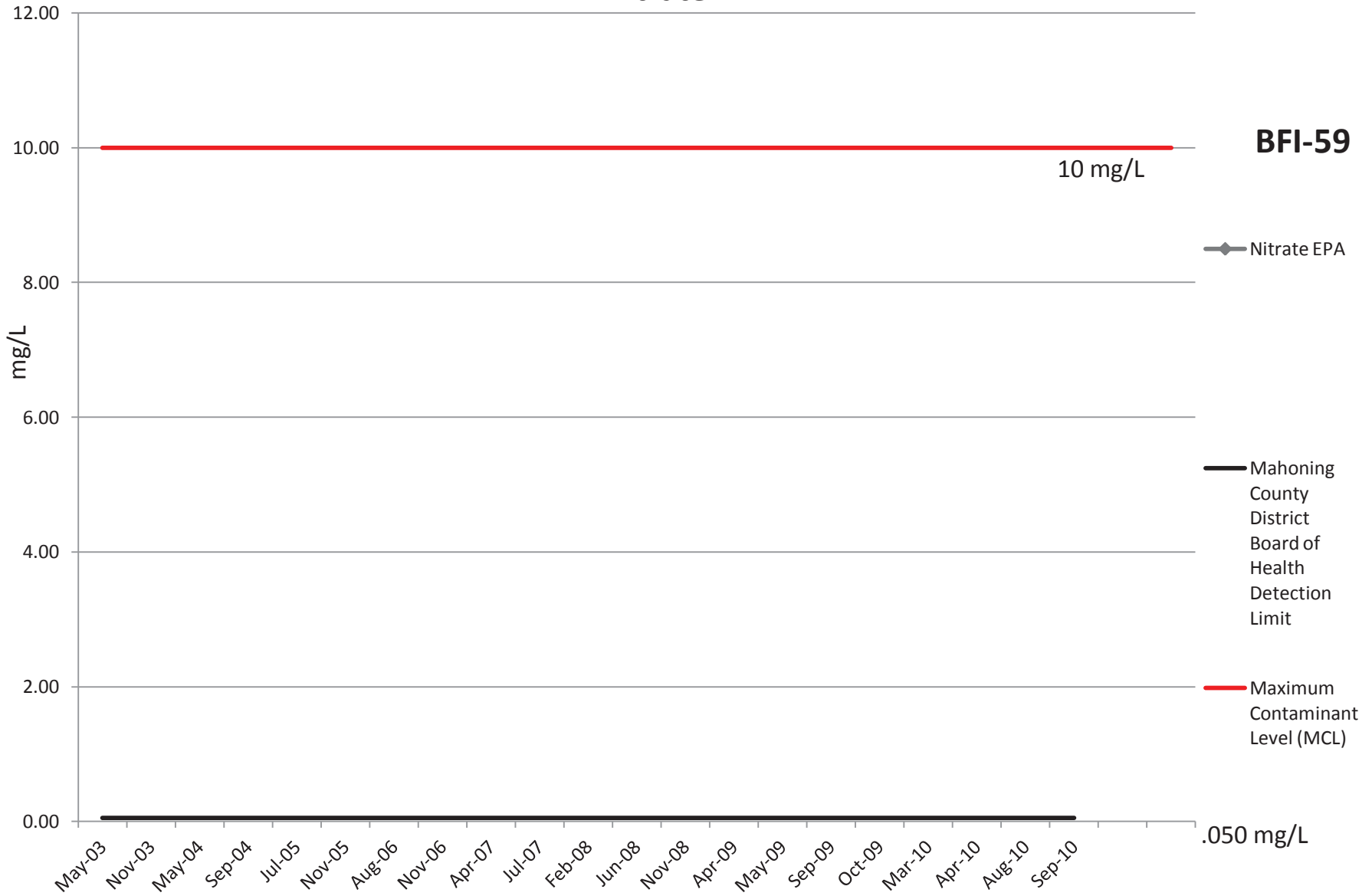
0.10 mg/L

# Sodium

**BFI-59**



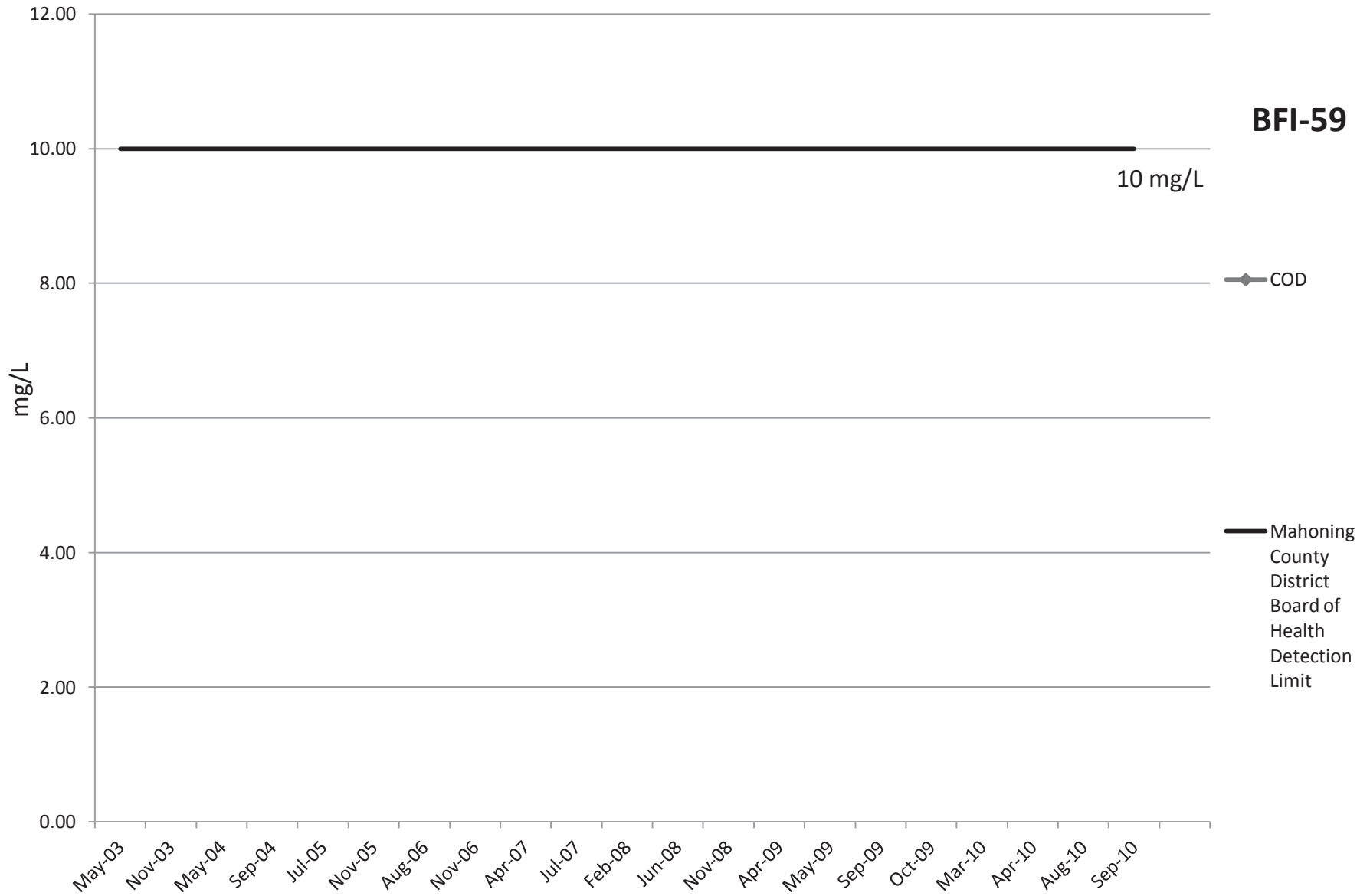
# Nitrate EPA



# COD

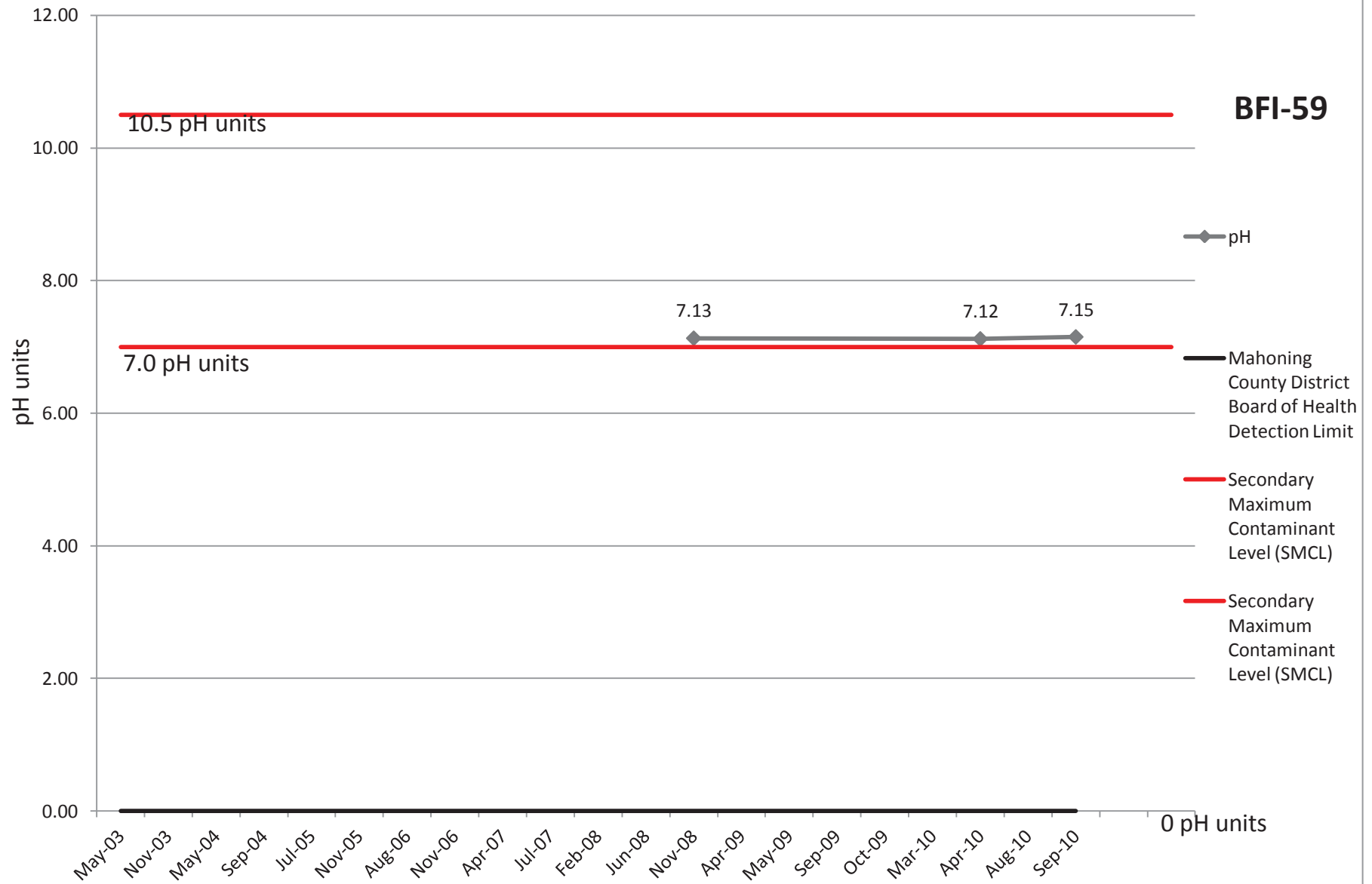
**BFI-59**

10 mg/L



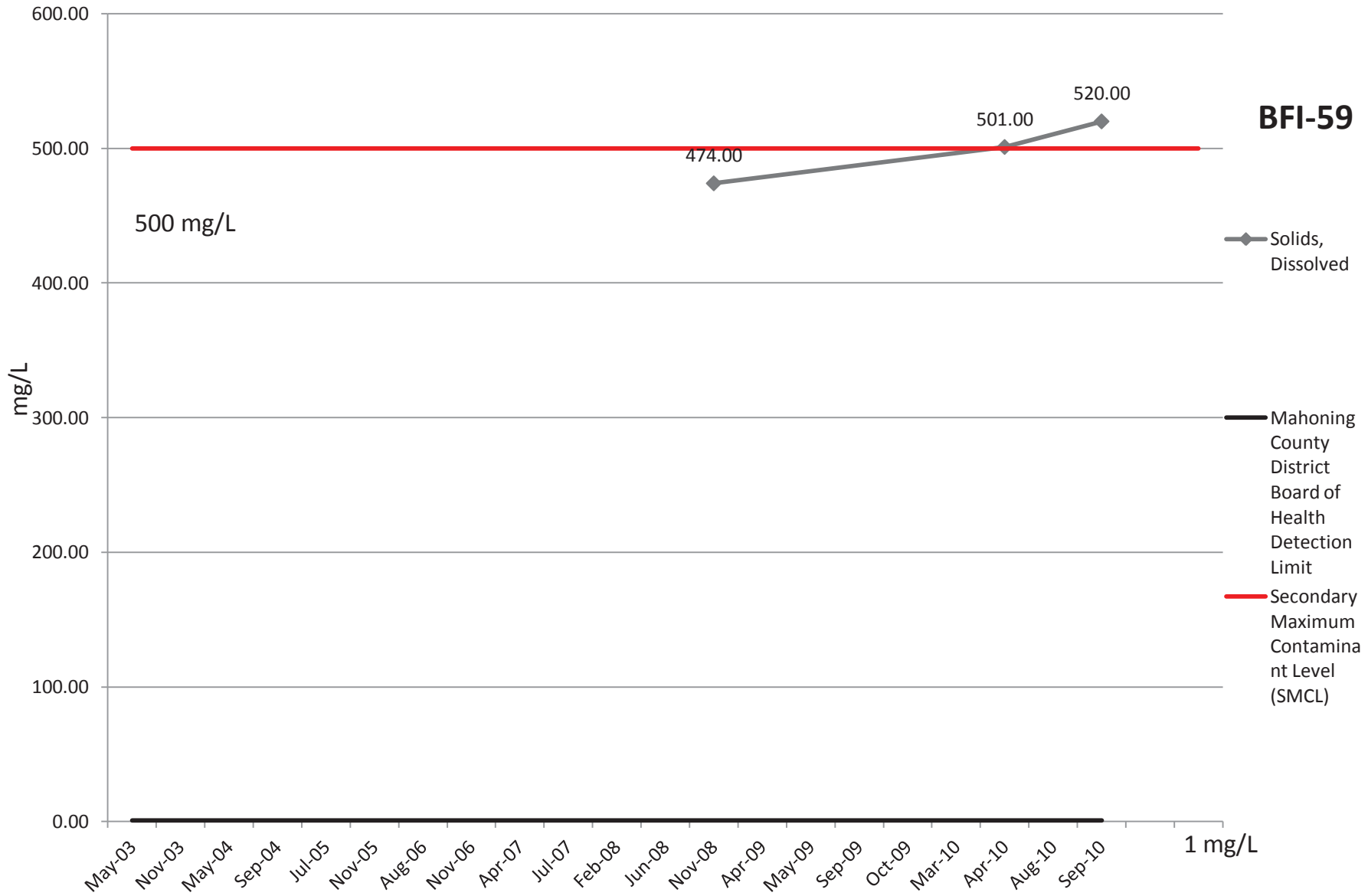
# pH

**BFI-59**



# Solids, Dissolved

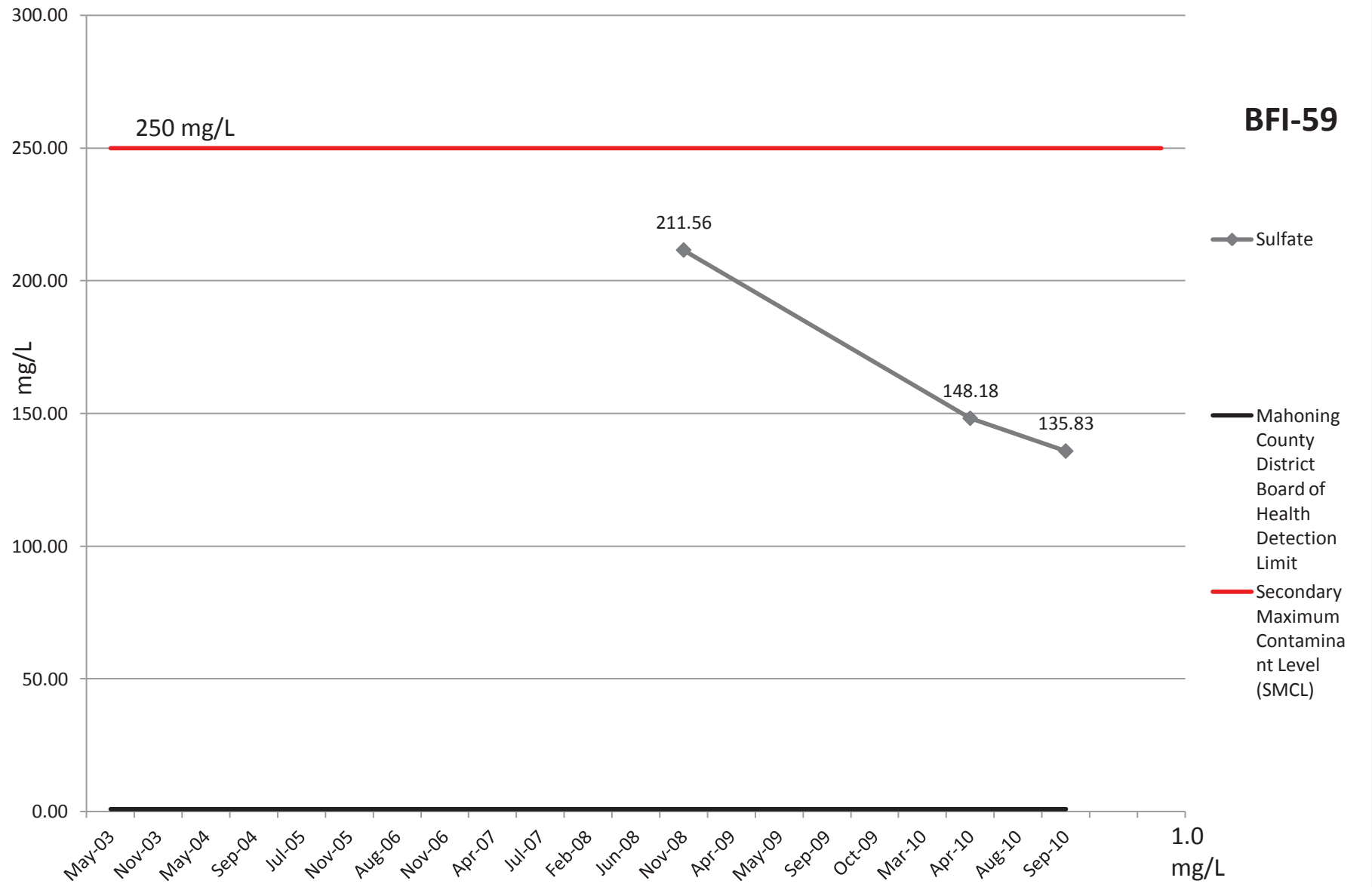
**BFI-59**





# Sulfate

**BFI-59**



# Bacteria

positive (1)

## BFI-59

Positive/Negative

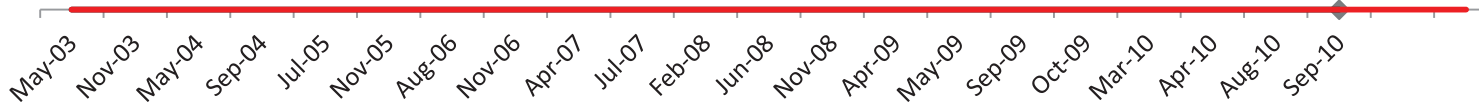
◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

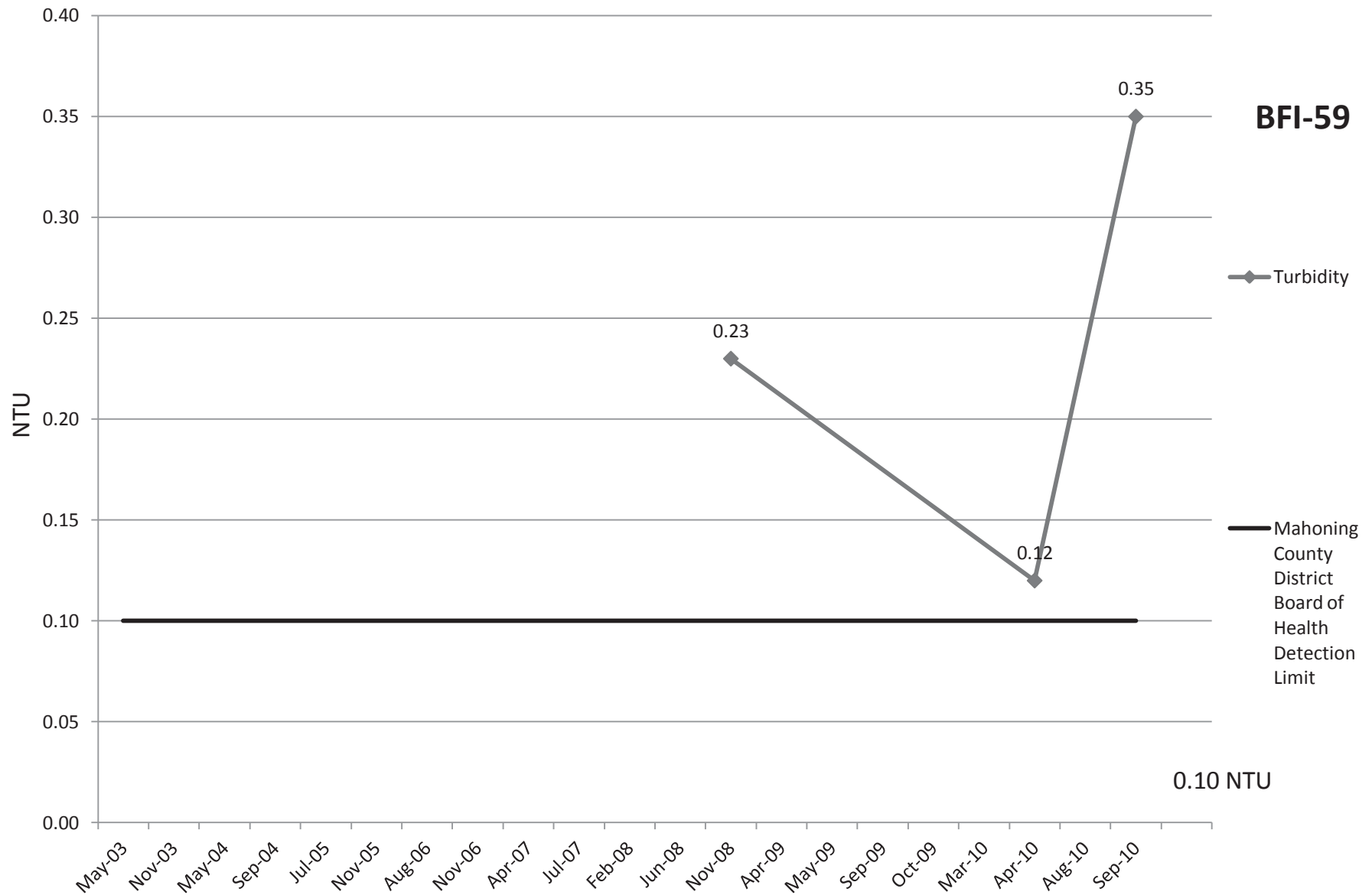
— Maximum  
Contaminant  
Level (MCL)

0.00

negative (0)



# Turbidity



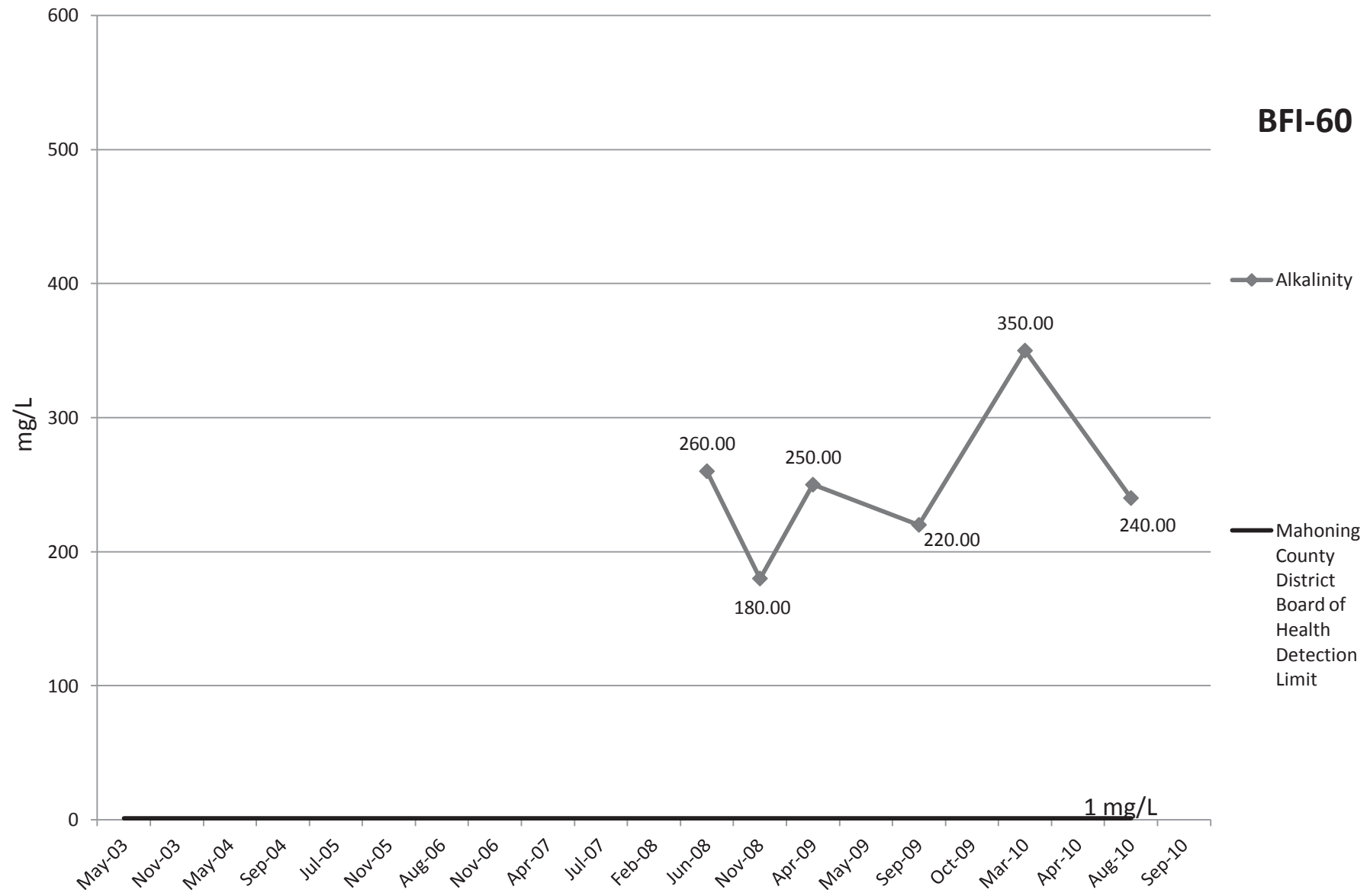
**BFI-59**

◆ Turbidity

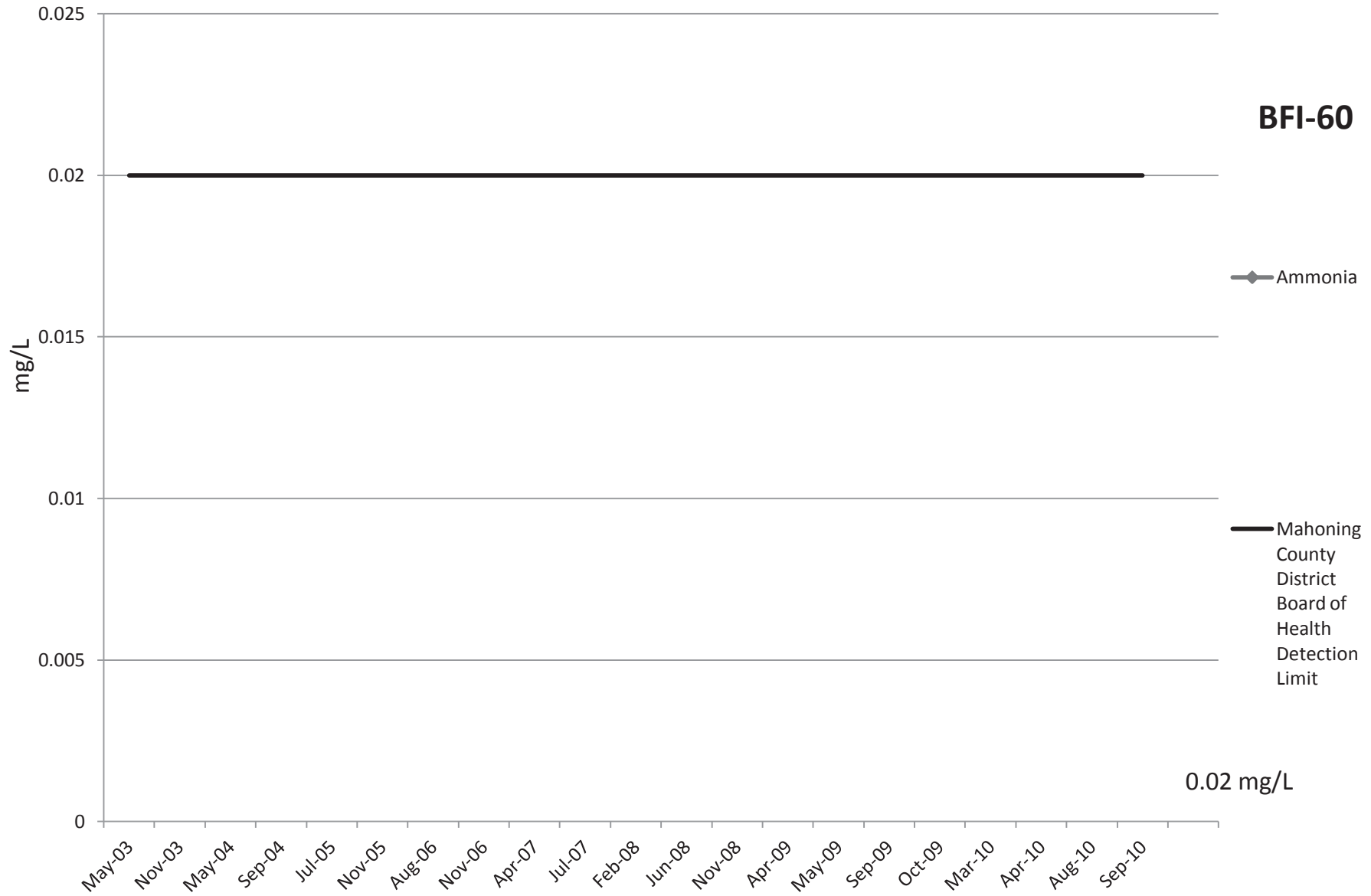
— Mahoning County District Board of Health Detection Limit

0.10 NTU

# Alkalinity



# Ammonia



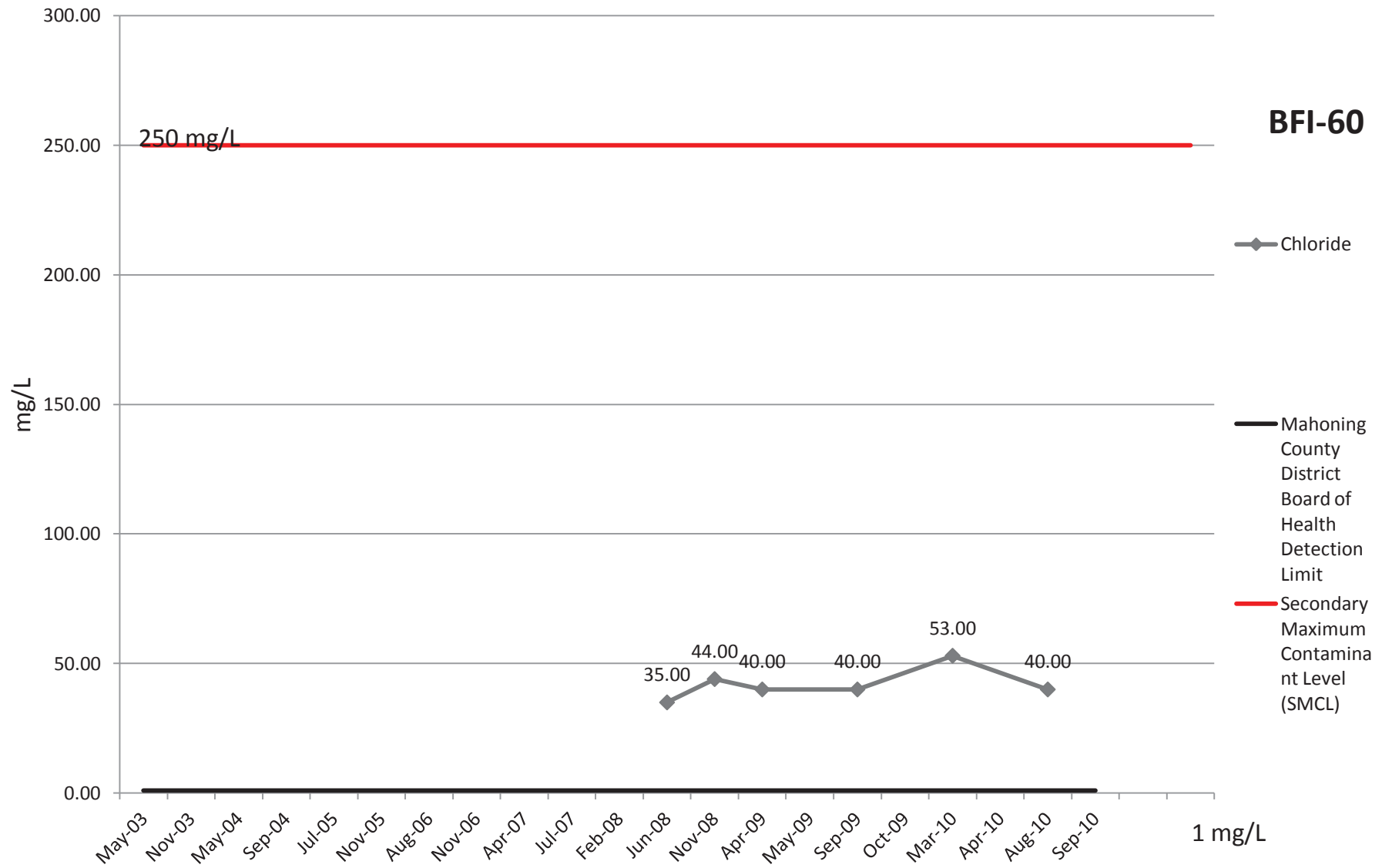
**BFI-60**

◆ Ammonia

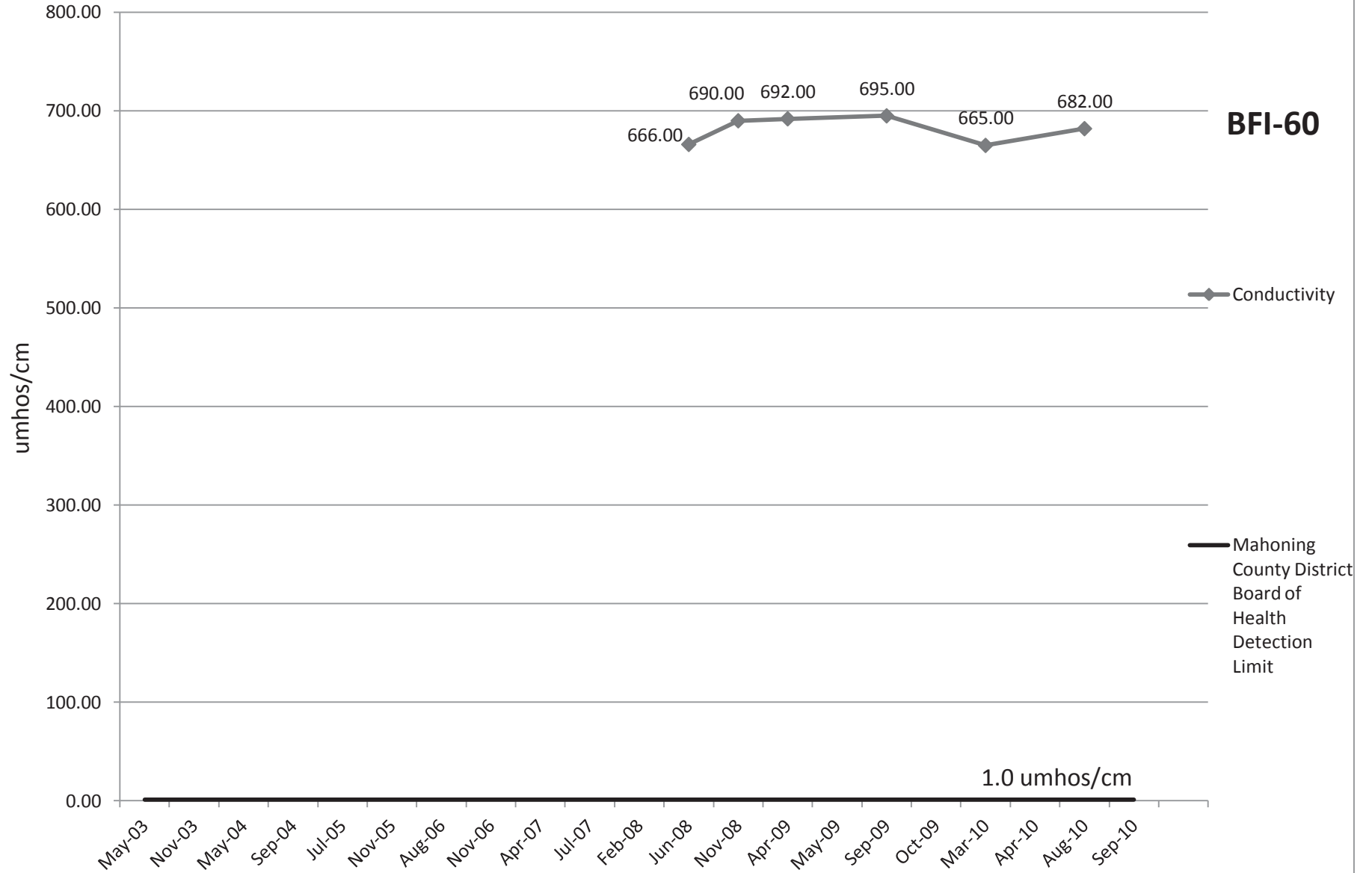
— Mahoning County District Board of Health Detection Limit

0.02 mg/L

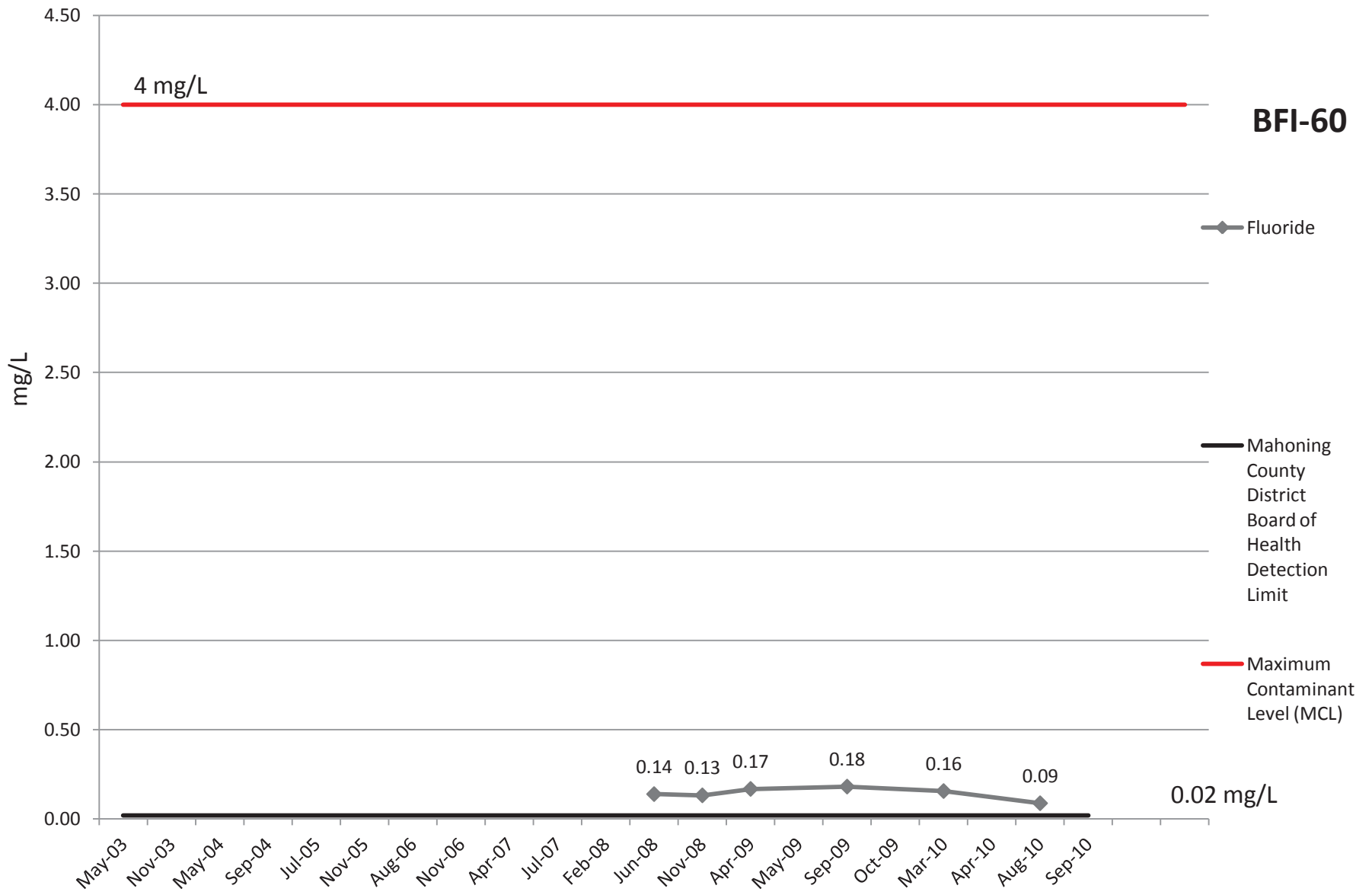
# Chloride



# Conductivity

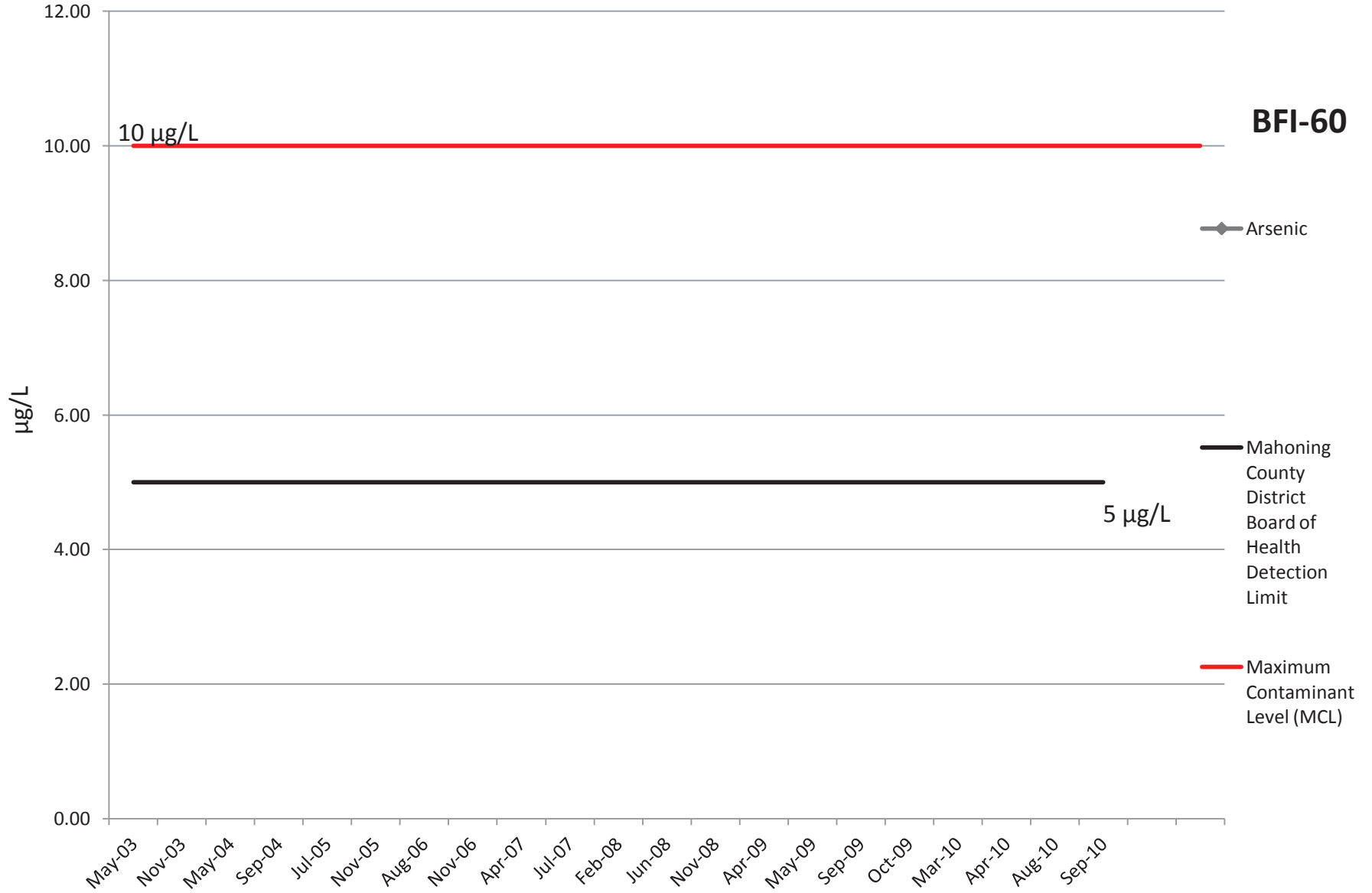


# Fluoride

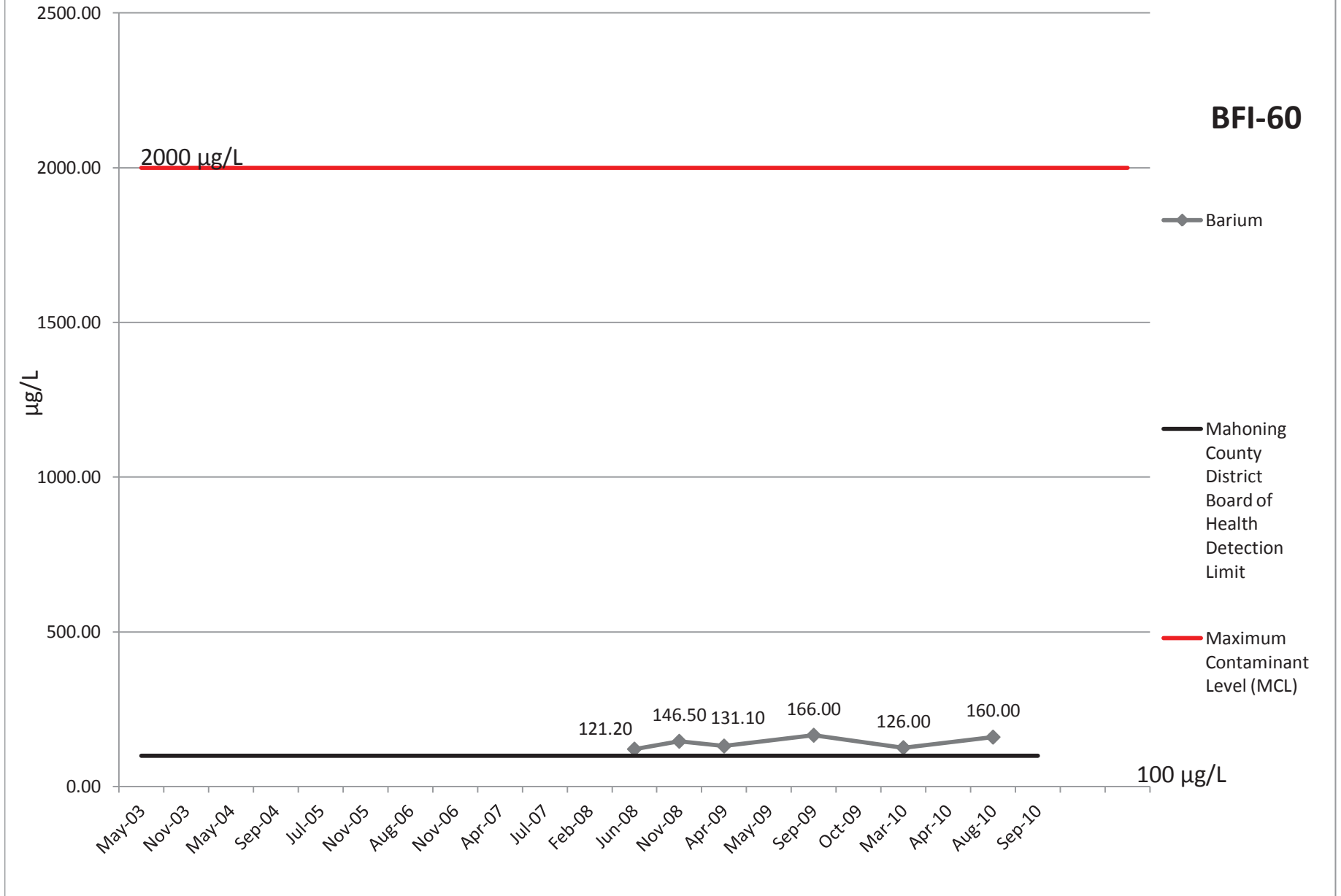




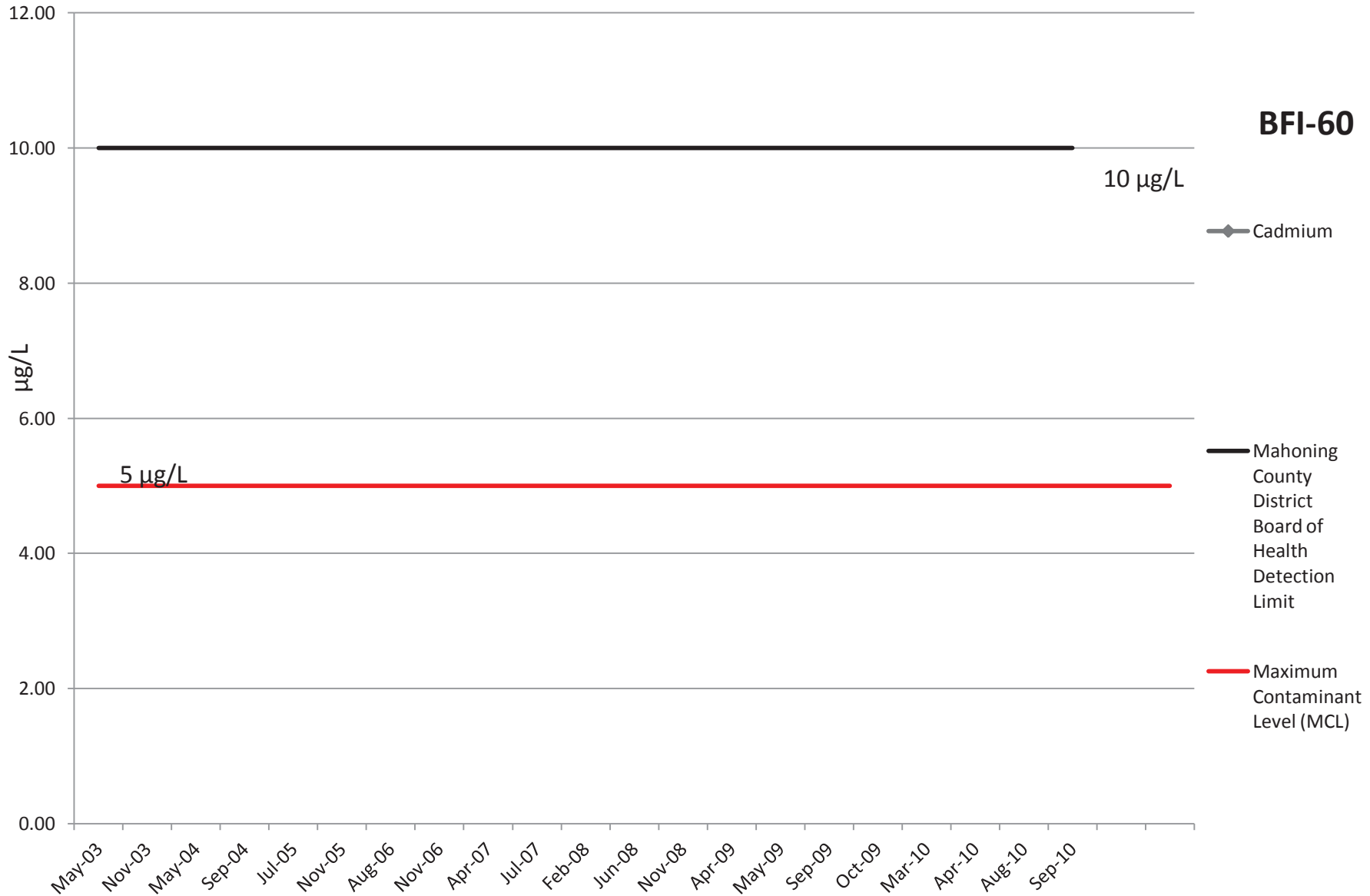
# Arsenic



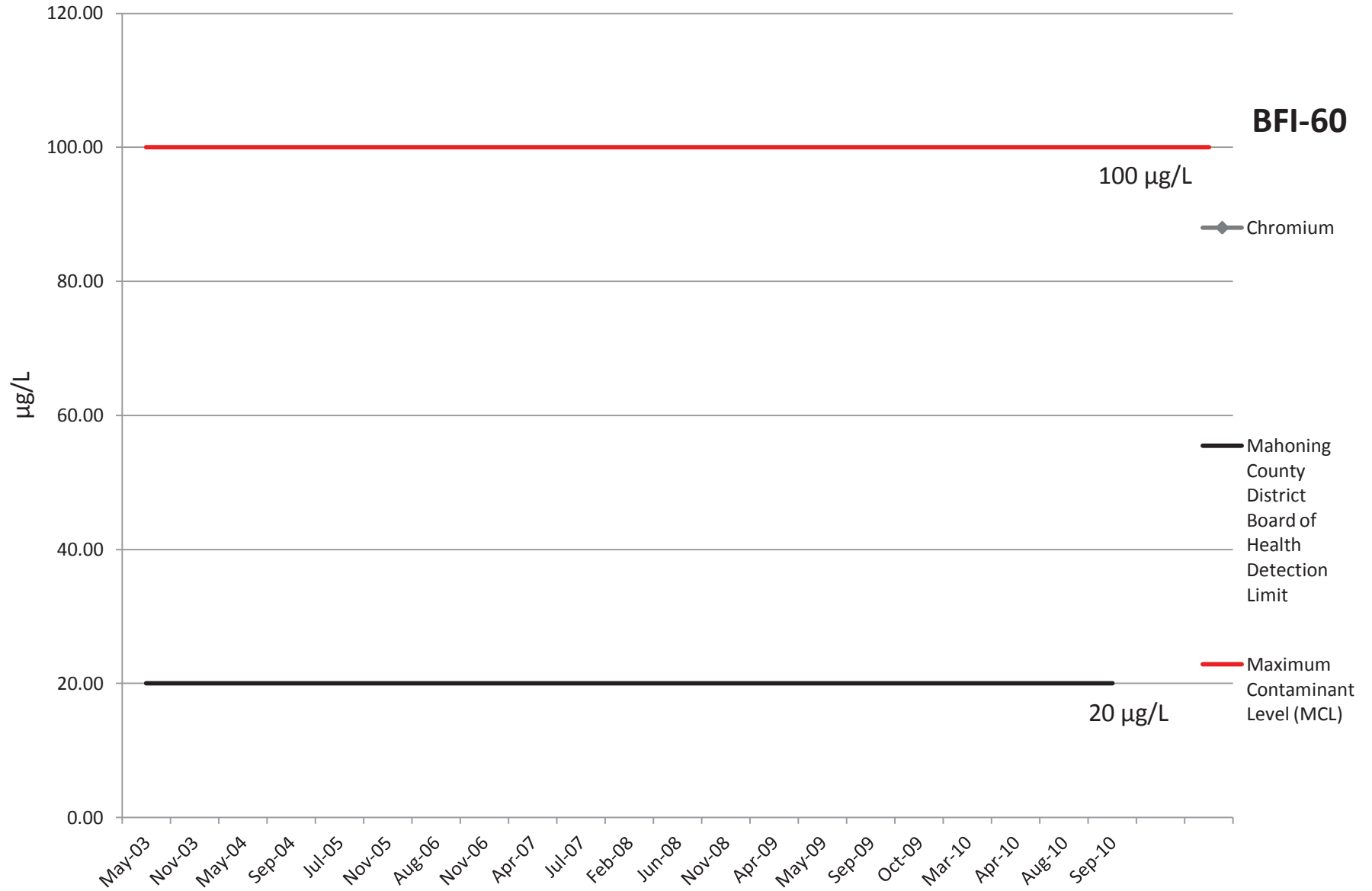
# Barium



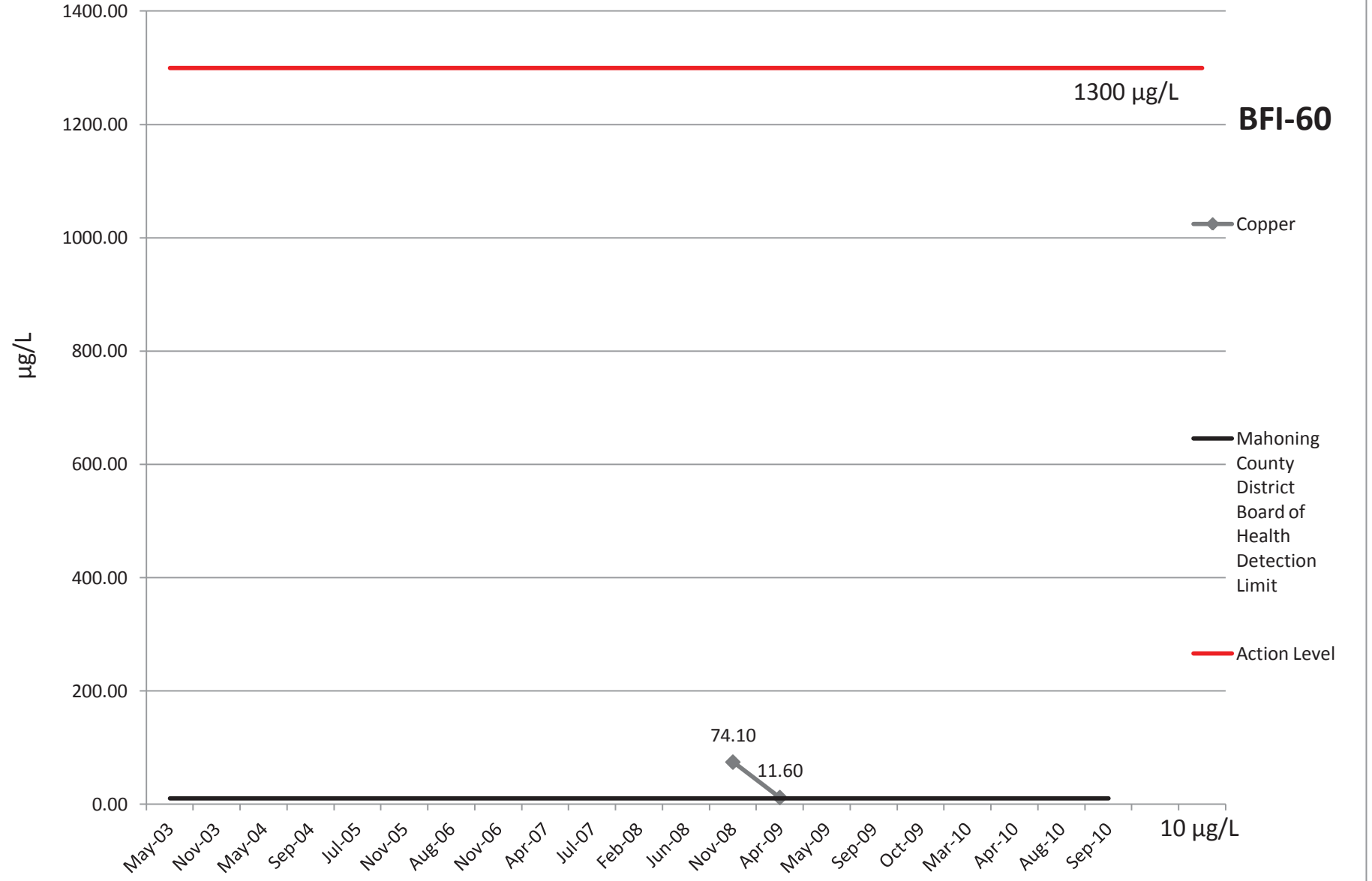
# Cadmium



# Chromium



# Copper



1300 µg/L

**BFI-60**

◆ Copper

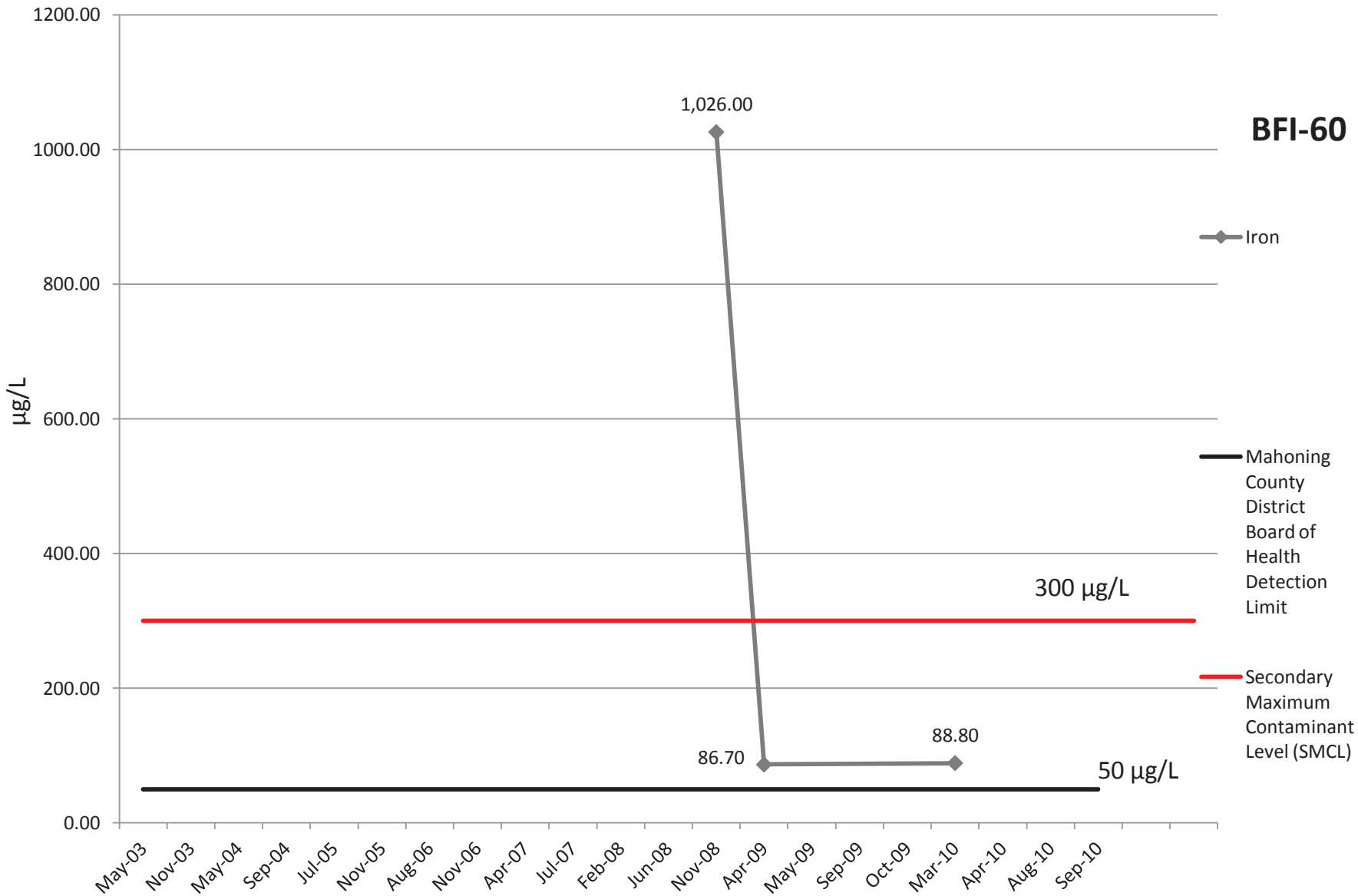
— Mahoning County District Board of Health Detection Limit

— Action Level

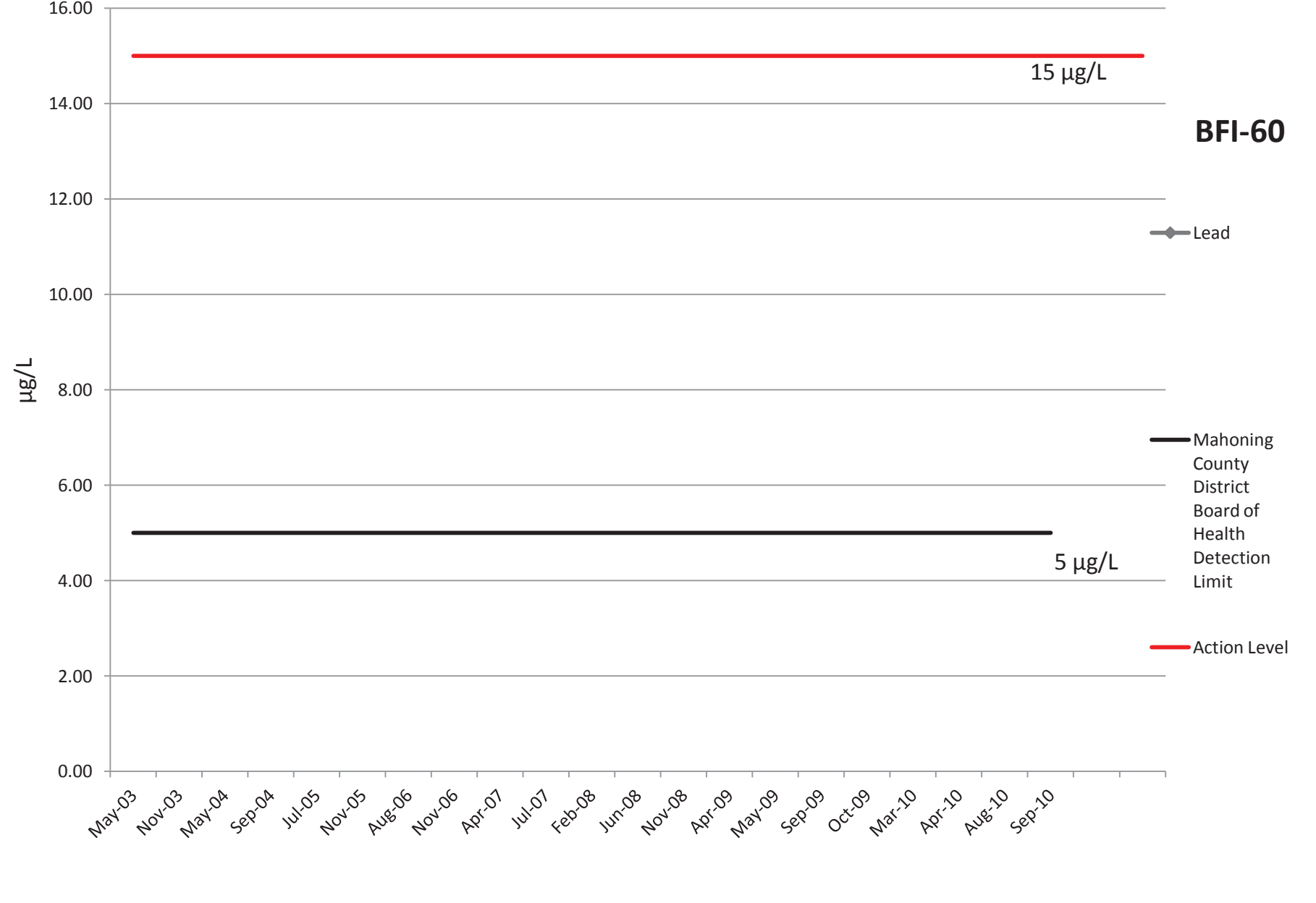
10 µg/L

# Iron

**BFI-60**

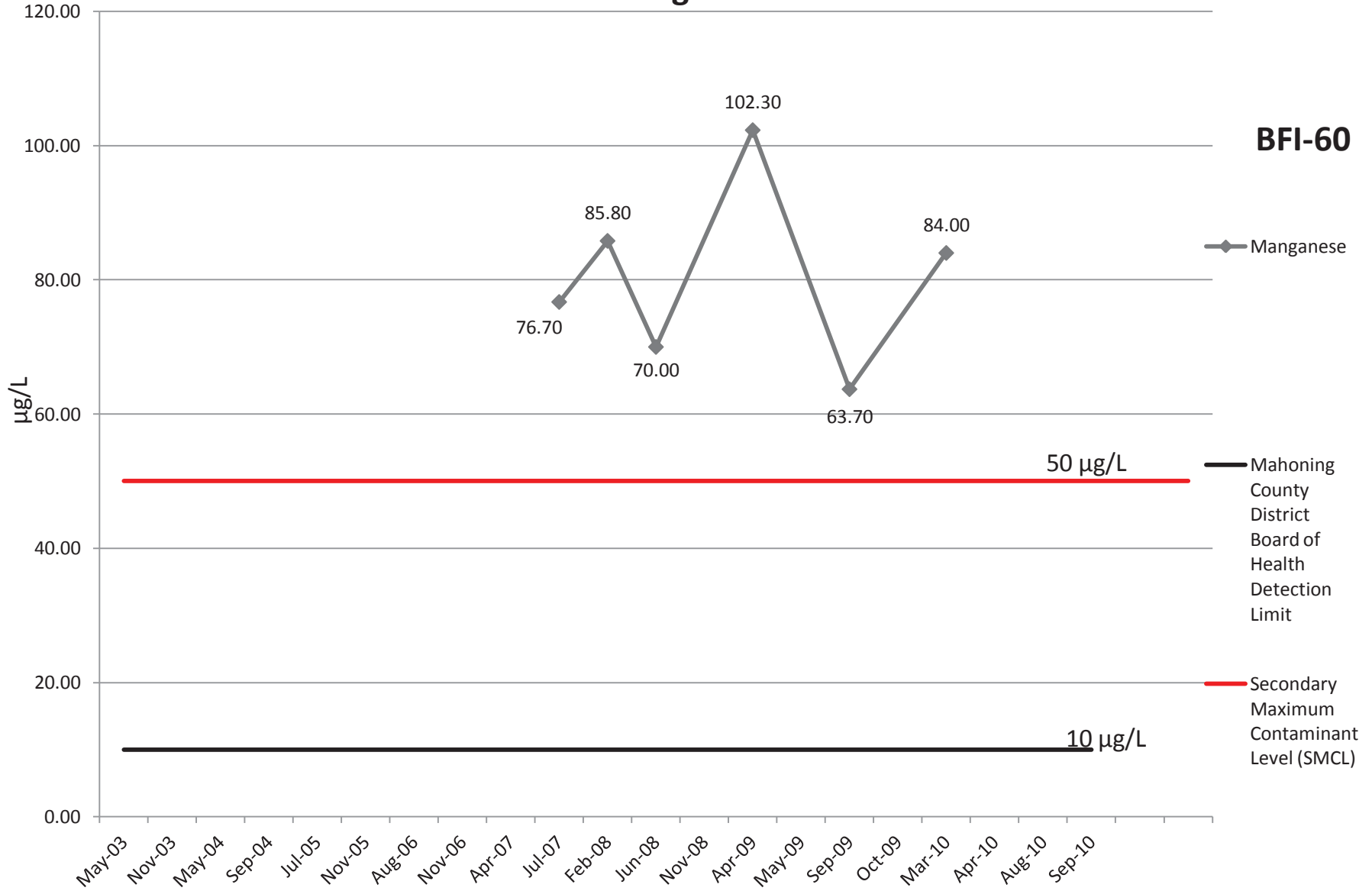


# Lead



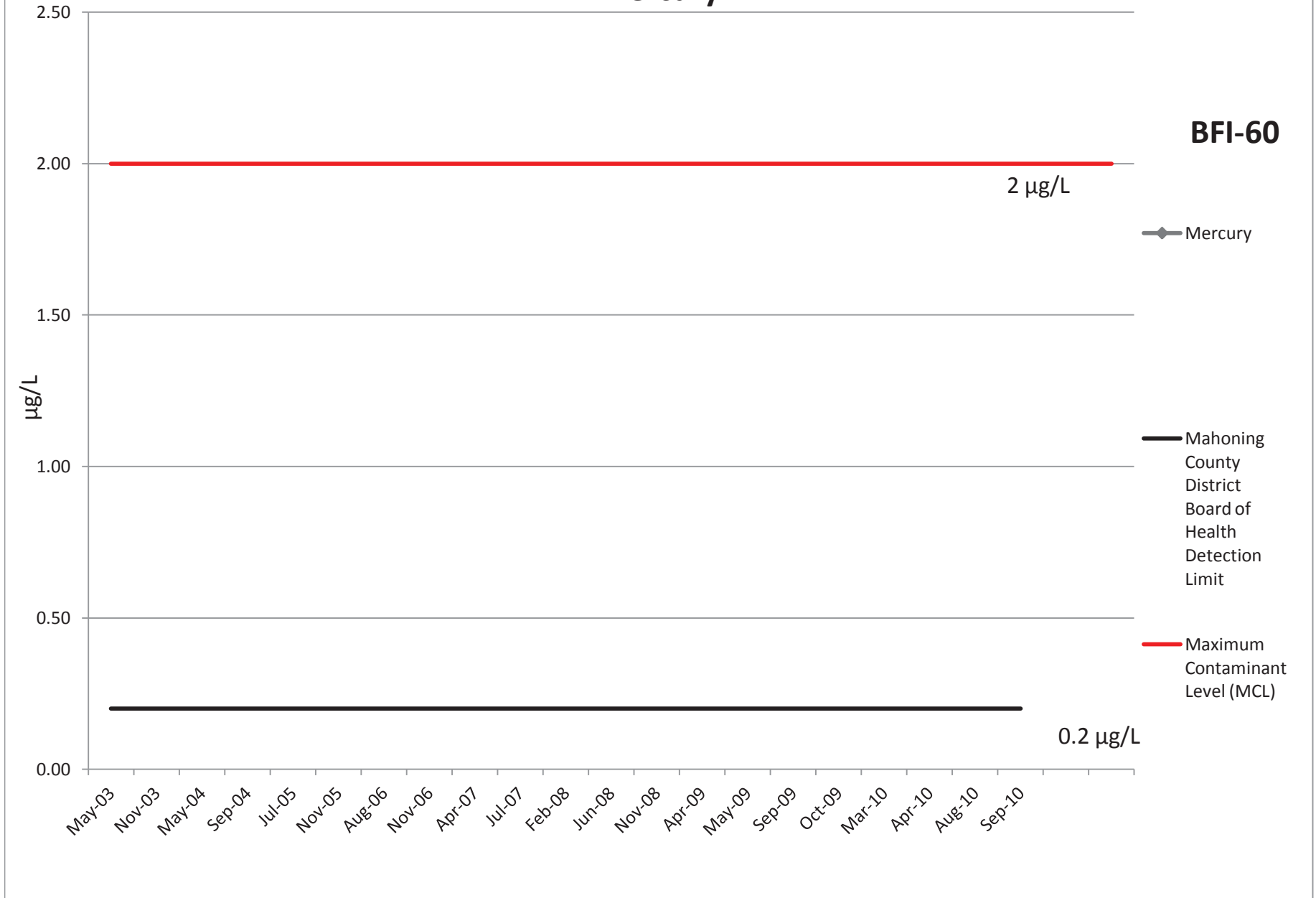
# Manganese

**BFI-60**

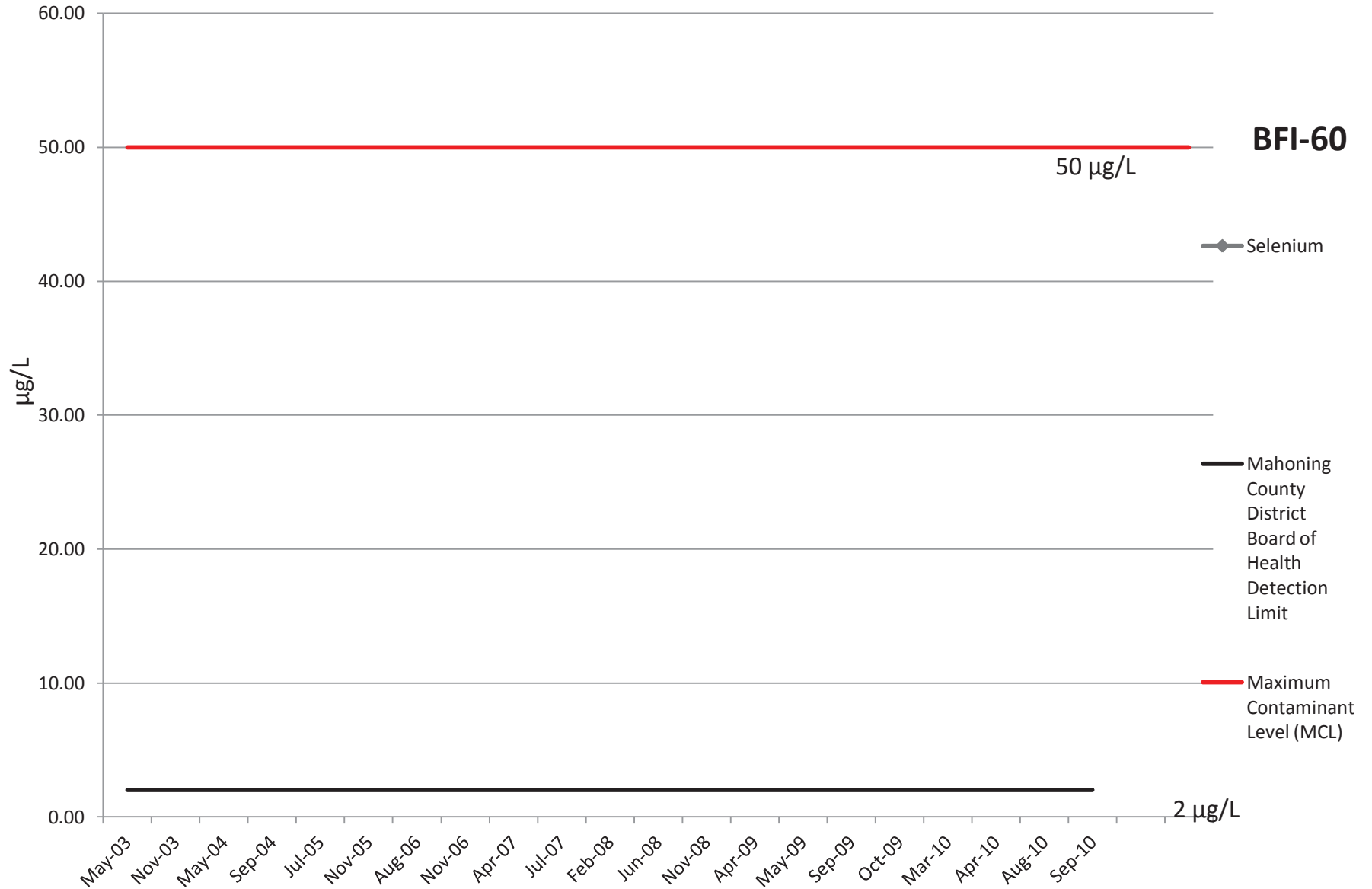




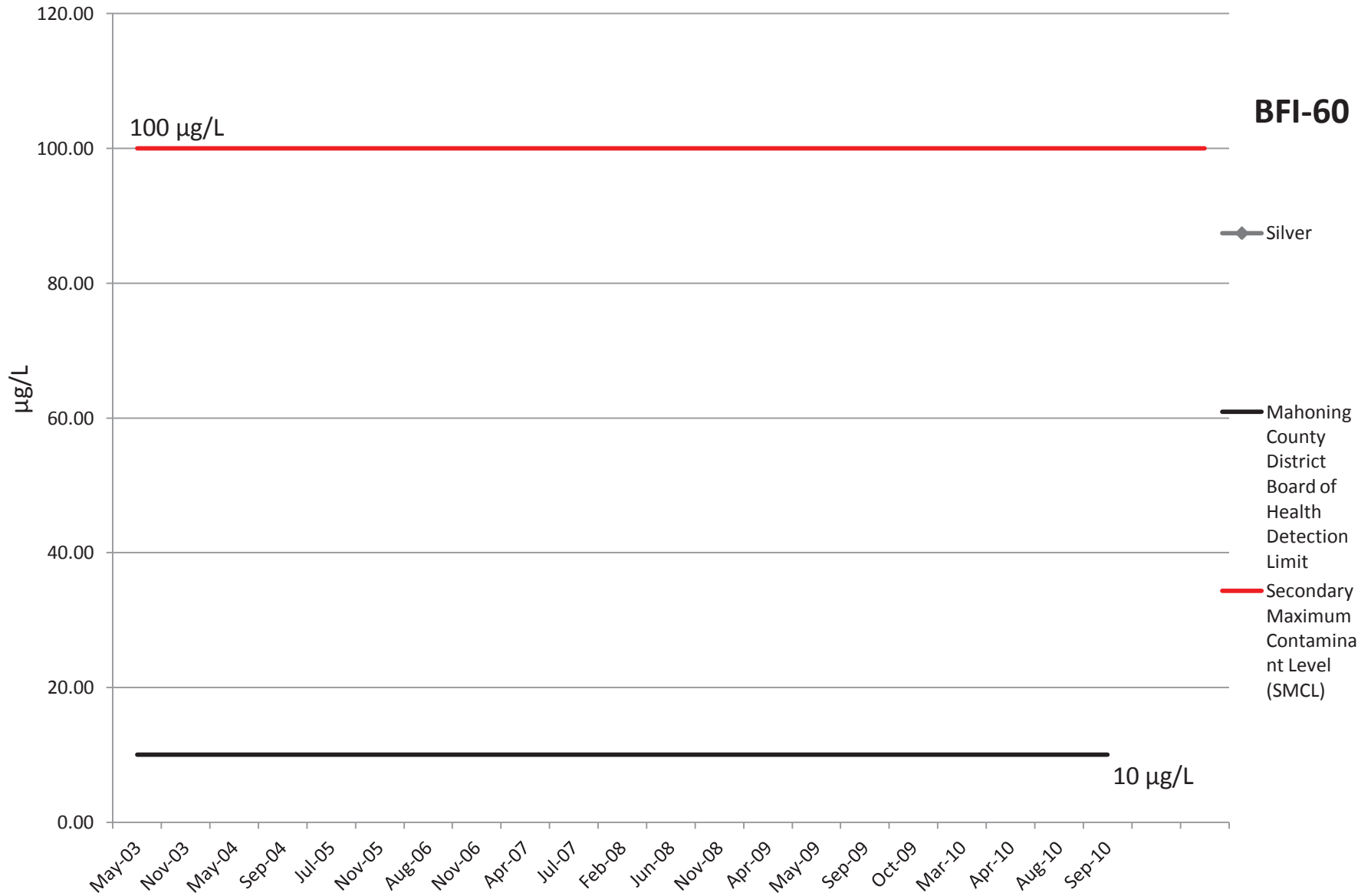
# Mercury



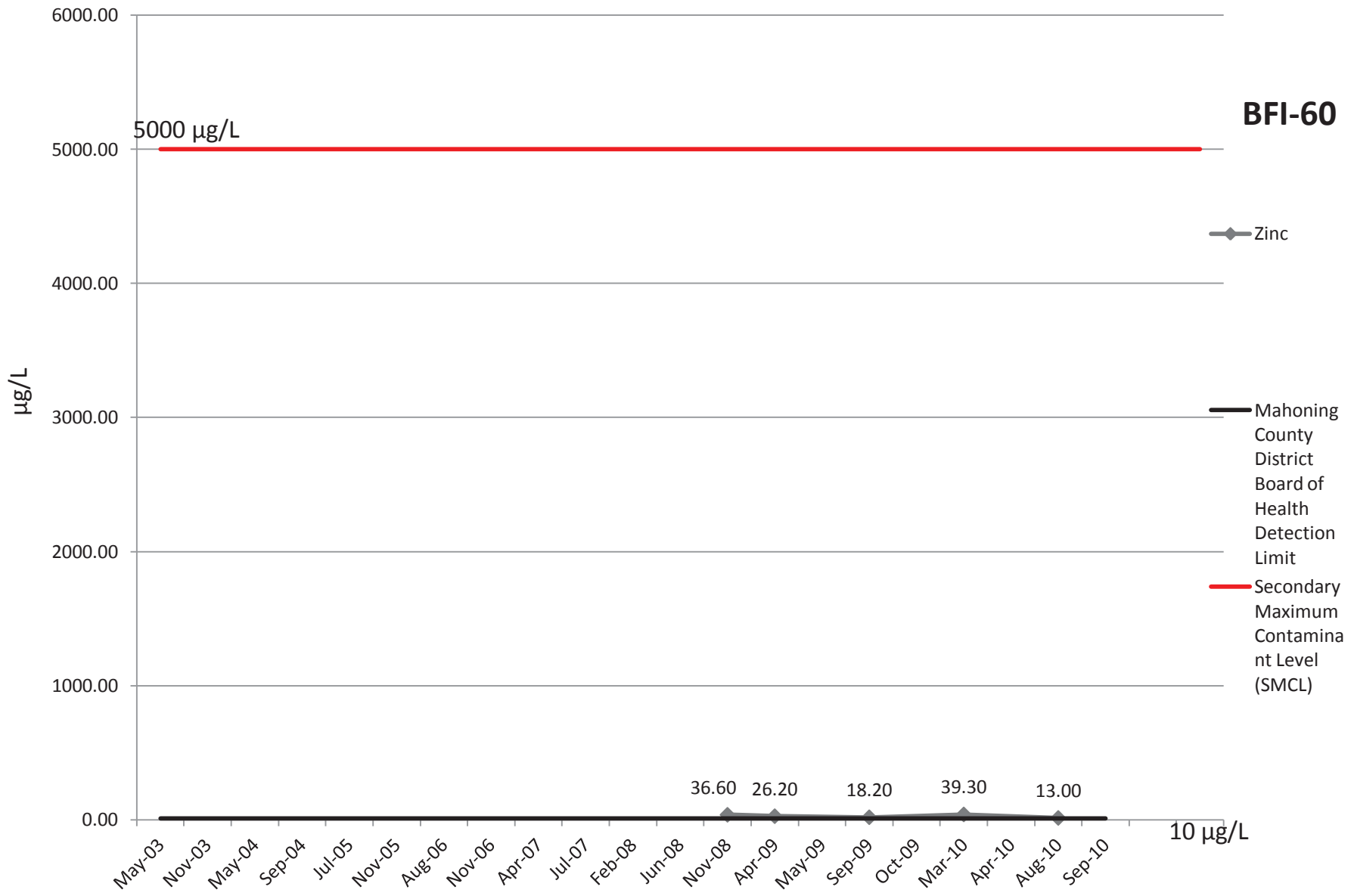
# Selenium



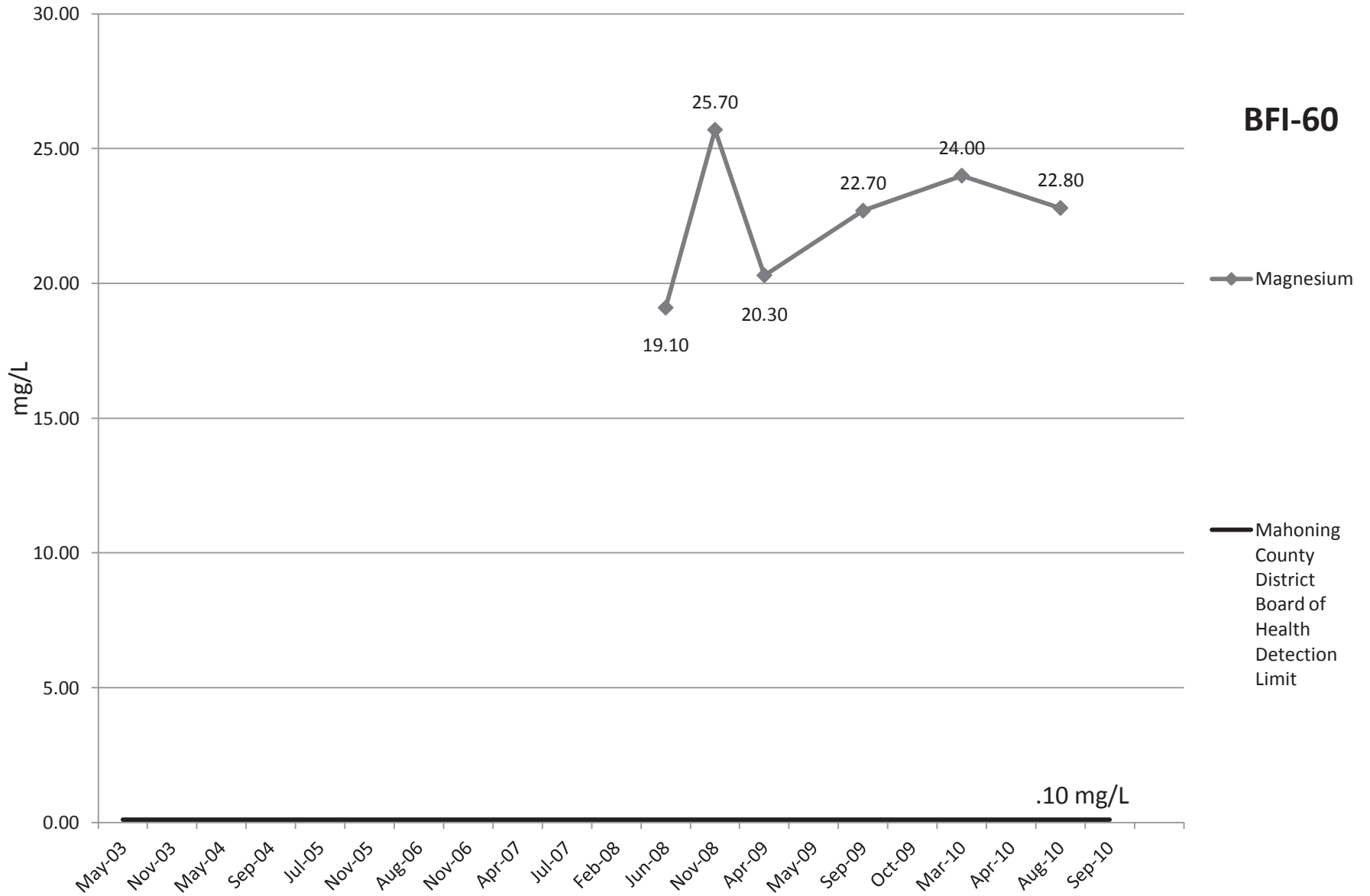
# Silver



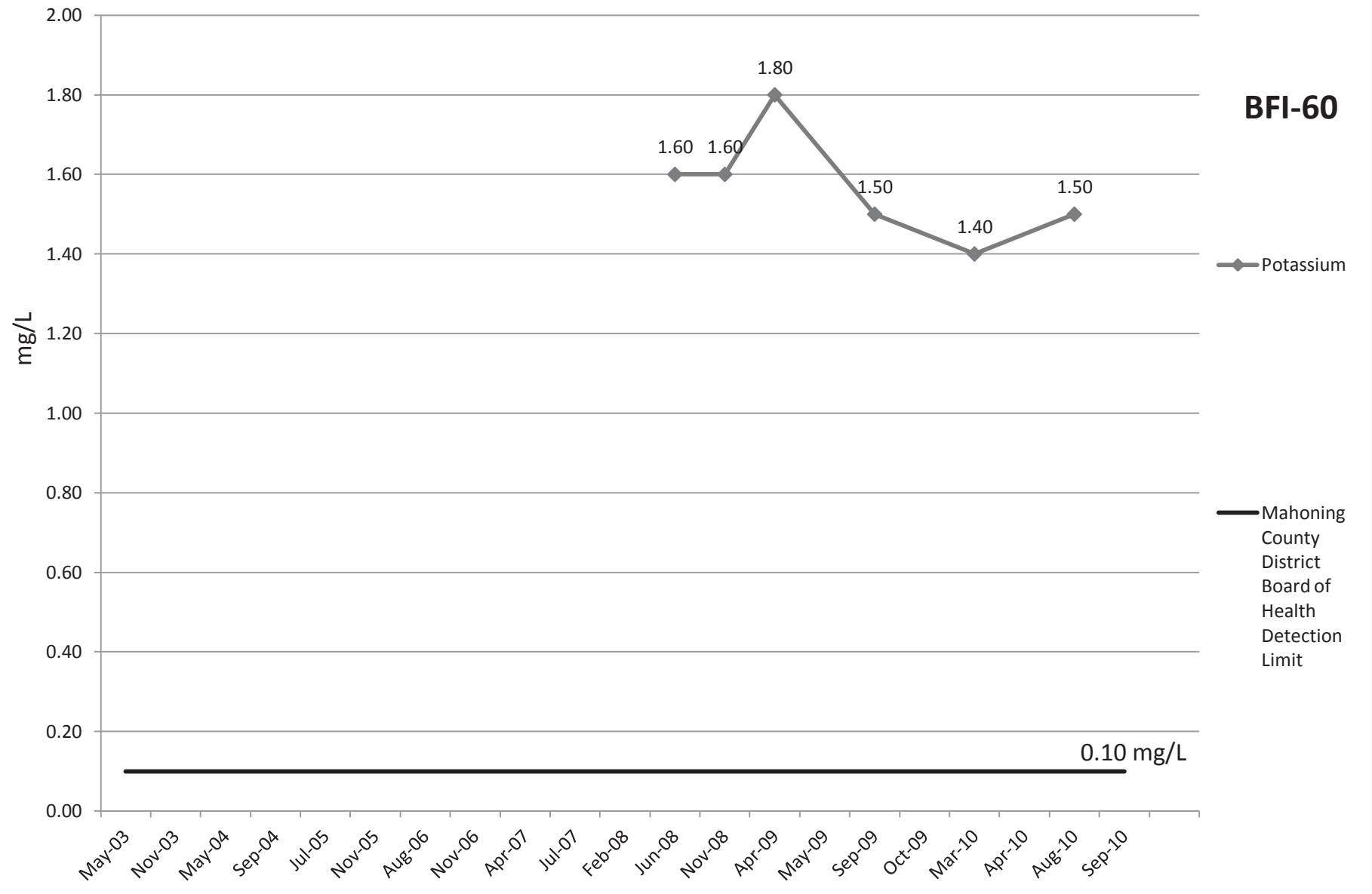
# Zinc



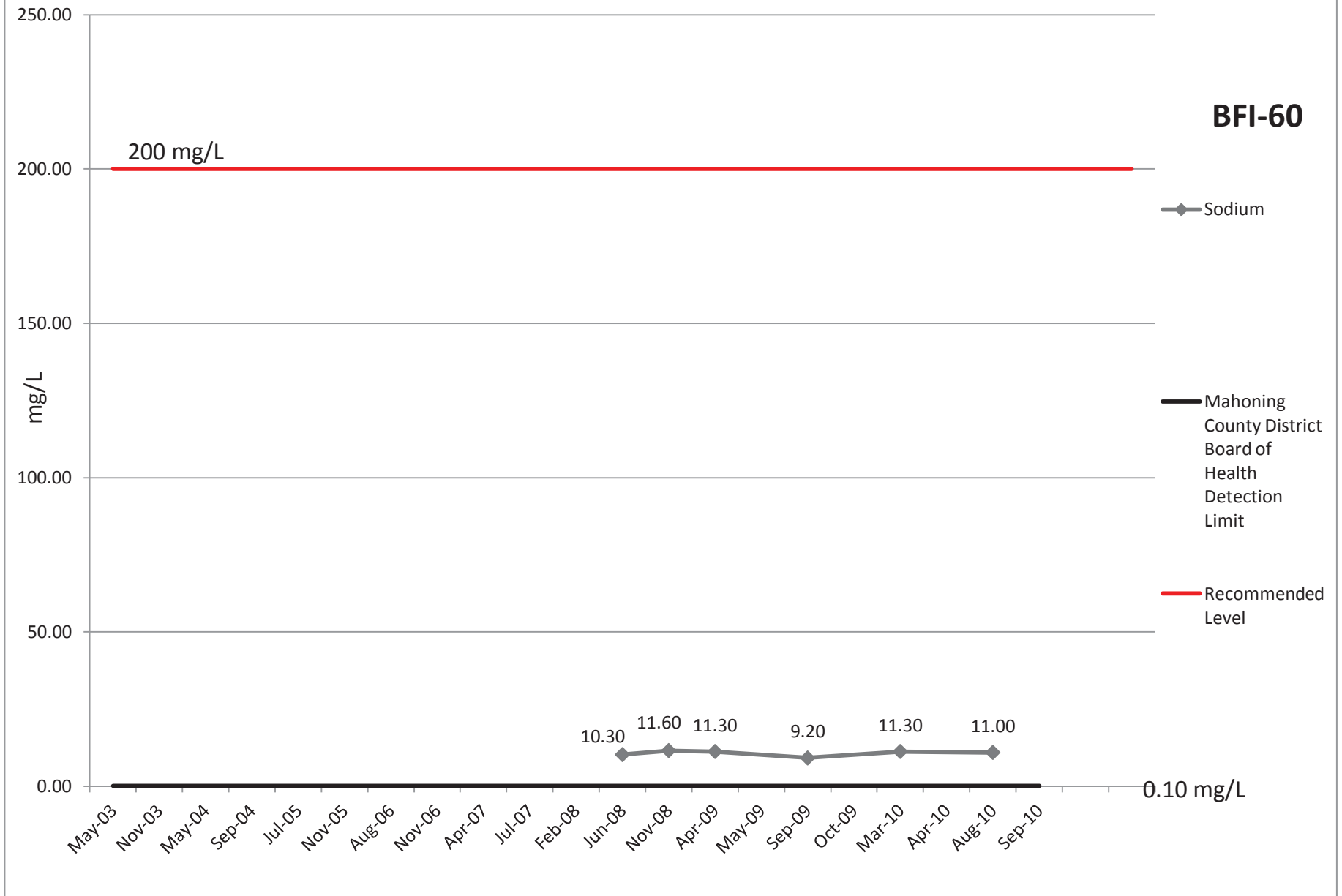
# Magnesium



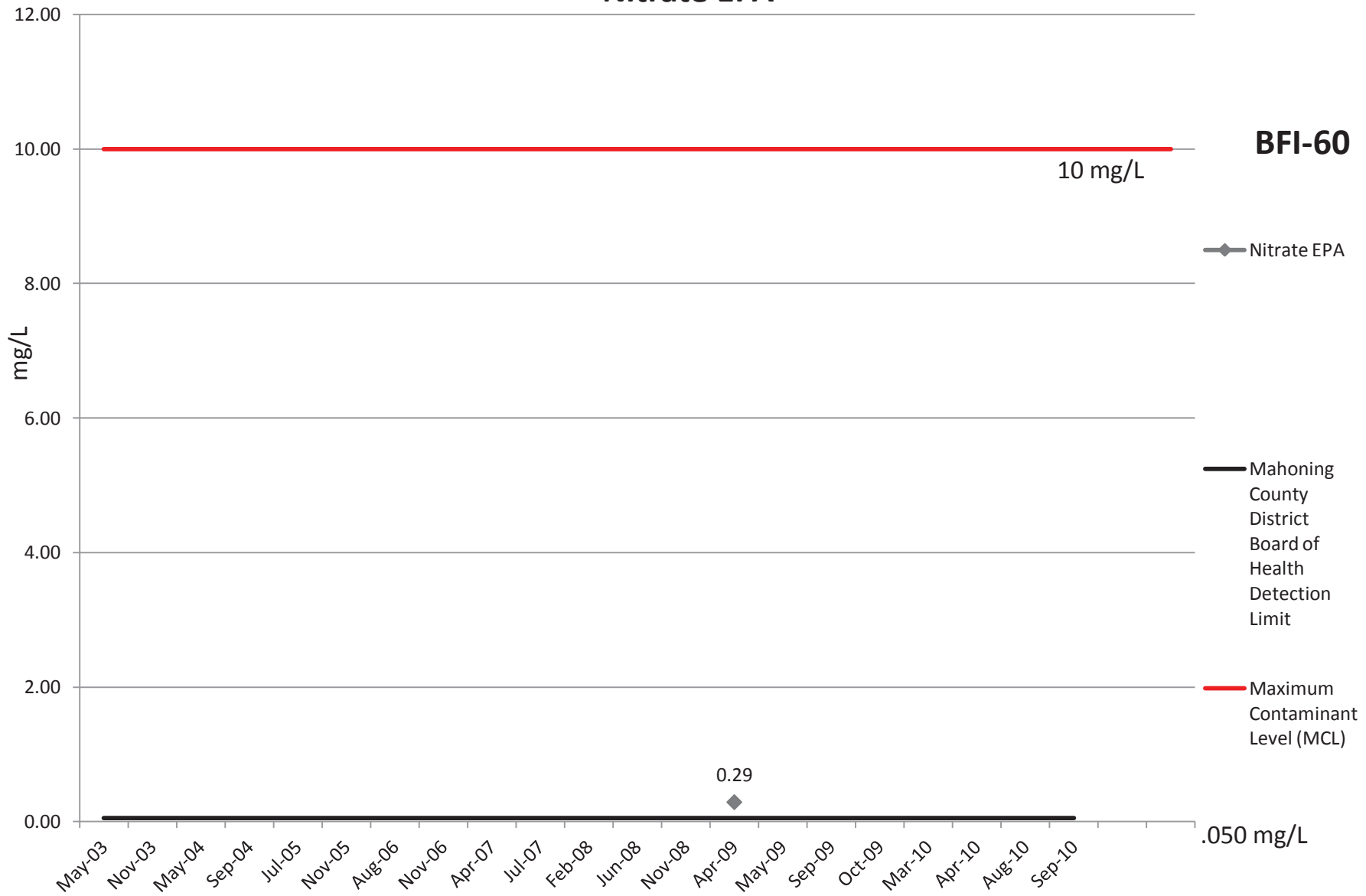
# Potassium



# Sodium

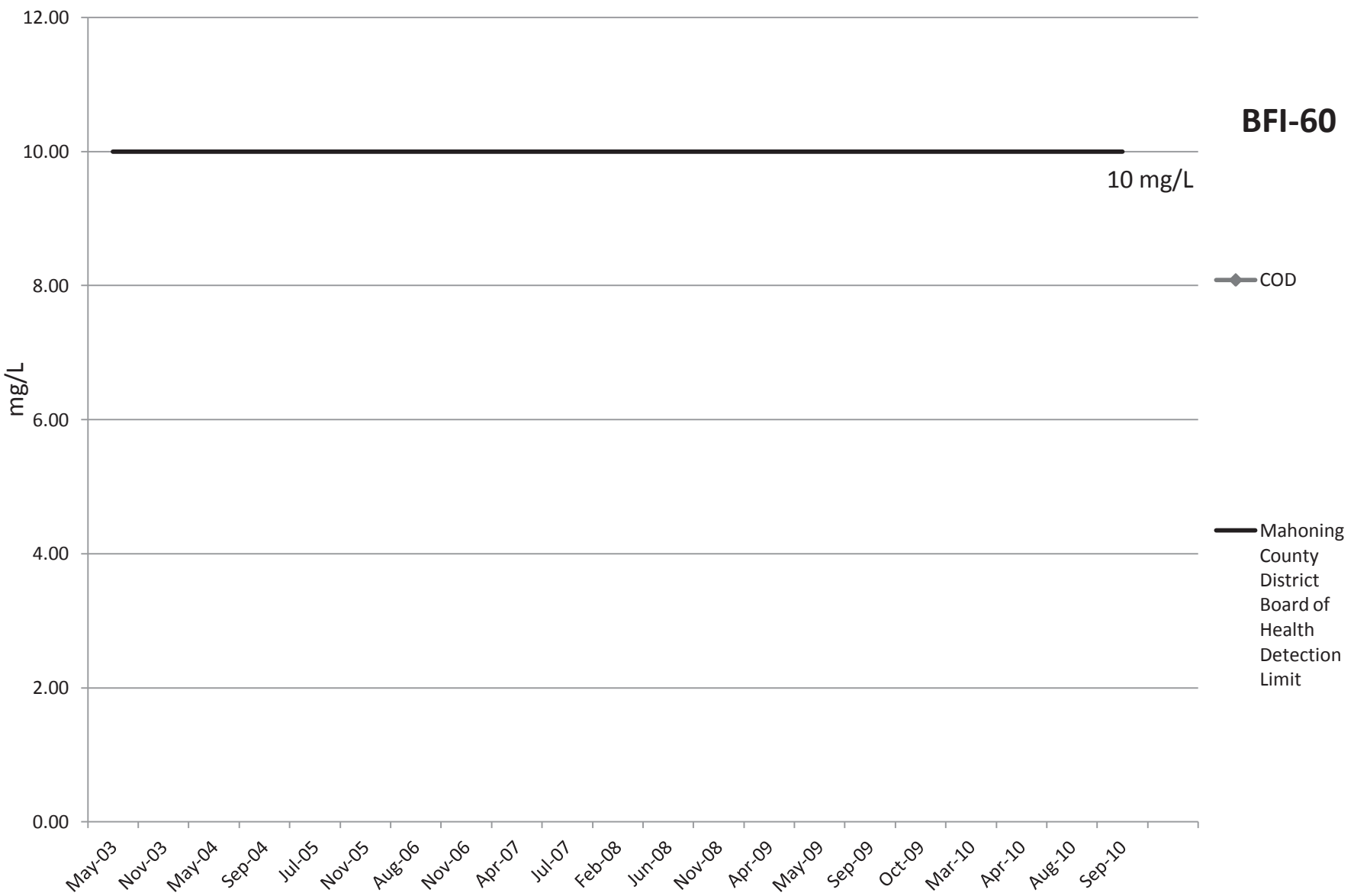


# Nitrate EPA

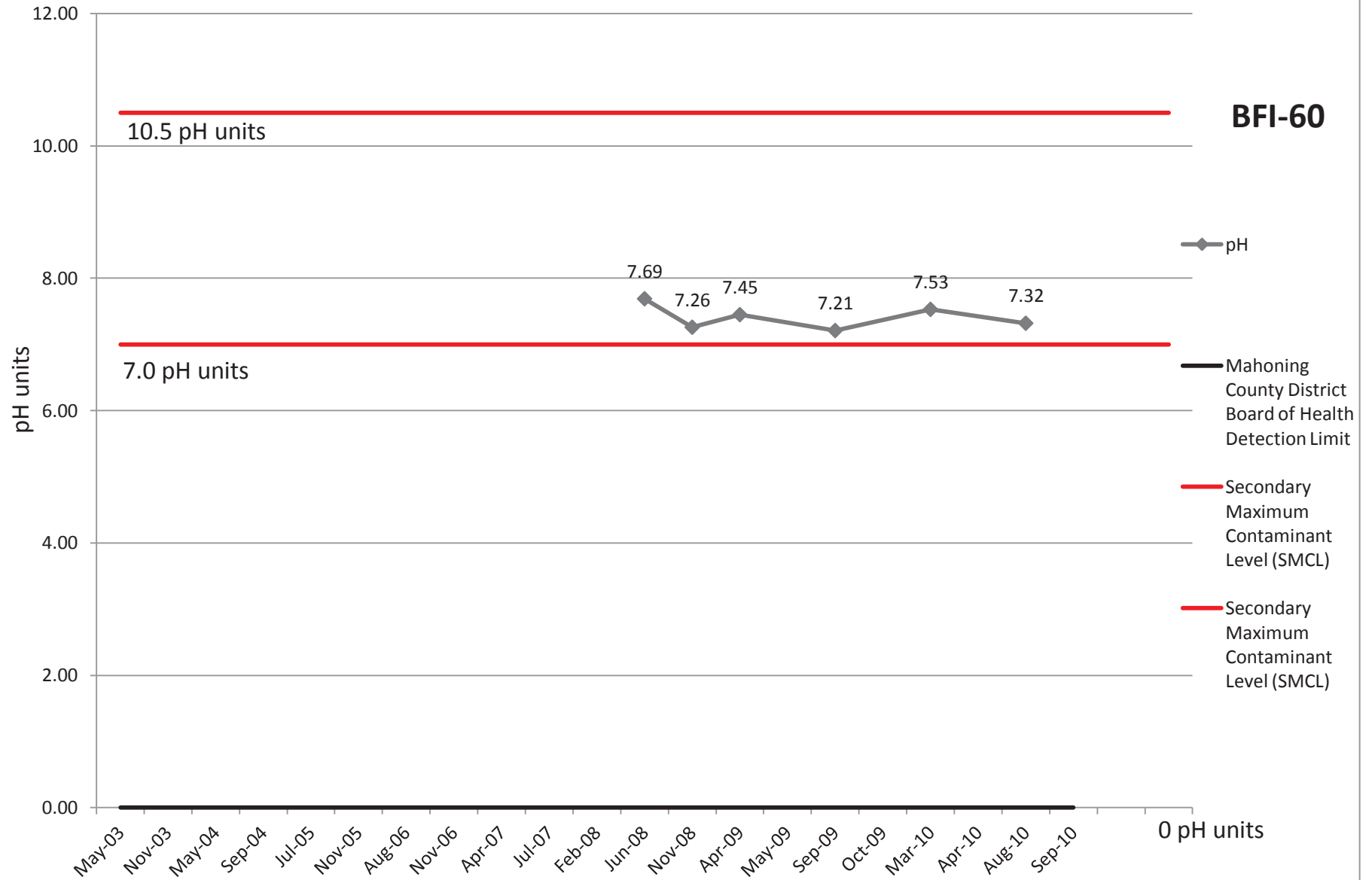




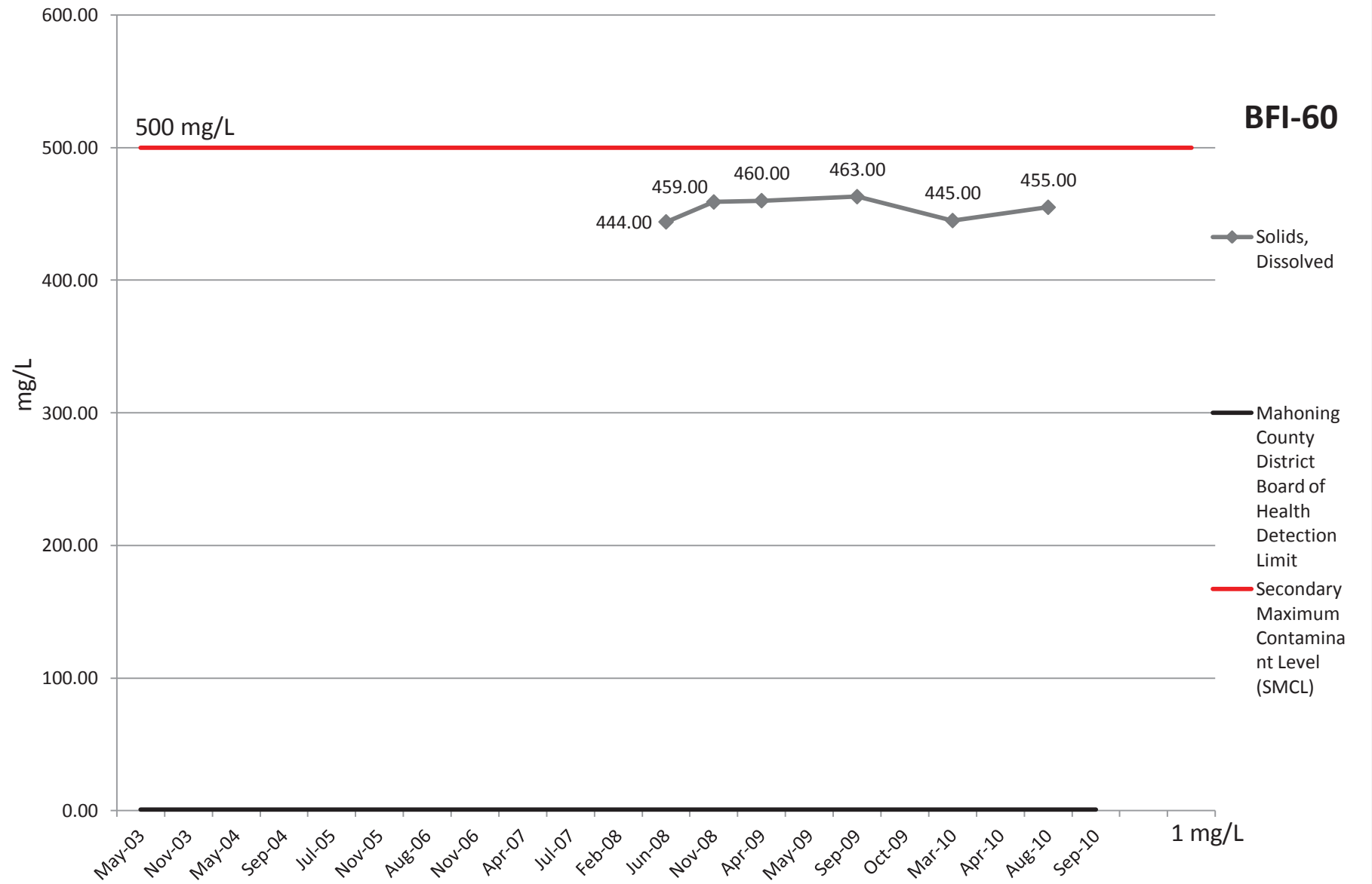
# COD



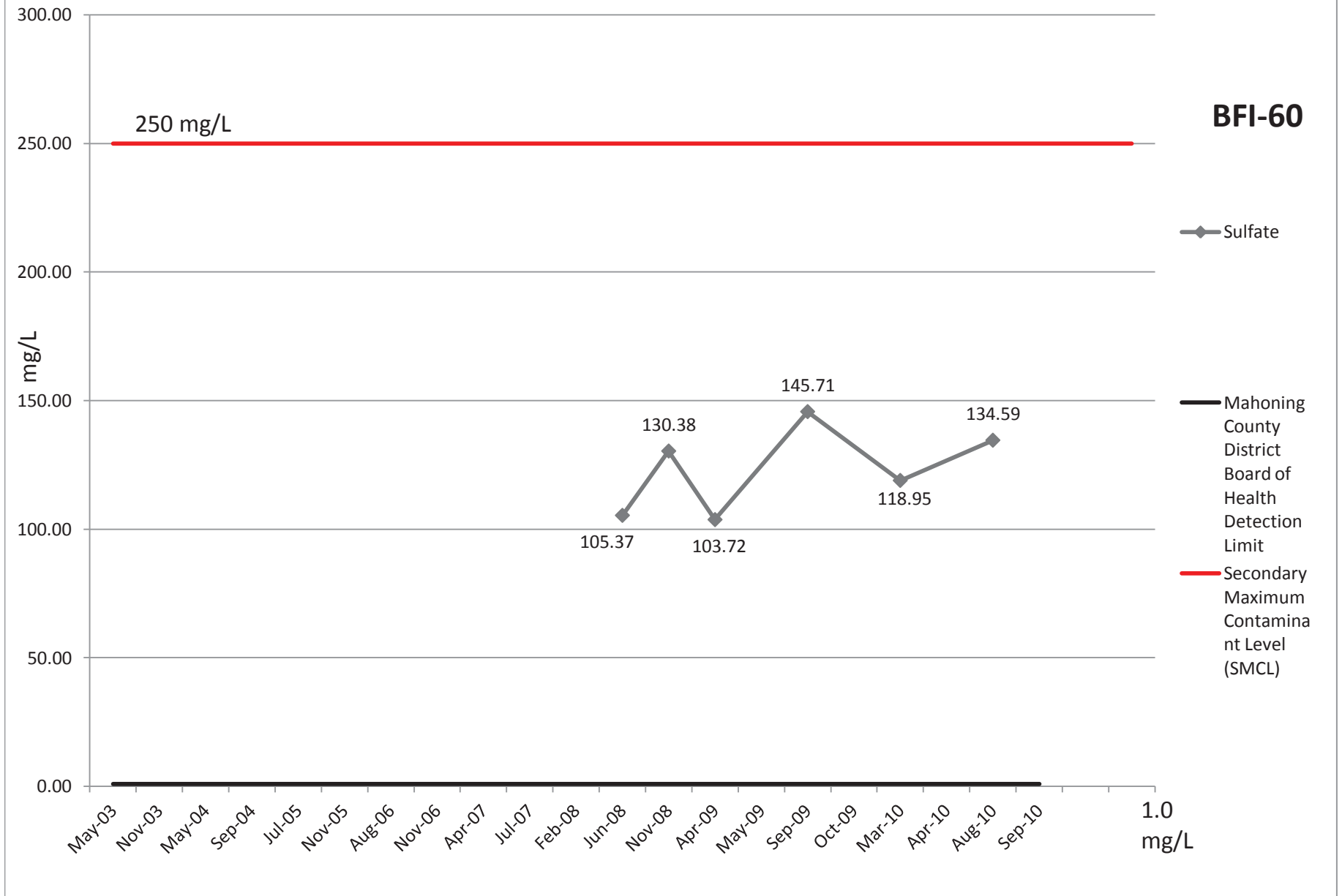
# pH



# Solids, Dissolved



# Sulfate



# Bacteria

## BFI-60

Positive/Negative

◆ Bacteria

positive (1)

1.00

1.00

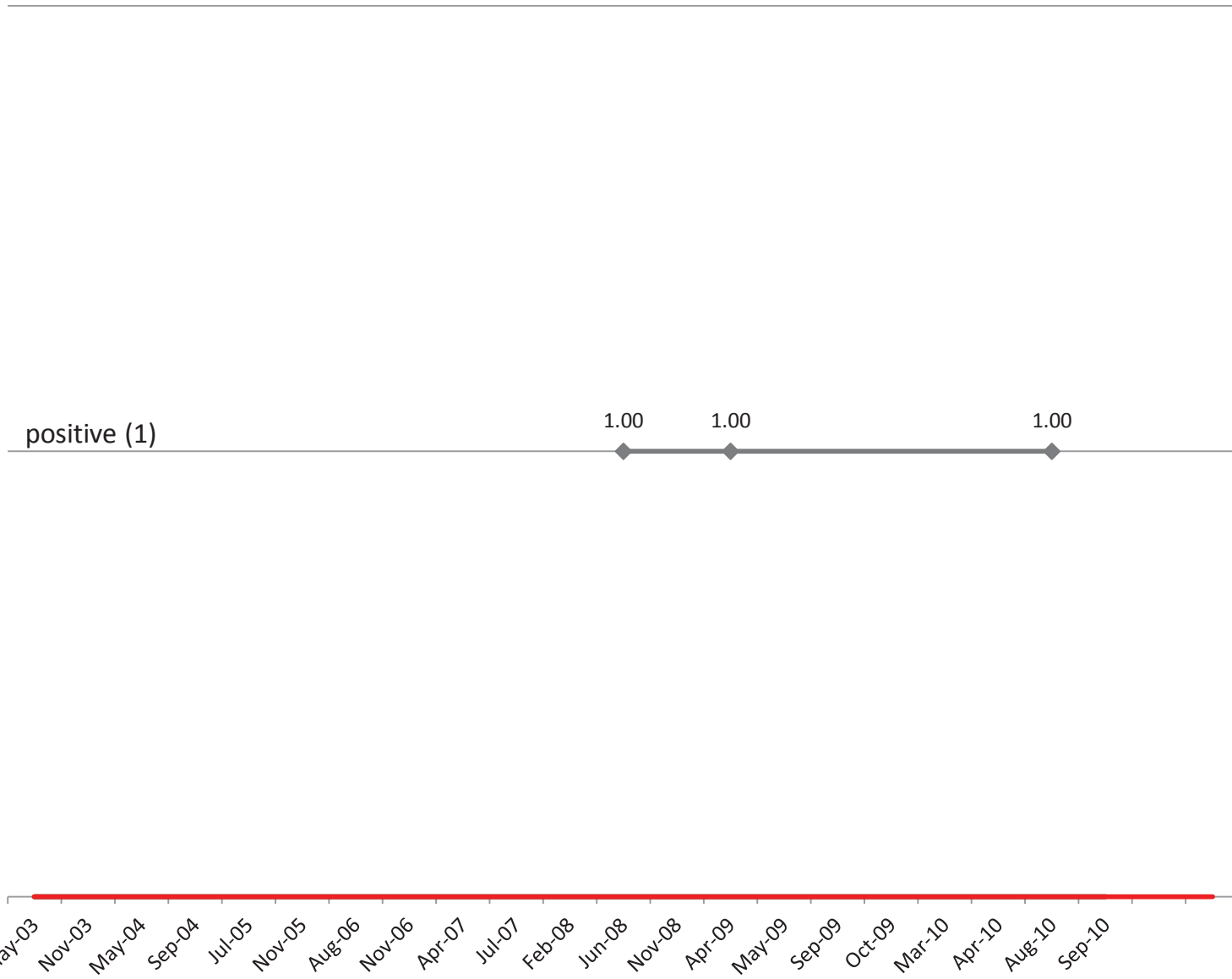
1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

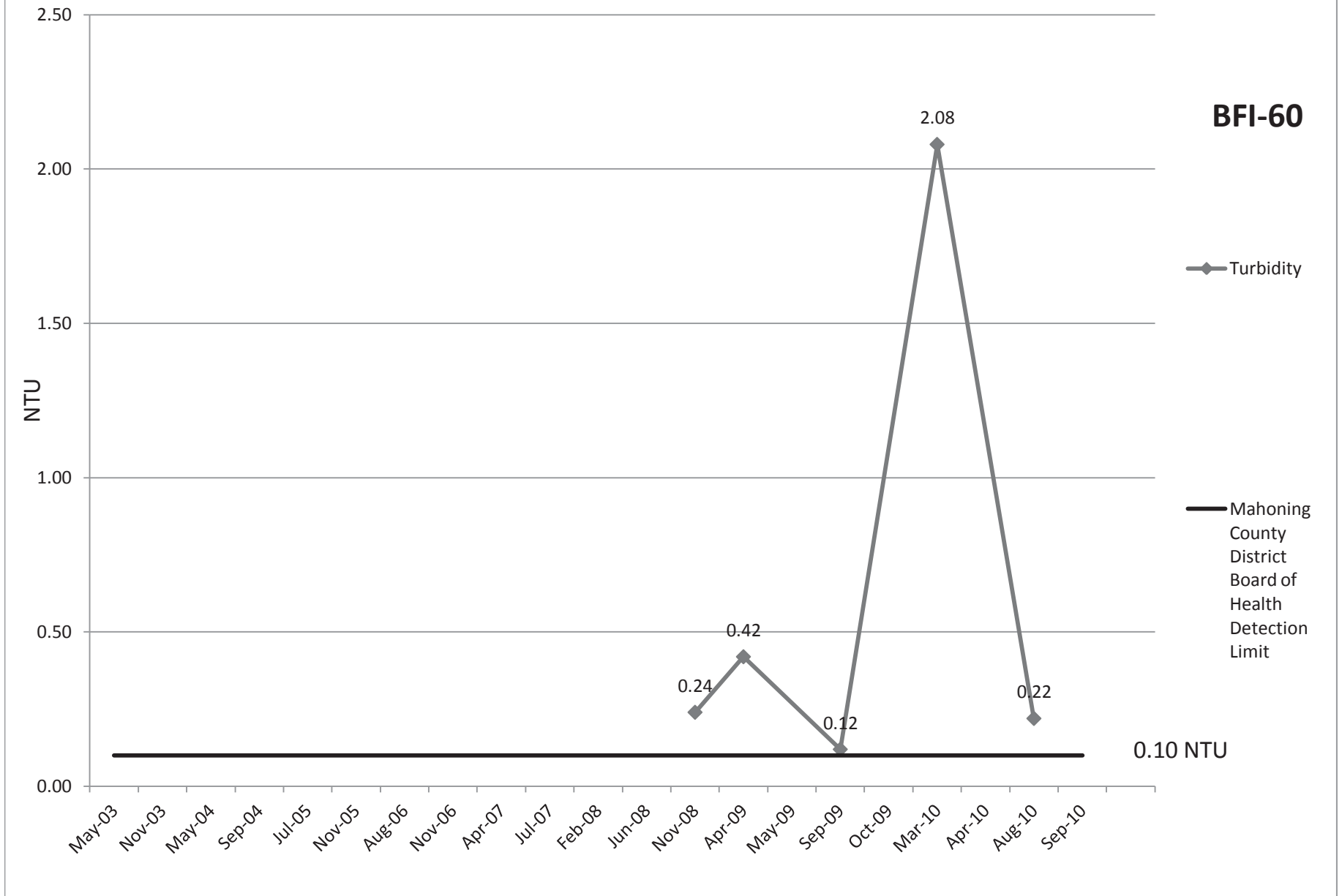
— Maximum  
Contaminant  
Level (MCL)

negative (0)

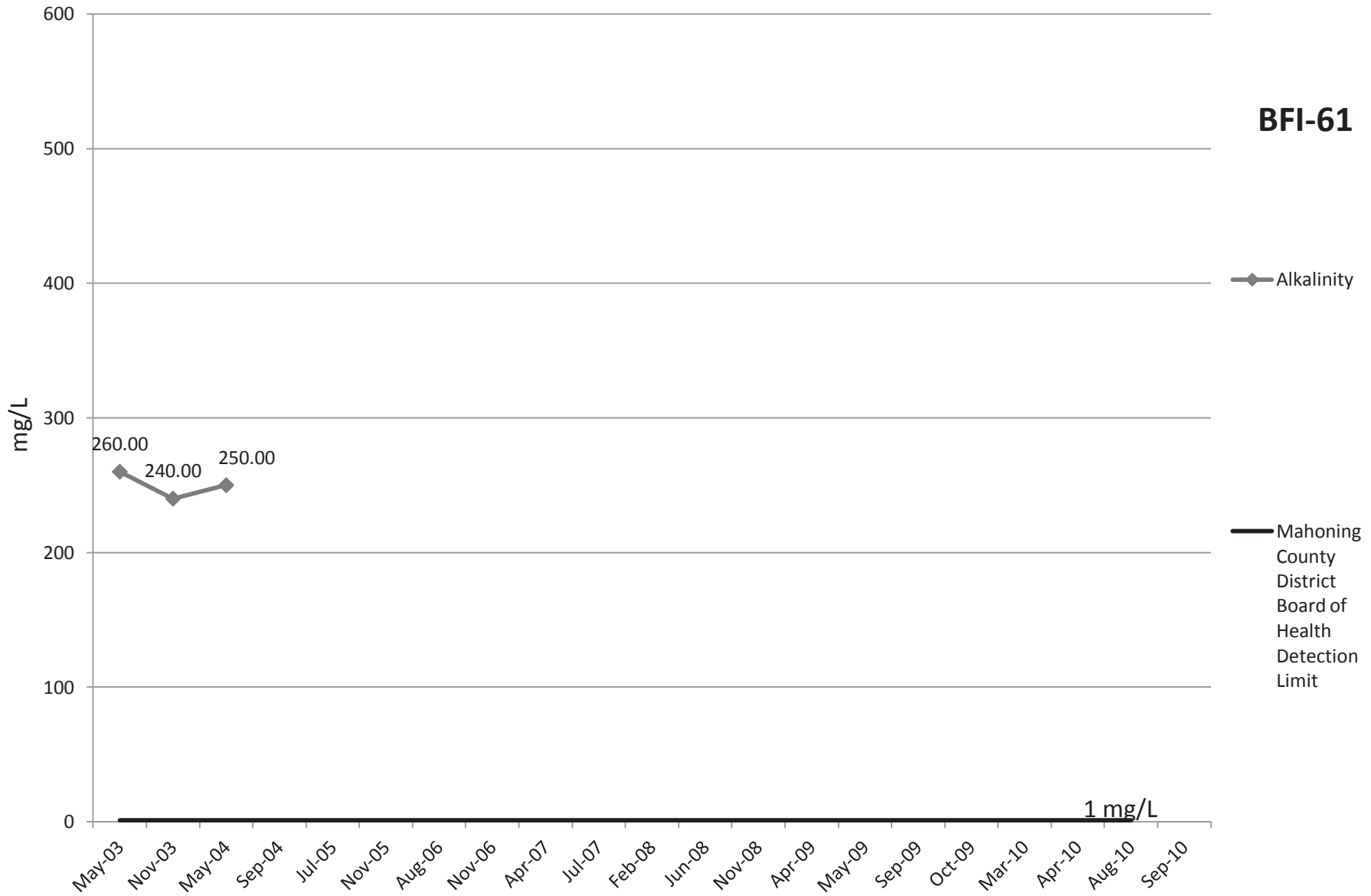
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



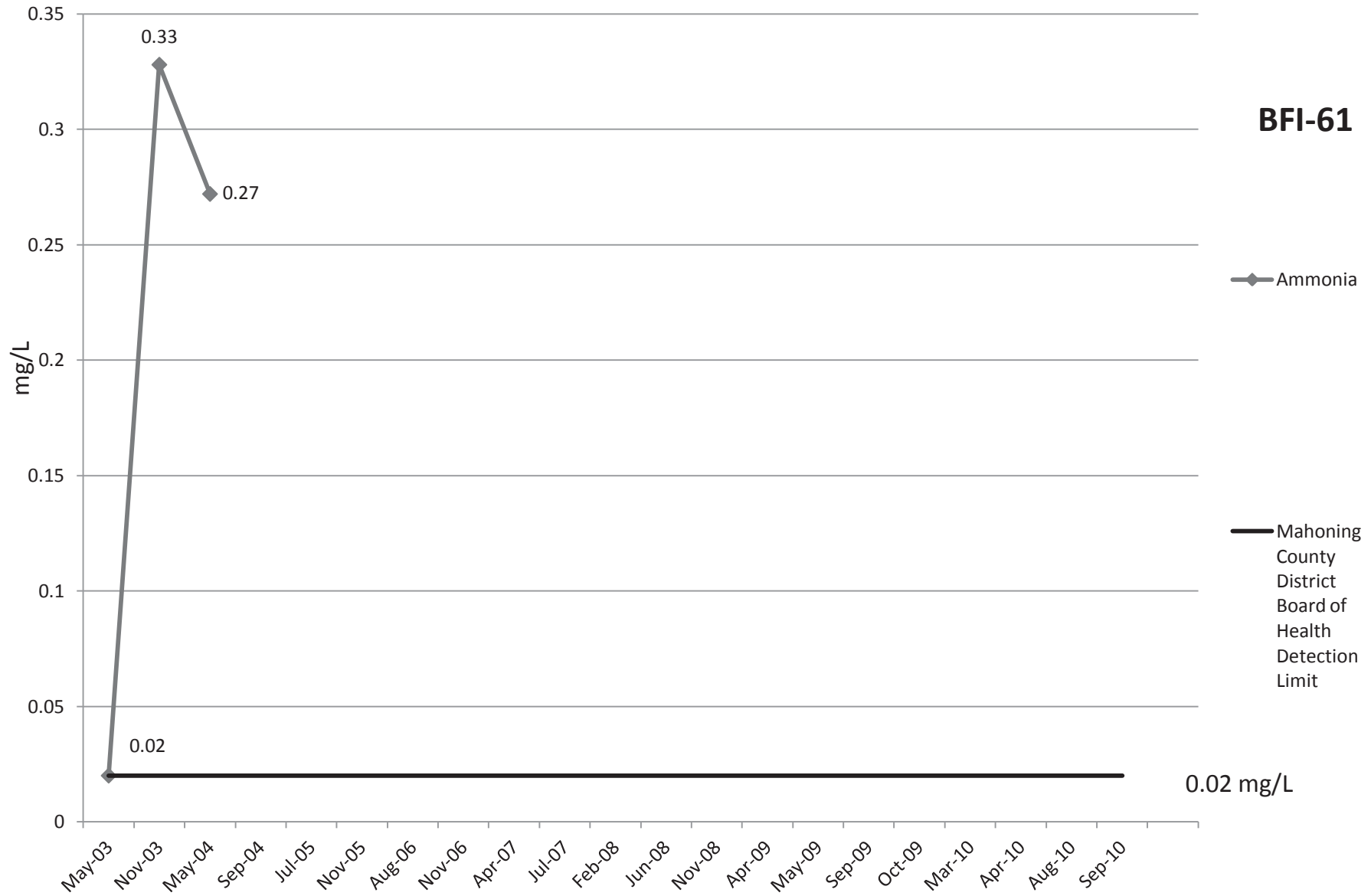
# Turbidity



# Alkalinity



# Ammonia



**BFI-61**

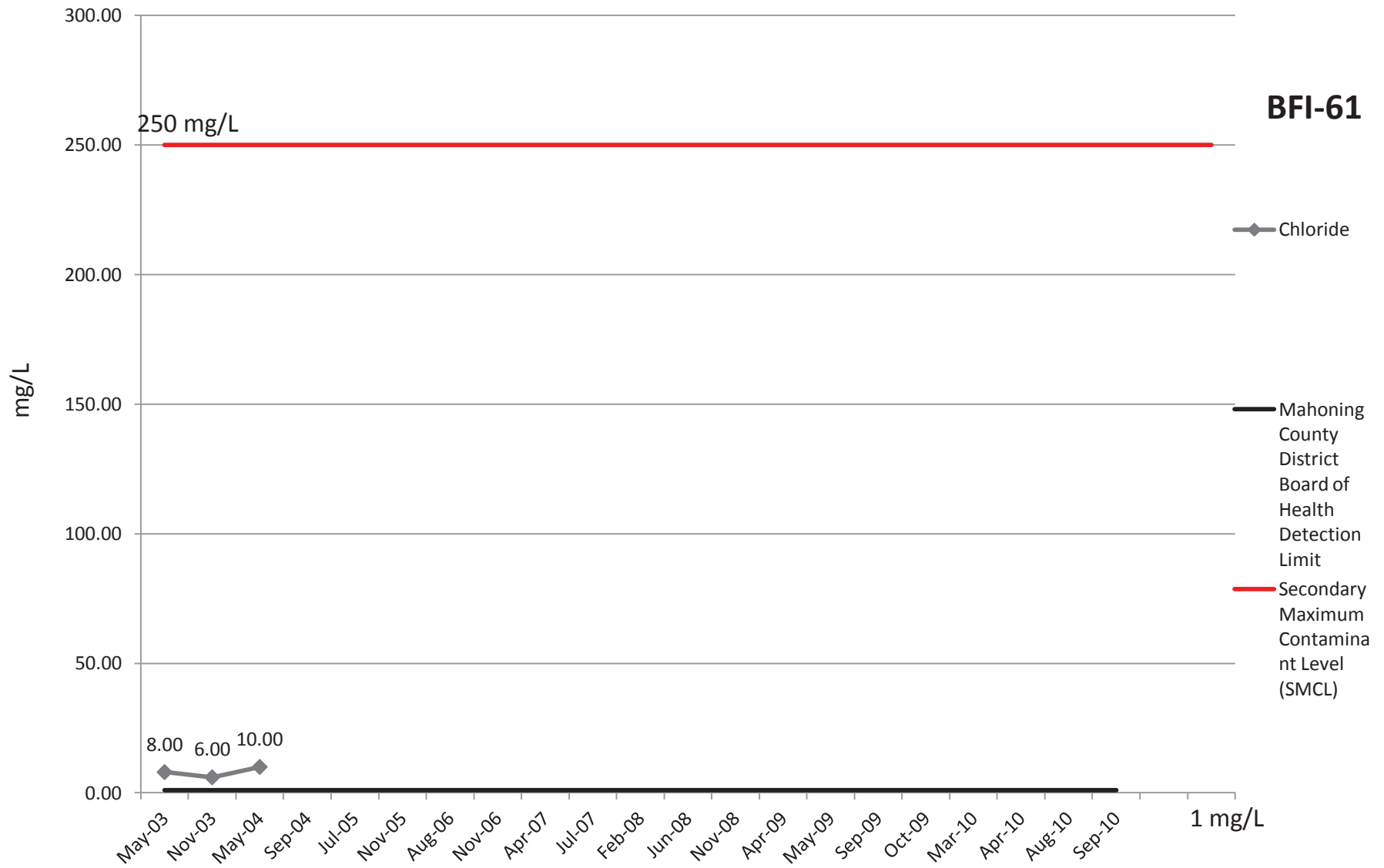
◆ Ammonia

— Mahoning County District Board of Health Detection Limit

0.02 mg/L



# Chloride



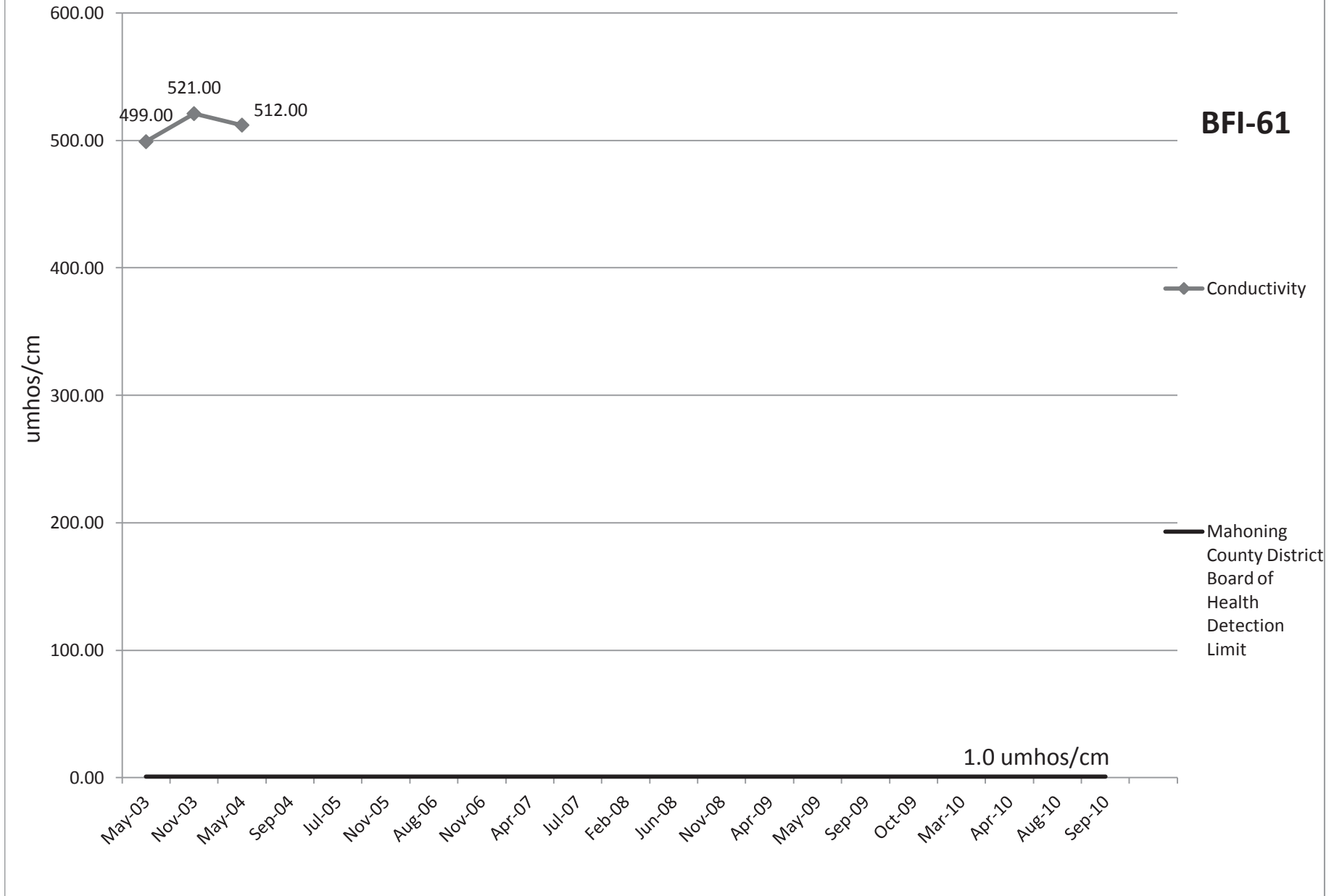
**BFI-61**

◆ Chloride

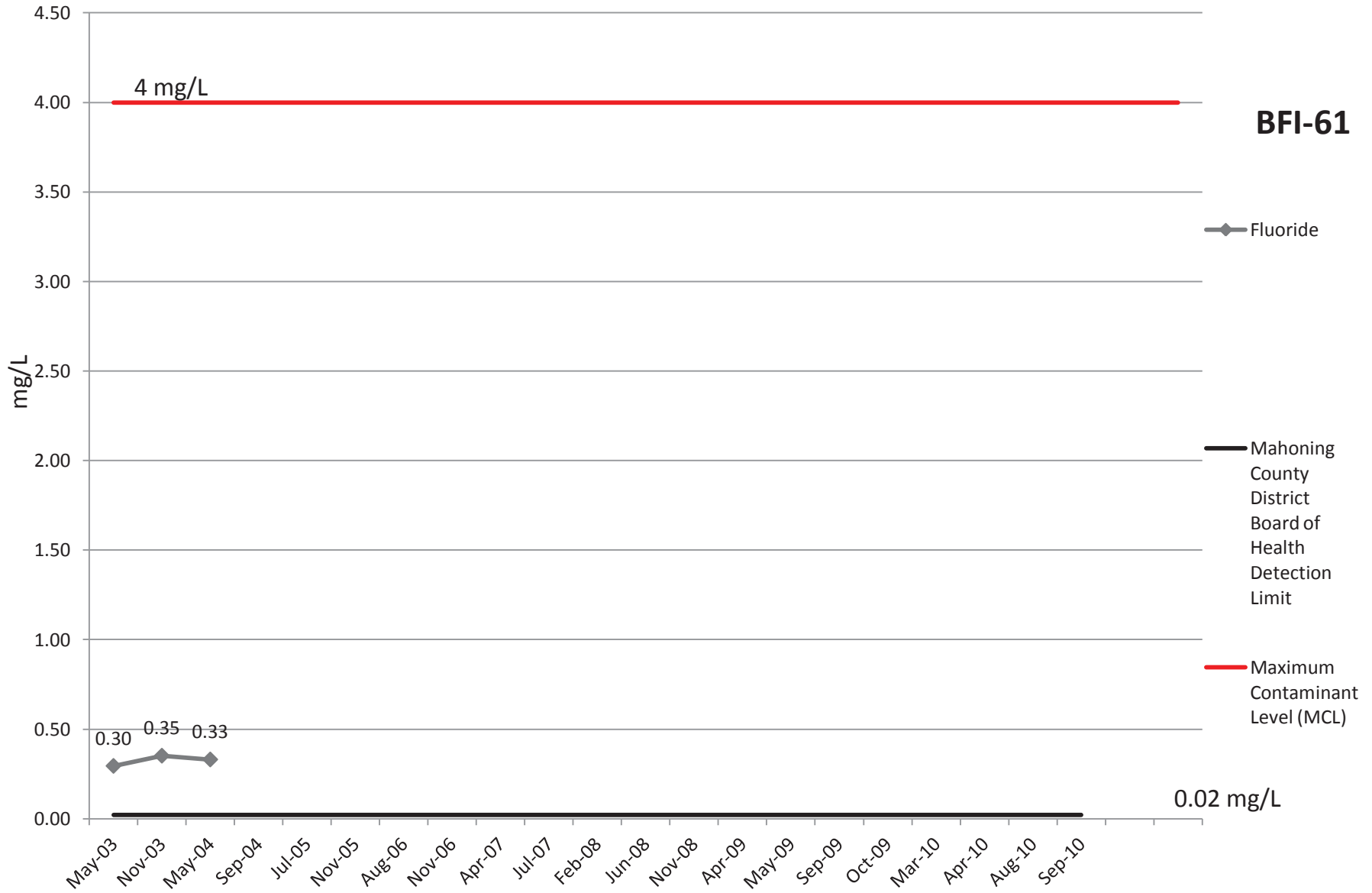
— Mahoning County District Board of Health Detection Limit  
— Secondary Maximum Contaminant Level (SMCL)

1 mg/L

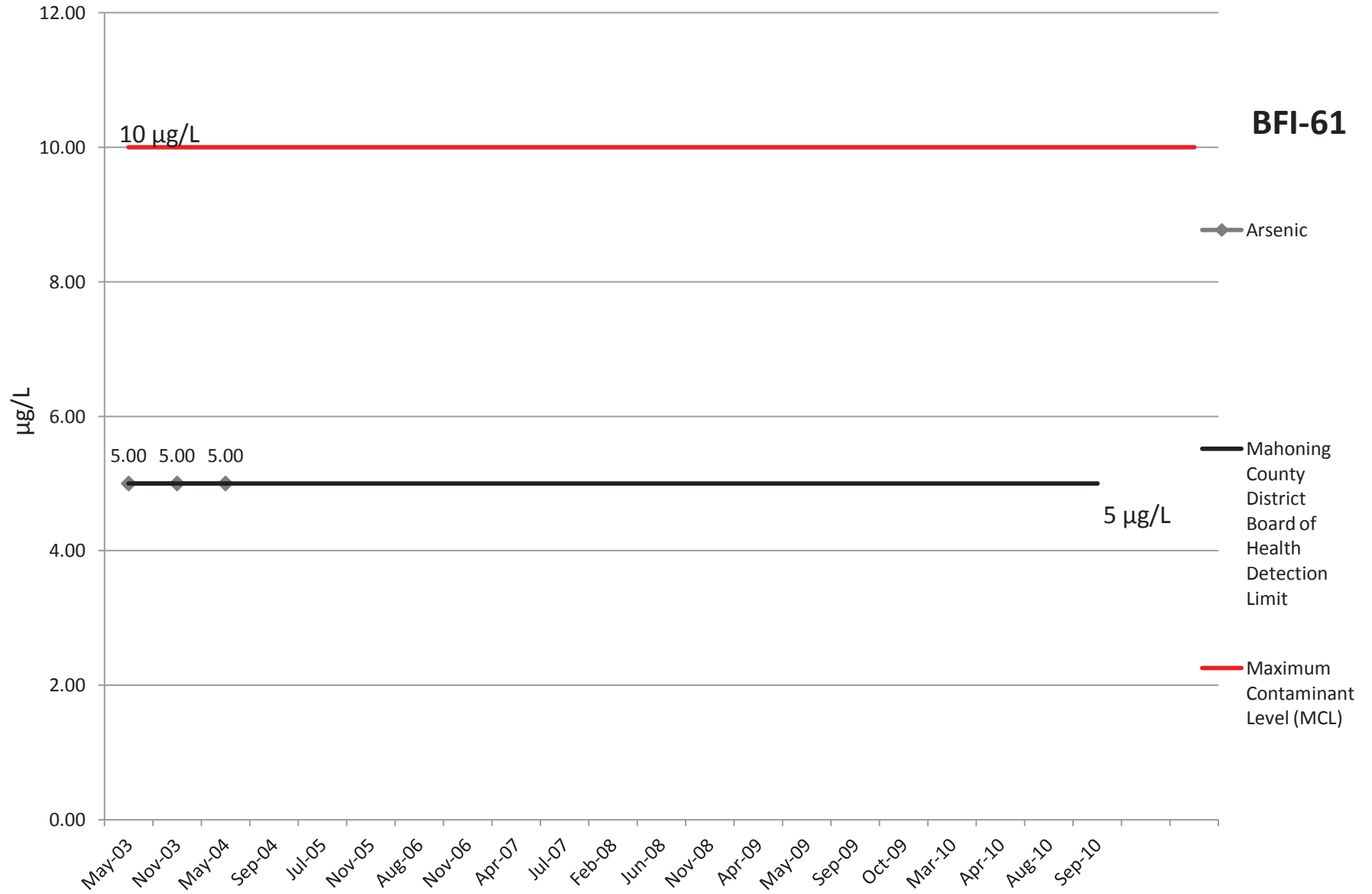
# Conductivity



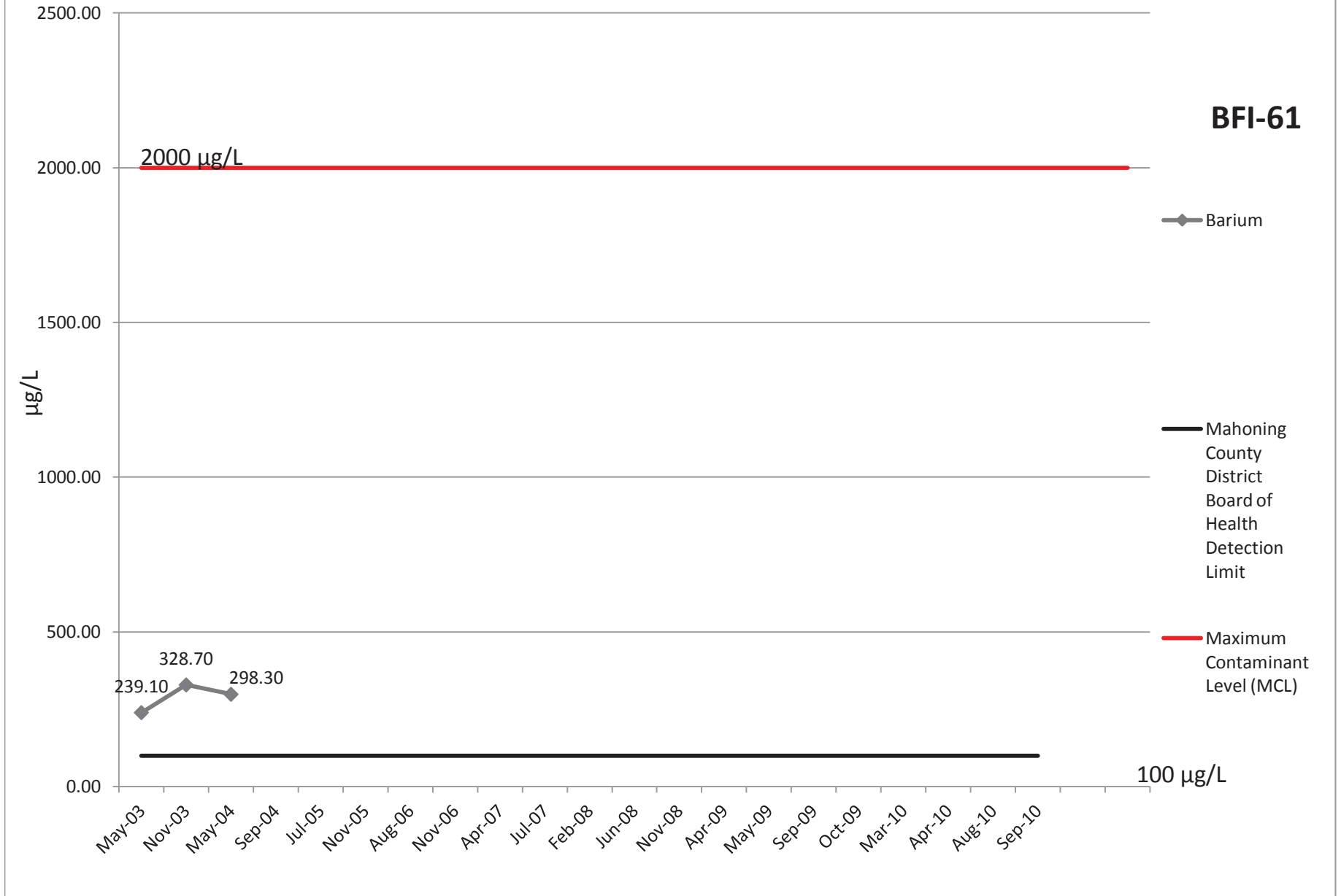
# Fluoride



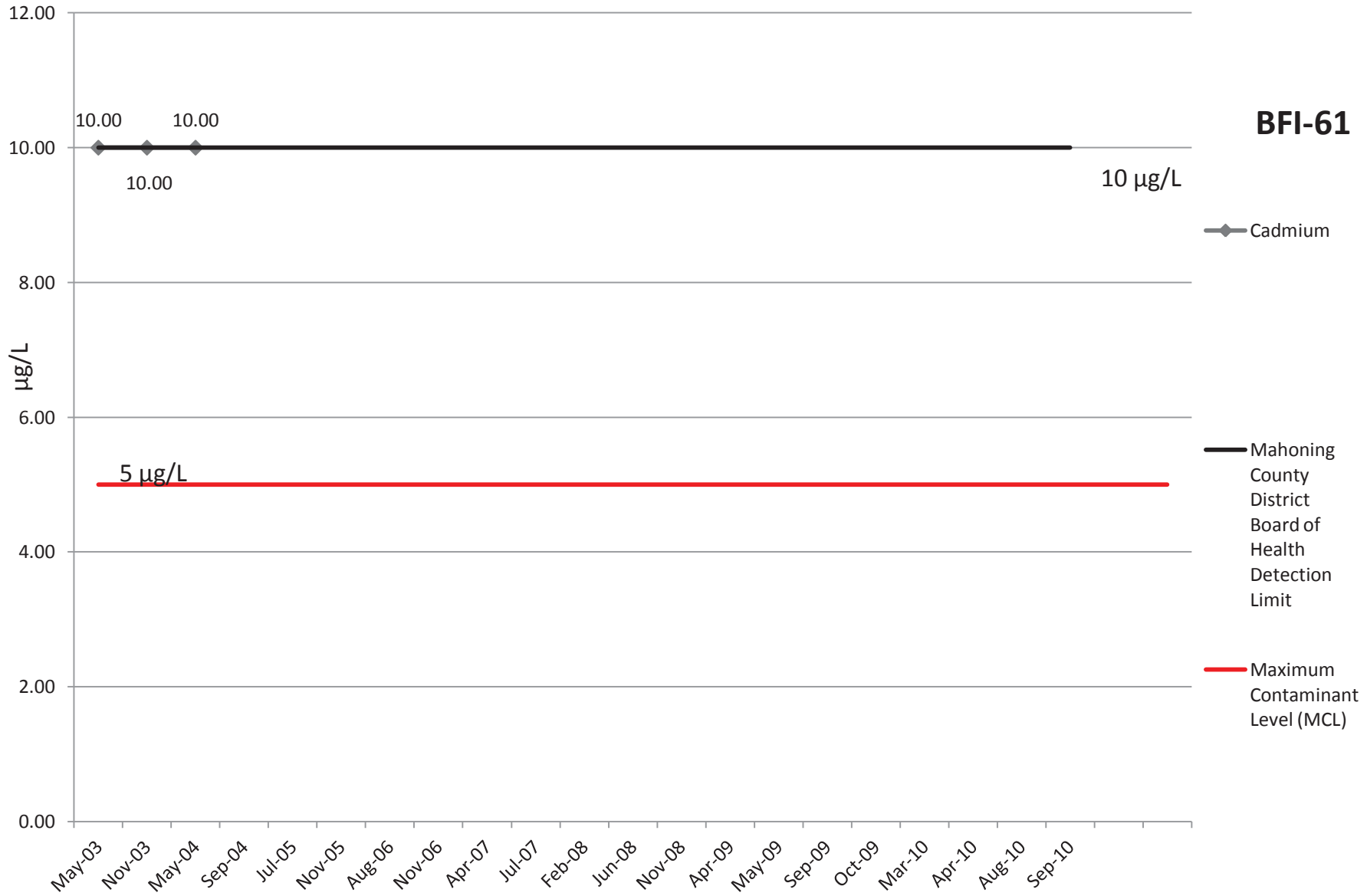
# Arsenic



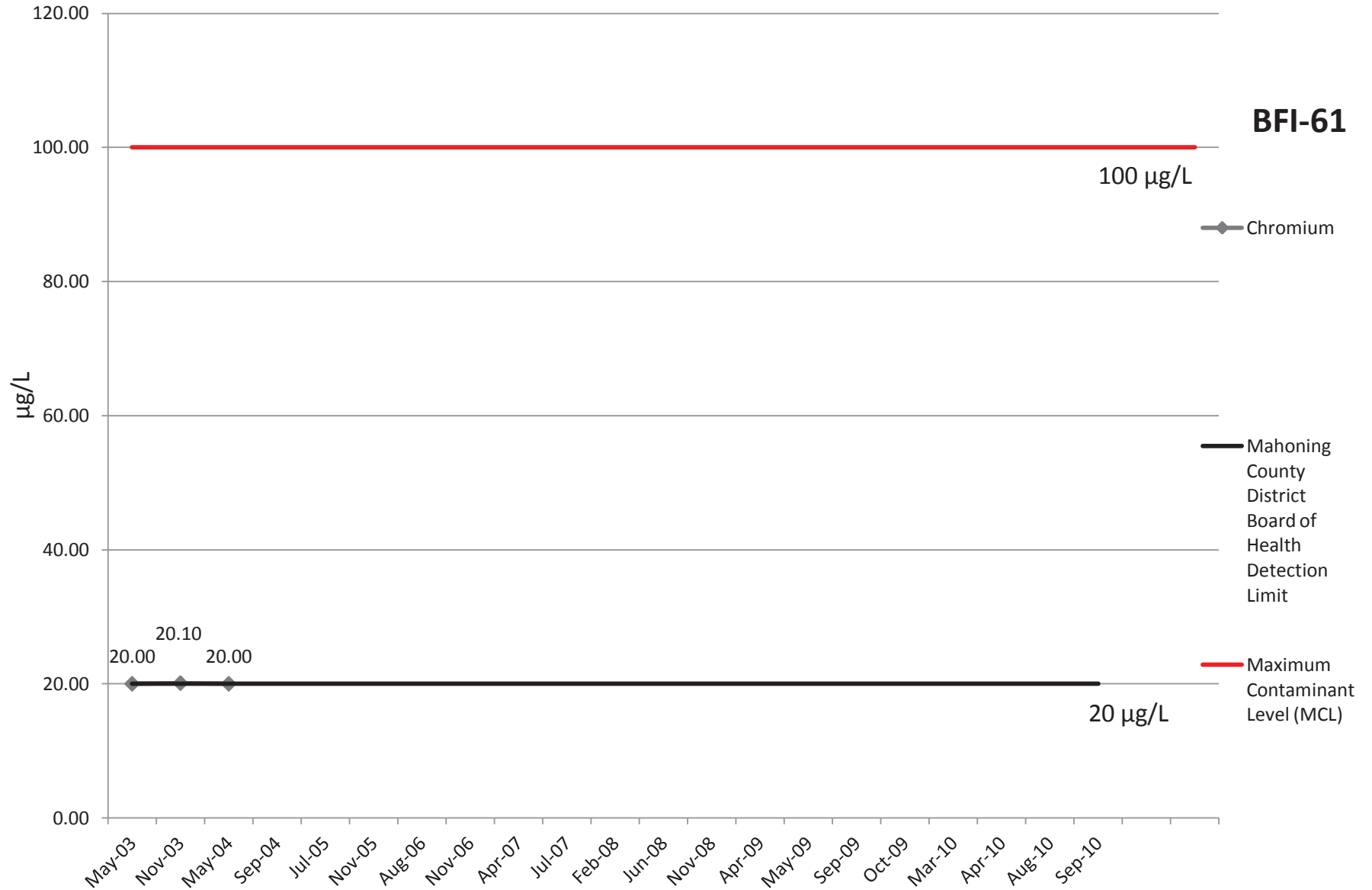
# Barium



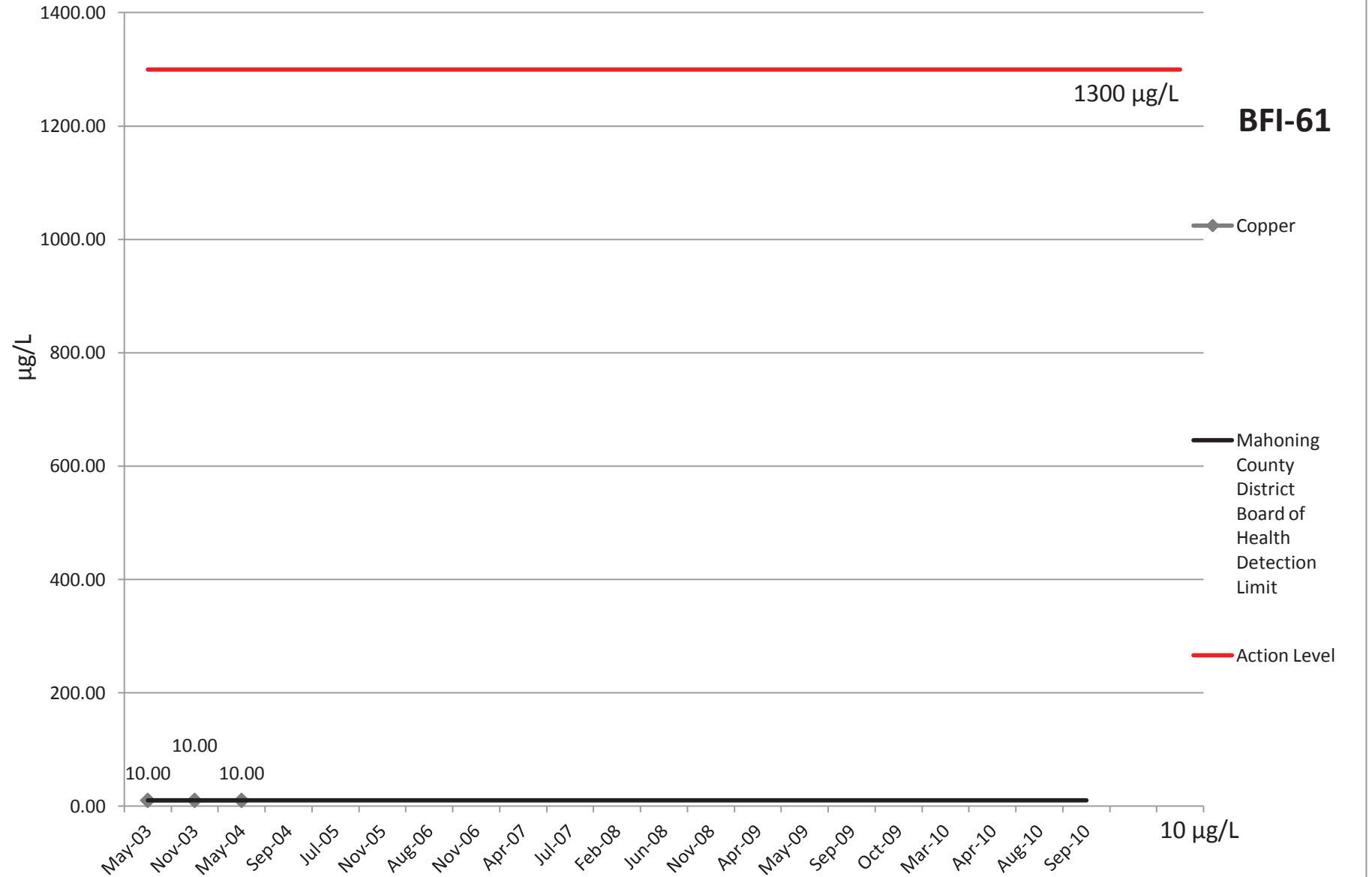
# Cadmium



# Chromium



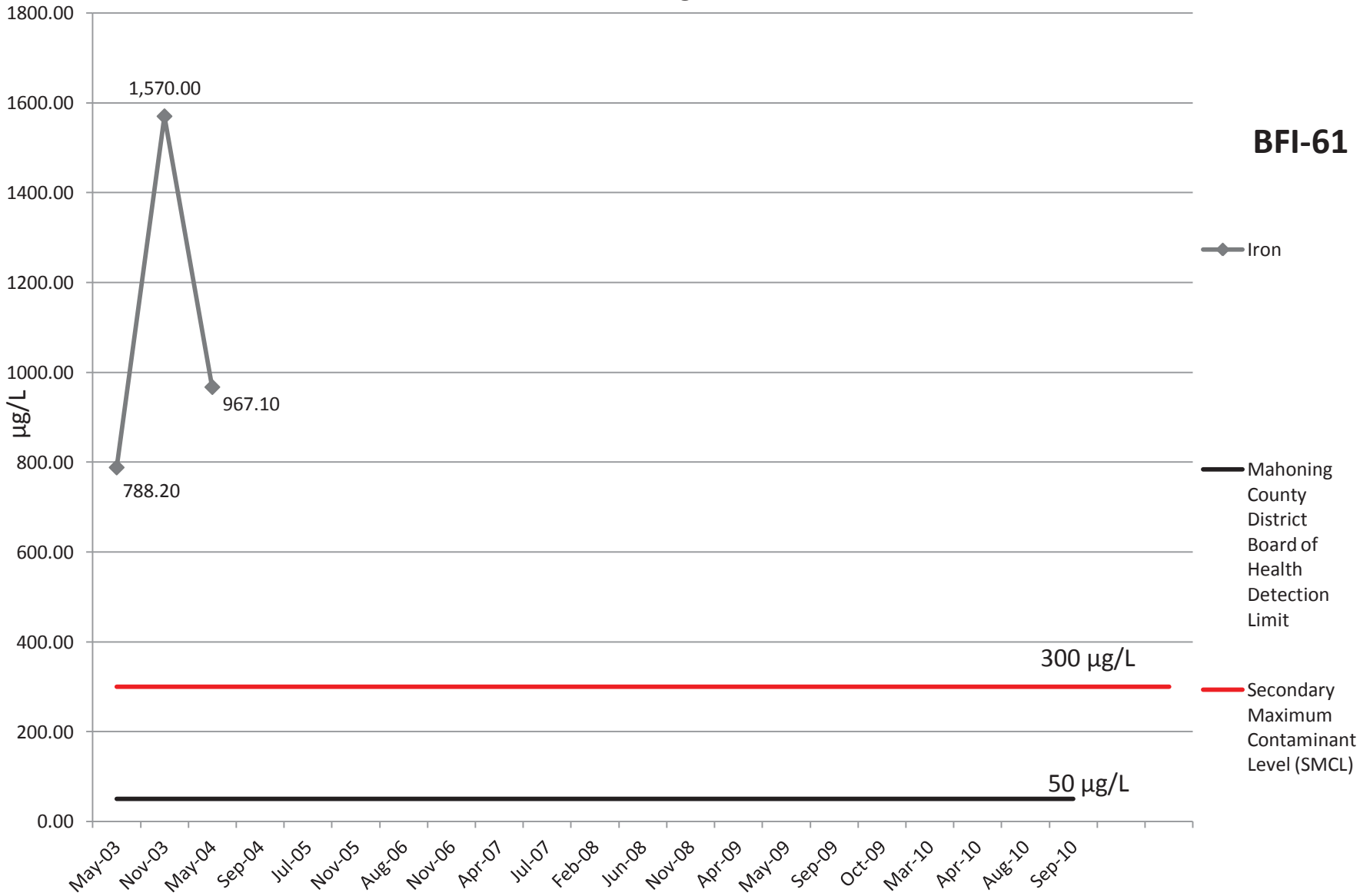
# Copper



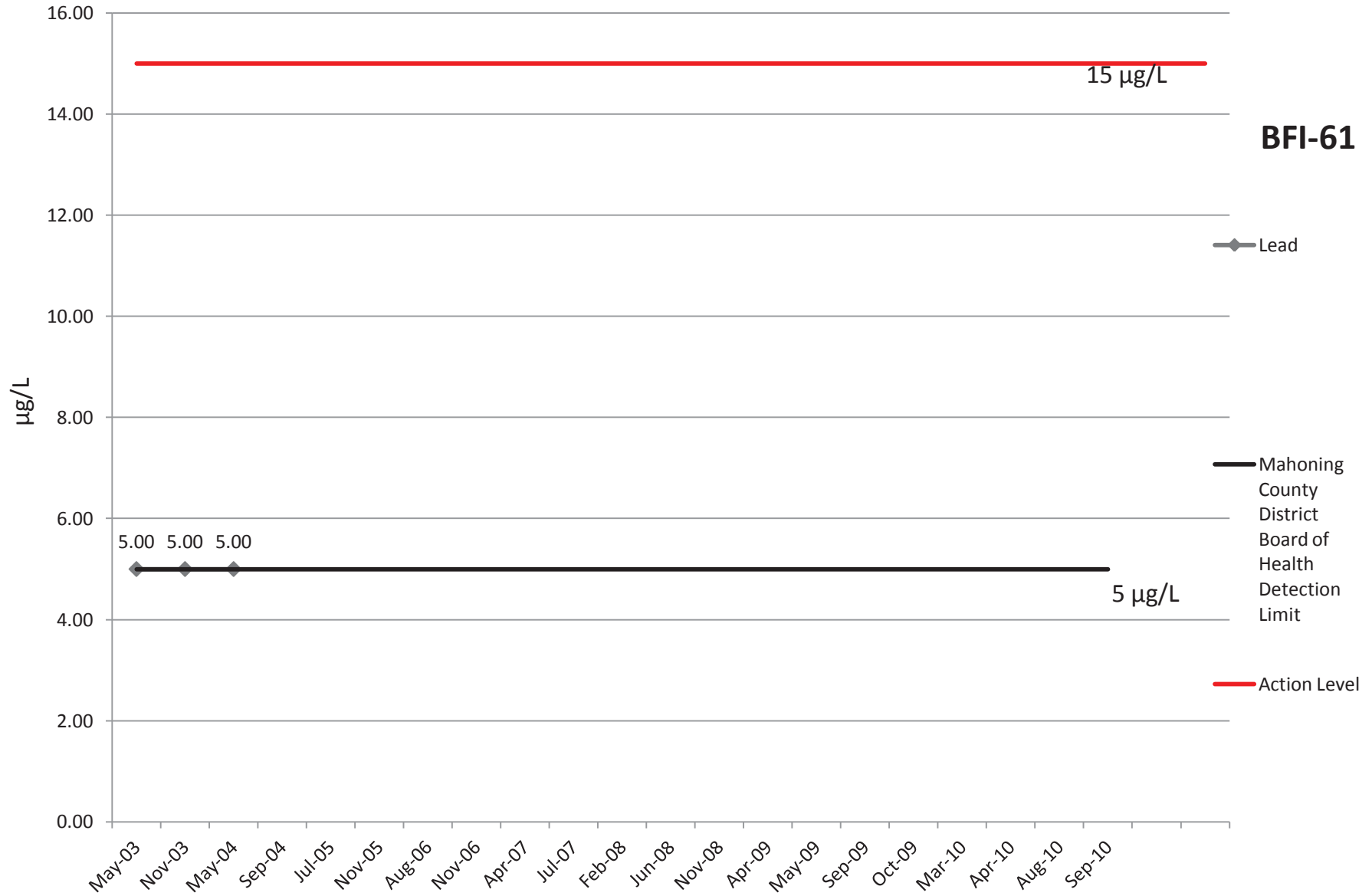


# Iron

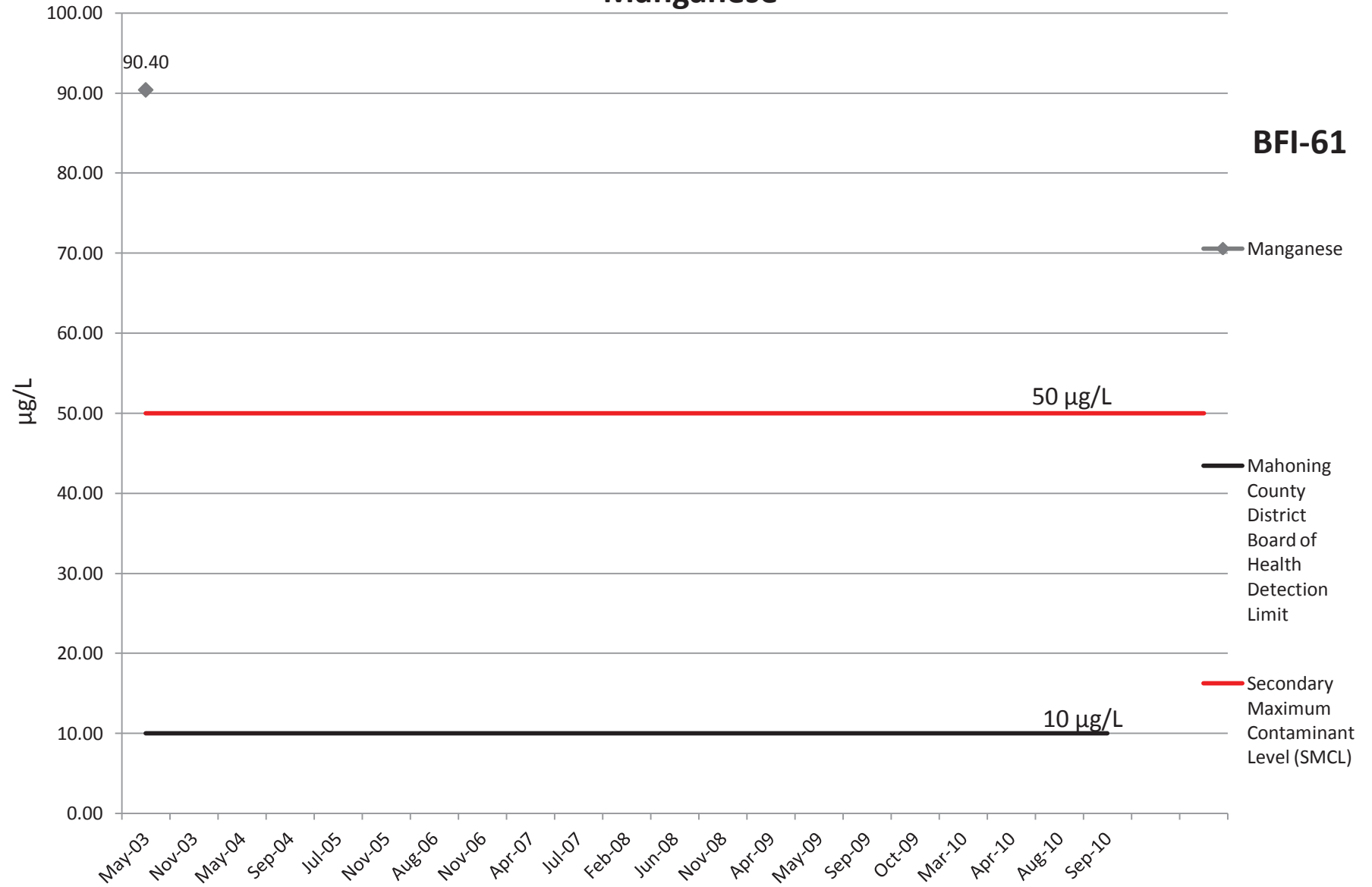
**BFI-61**



# Lead

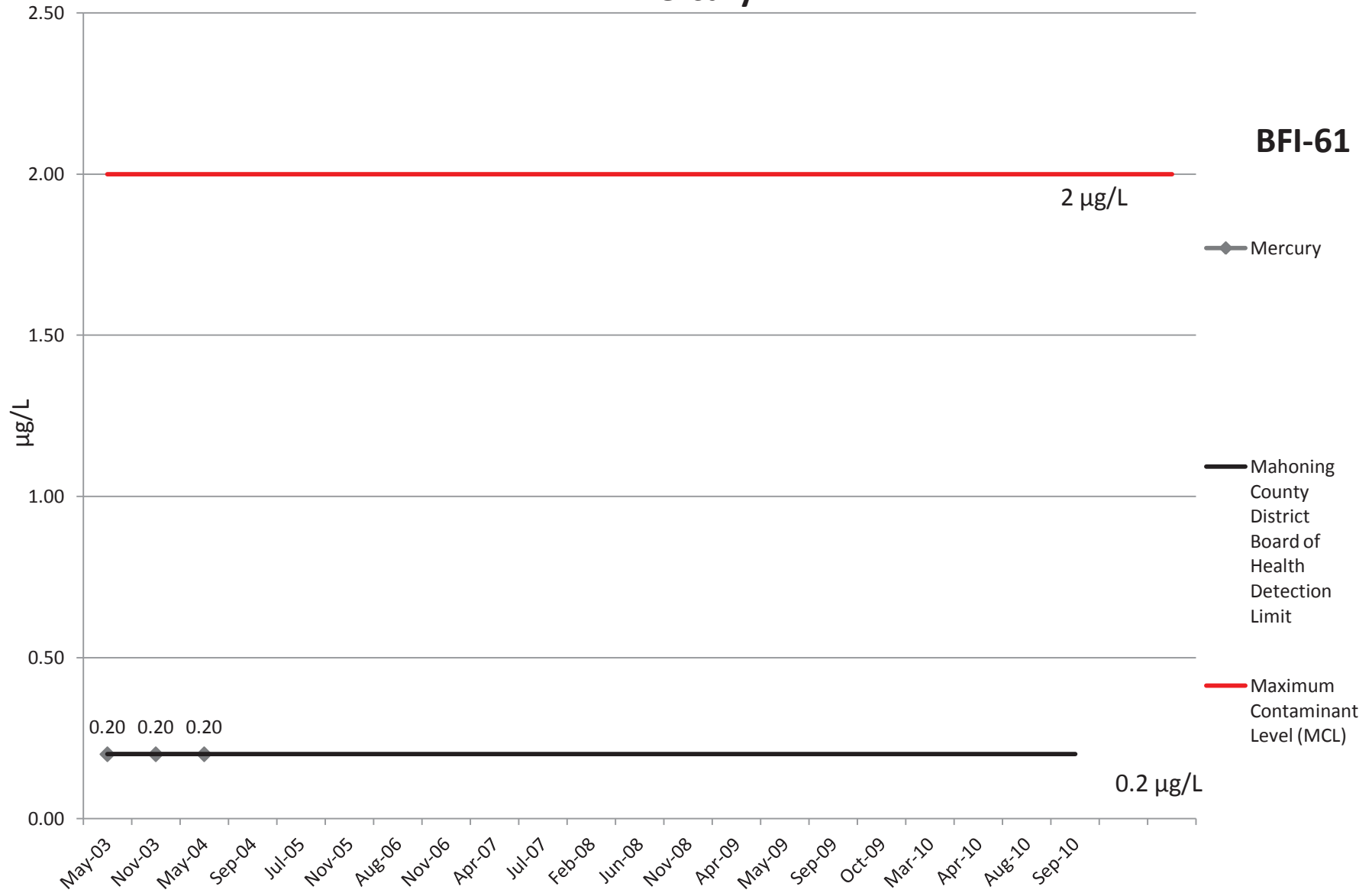


# Manganese

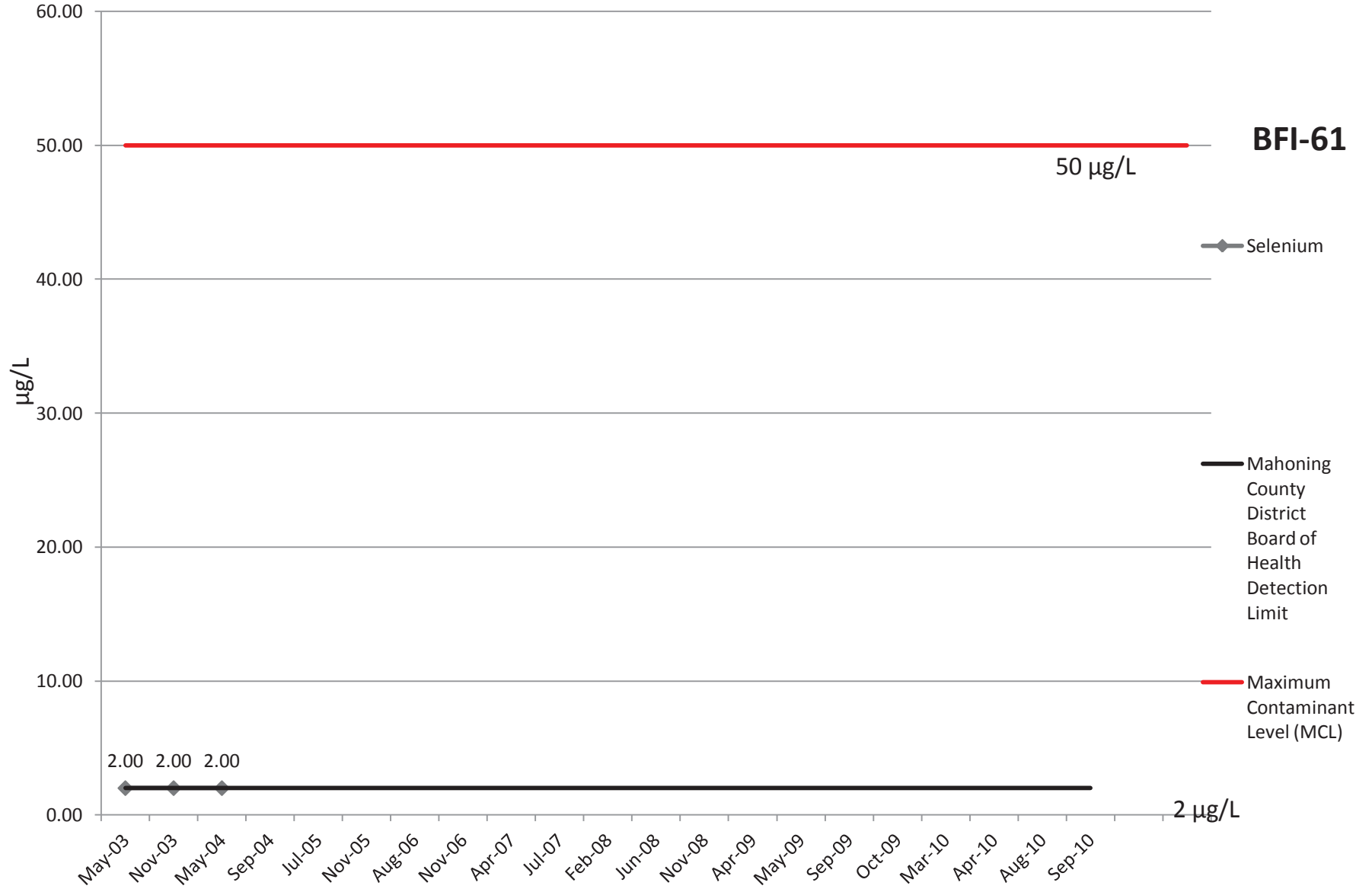


# Mercury

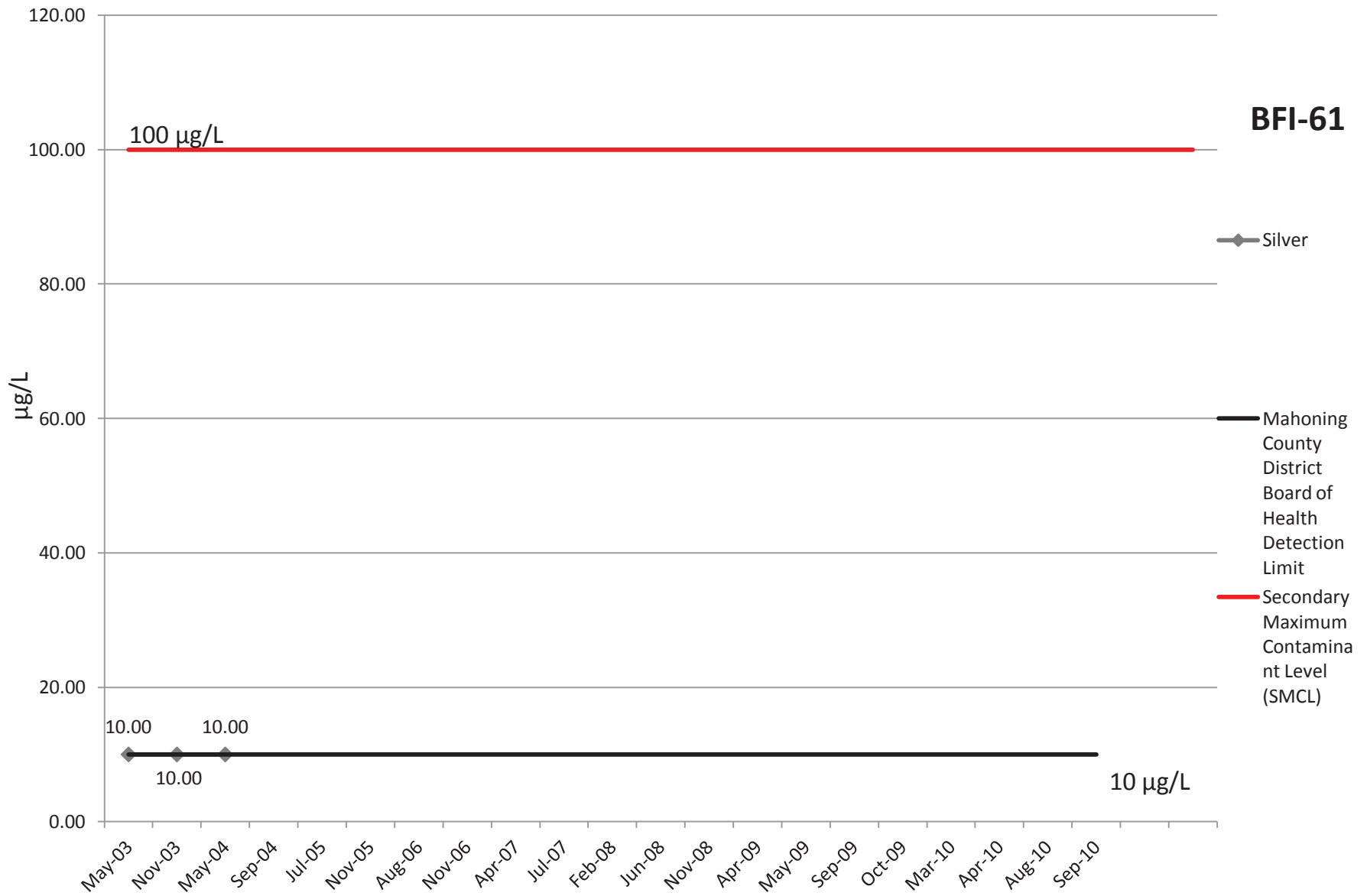
**BFI-61**



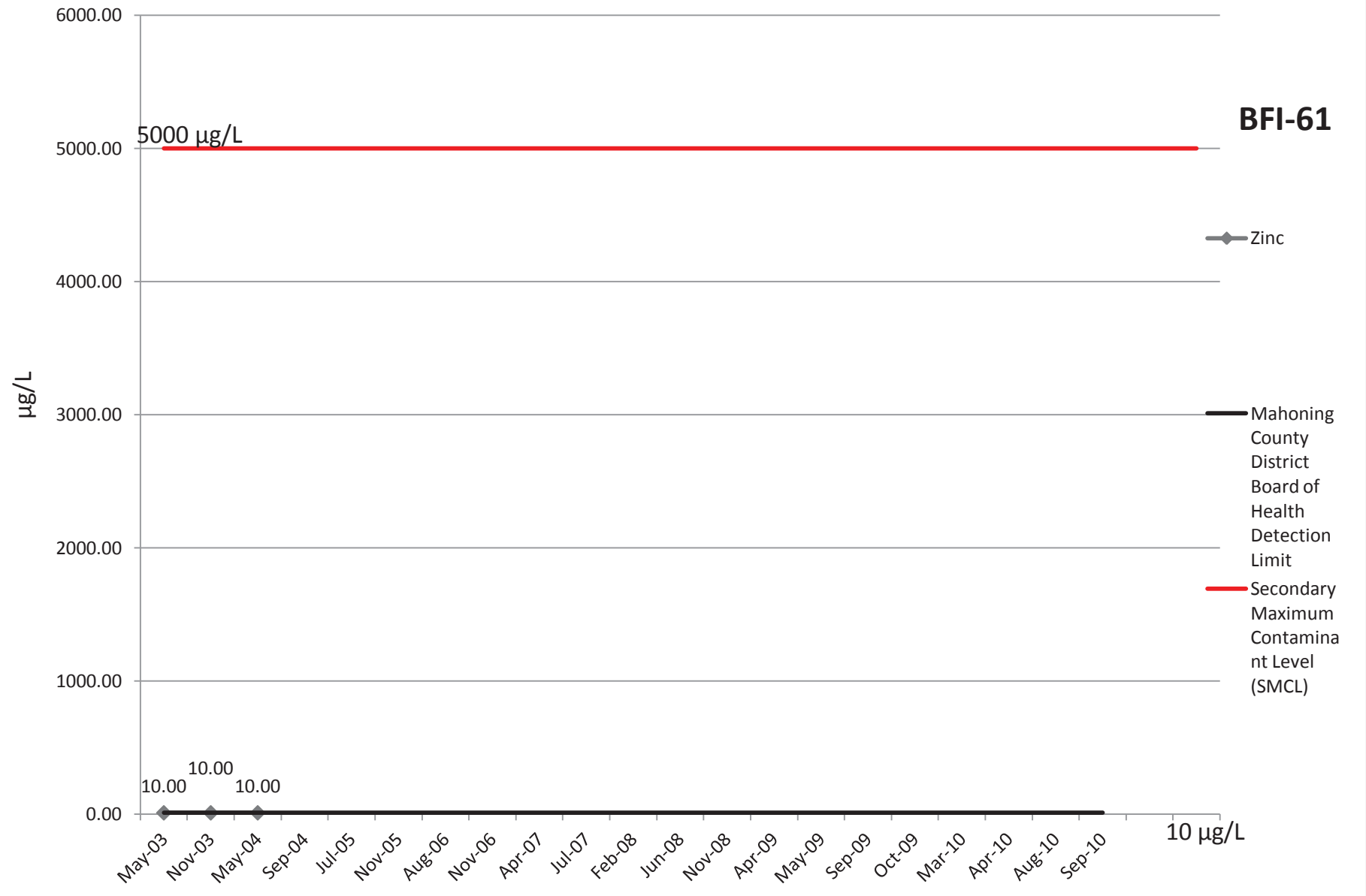
# Selenium



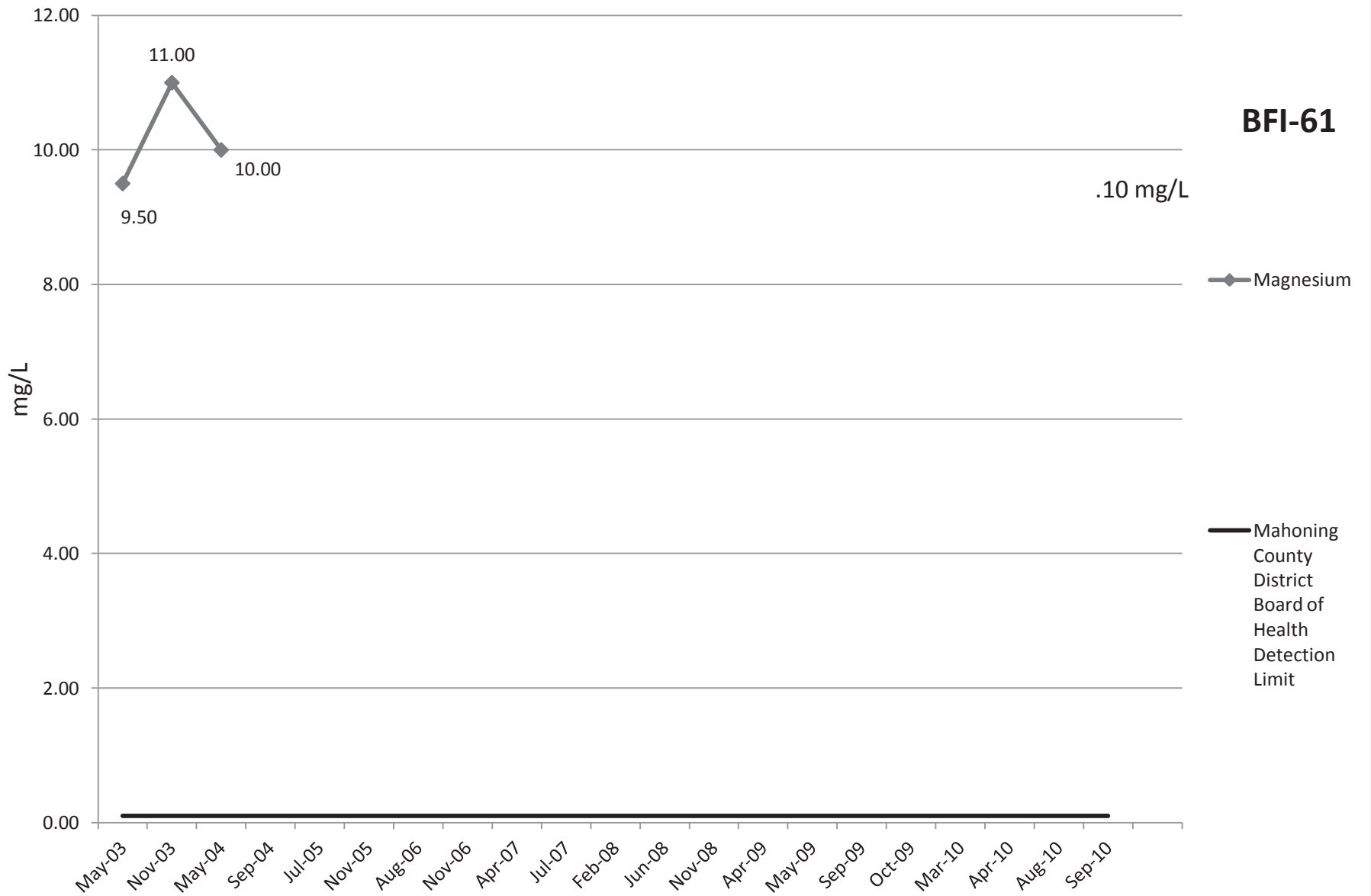
# Silver



# Zinc

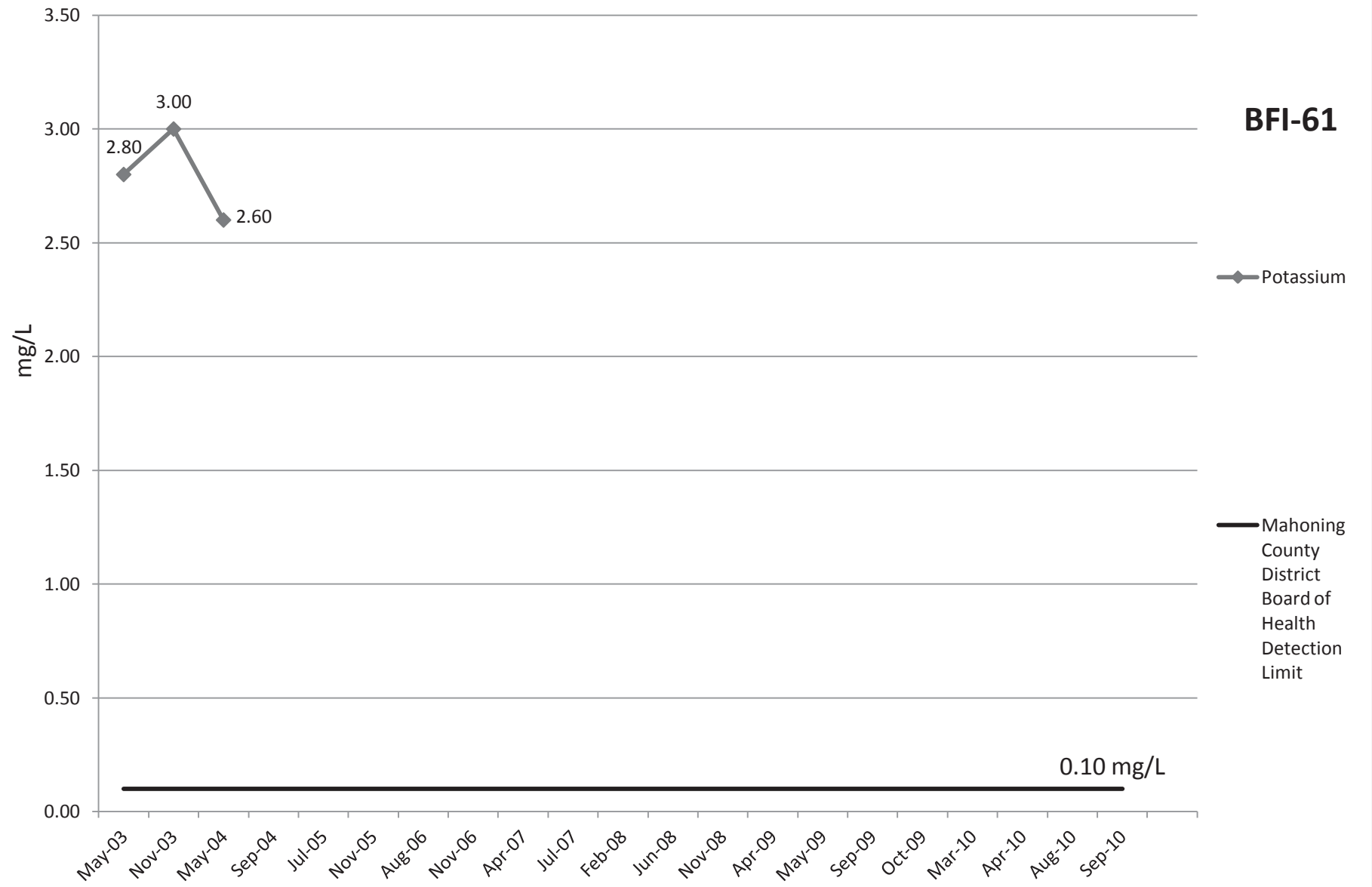


# Magnesium

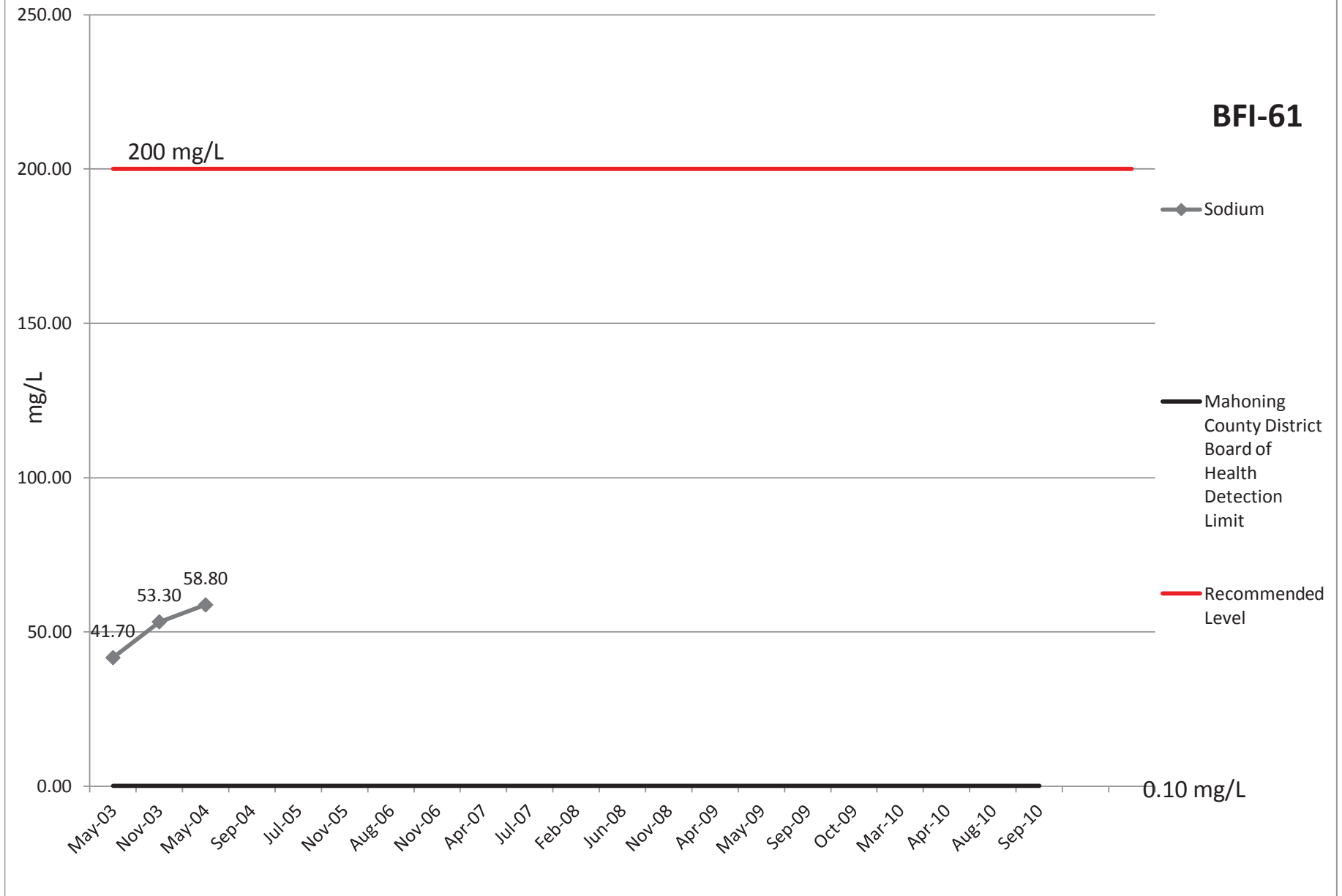




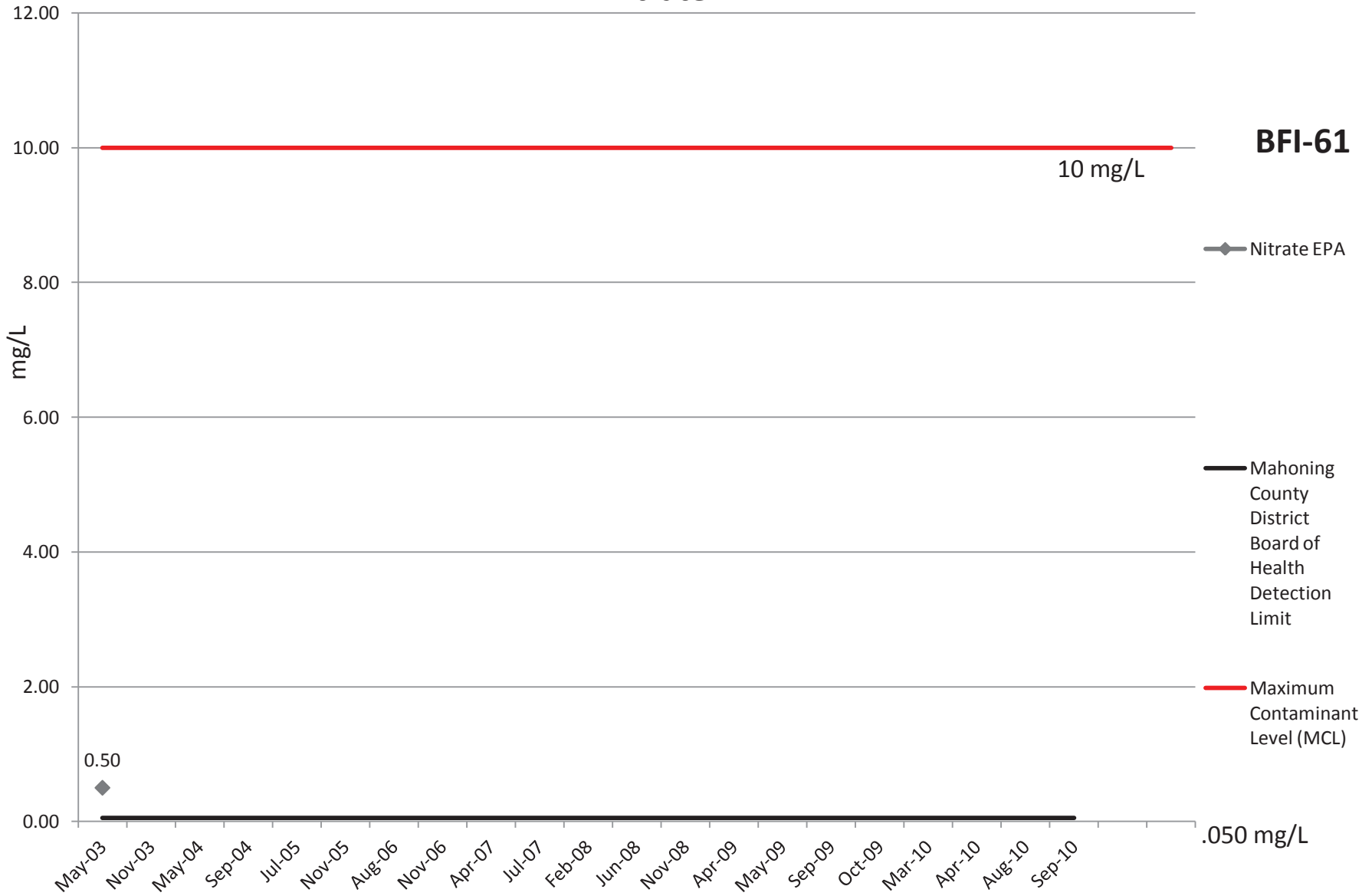
# Potassium



# Sodium



# Nitrate EPA



**BFI-61**

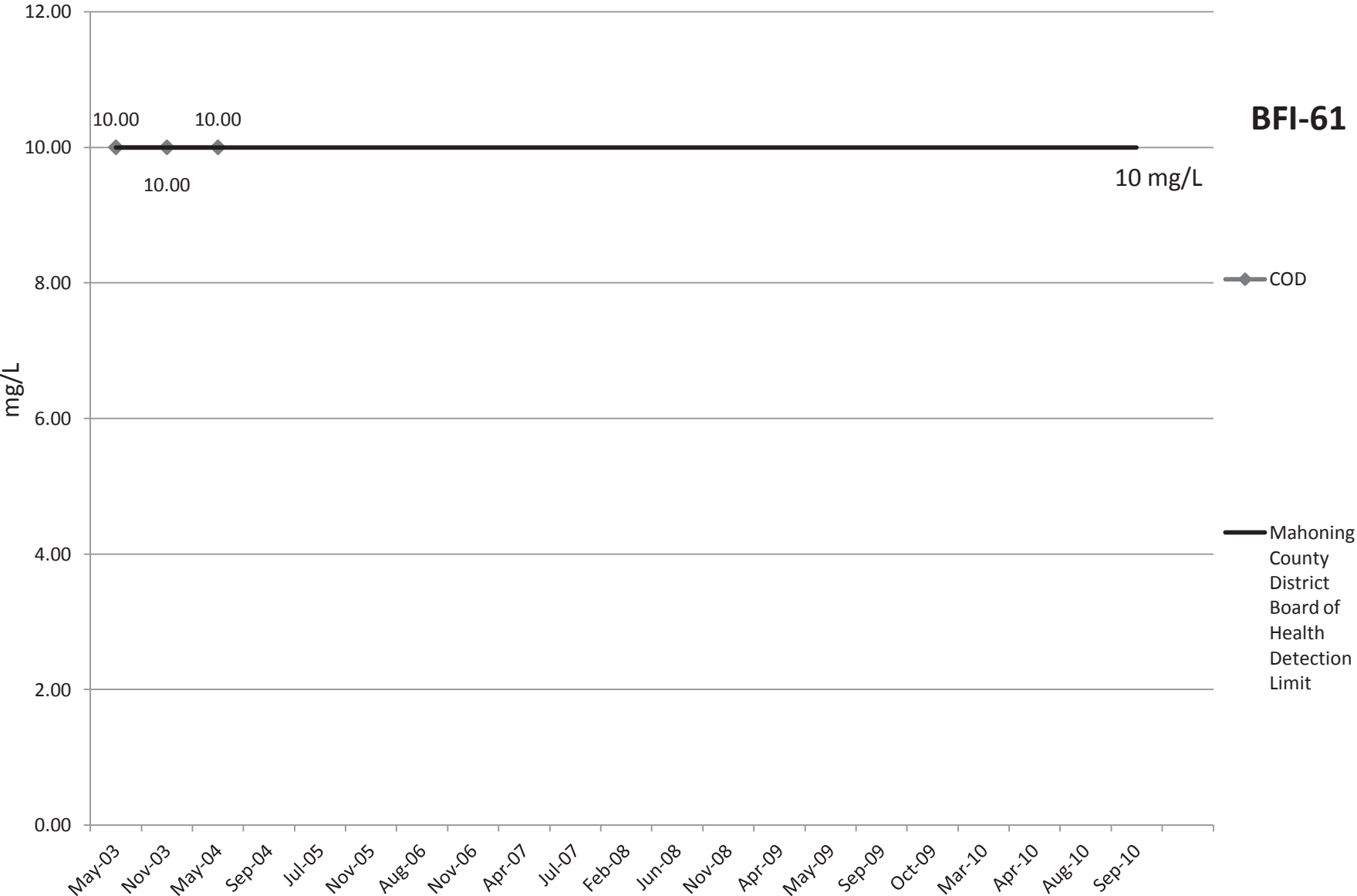
◆ Nitrate EPA

— Mahoning County District Board of Health Detection Limit

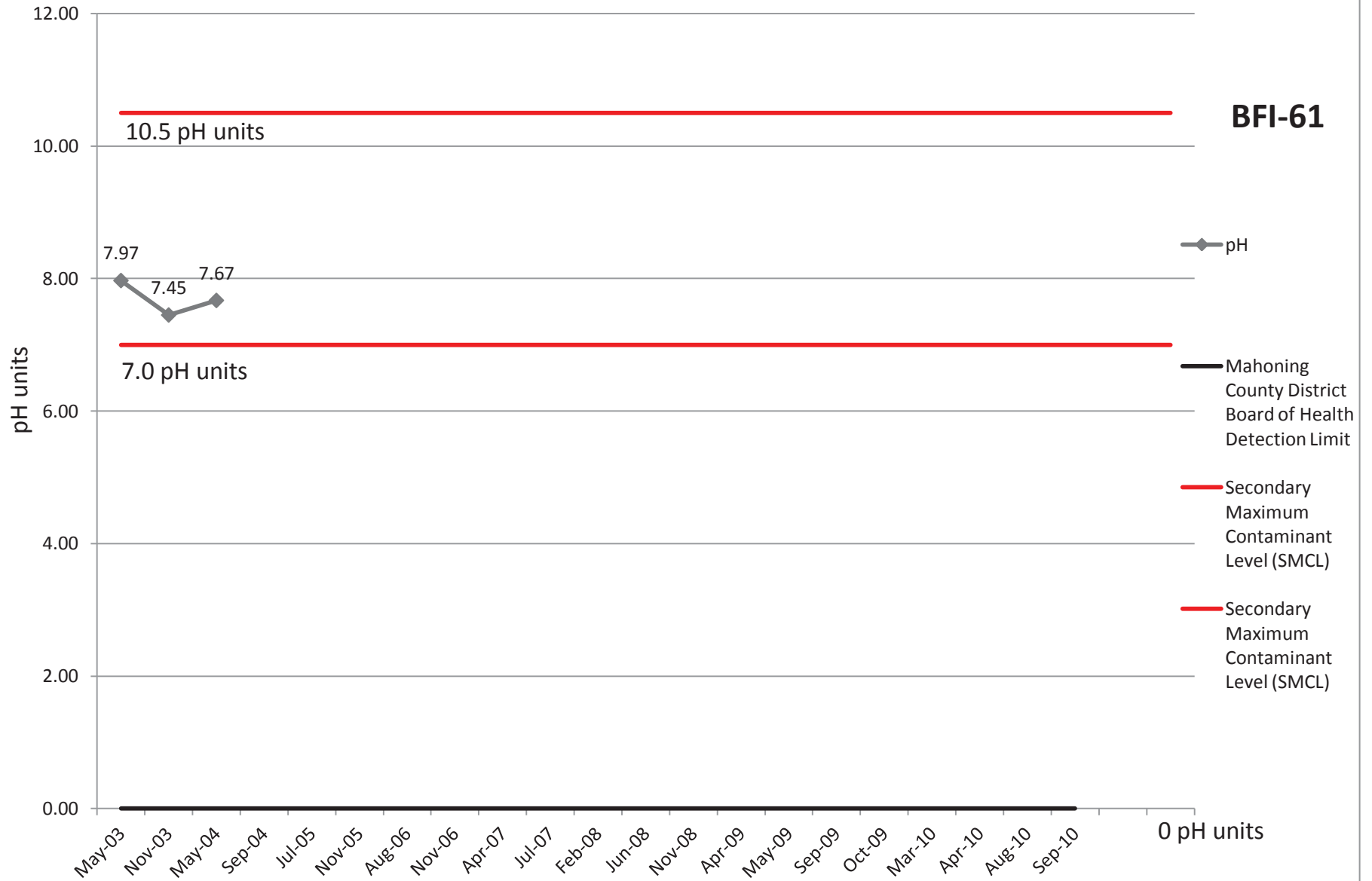
— Maximum Contaminant Level (MCL)

.050 mg/L

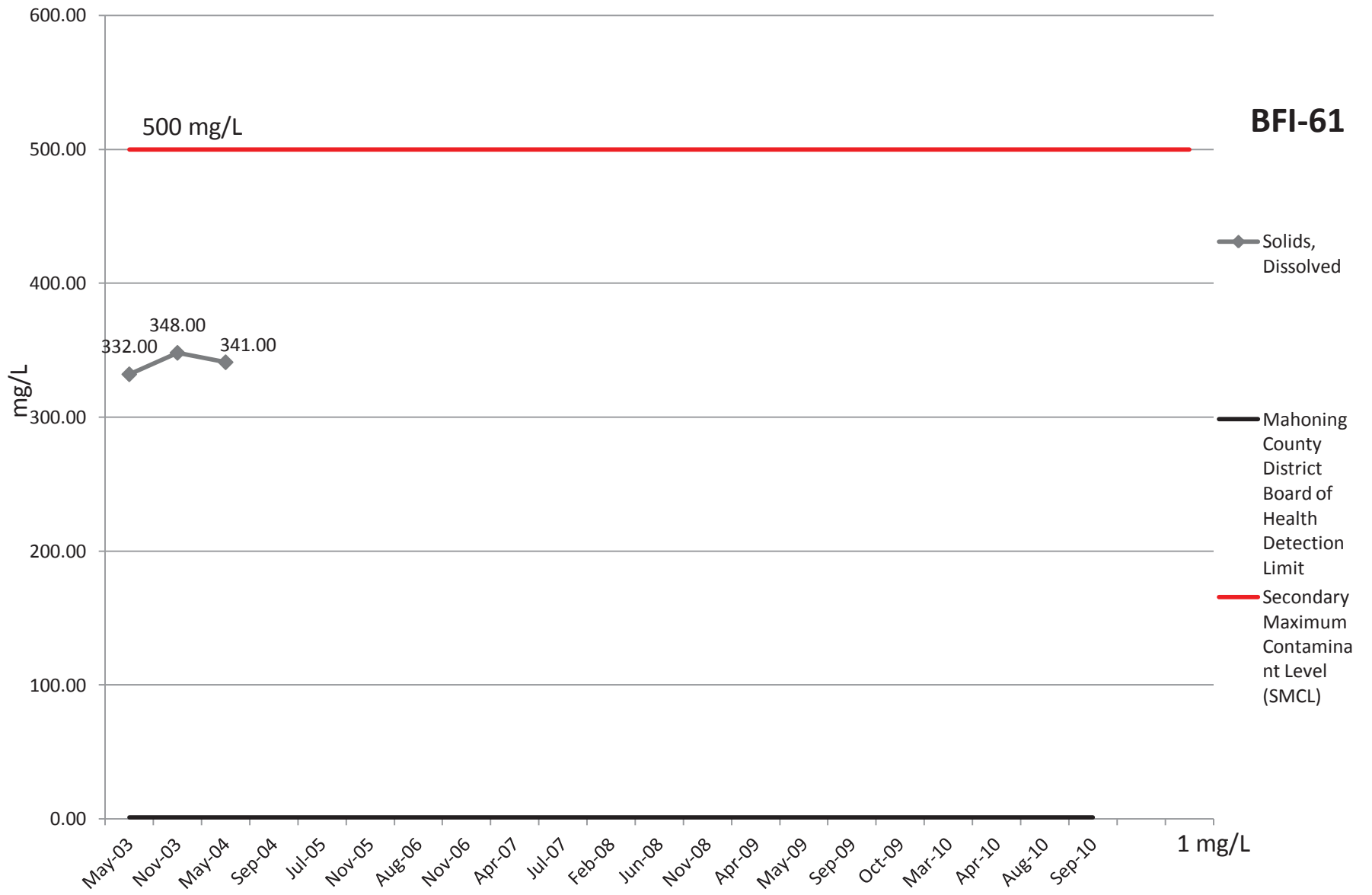
# COD



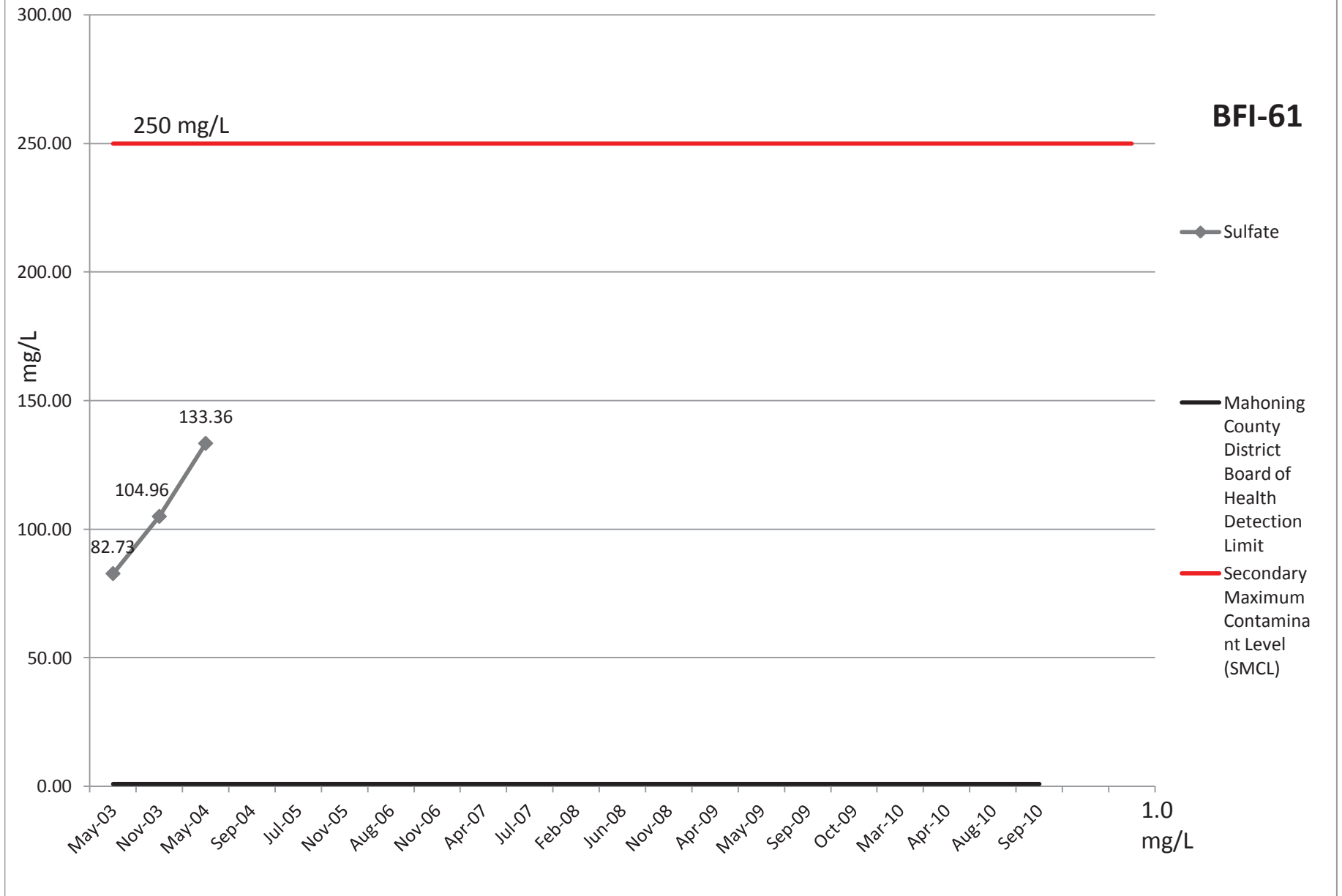
# pH



# Solids, Dissolved



# Sulfate



# Bacteria

**BFI-61**

Positive/Negative

1.00

positive (1)

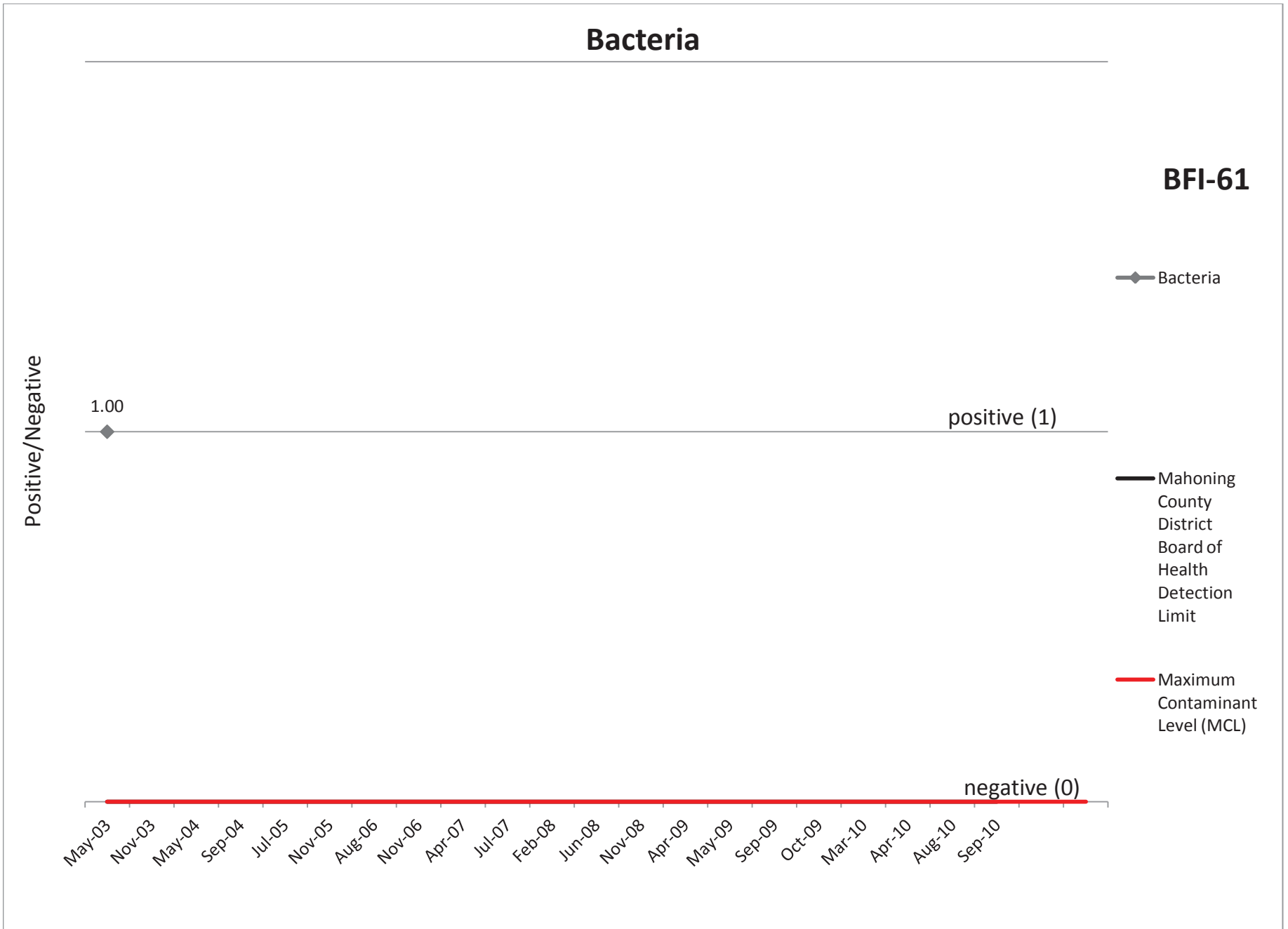
negative (0)

◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

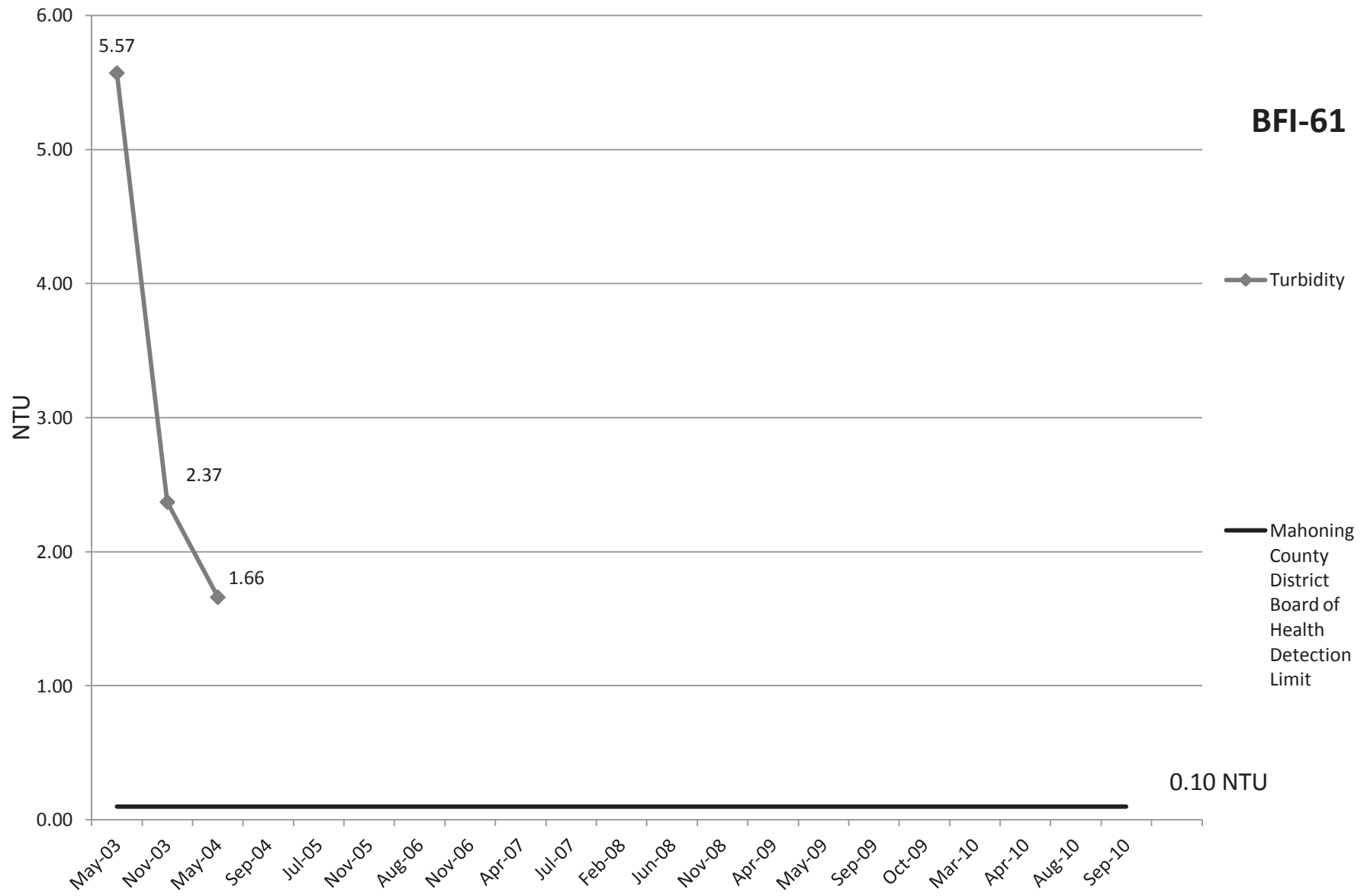
— Maximum  
Contaminant  
Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



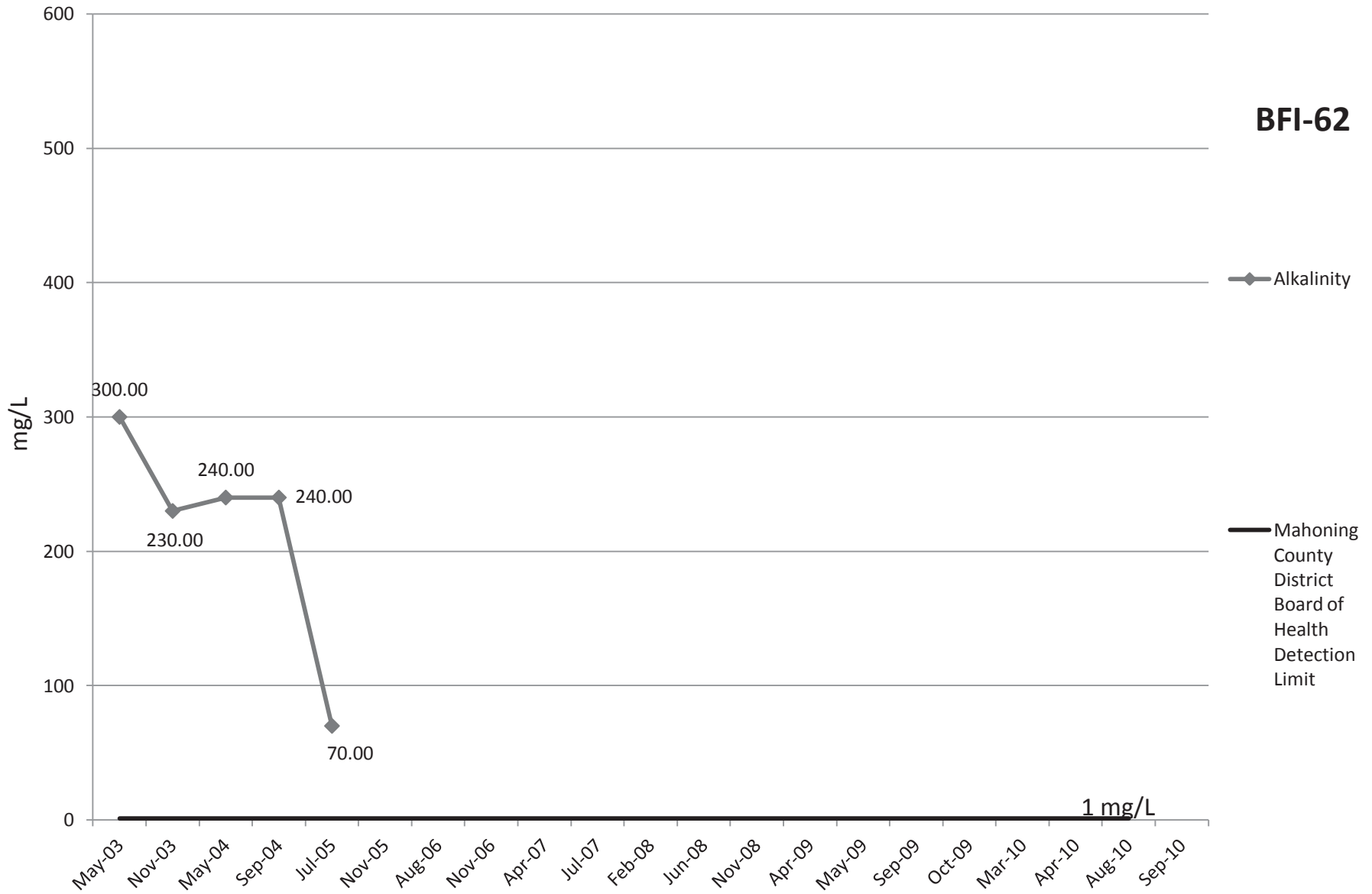


# Turbidity

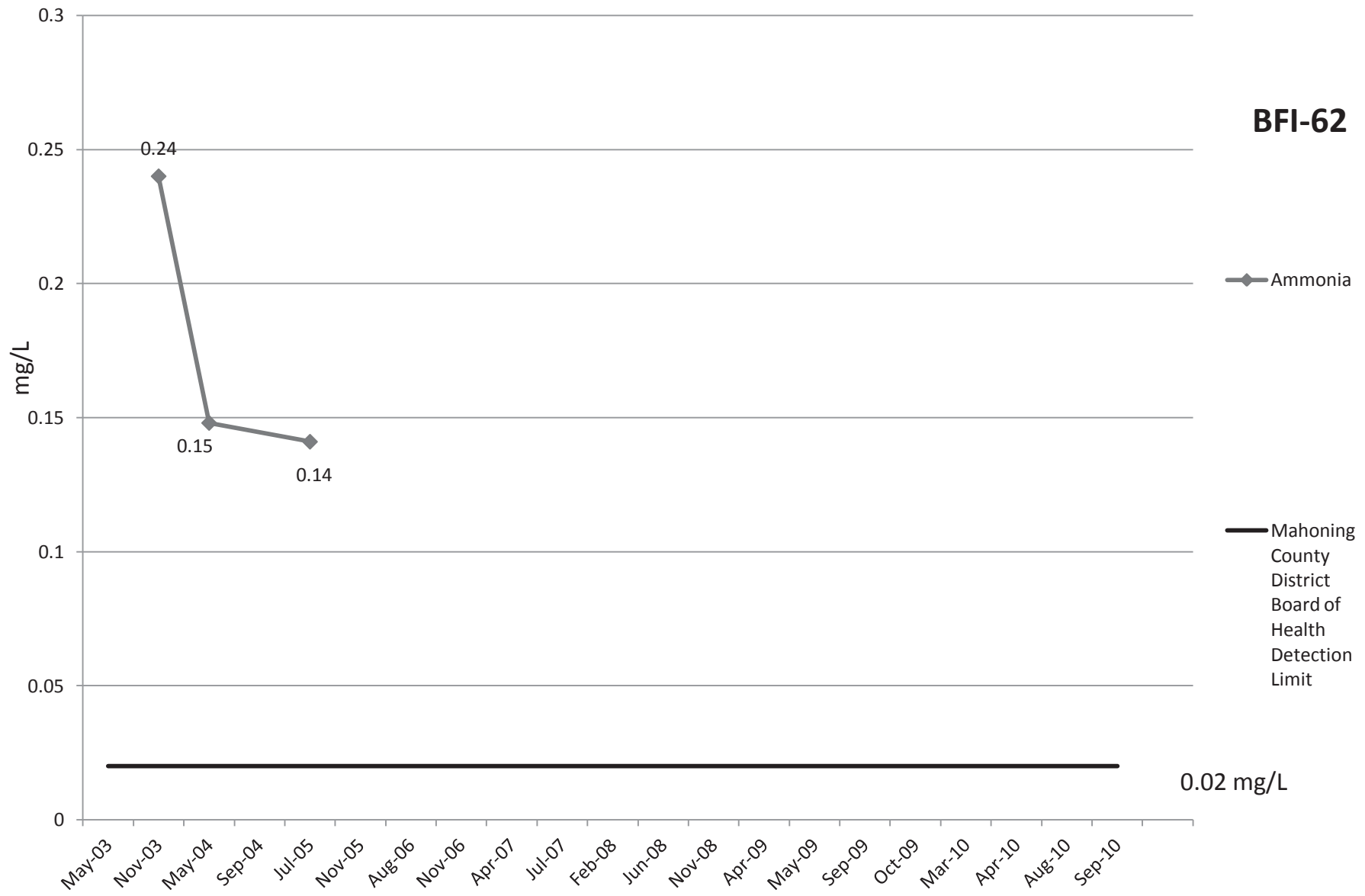


# Alkalinity

**BFI-62**



# Ammonia



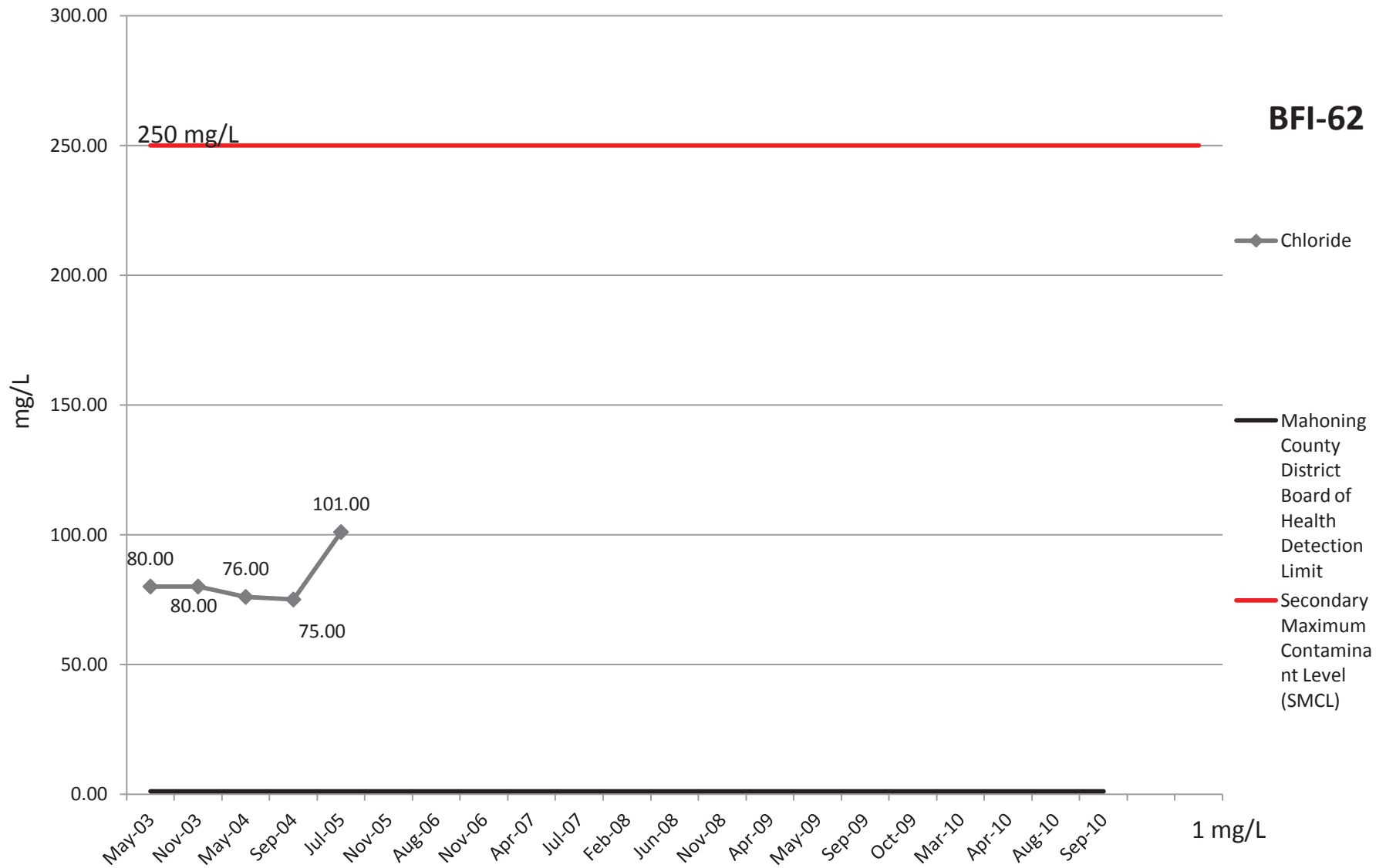
**BFI-62**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

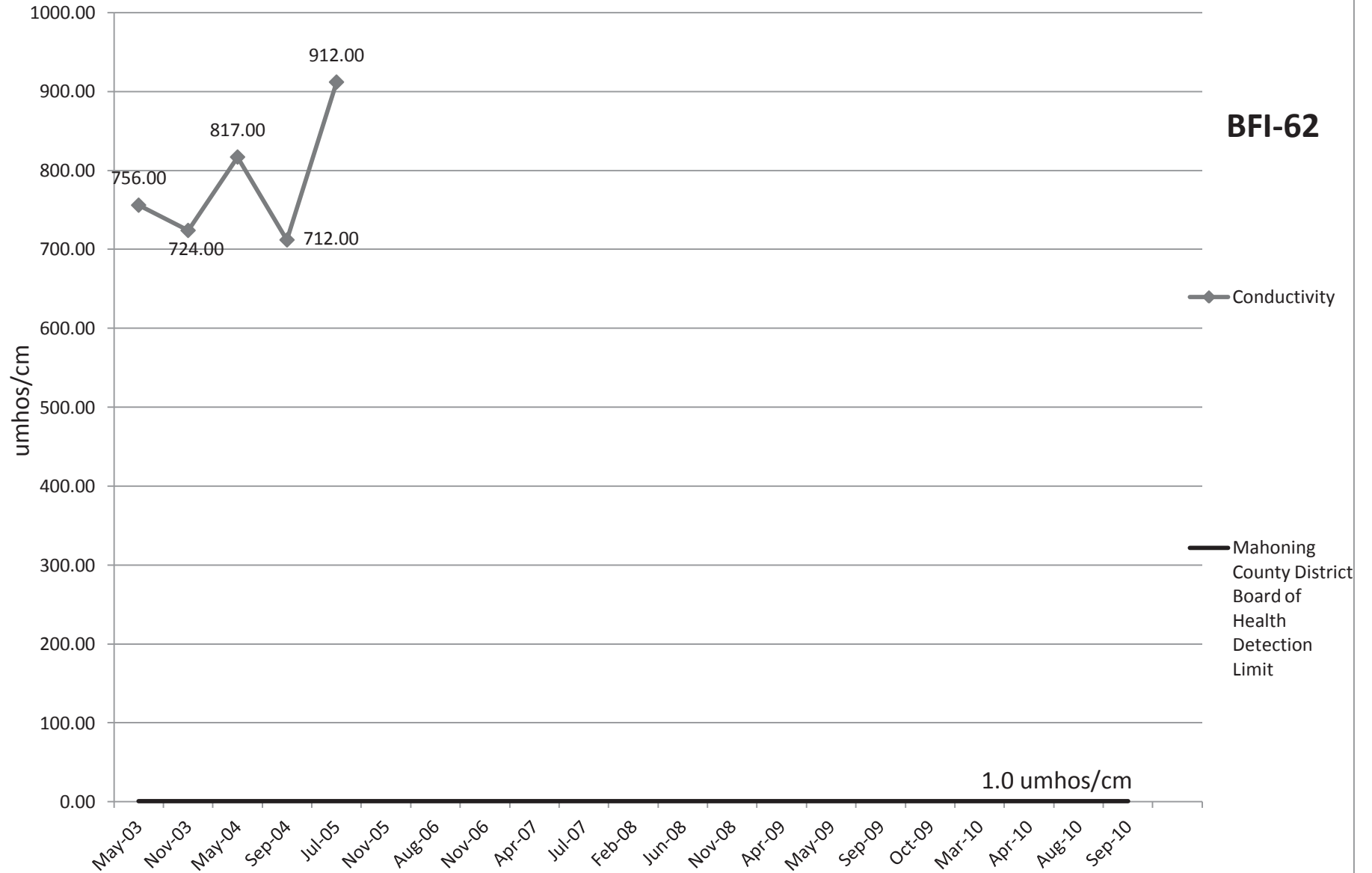
0.02 mg/L

# Chloride

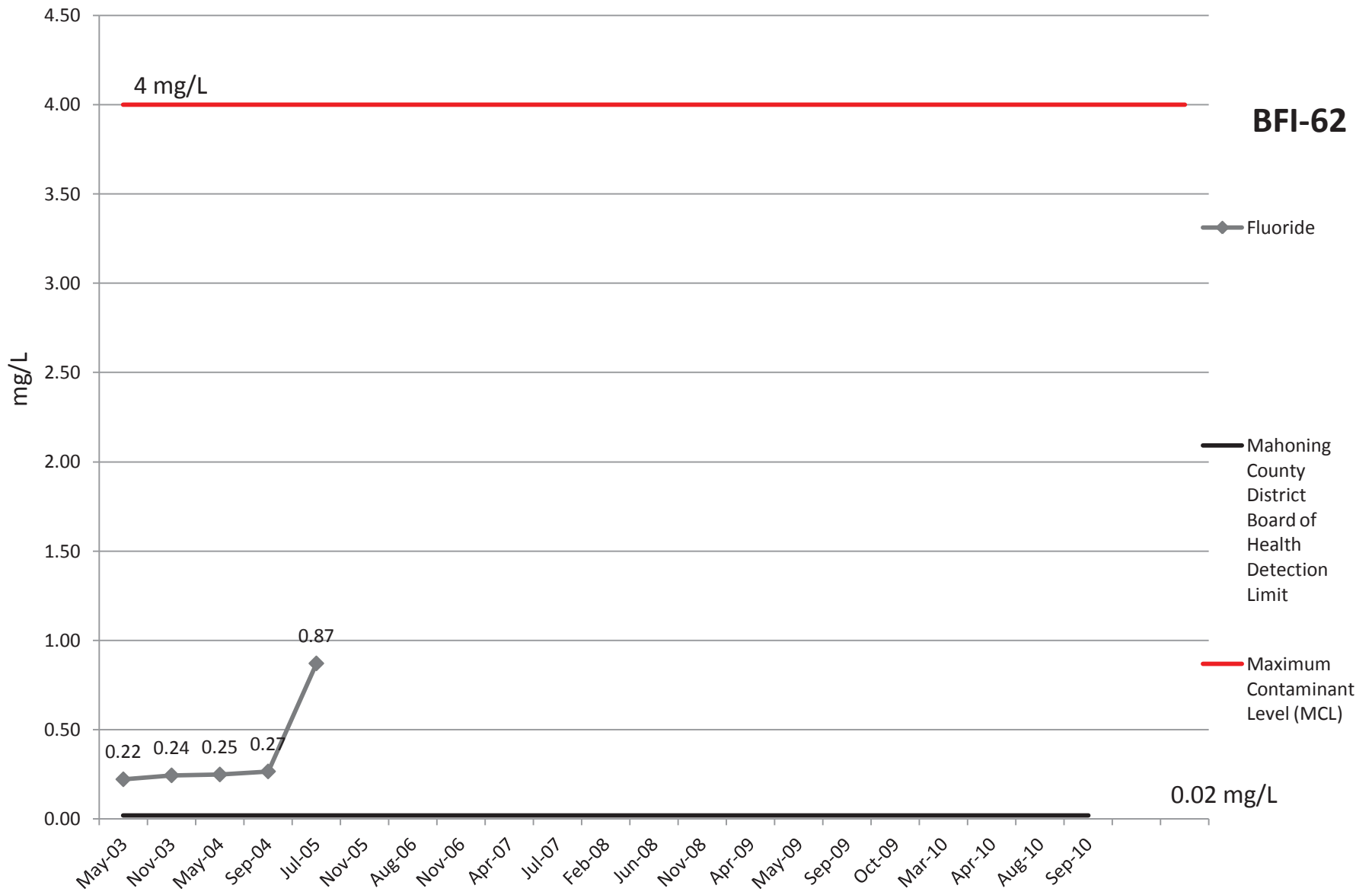


# Conductivity

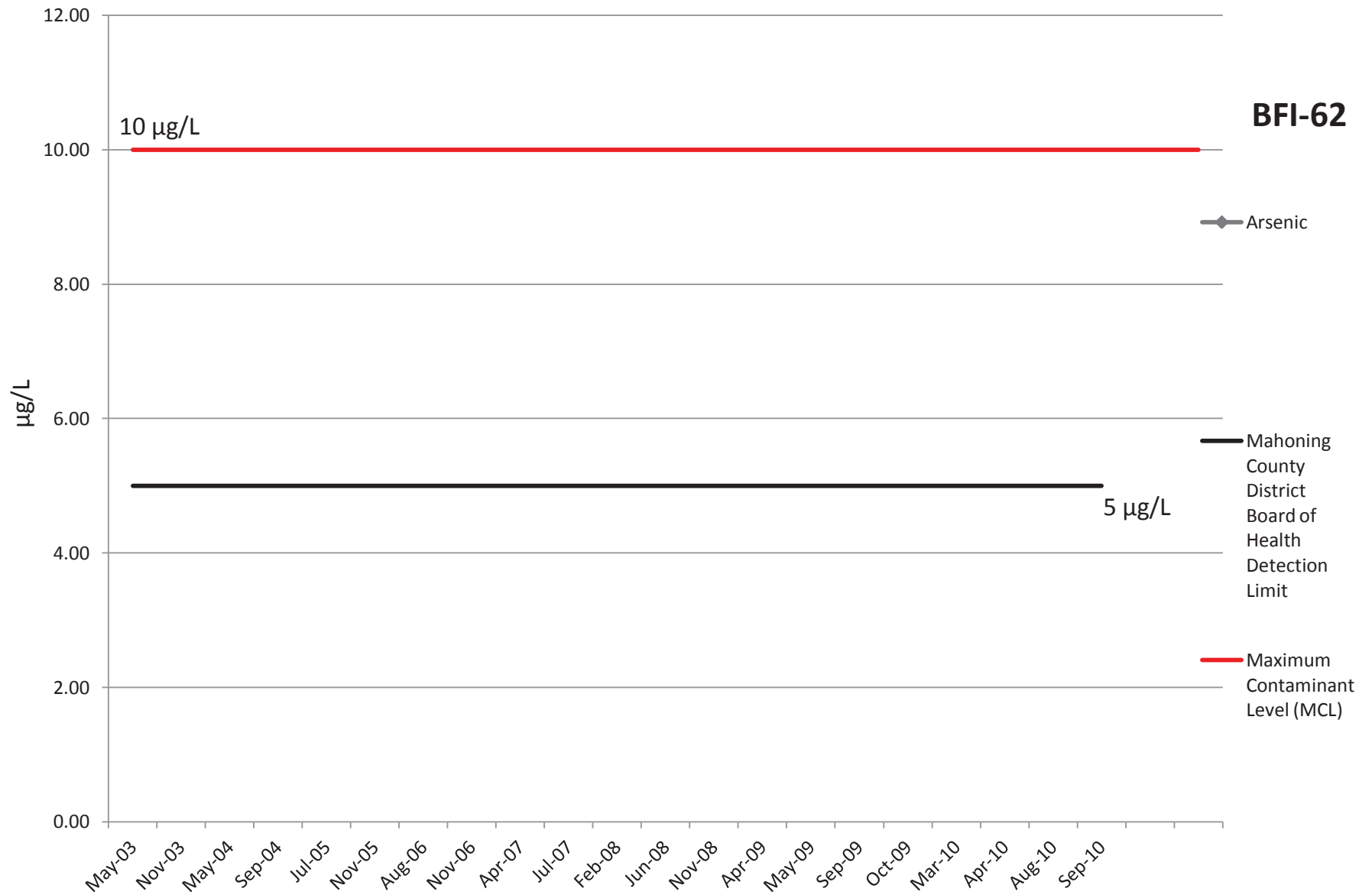
**BFI-62**



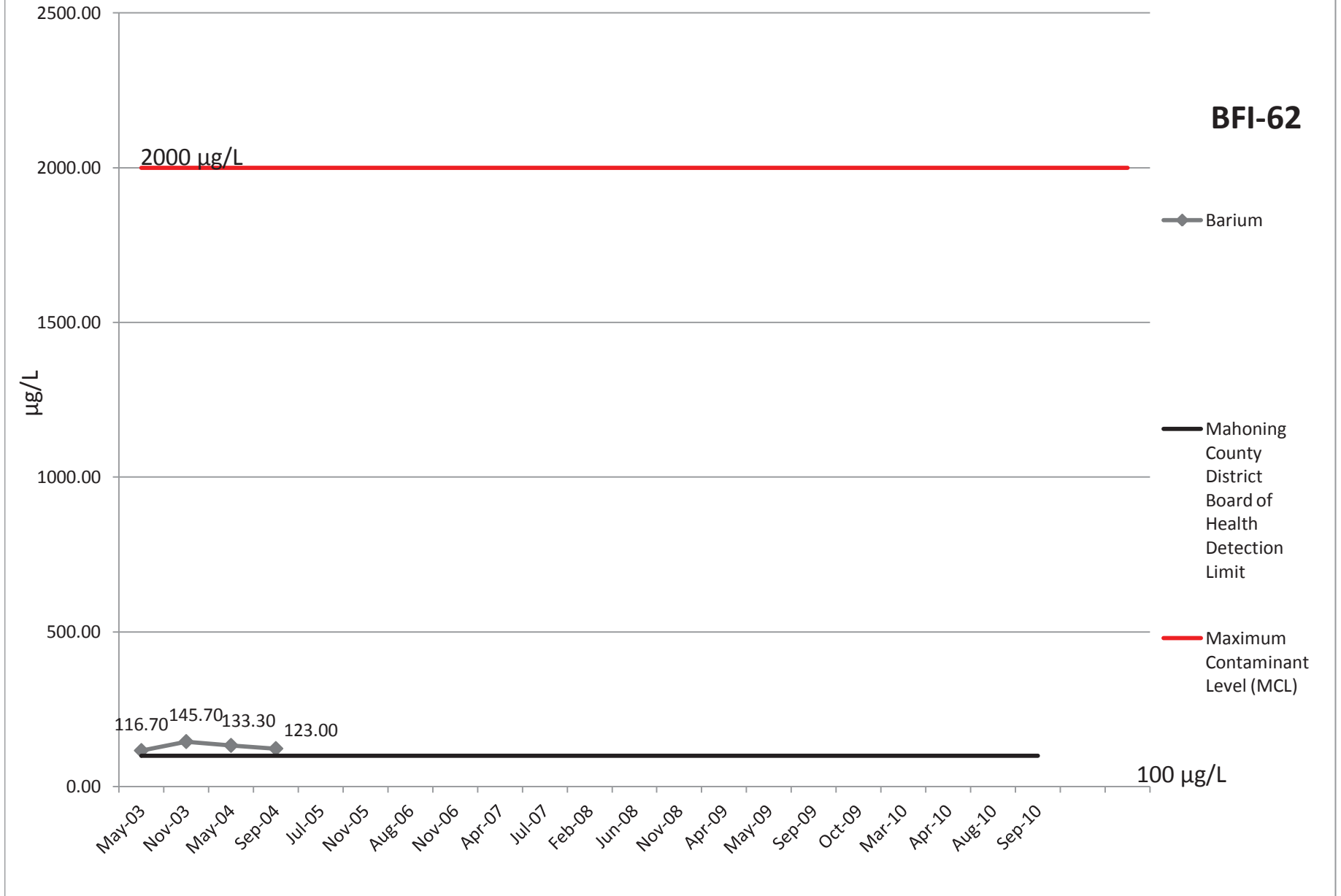
# Fluoride



# Arsenic



# Barium





# Cadmium

**BFI-62**

10 µg/L

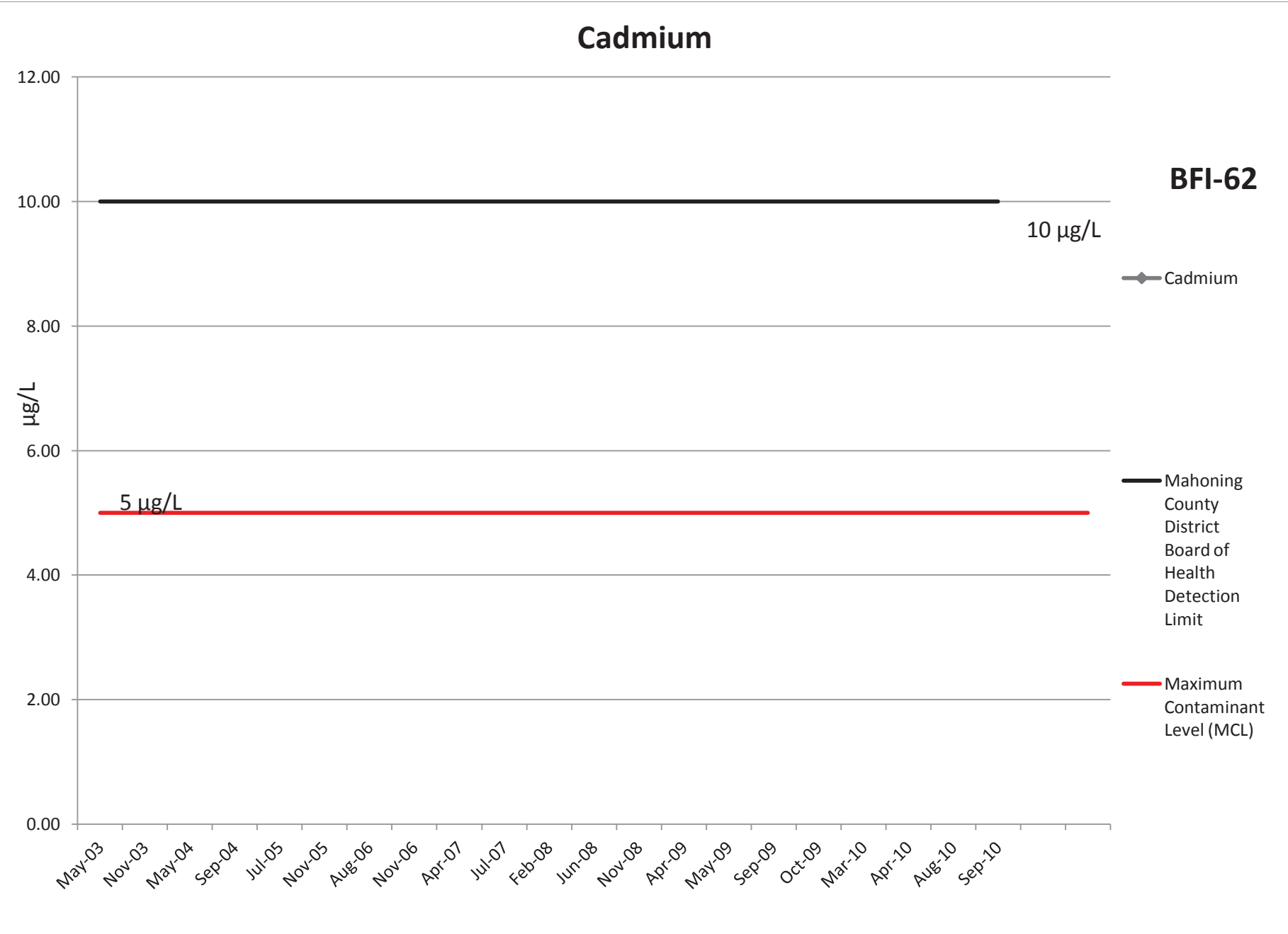
12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

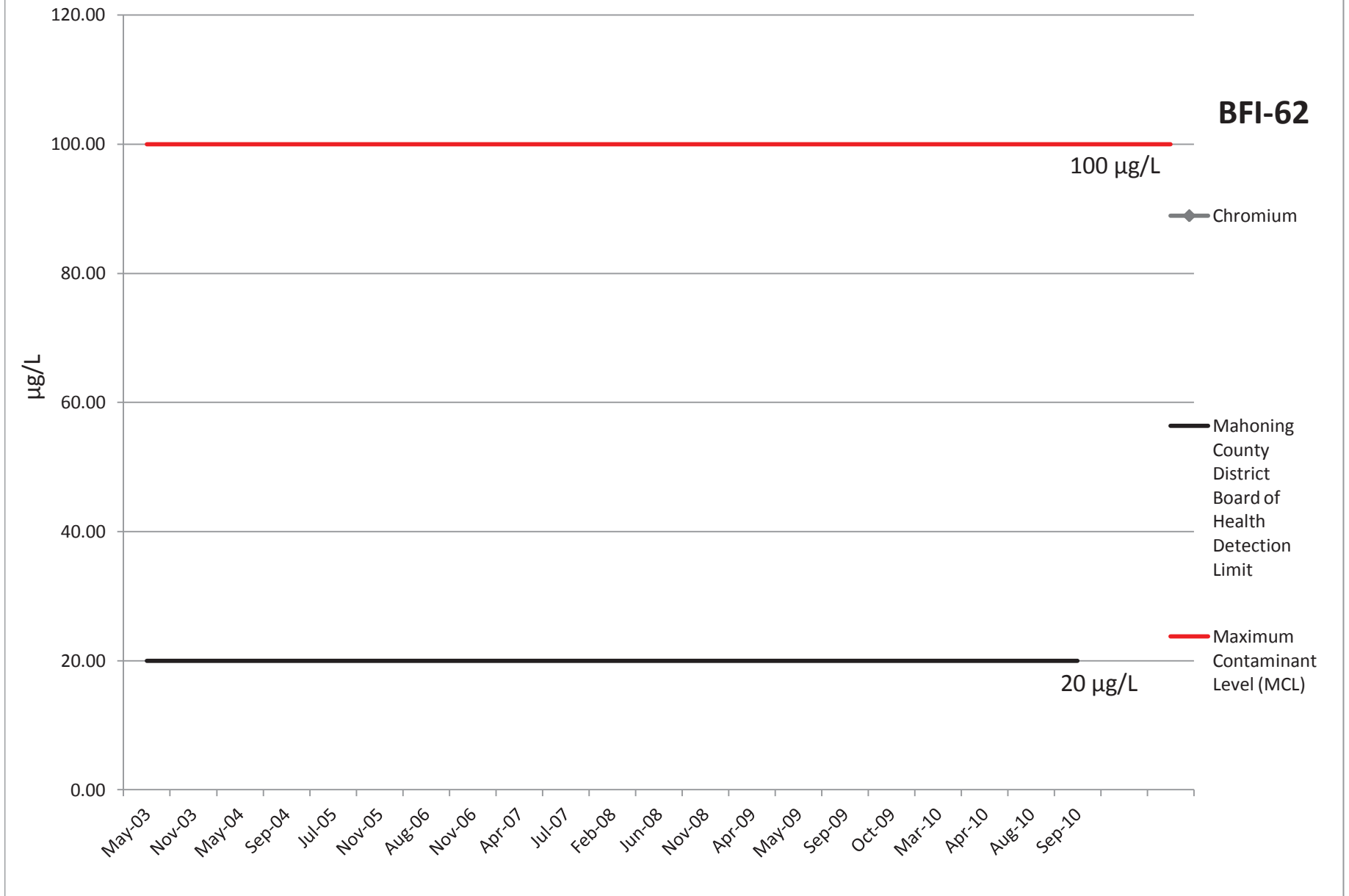
5 µg/L

- ◆ Cadmium
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

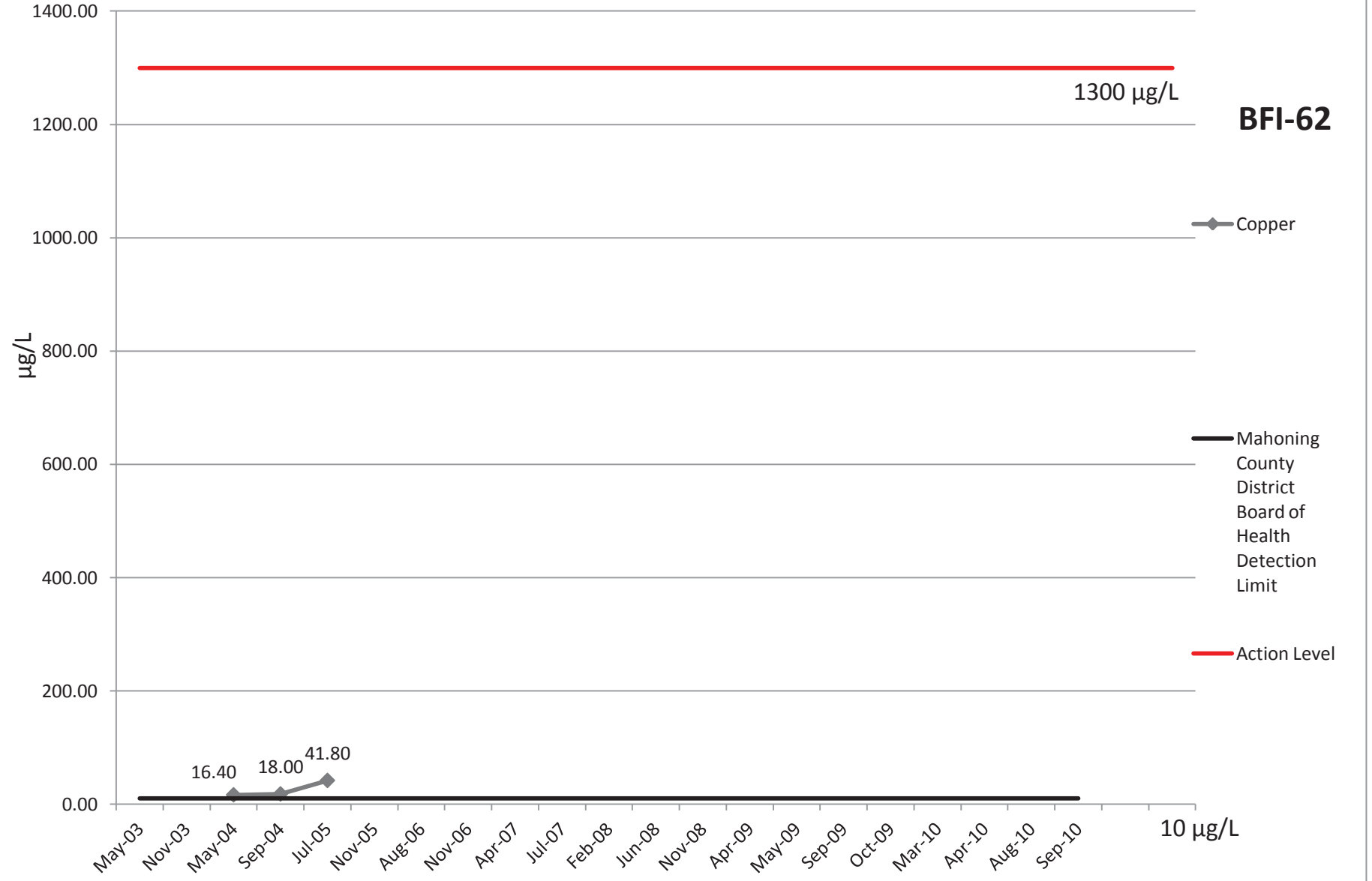
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# Chromium

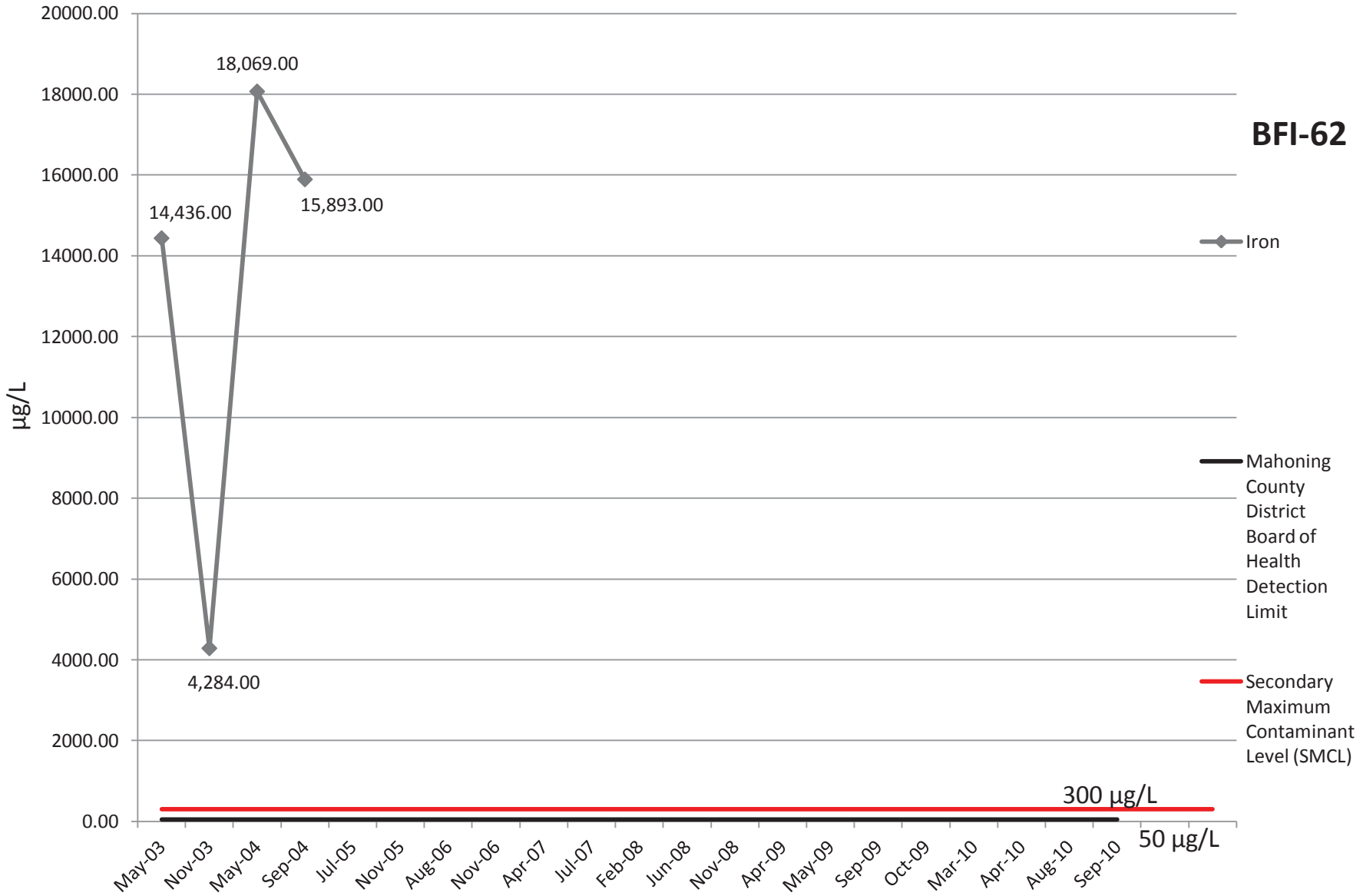


# Copper



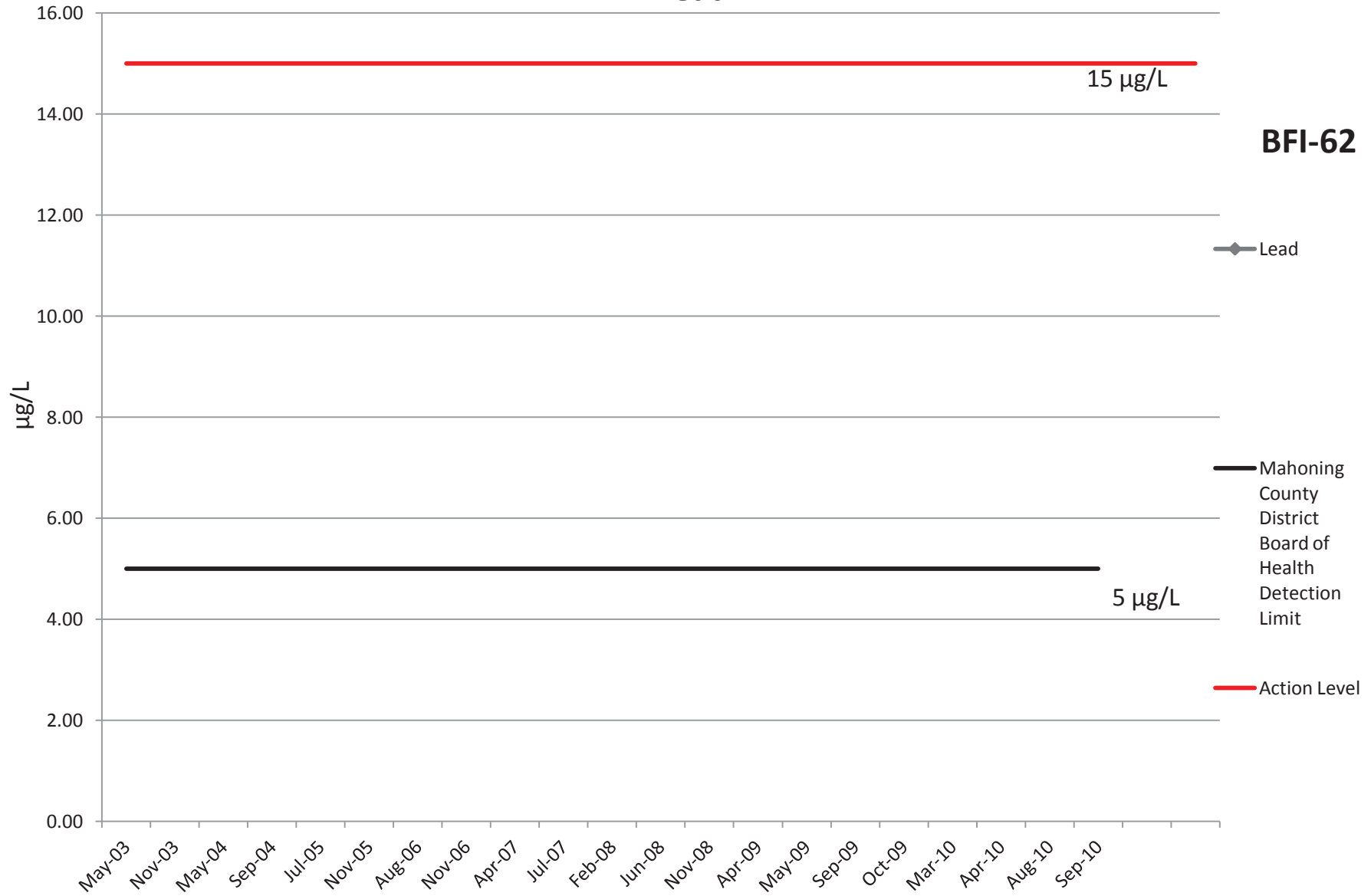
# Iron

**BFI-62**



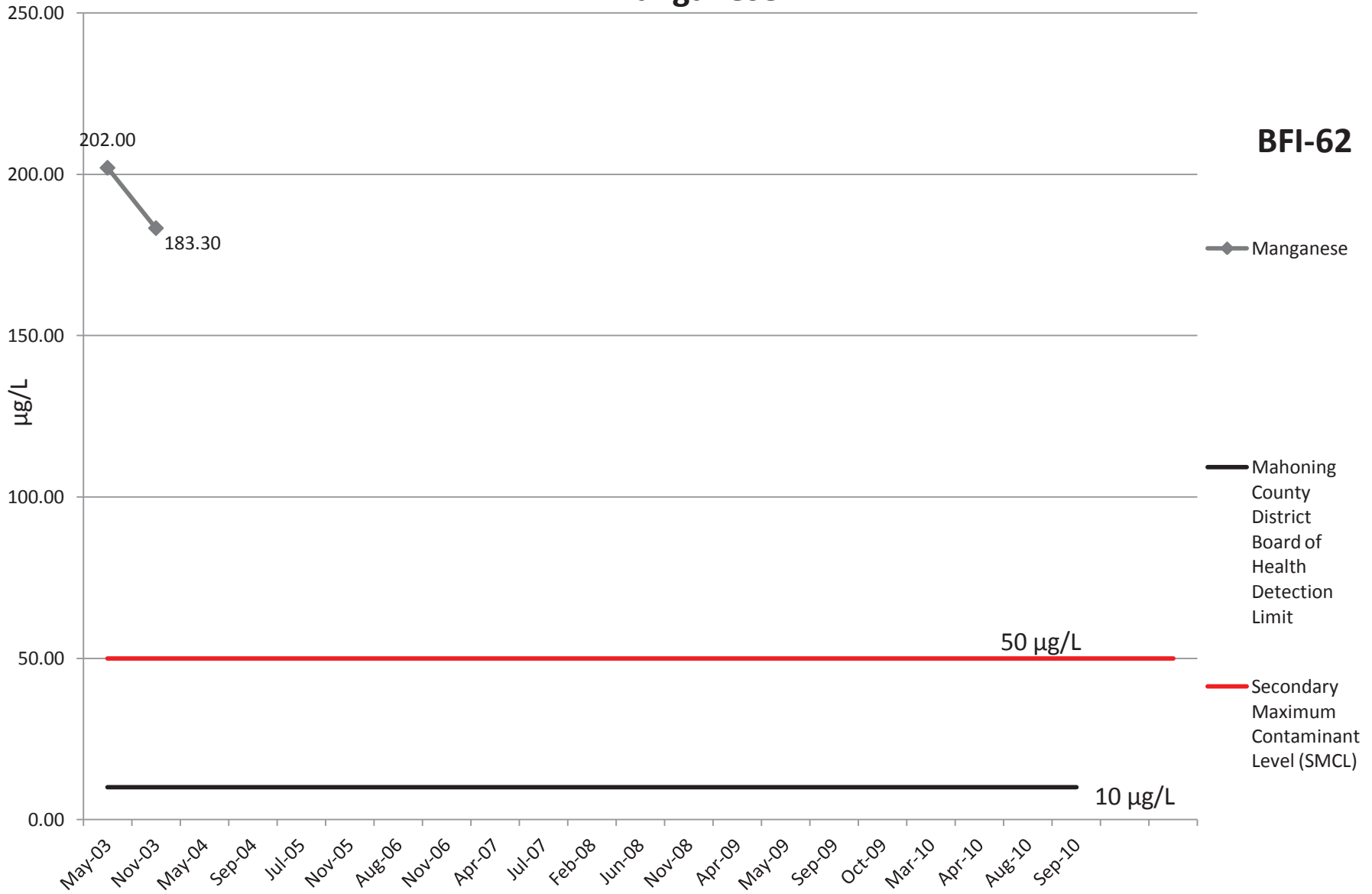
# Lead

**BFI-62**



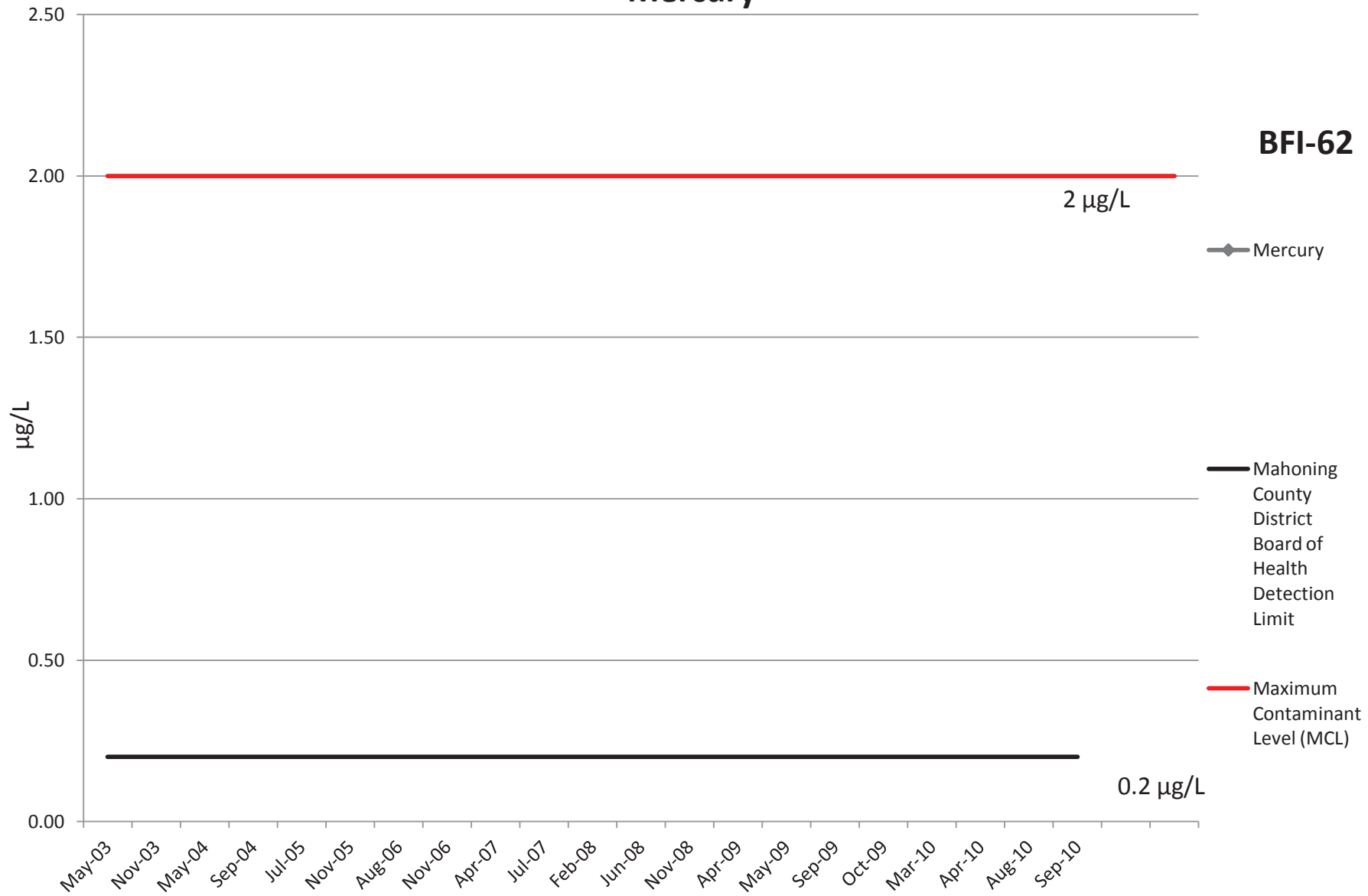
# Manganese

**BFI-62**

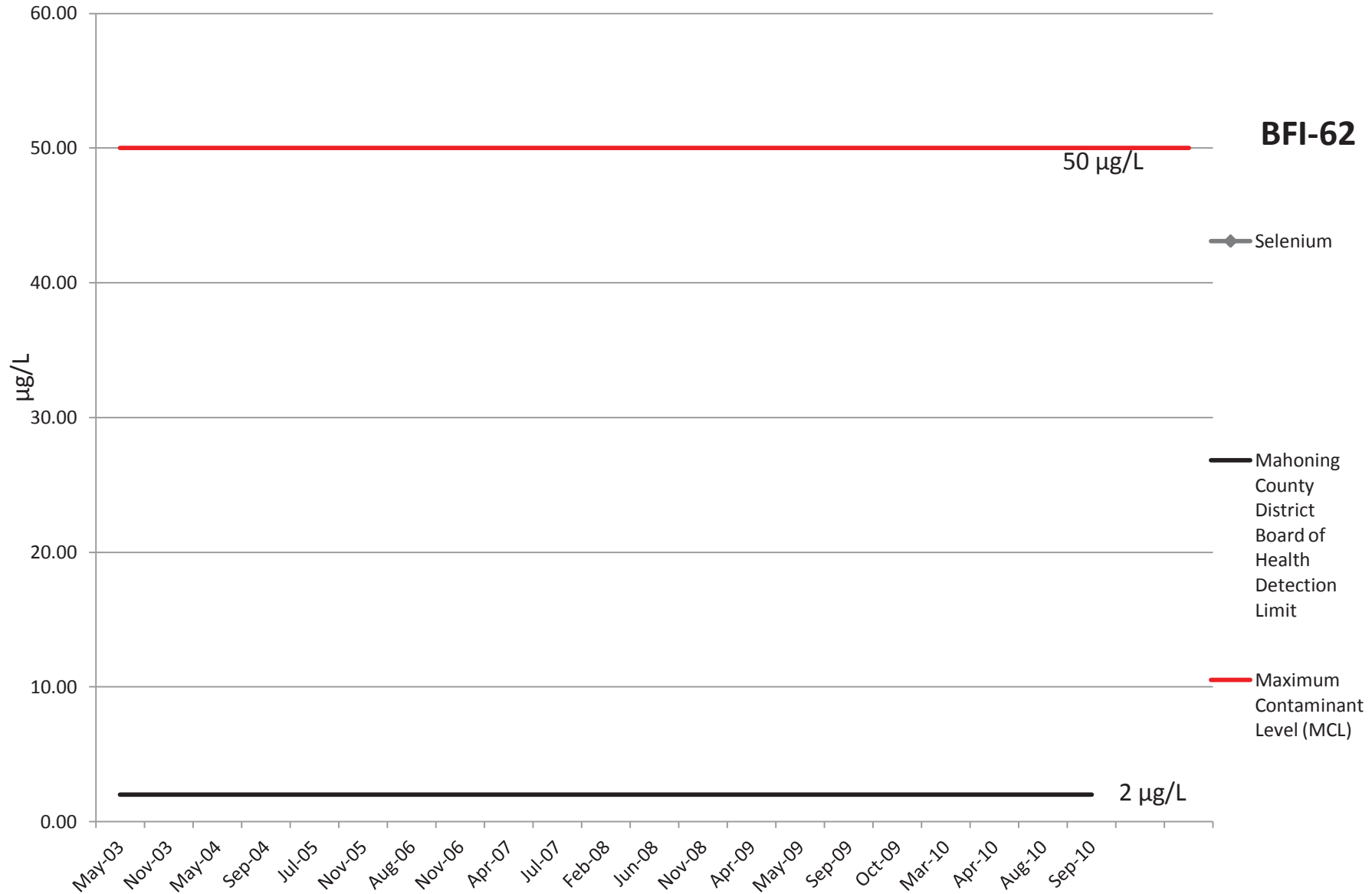


# Mercury

**BFI-62**



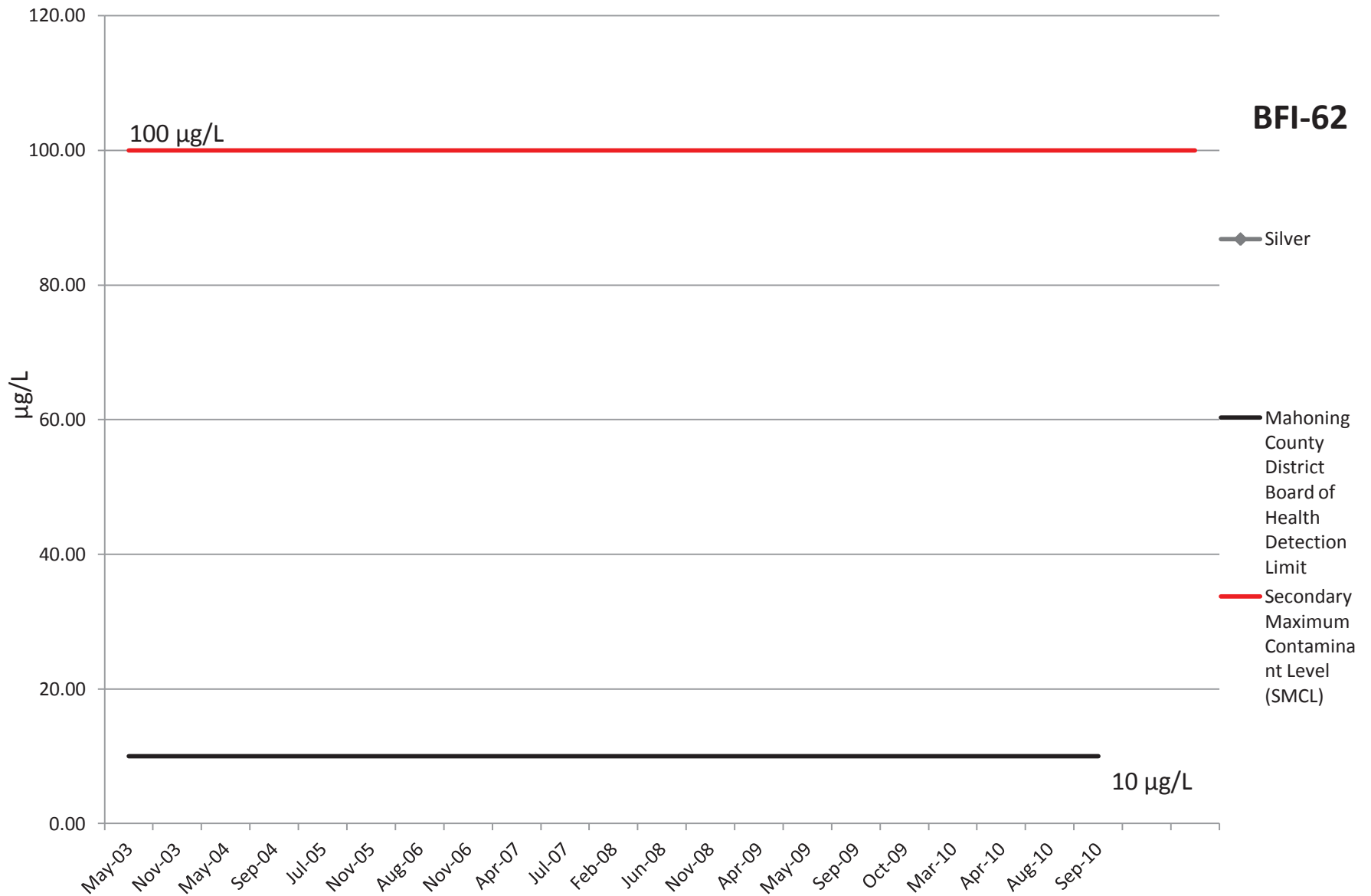
# Selenium



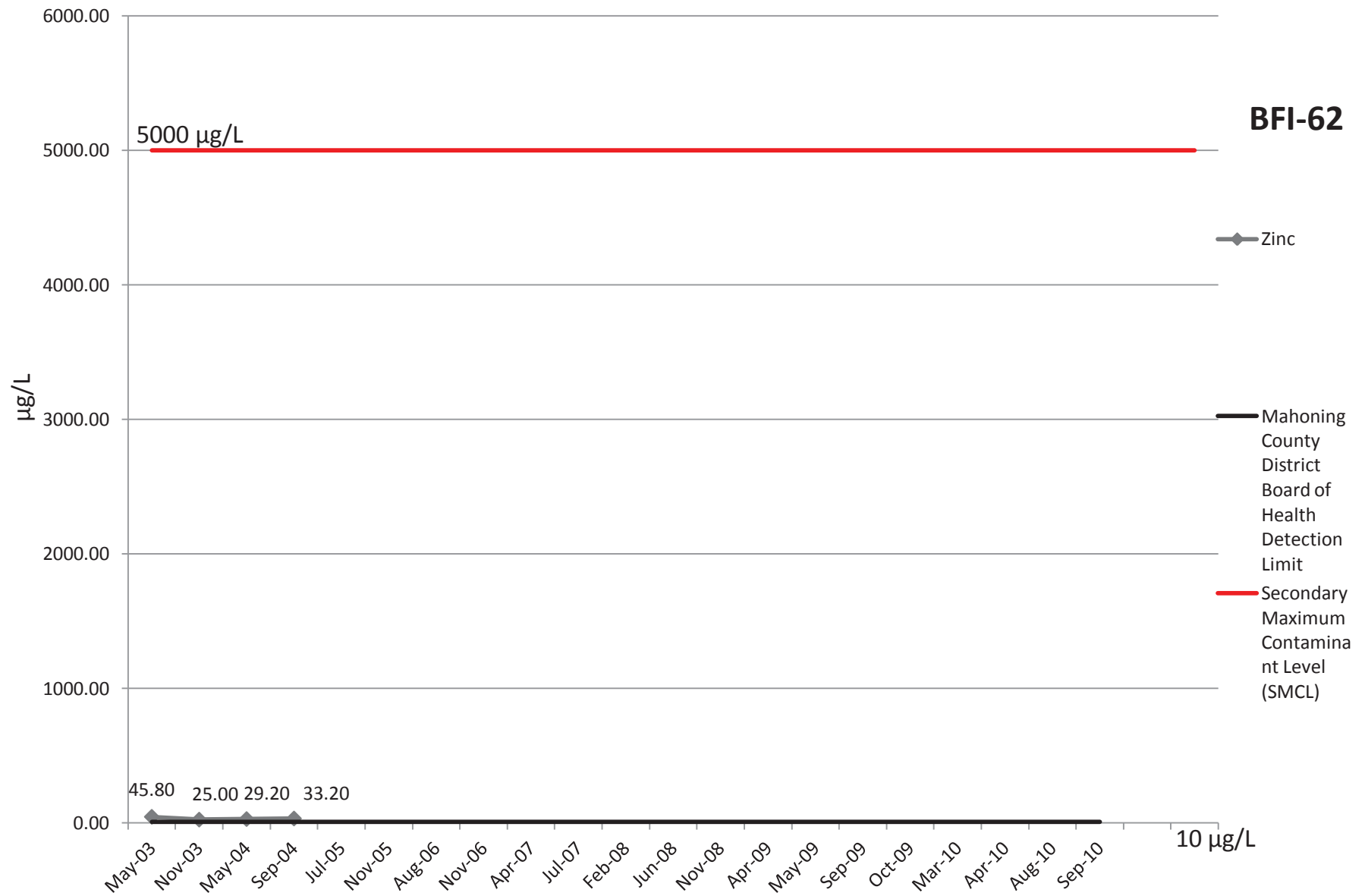


# Silver

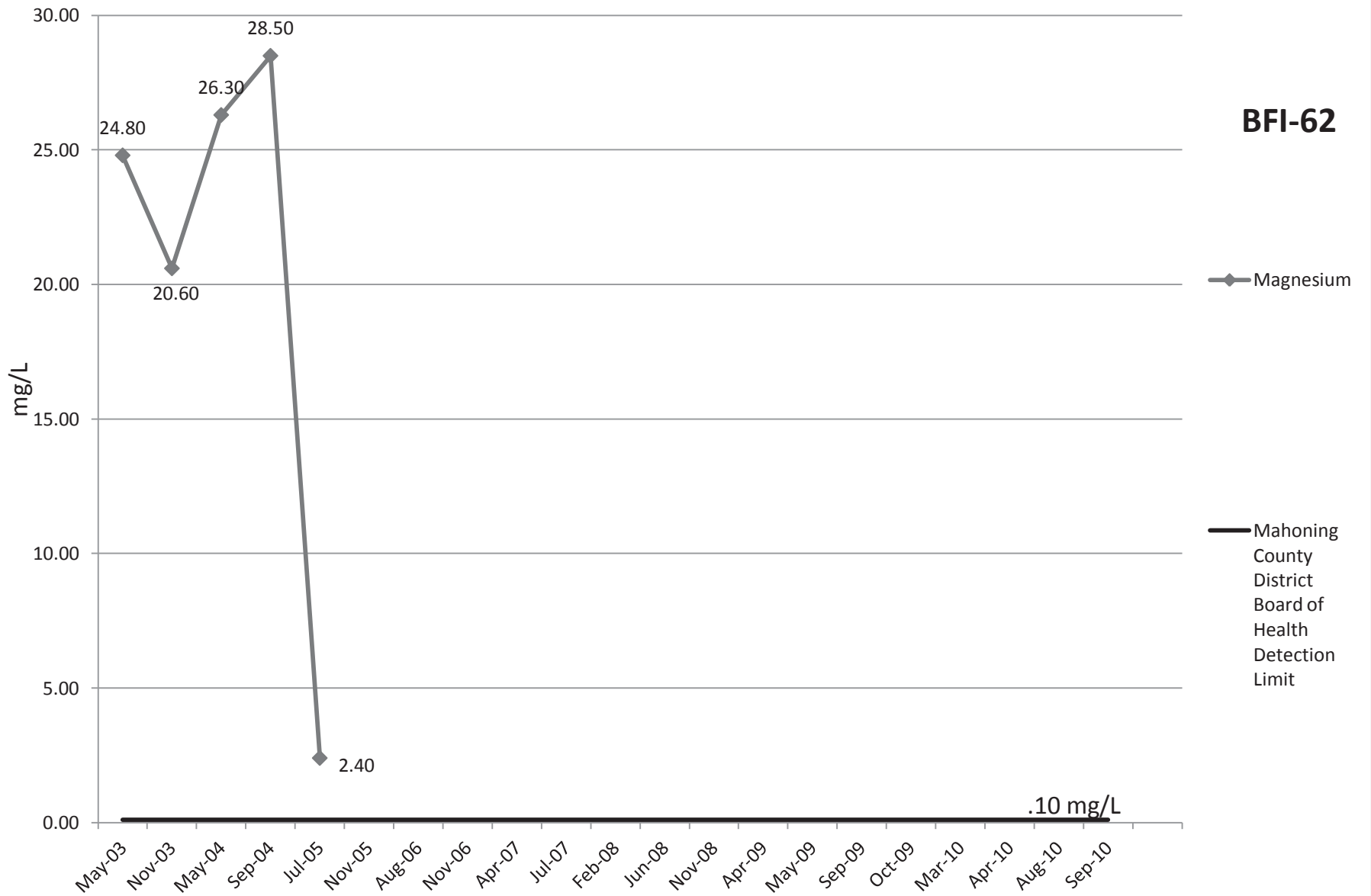
**BFI-62**



# Zinc



# Magnesium

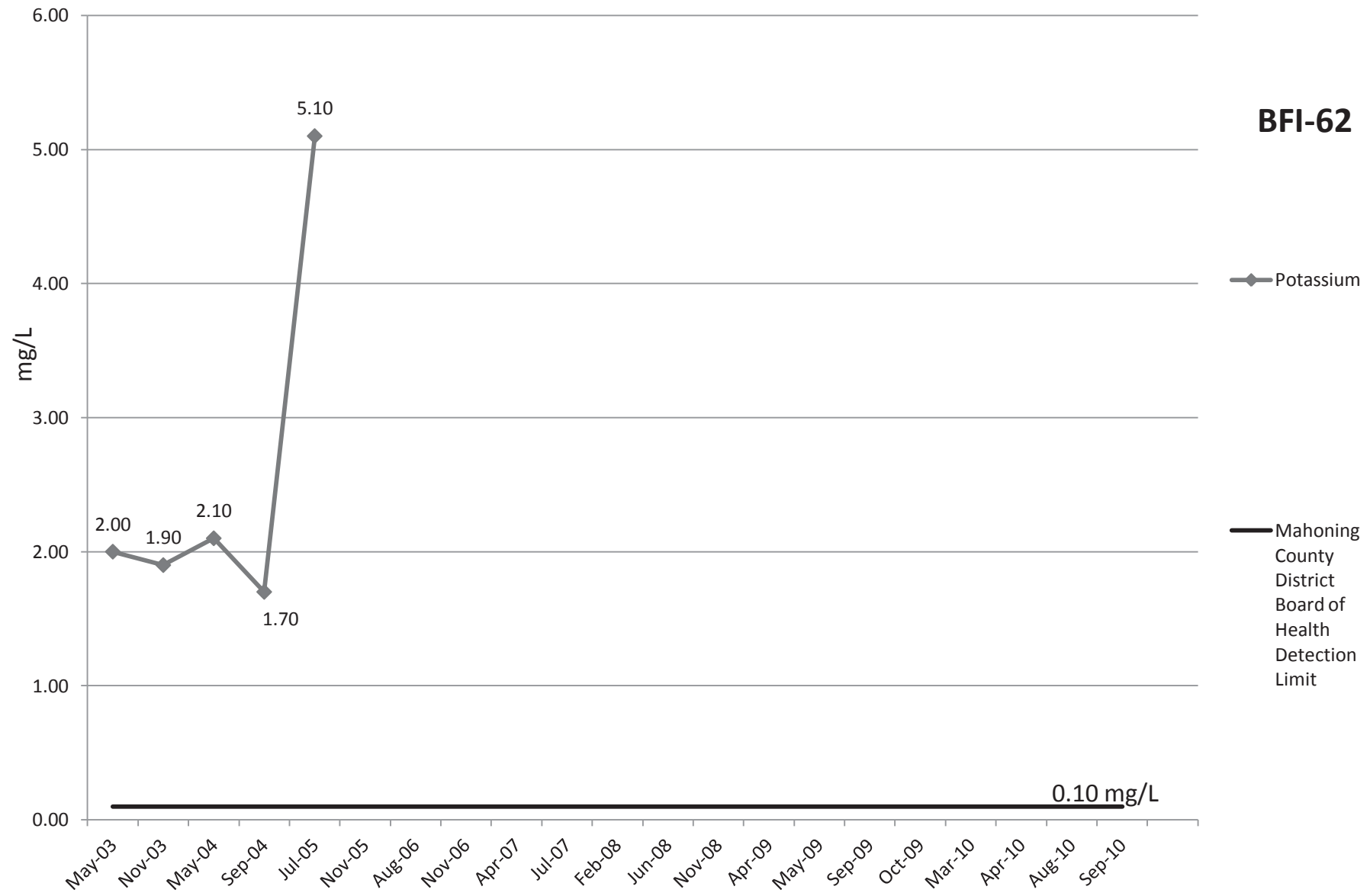


**BFI-62**

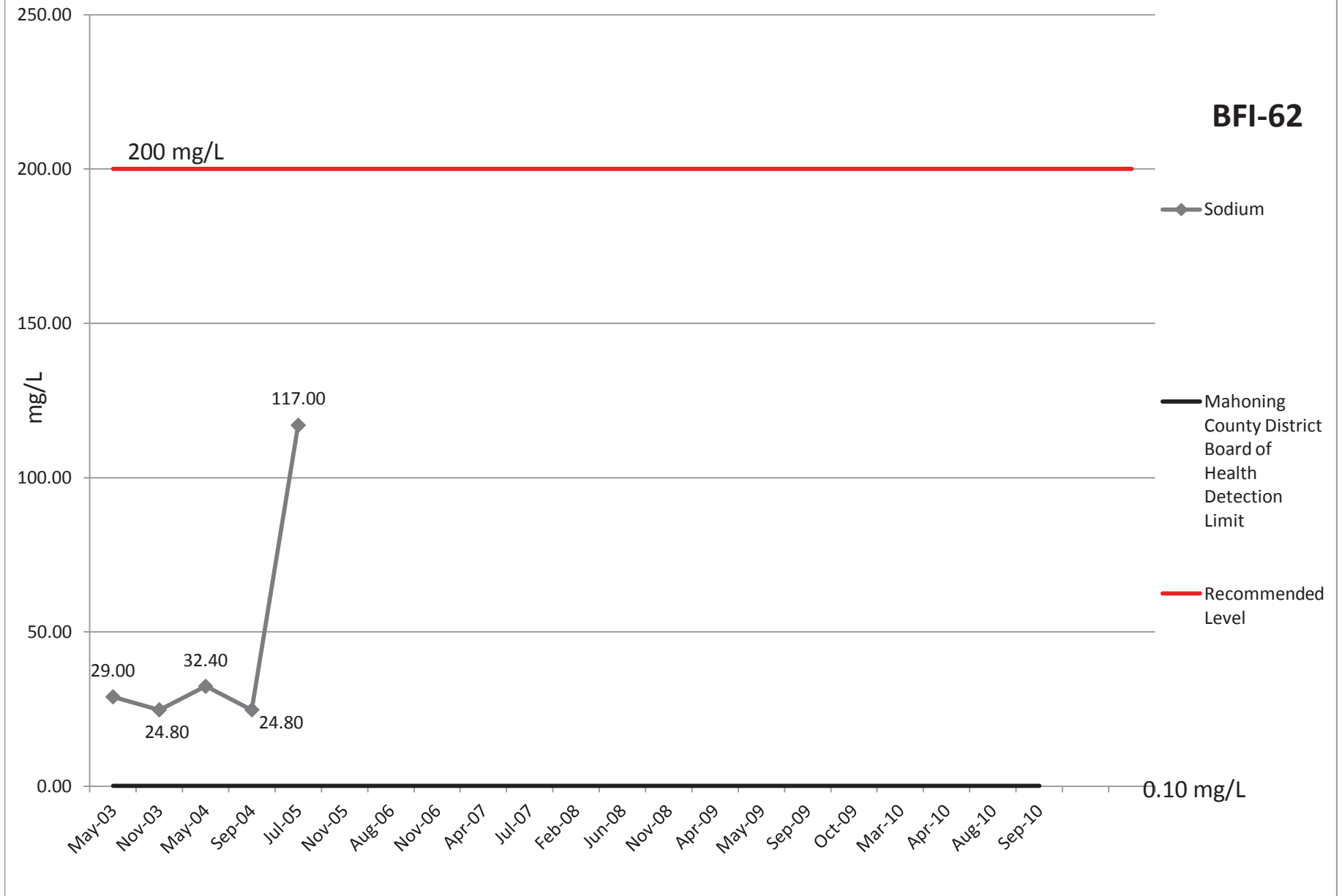
◆ Magnesium

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

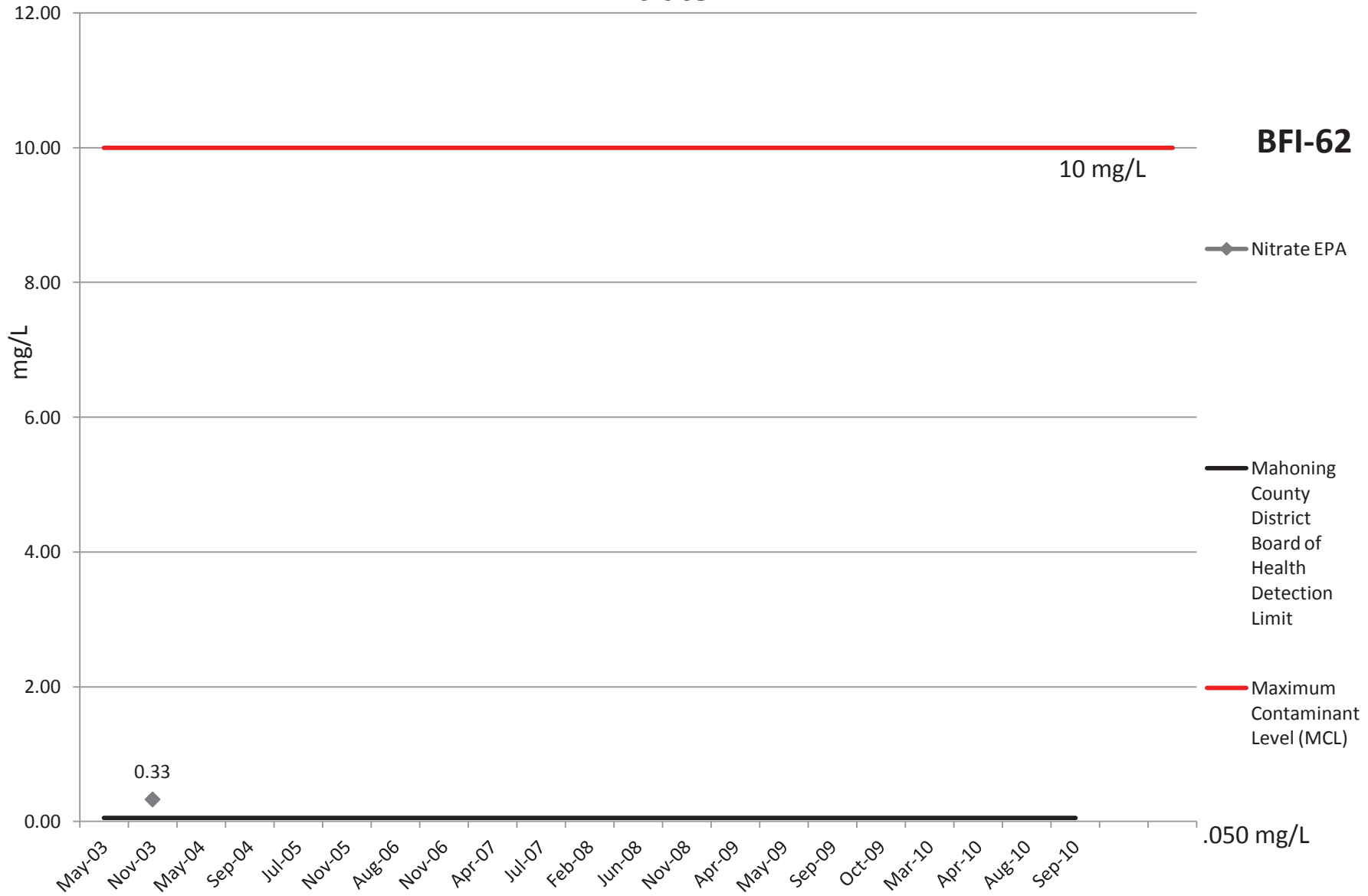
# Potassium



# Sodium

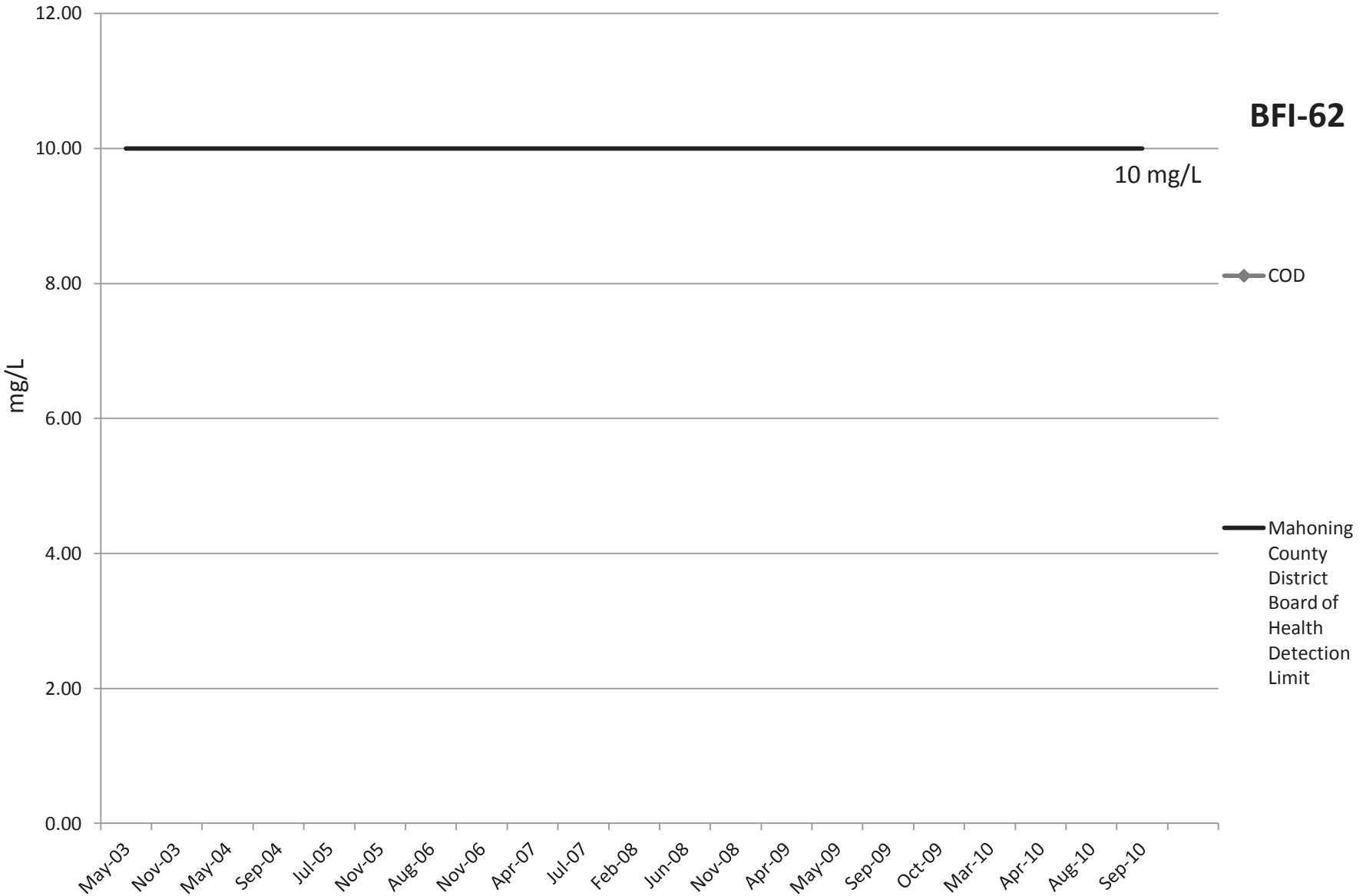


# Nitrate EPA

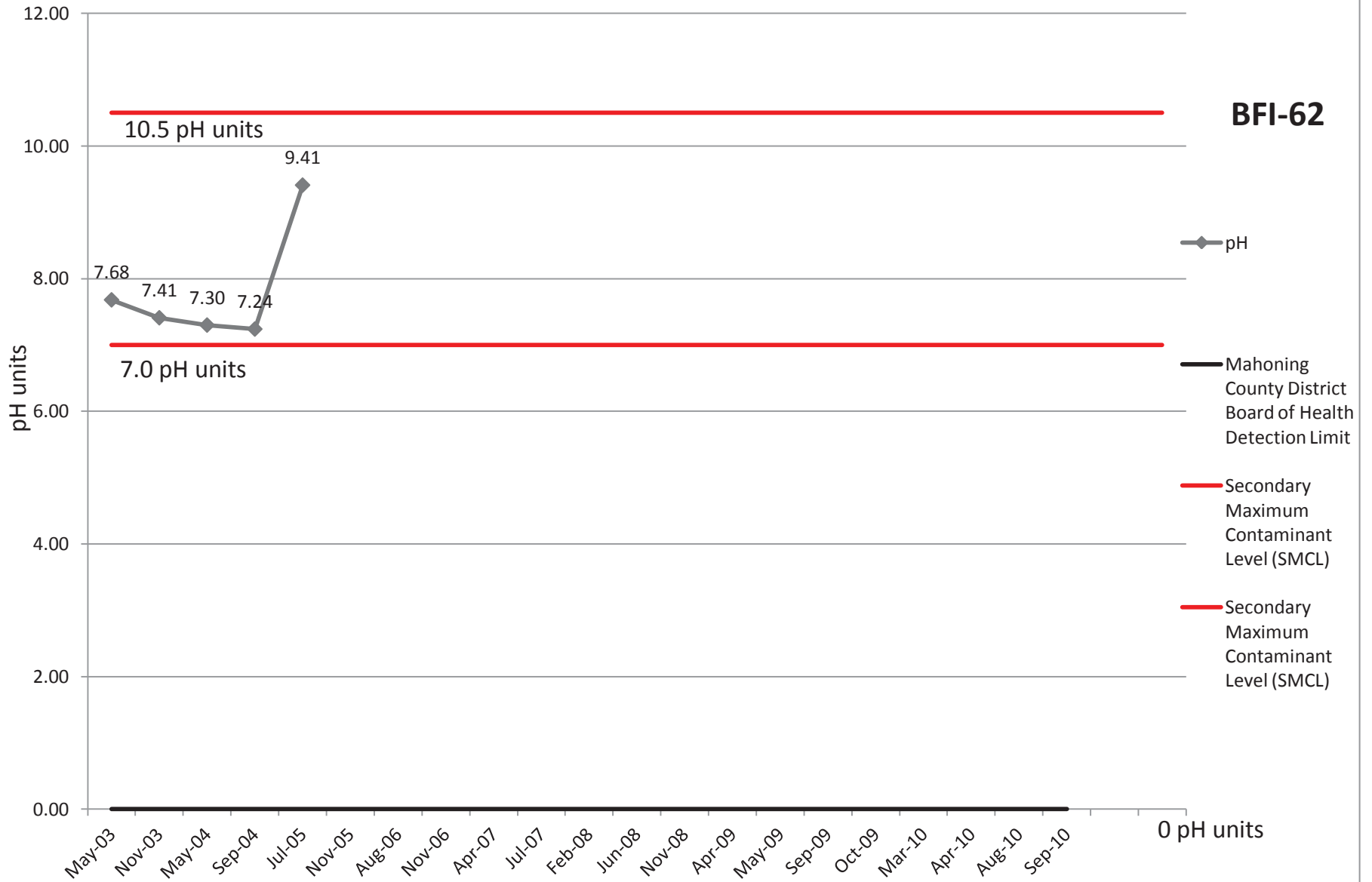


# COD

**BFI-62**



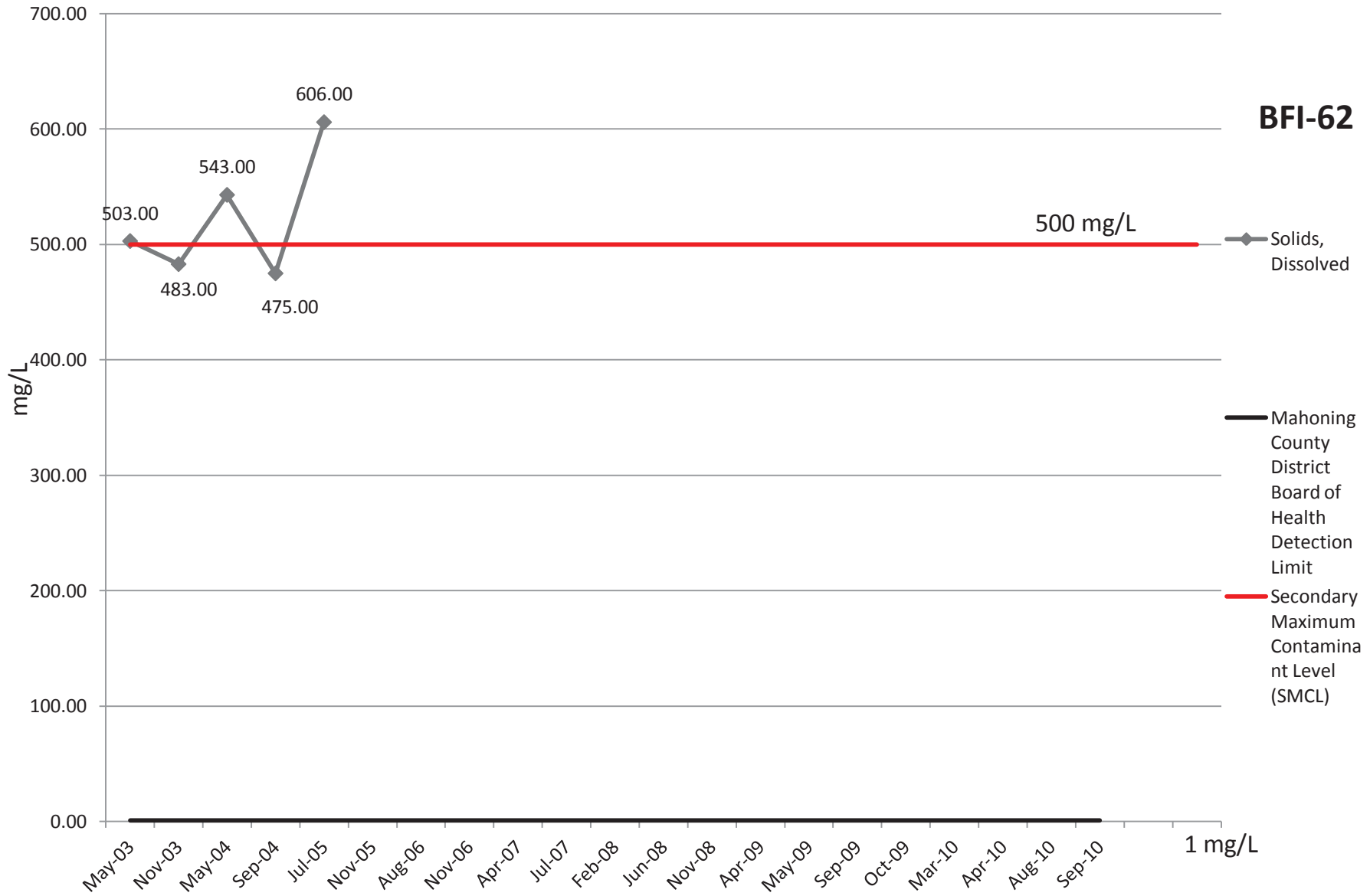
# pH



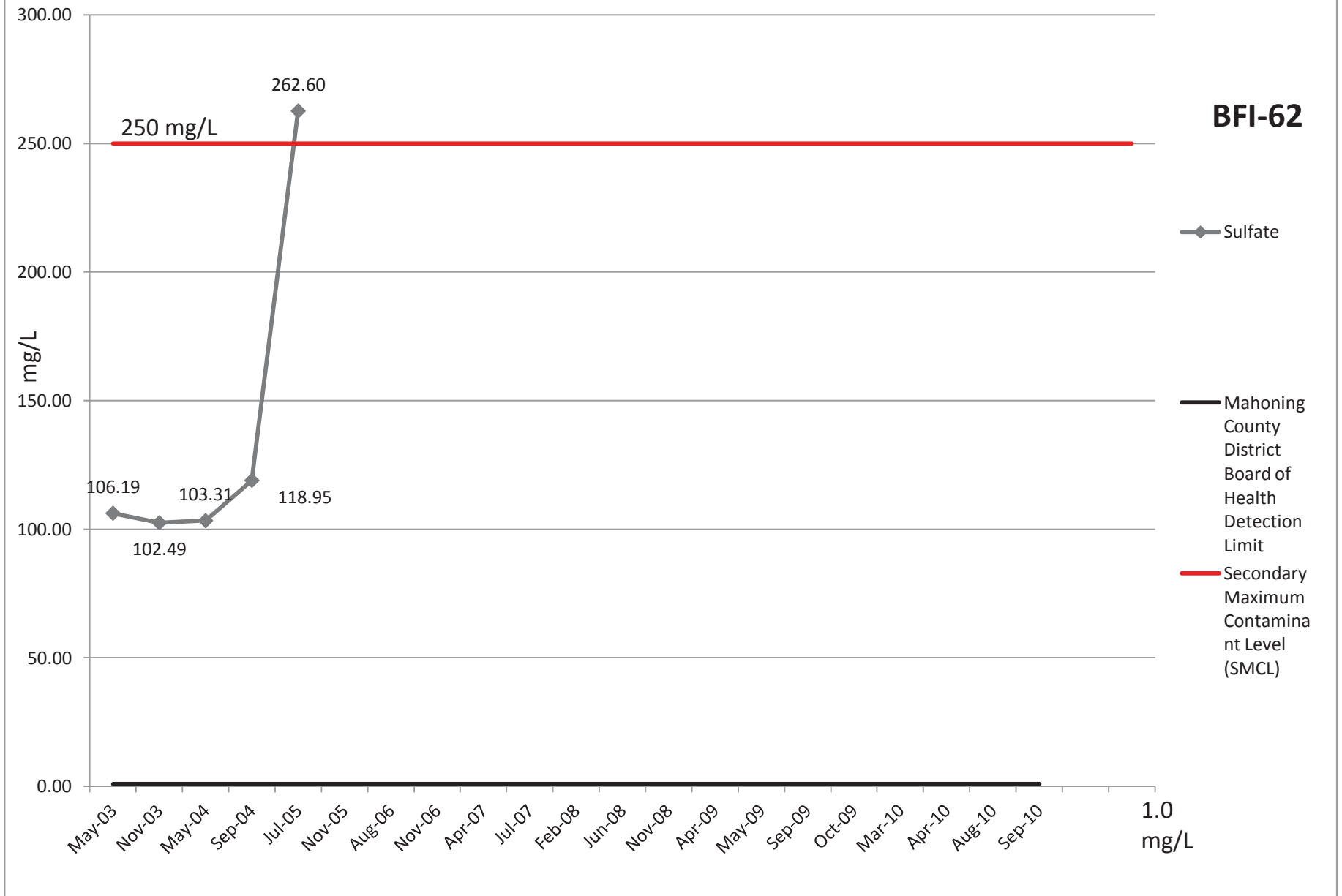


# Solids, Dissolved

**BFI-62**



# Sulfate



# Bacteria

positive (1)

**BFI-62**

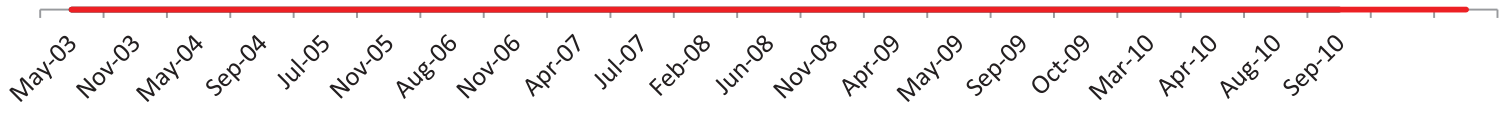
Positive/Negative

◆ Bacteria

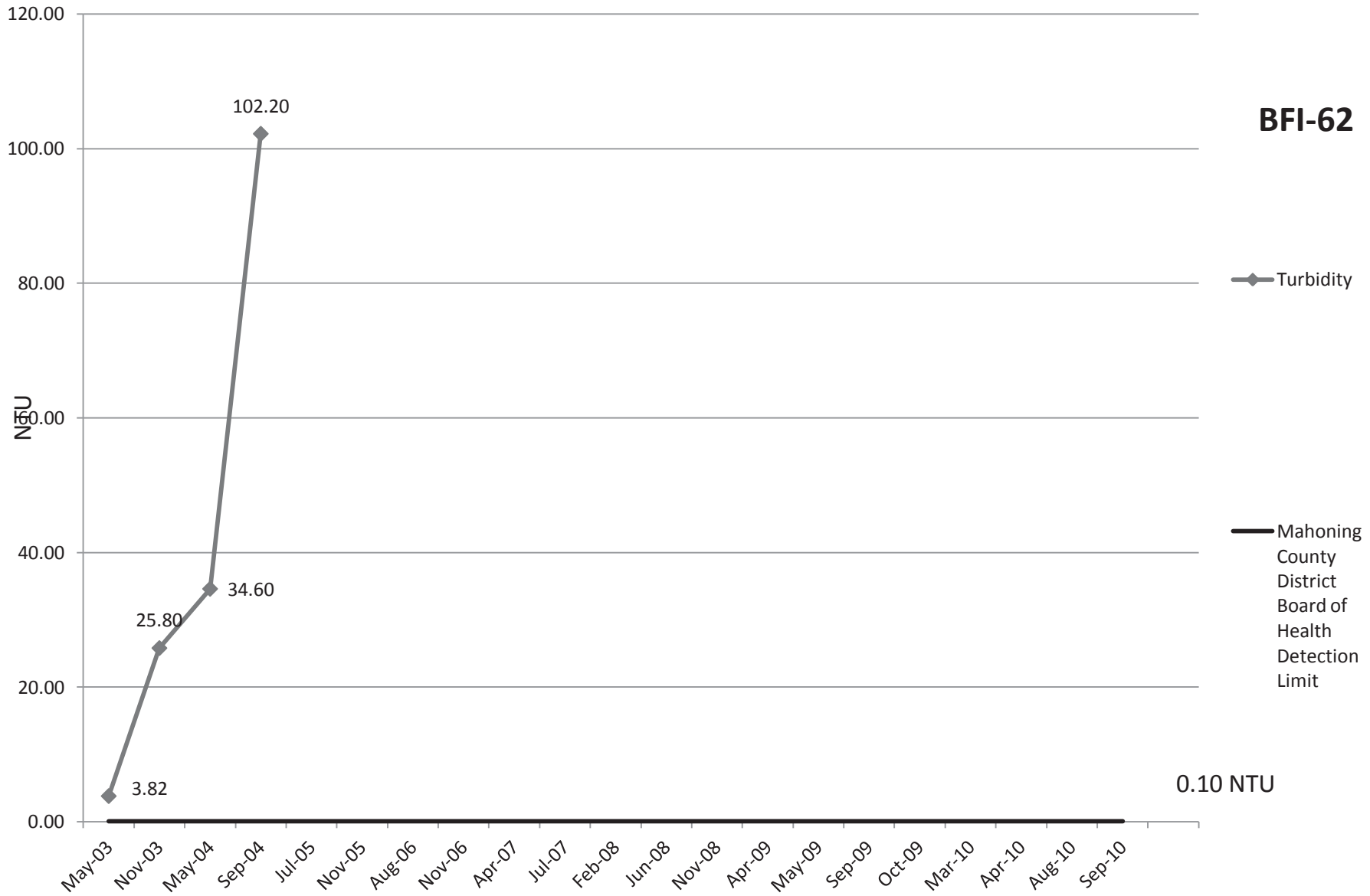
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

negative (0)



# Turbidity



**BFI-62**

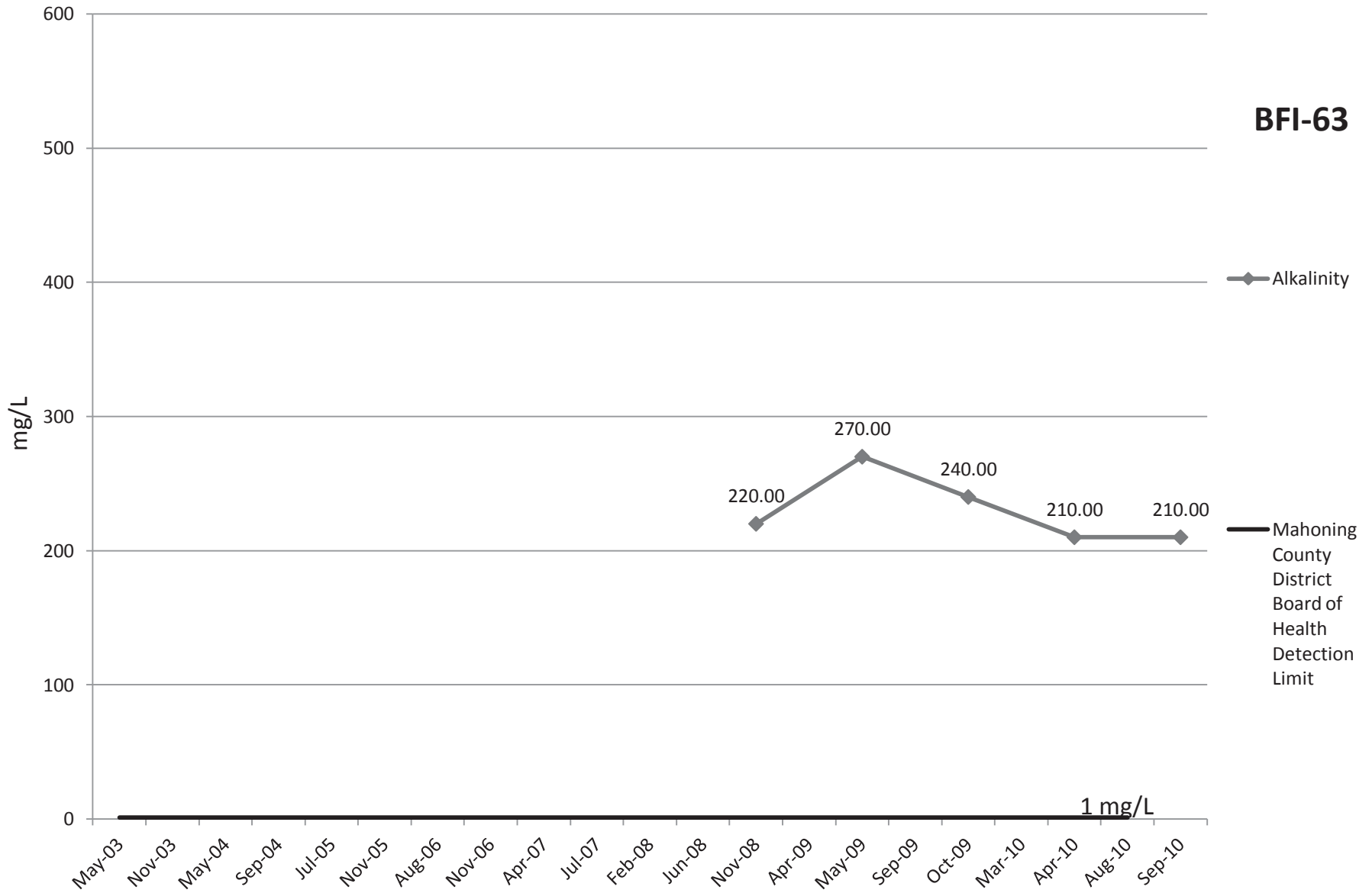
◆ Turbidity

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

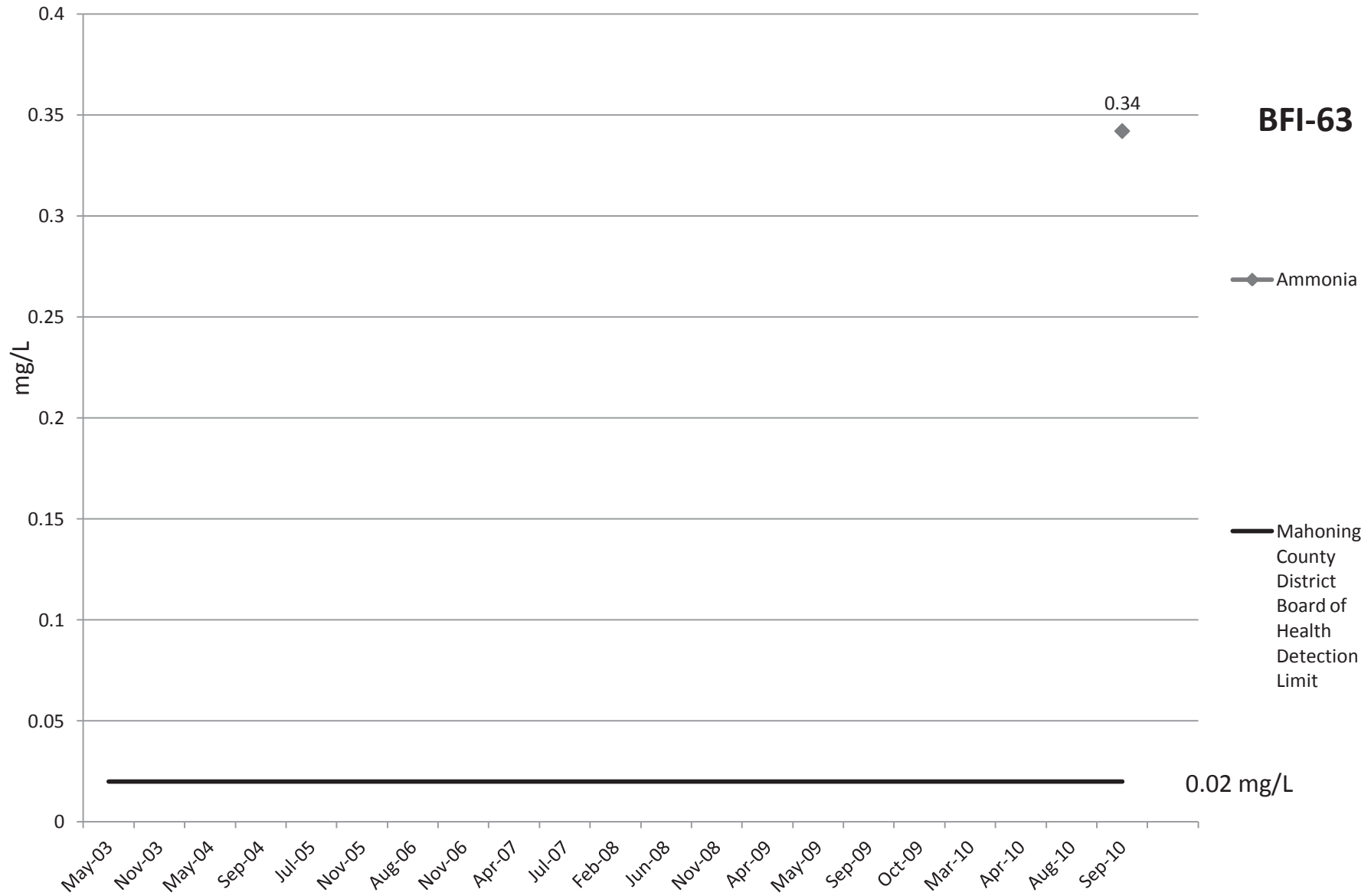
0.10 NTU

# Alkalinity

**BFI-63**



# Ammonia



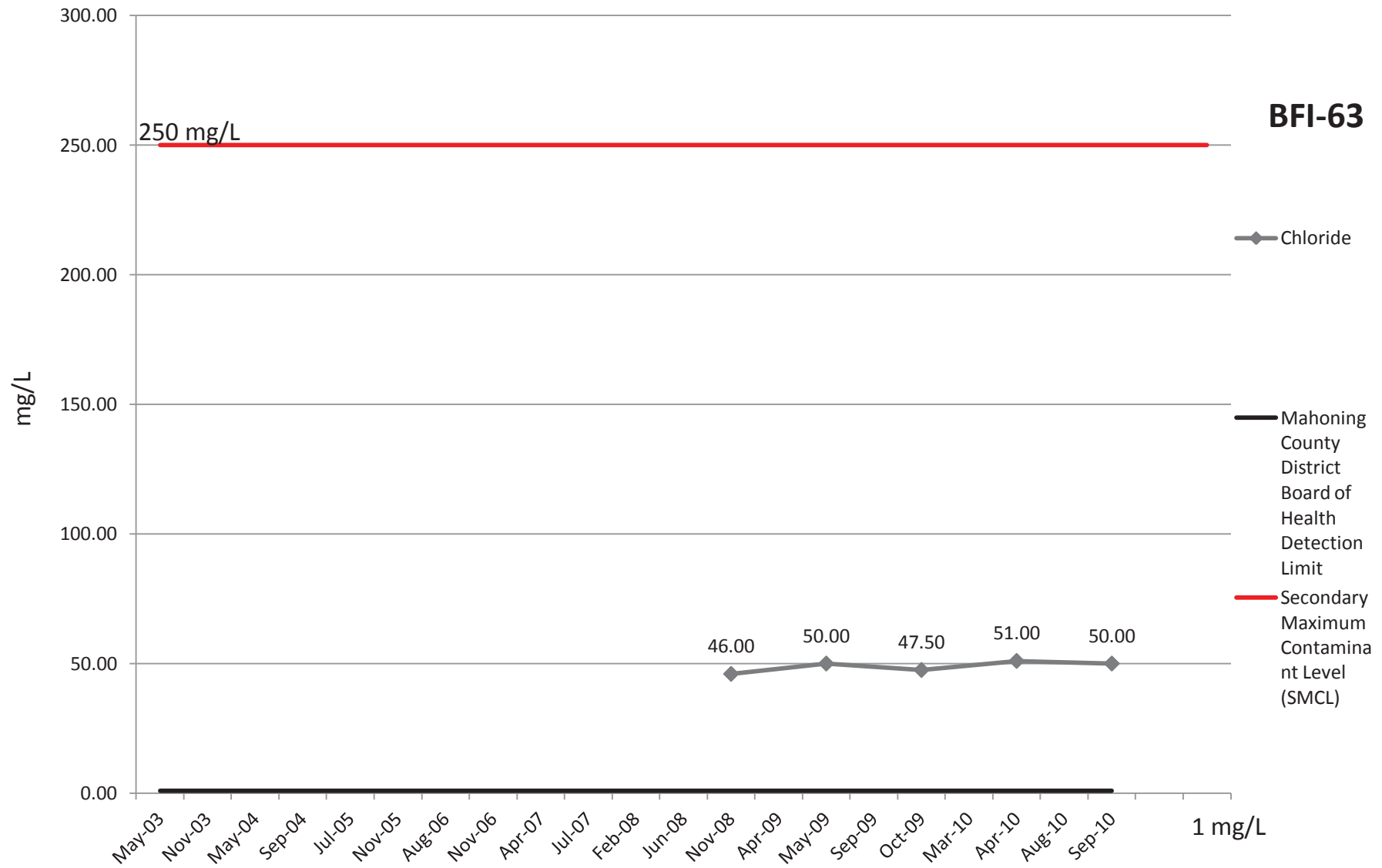
**BFI-63**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

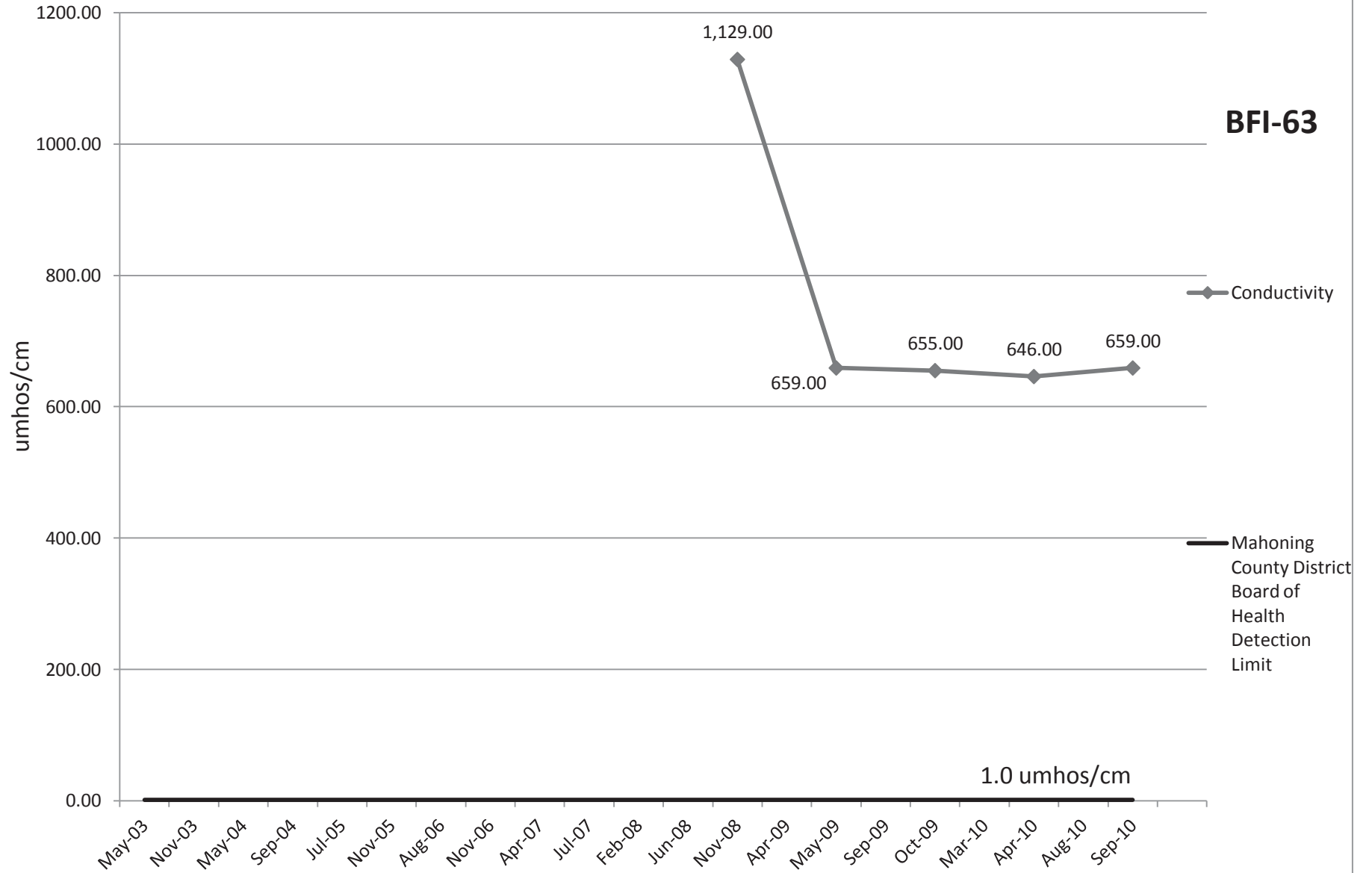
0.02 mg/L

# Chloride



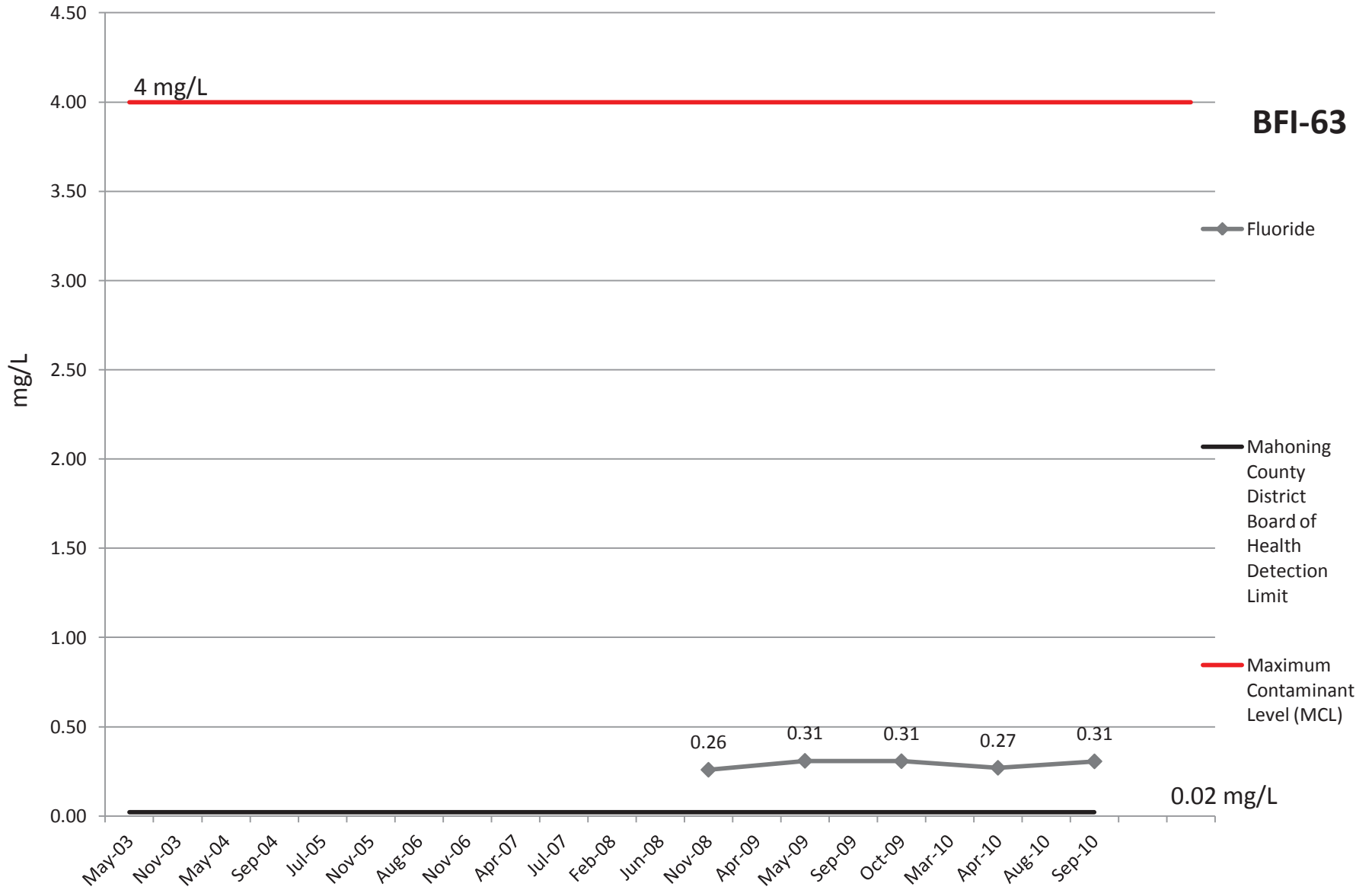
# Conductivity

**BFI-63**

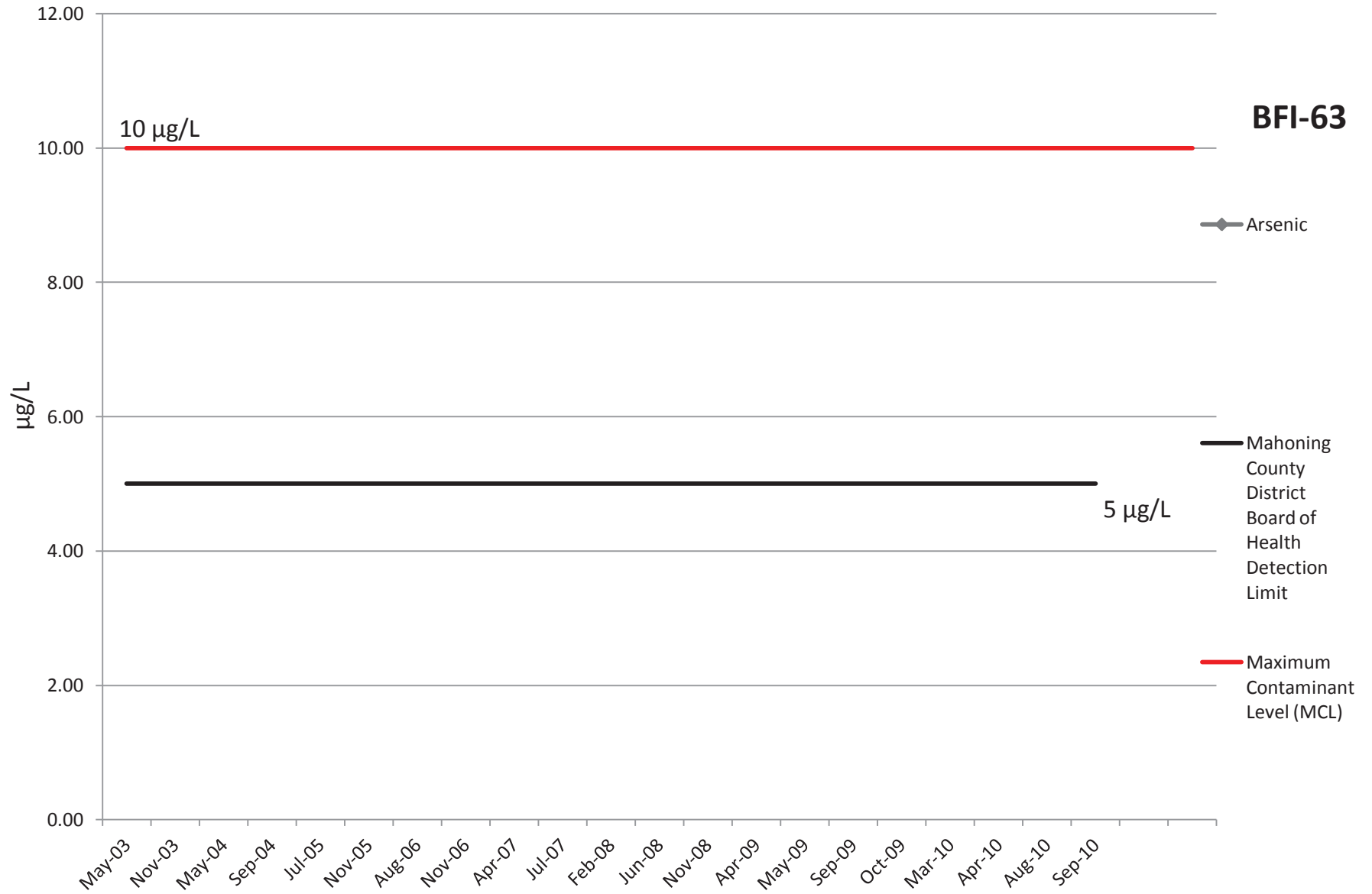




# Fluoride

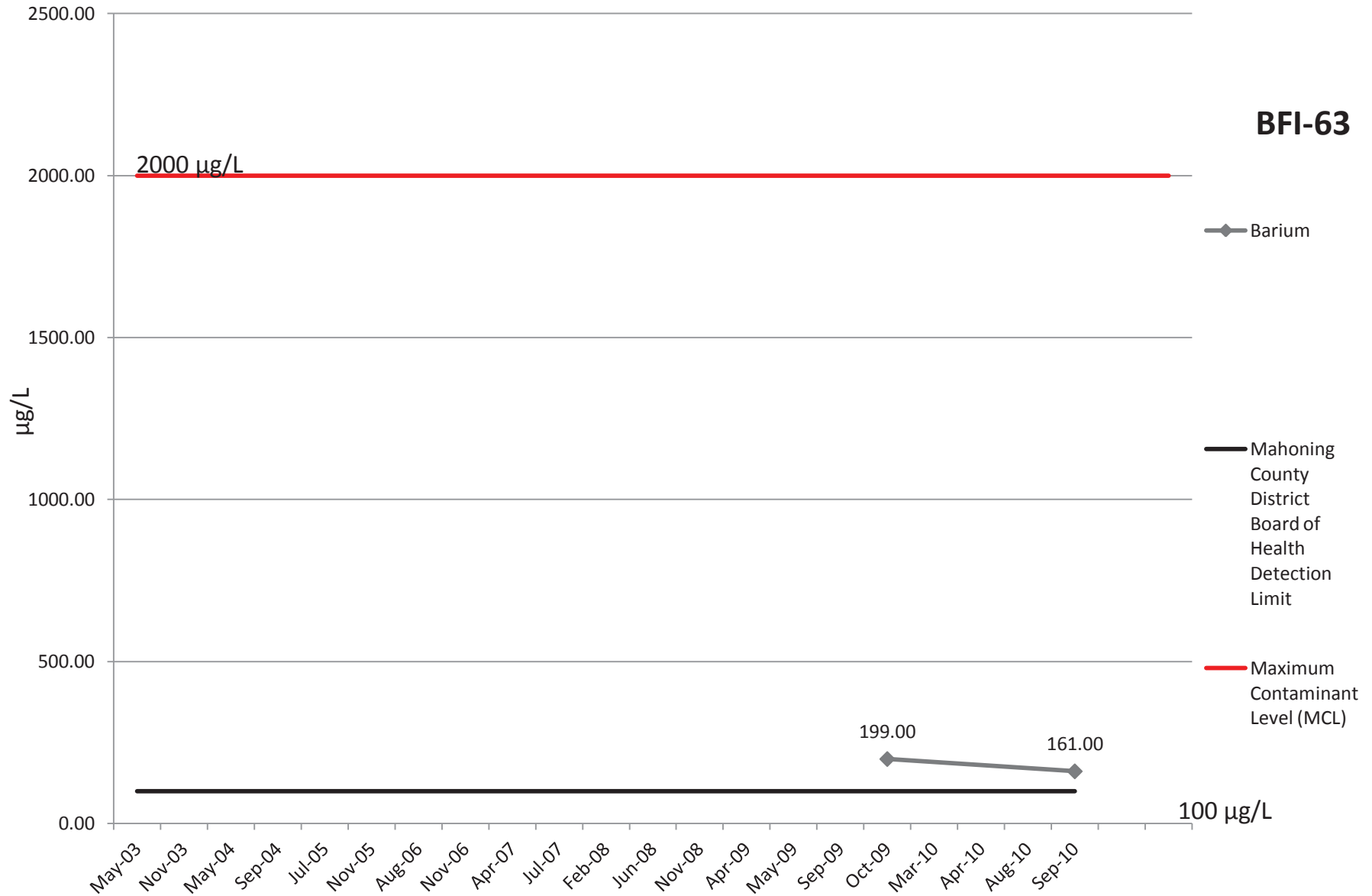


# Arsenic



# Barium

**BFI-63**



# Cadmium

**BFI-63**

10 µg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

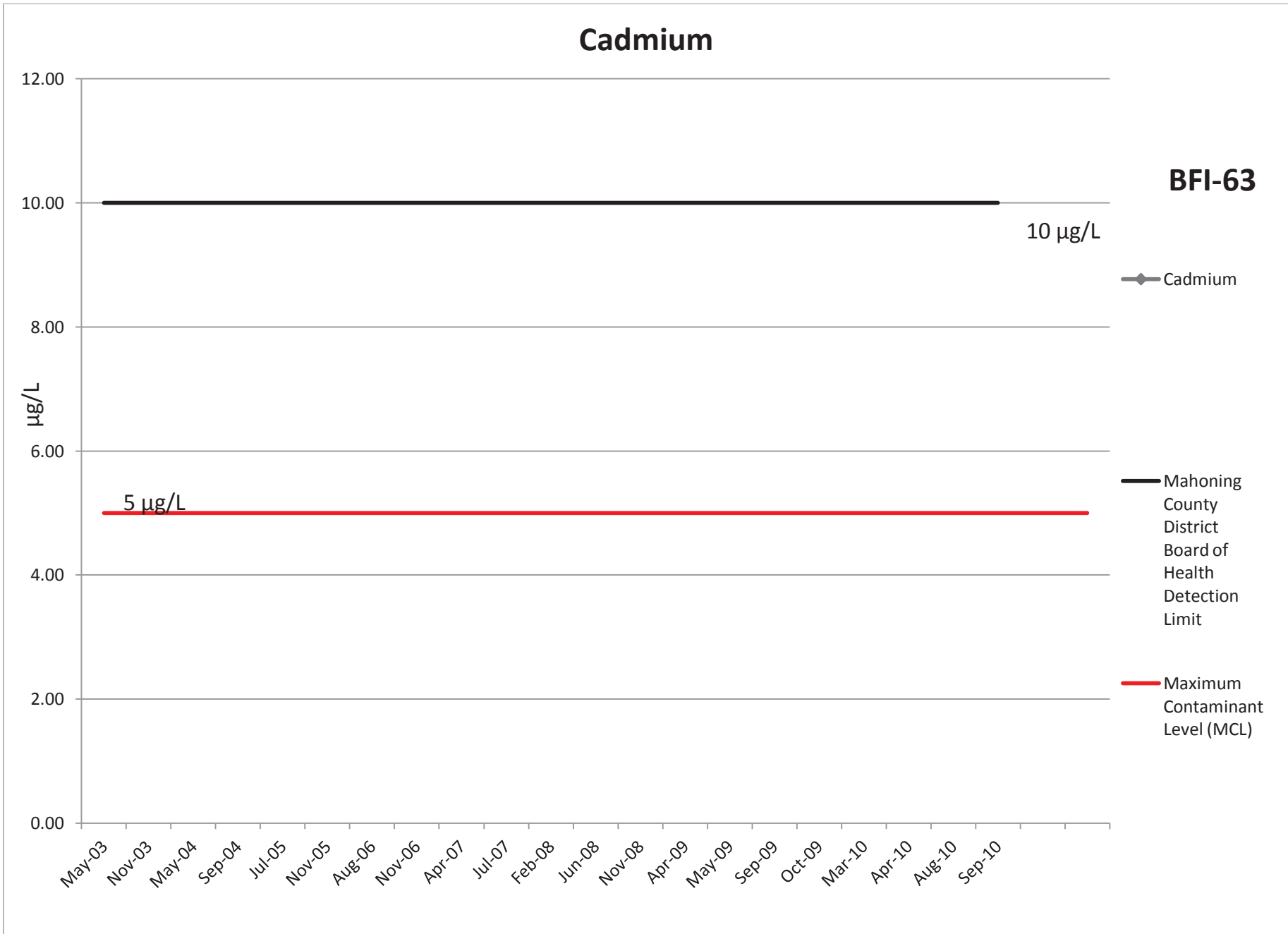
5 µg/L

◆ Cadmium

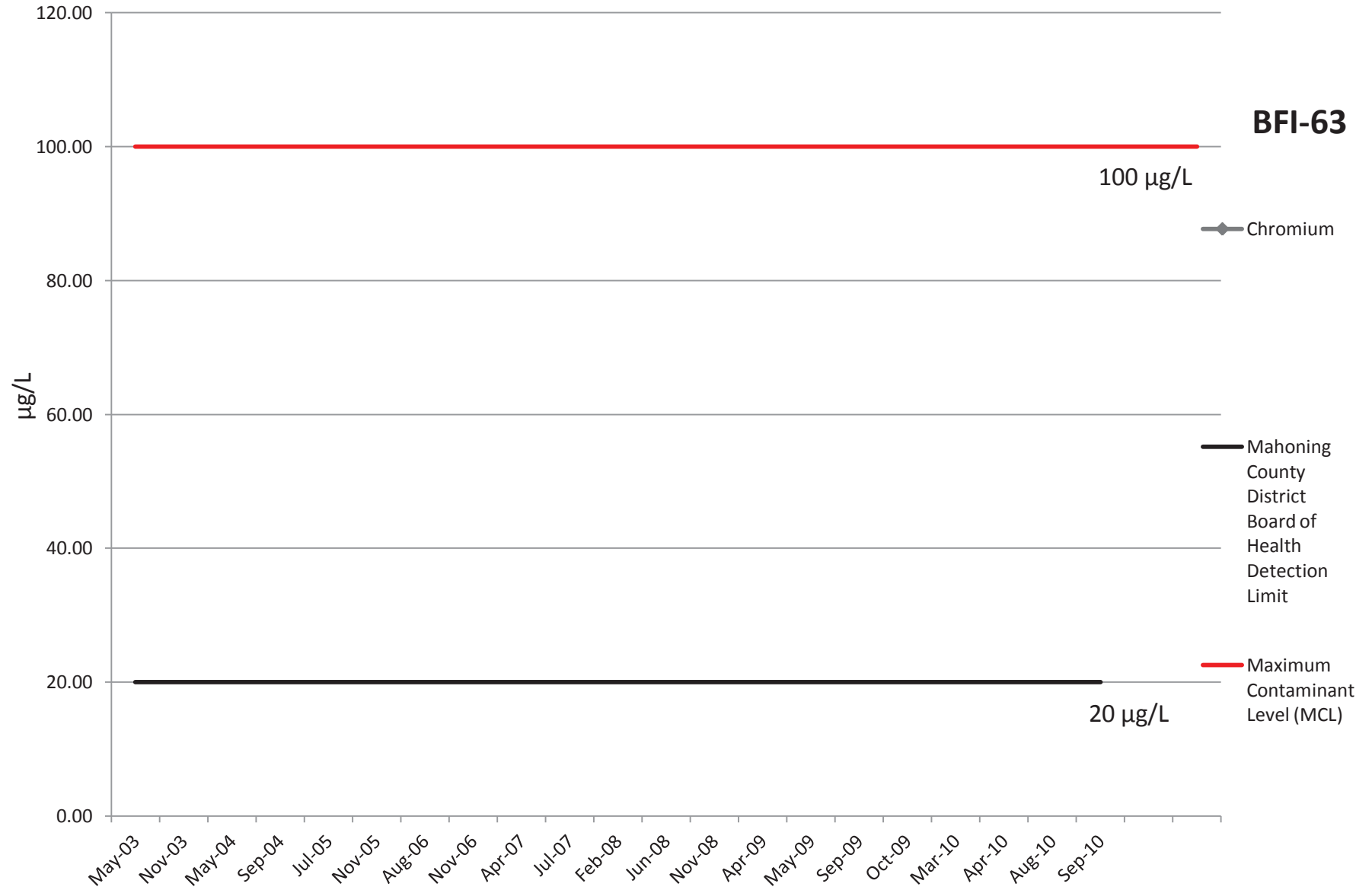
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

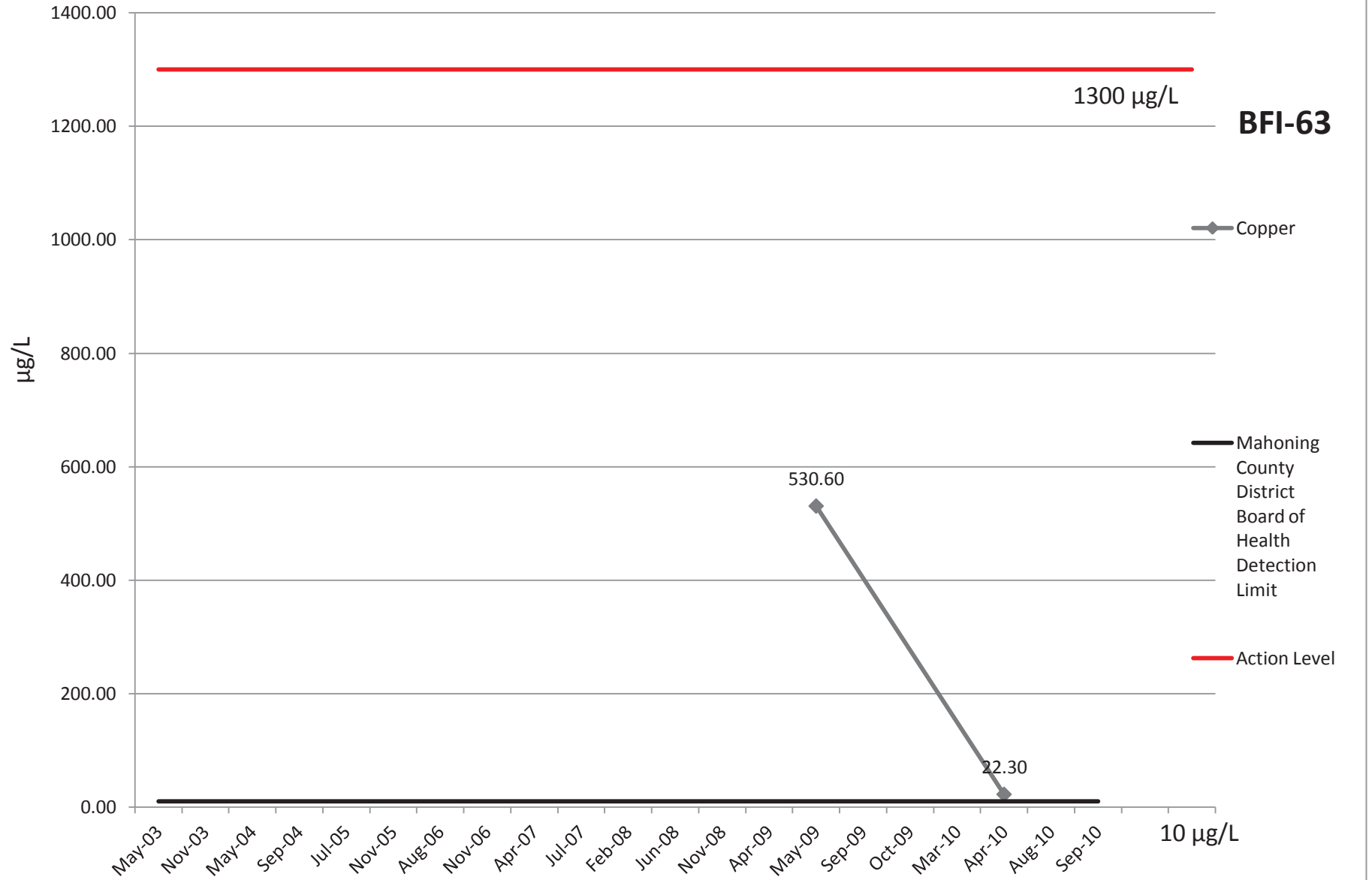
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# Chromium

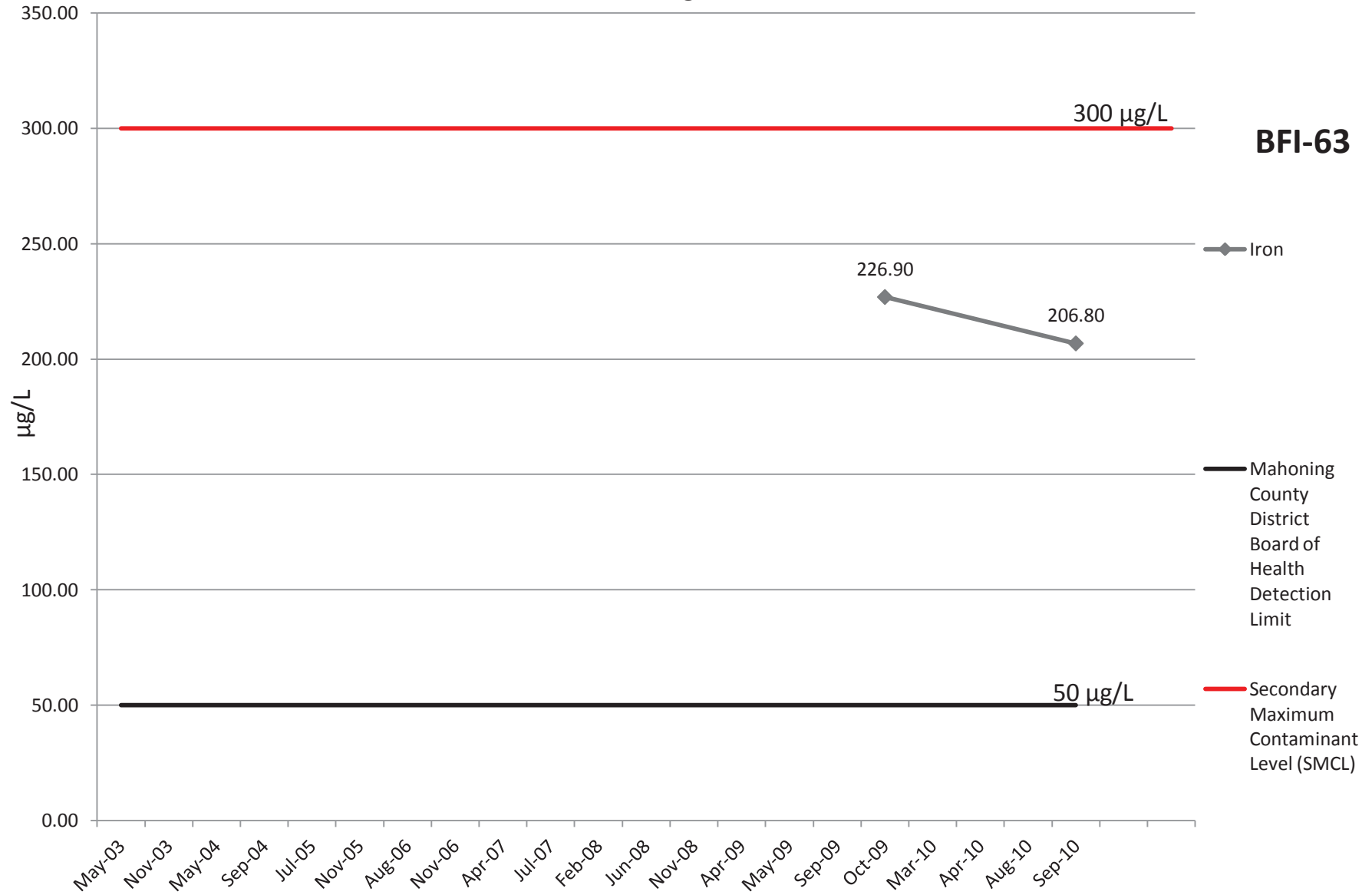


# Copper



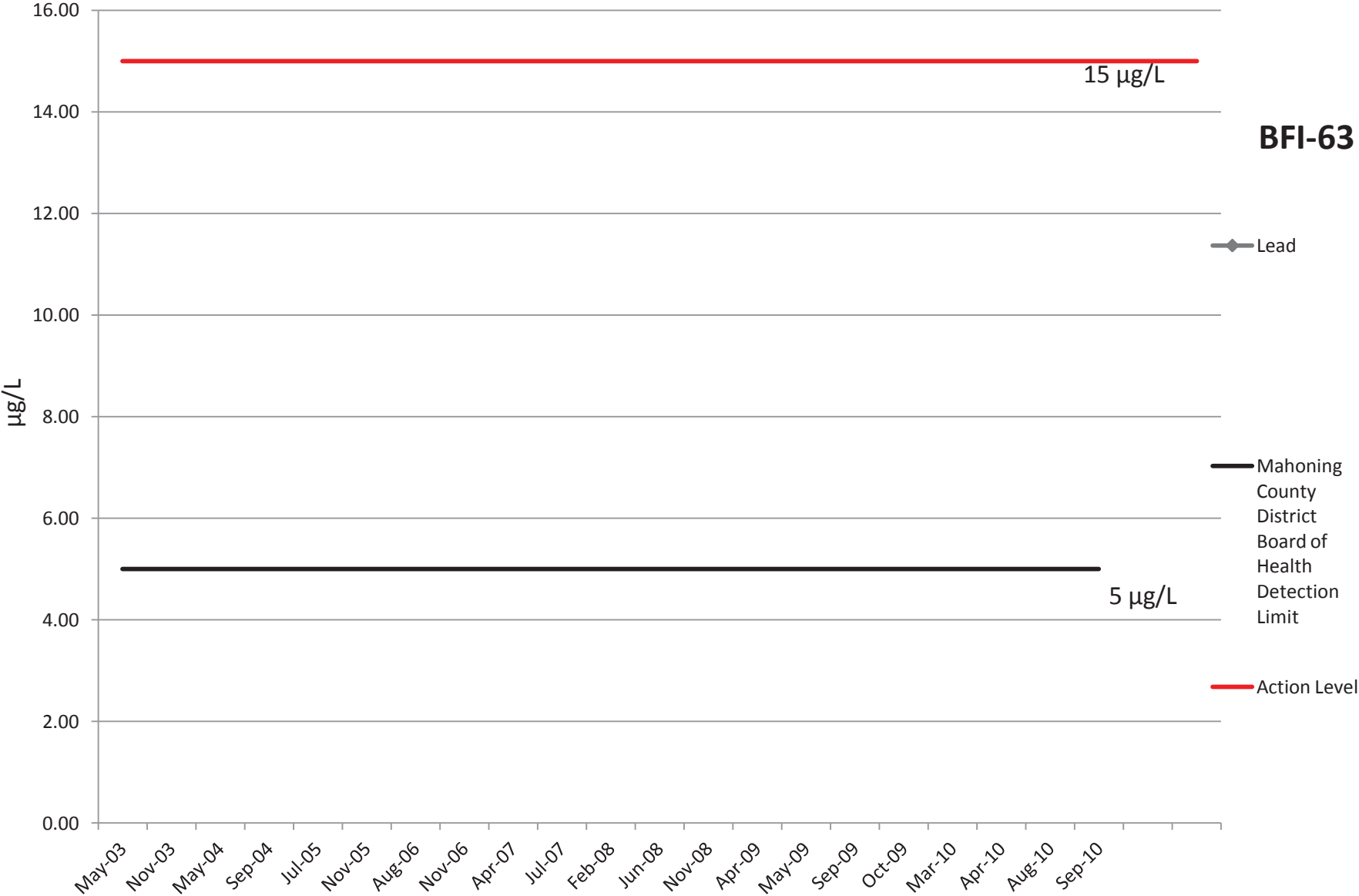
# Iron

**BFI-63**



# Lead

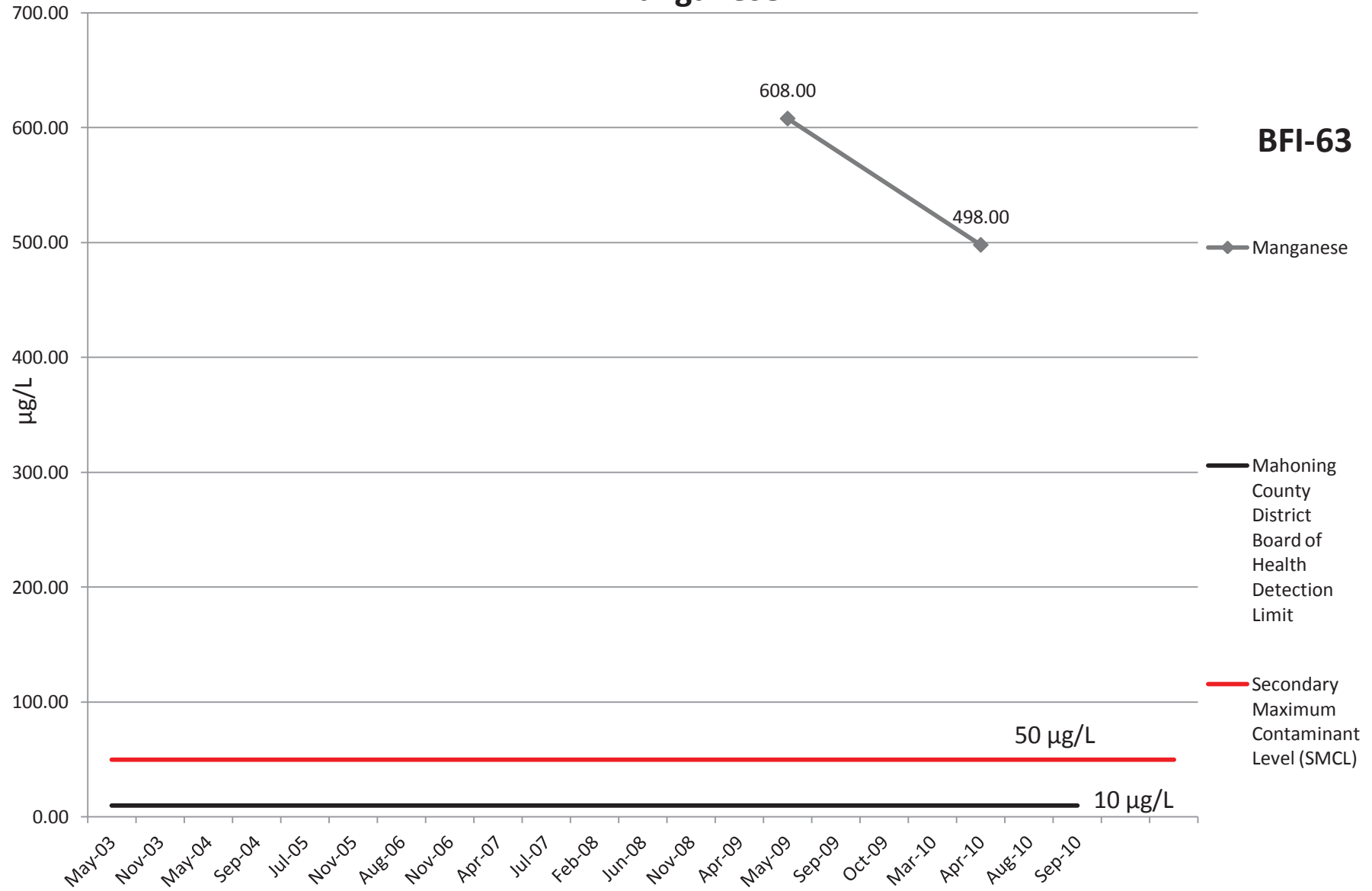
**BFI-63**





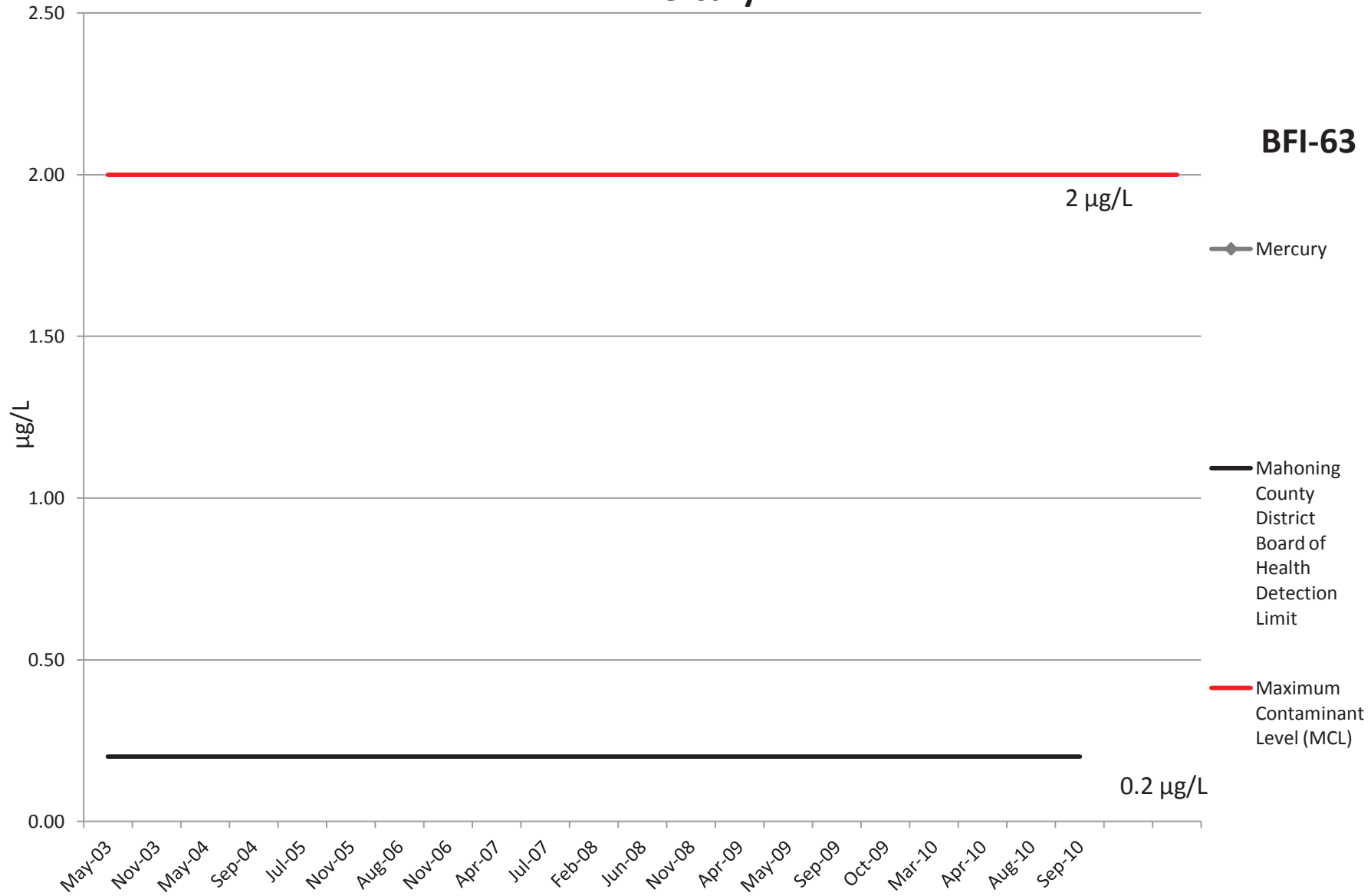
# Manganese

**BFI-63**

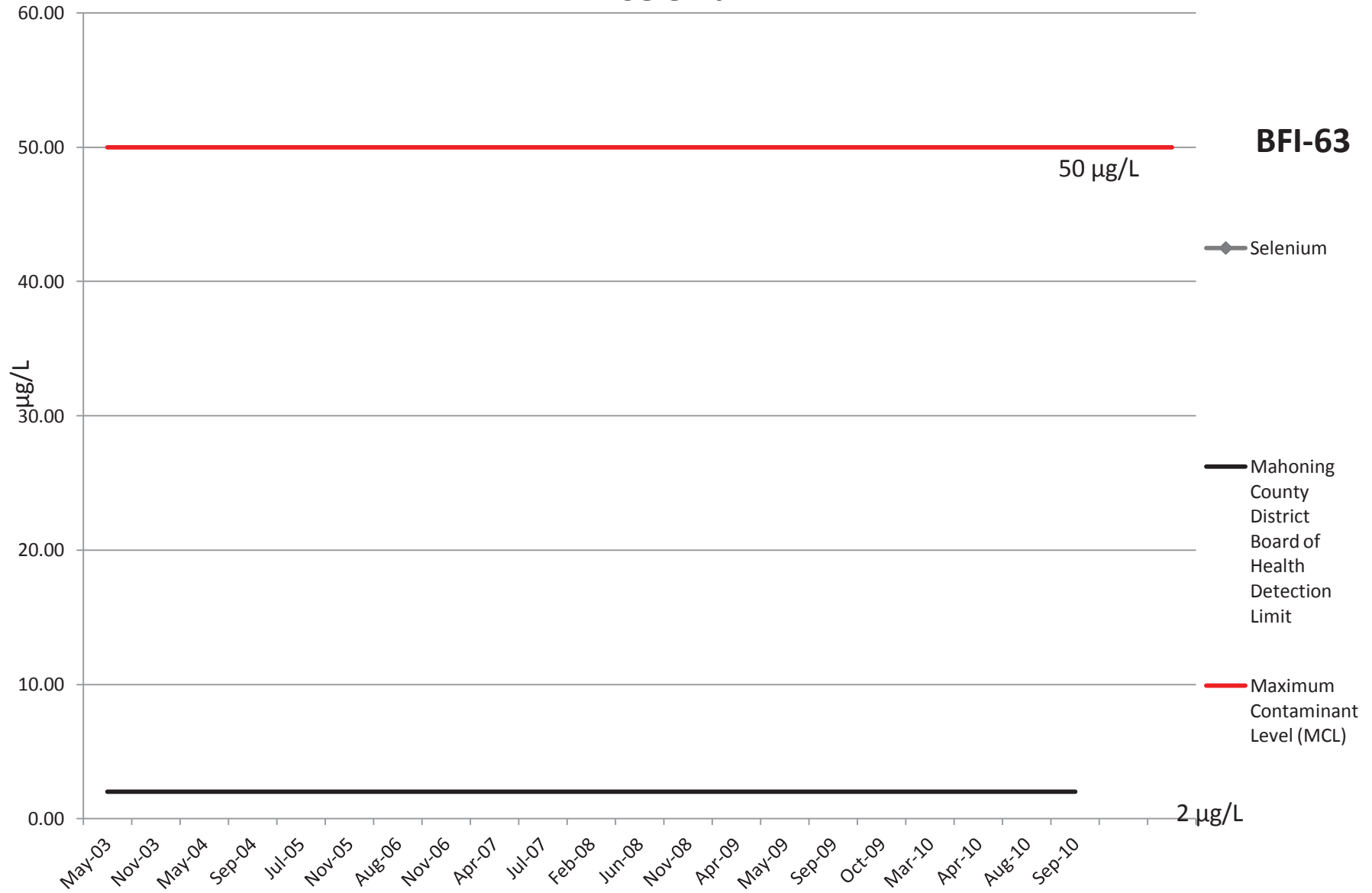


# Mercury

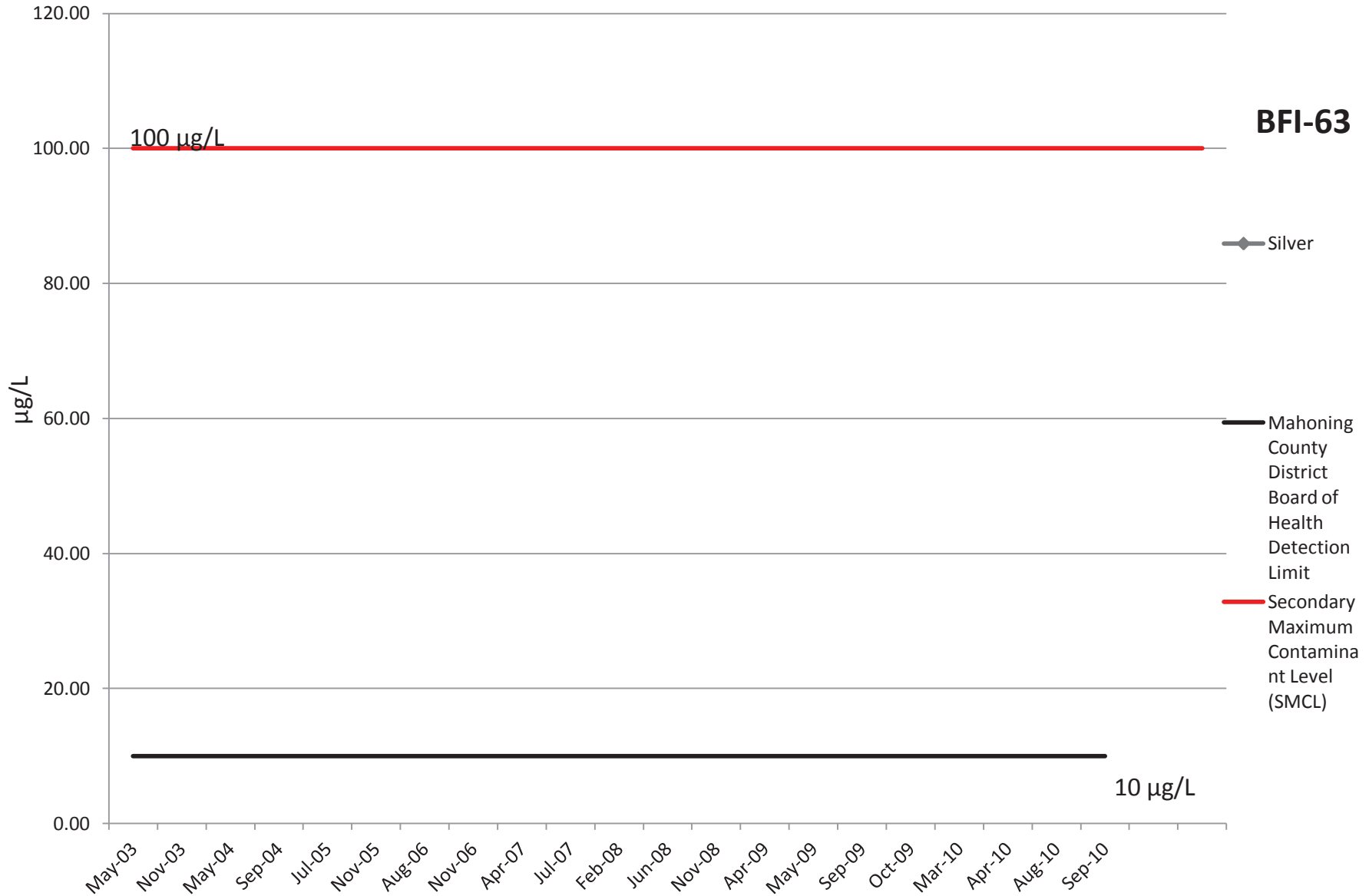
**BFI-63**



# Selenium

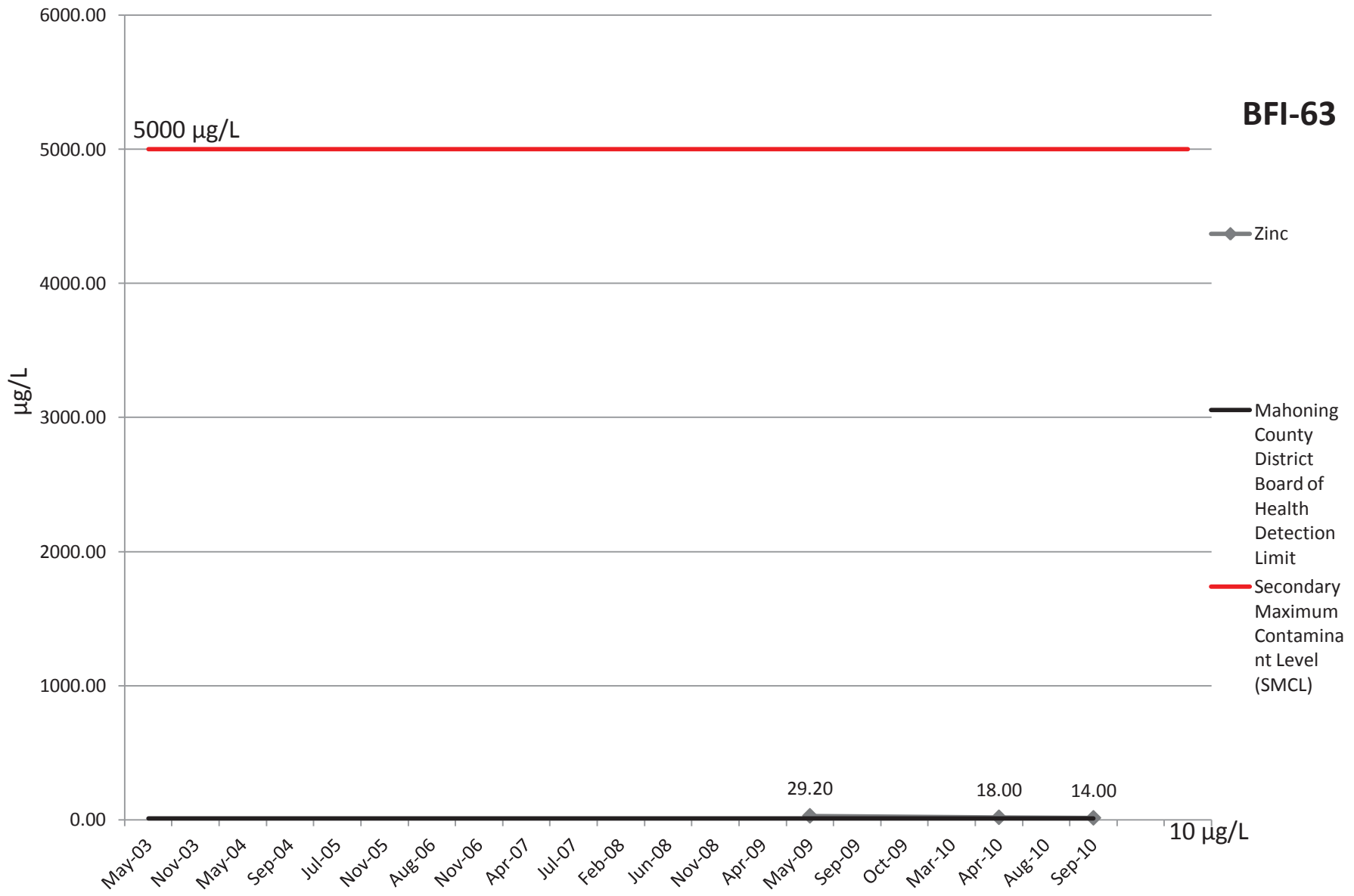


# Silver

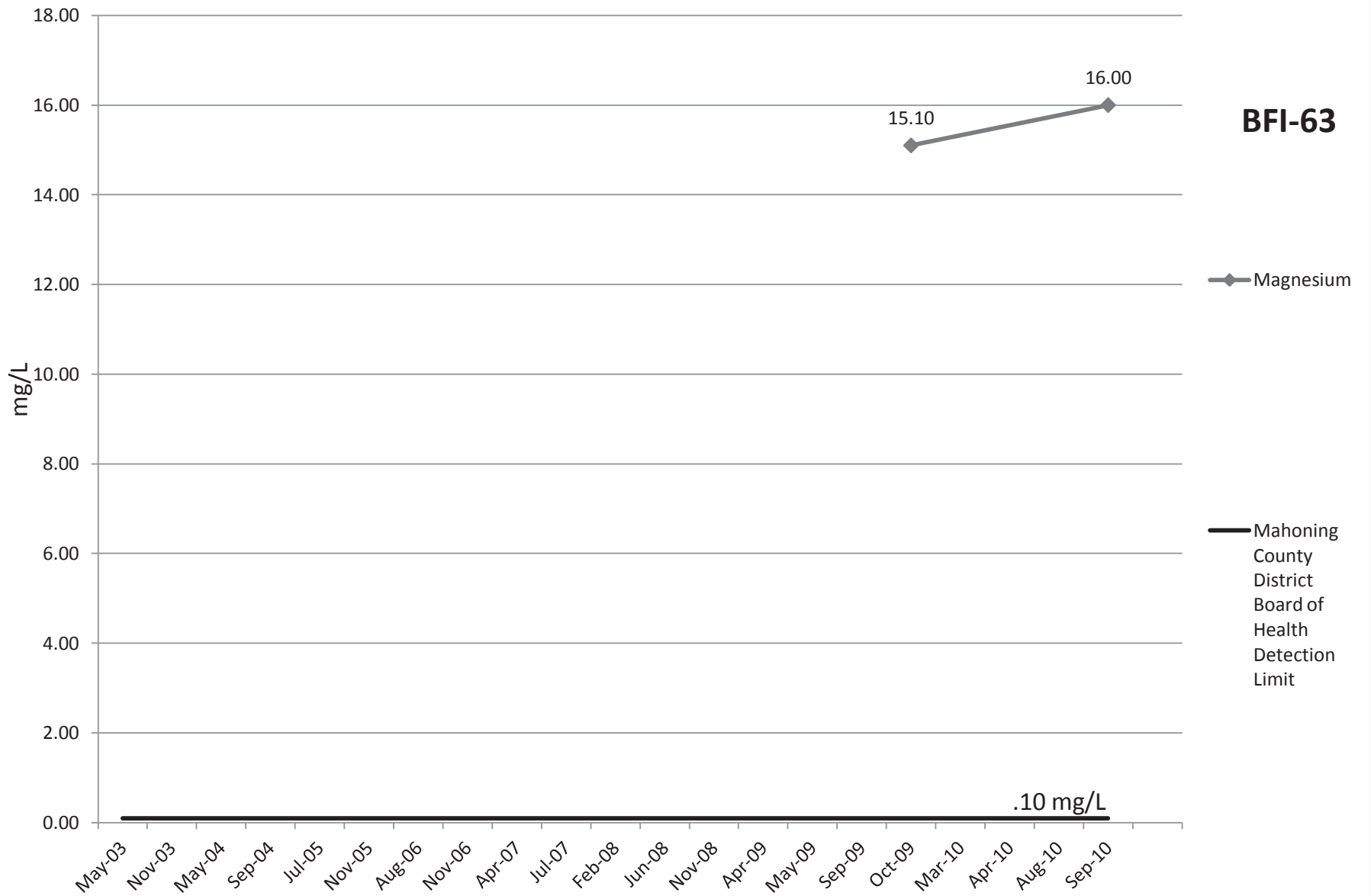


# Zinc

**BFI-63**



# Magnesium



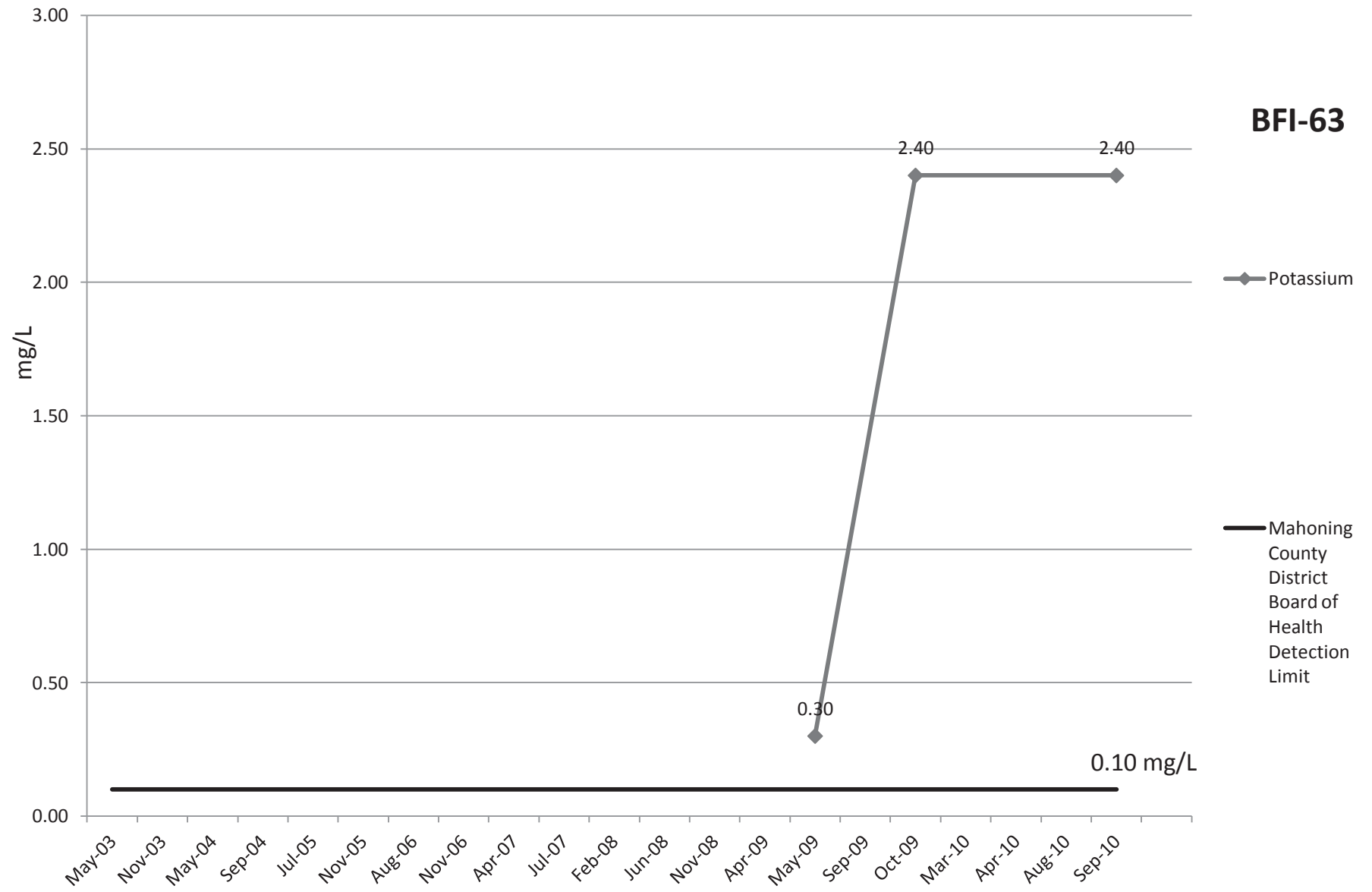
**BFI-63**

◆ Magnesium

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

.10 mg/L

# Potassium



**BFI-63**

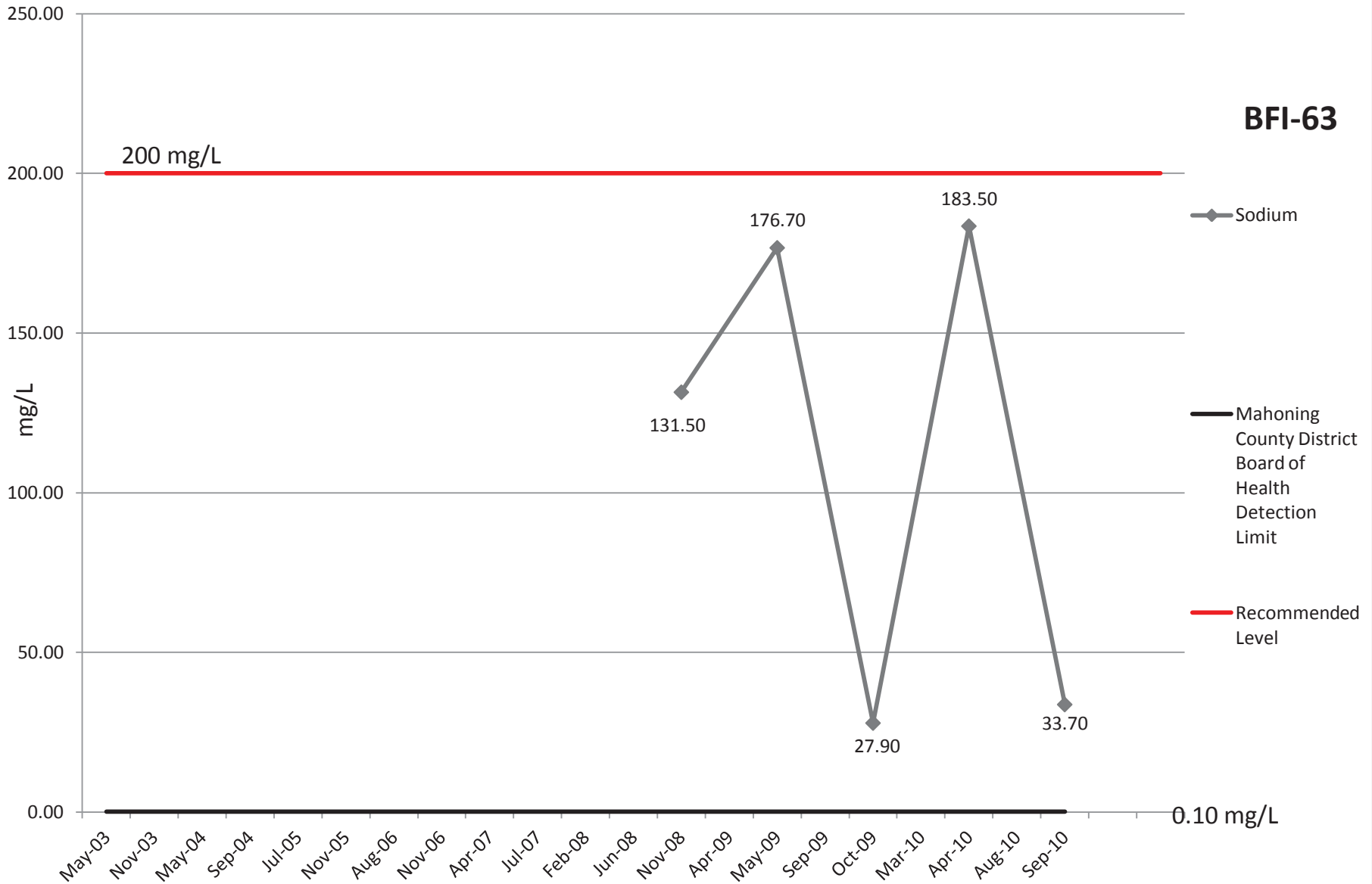
◆ Potassium

— Mahoning County District Board of Health Detection Limit

0.10 mg/L

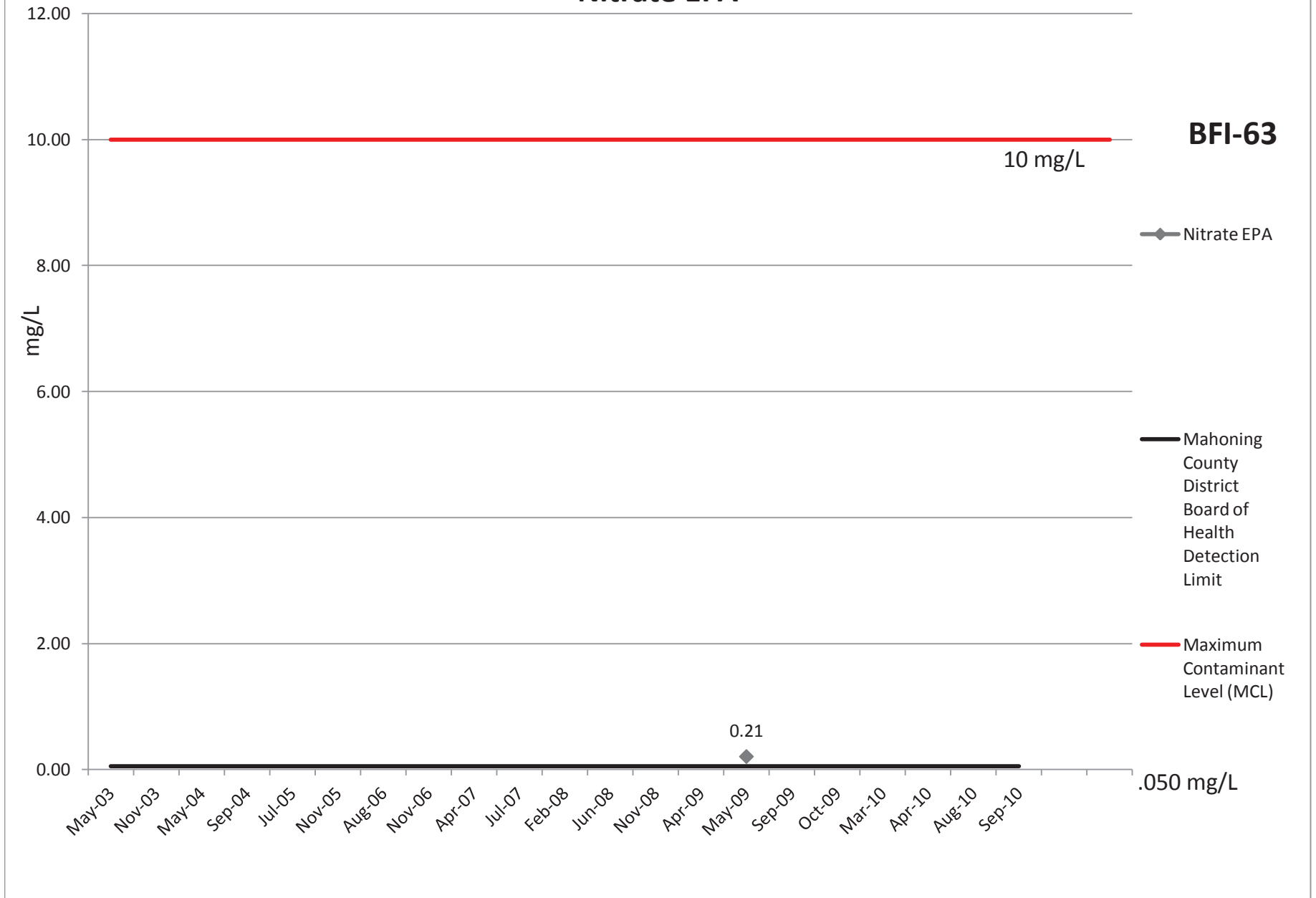
# Sodium

**BFI-63**



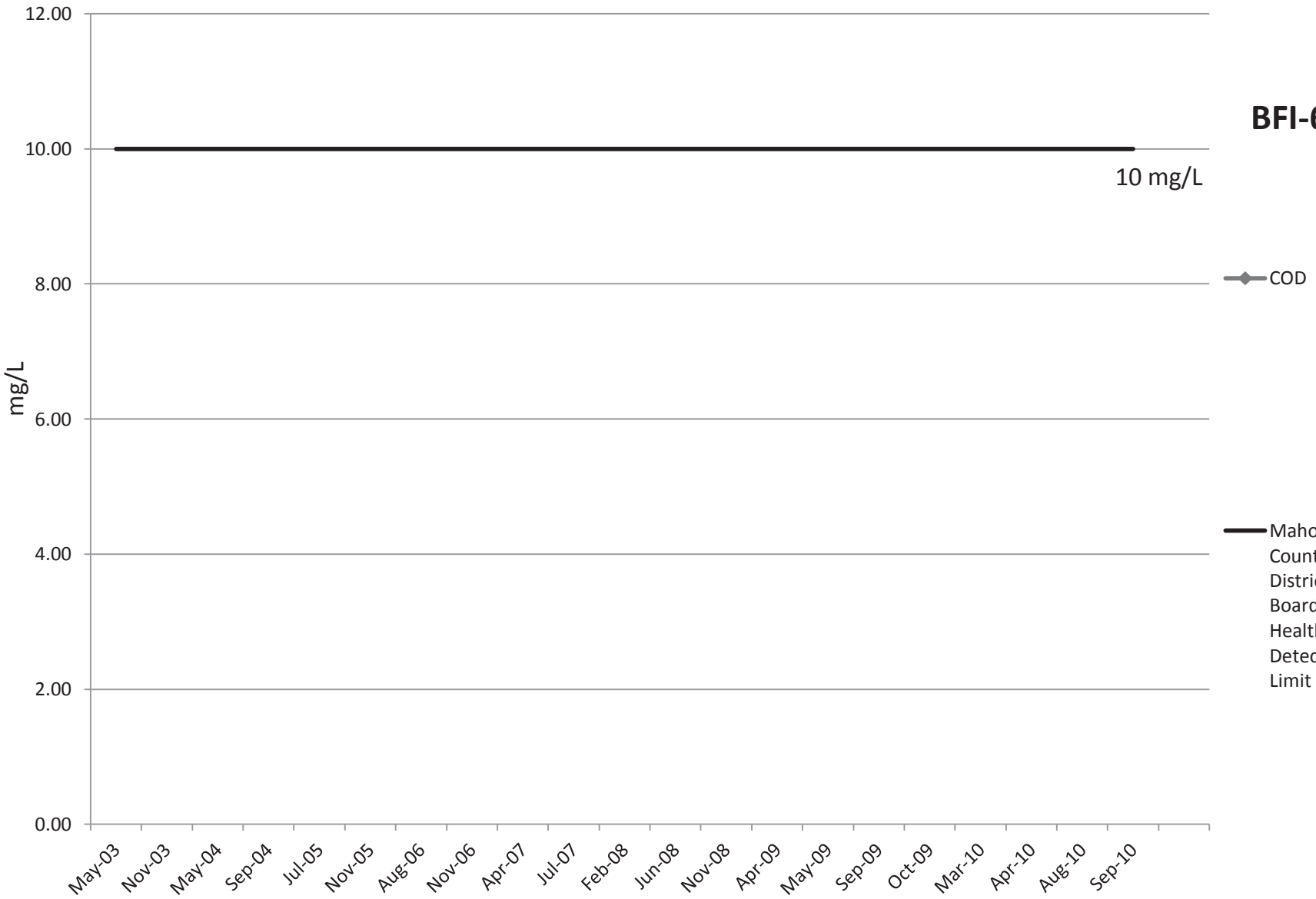


# Nitrate EPA



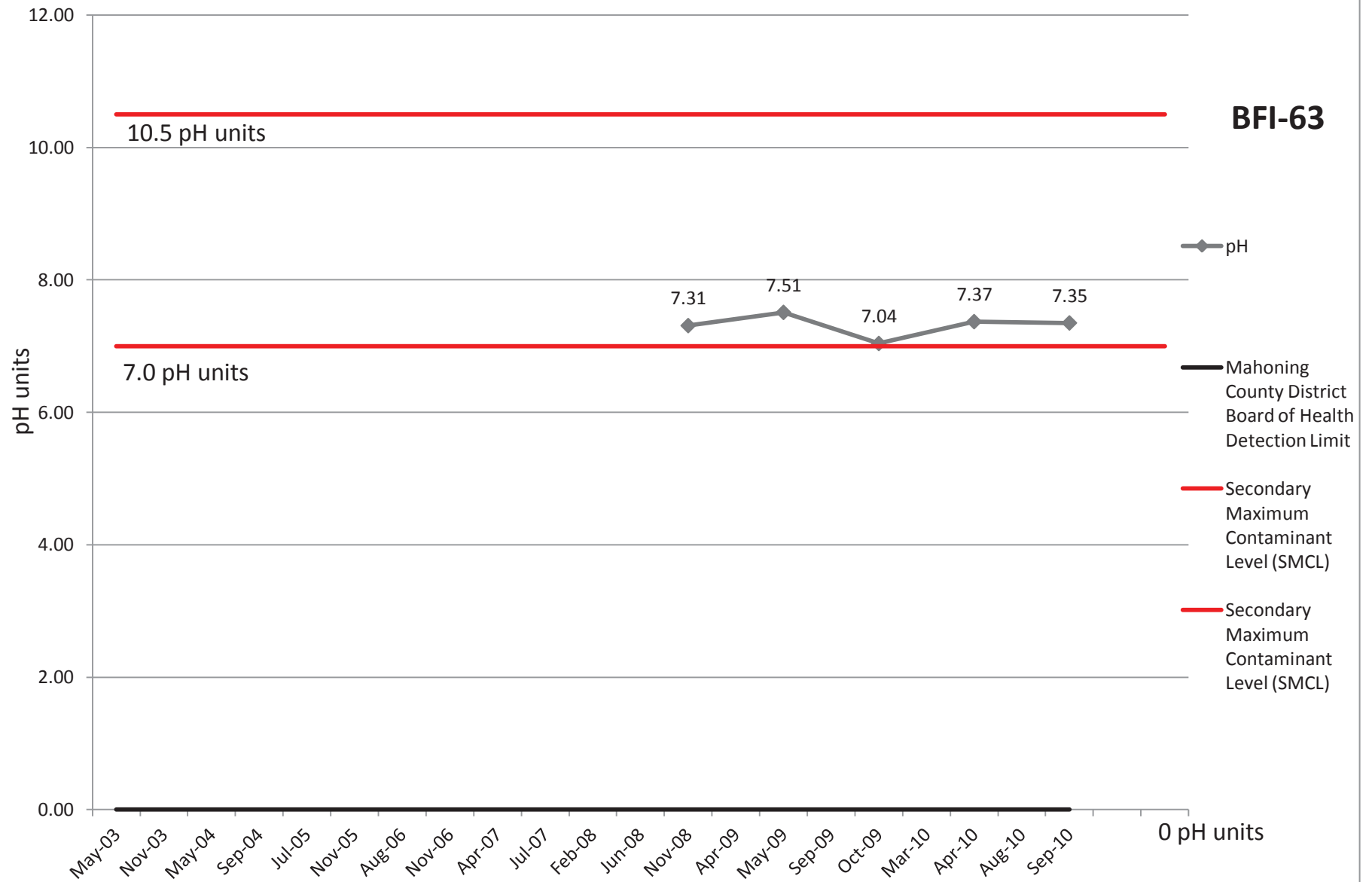
# COD

**BFI-63**



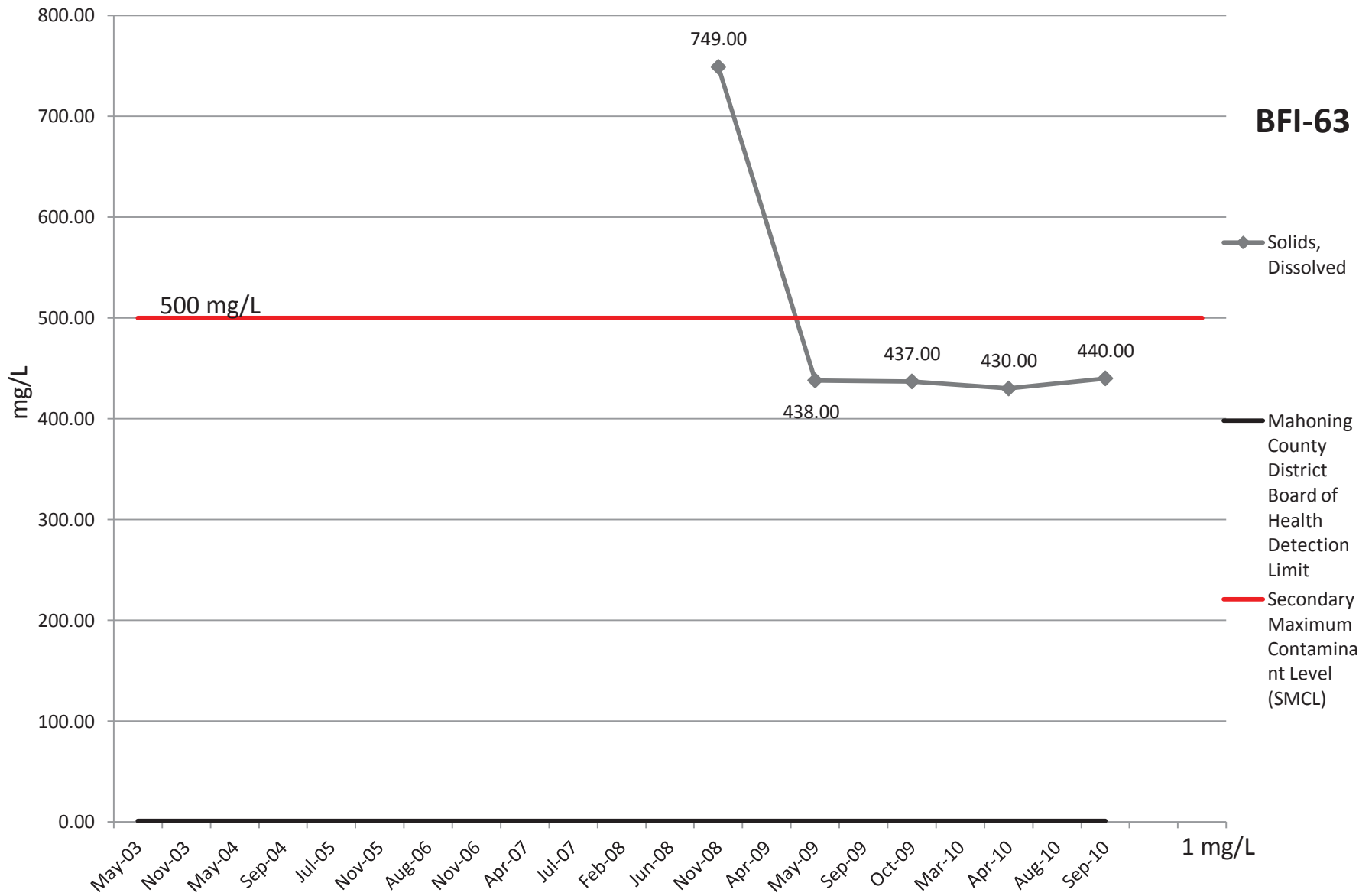
# pH

**BFI-63**



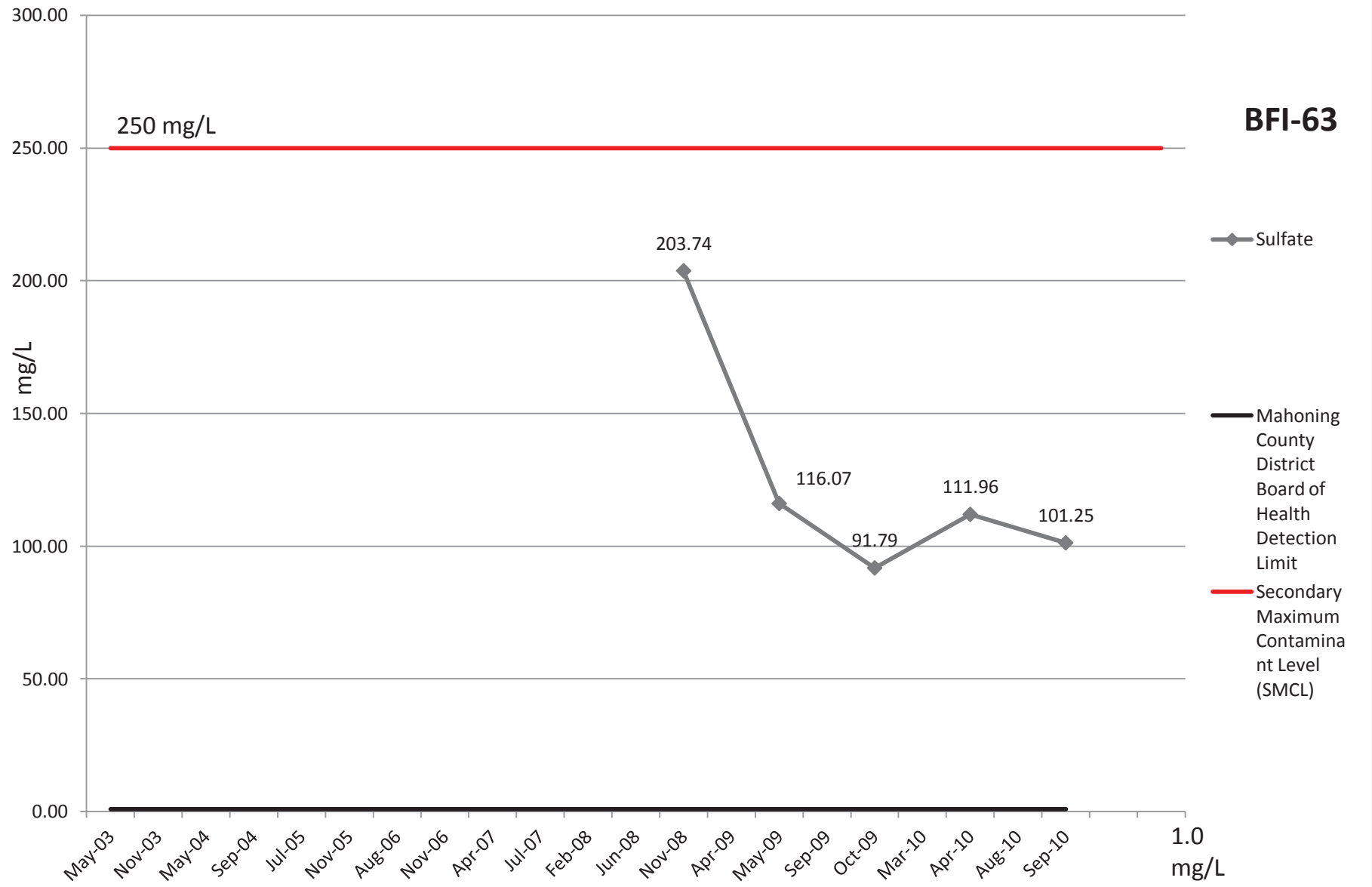
# Solids, Dissolved

**BFI-63**



# Sulfate

**BFI-63**



# Bacteria

**BFI-63**

Positive/Negative

◆ Bacteria

positive (1)

1.00

1.00

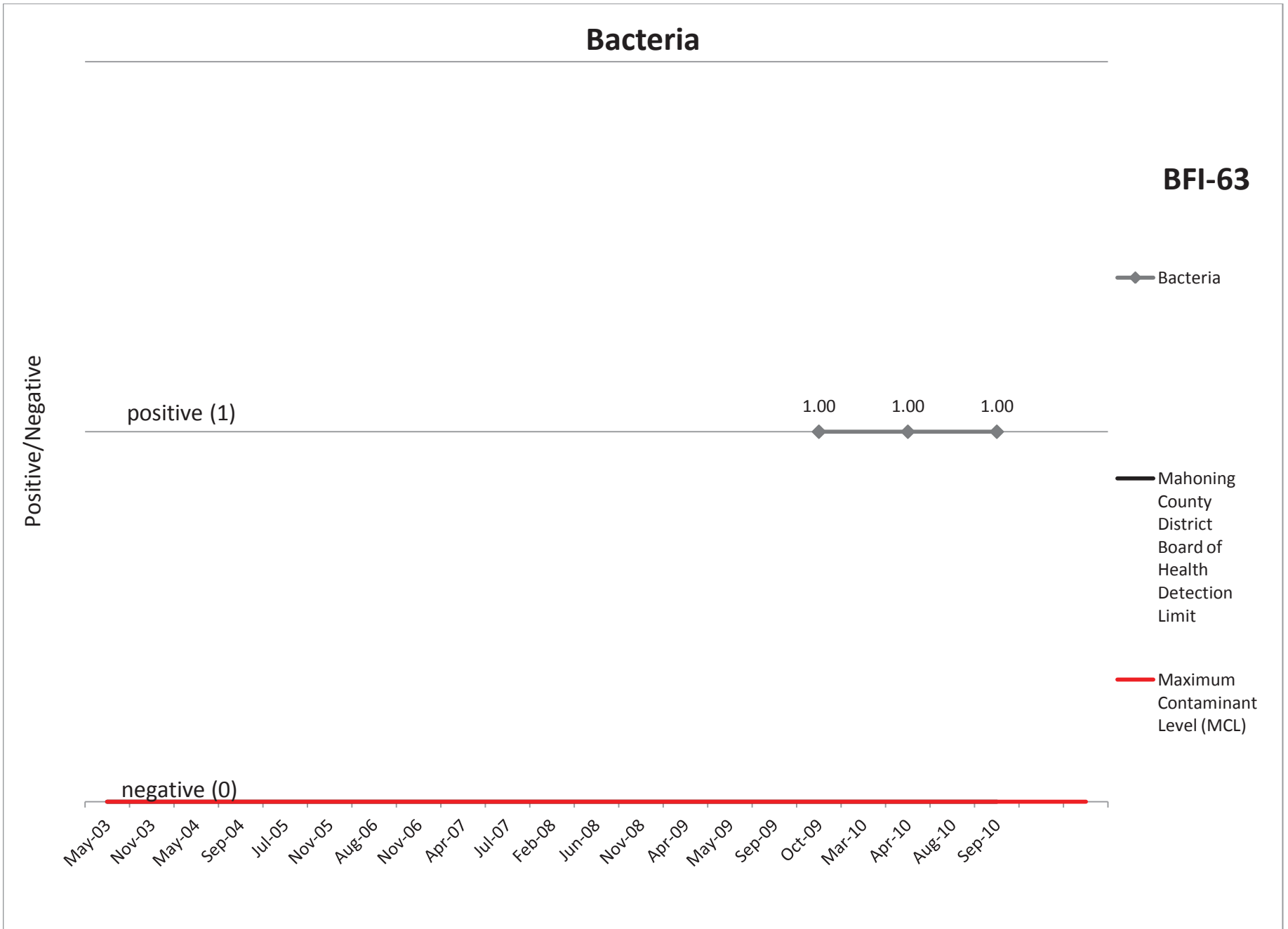
1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

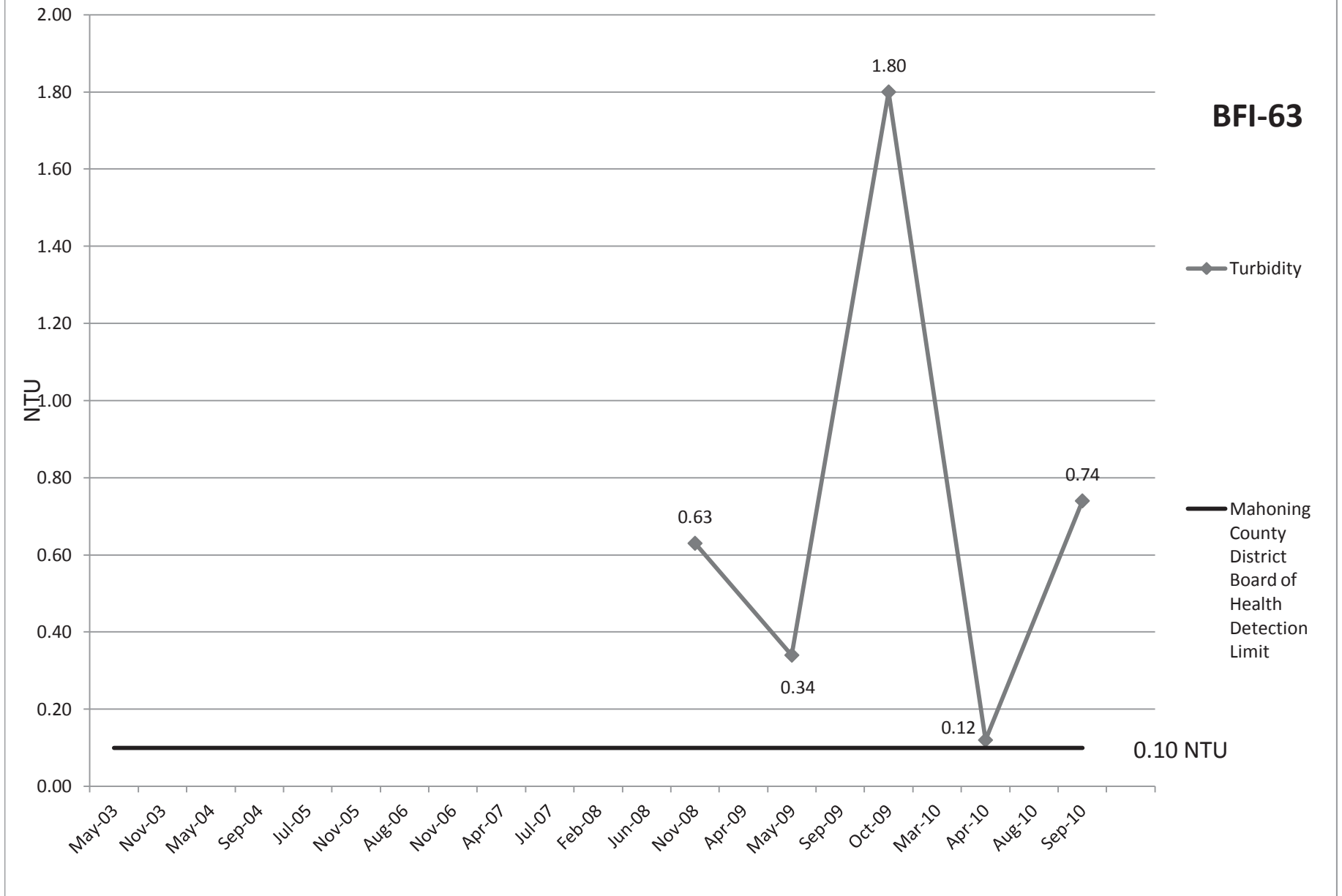
— Maximum  
Contaminant  
Level (MCL)

negative (0)

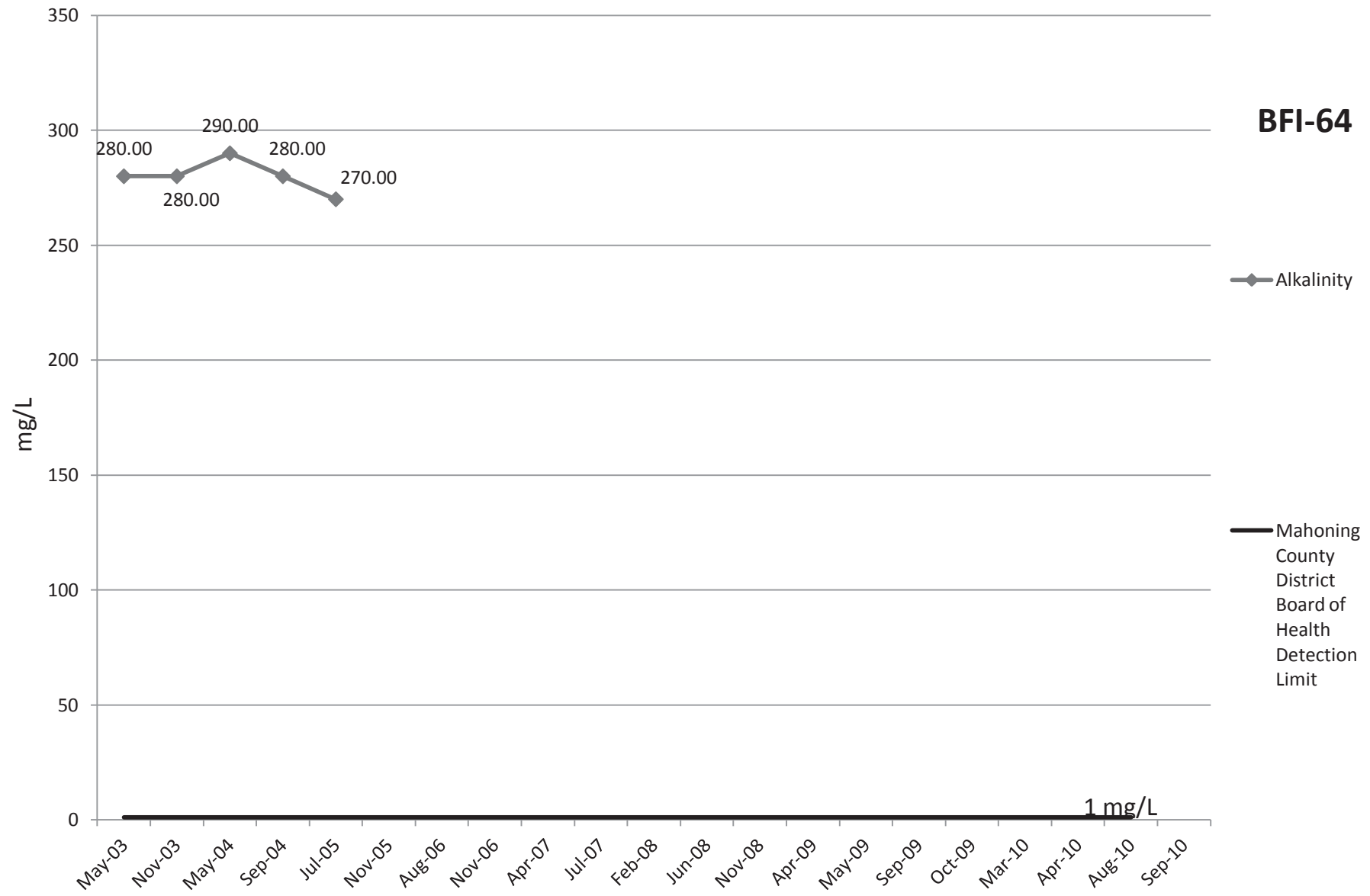
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# Turbidity

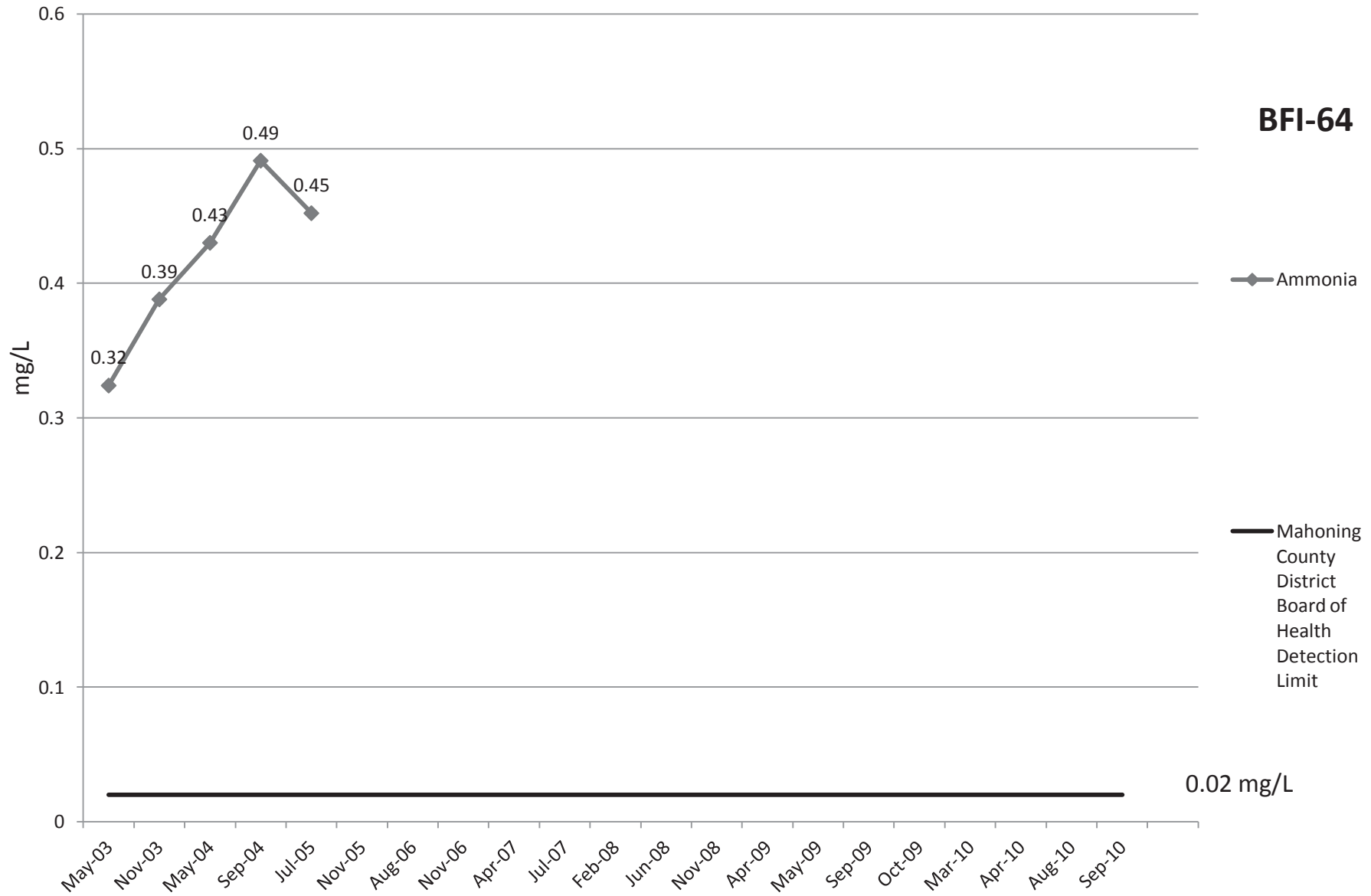


# Alkalinity





# Ammonia



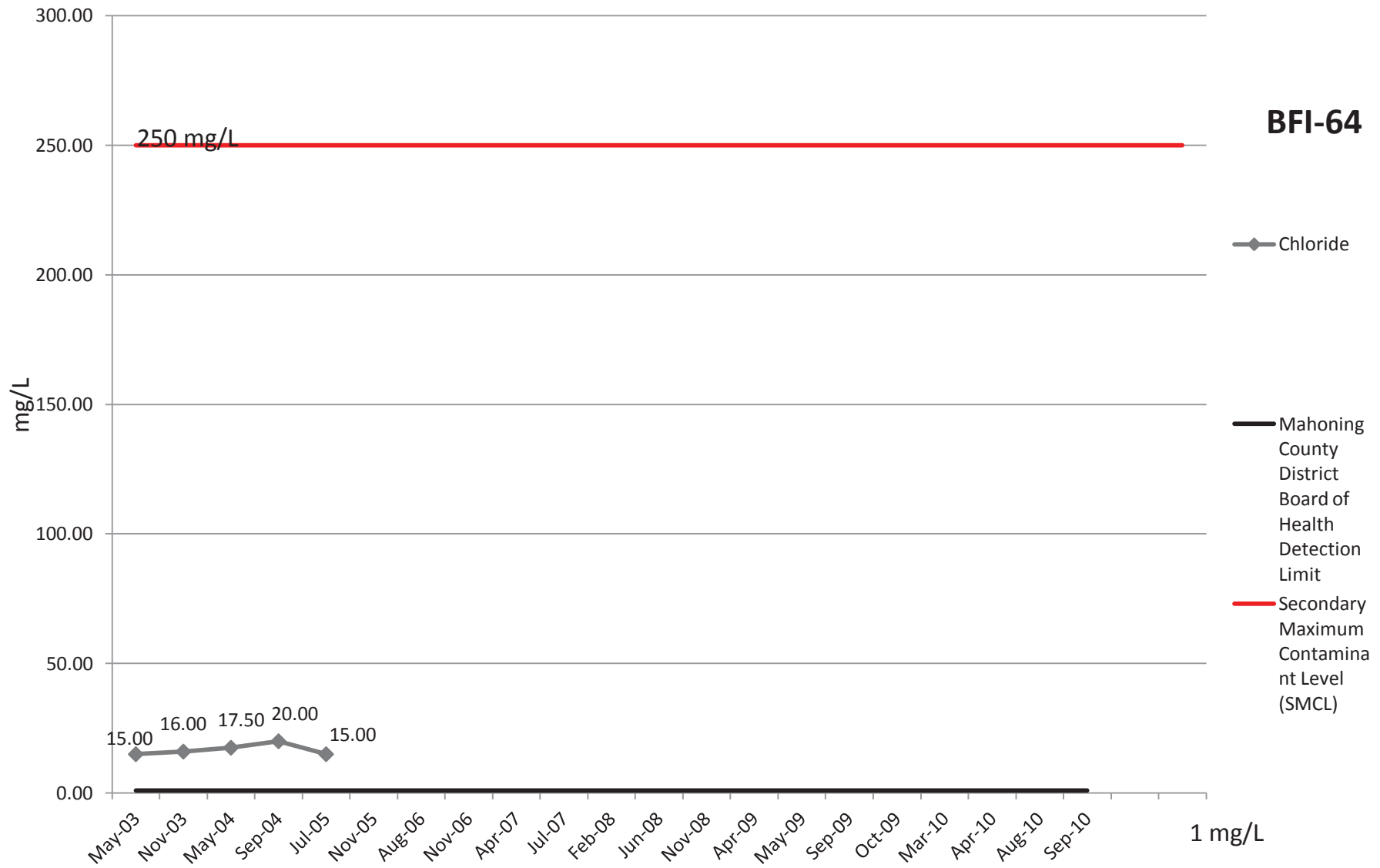
**BFI-64**

◆ Ammonia

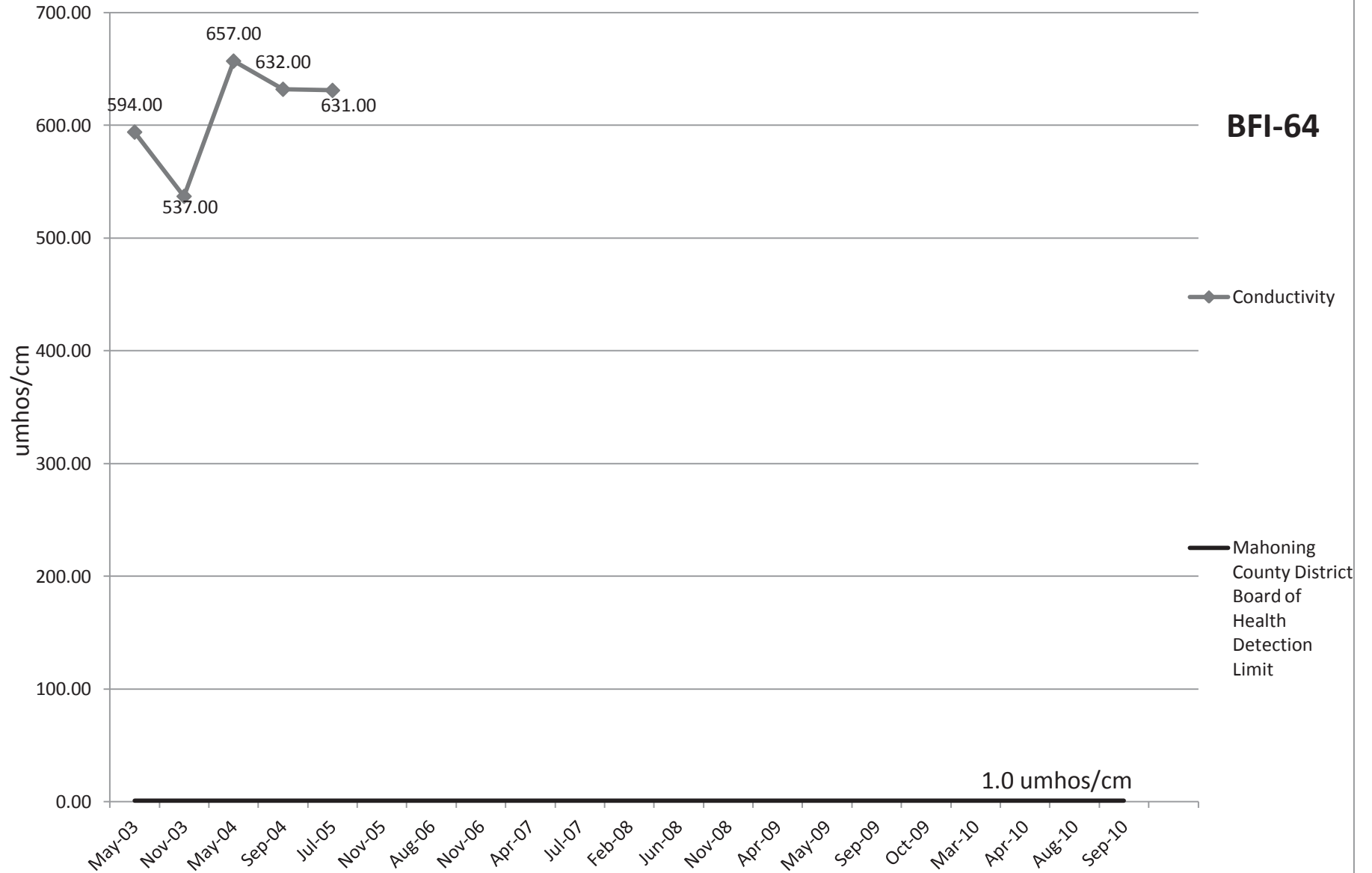
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

0.02 mg/L

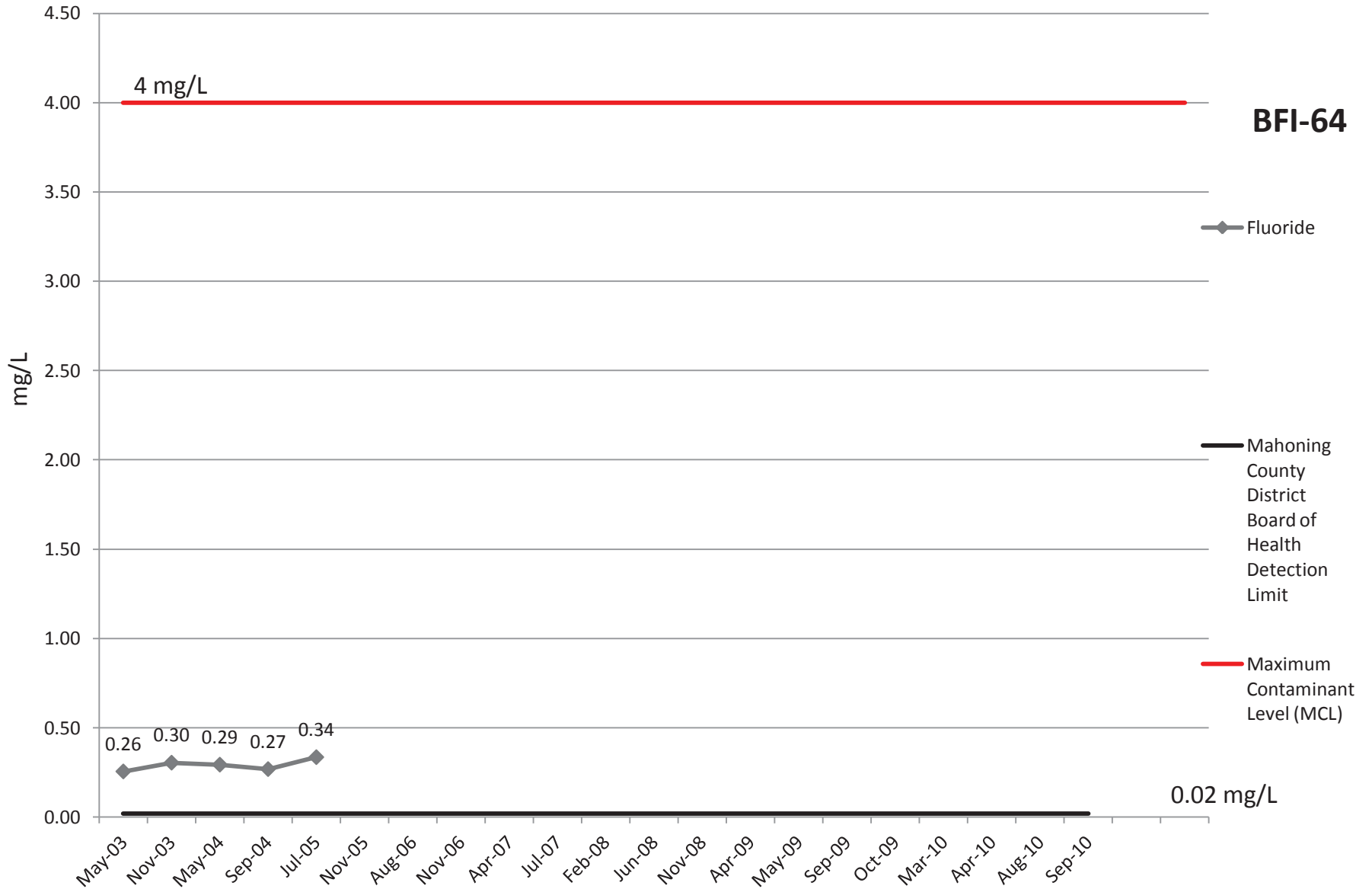
# Chloride



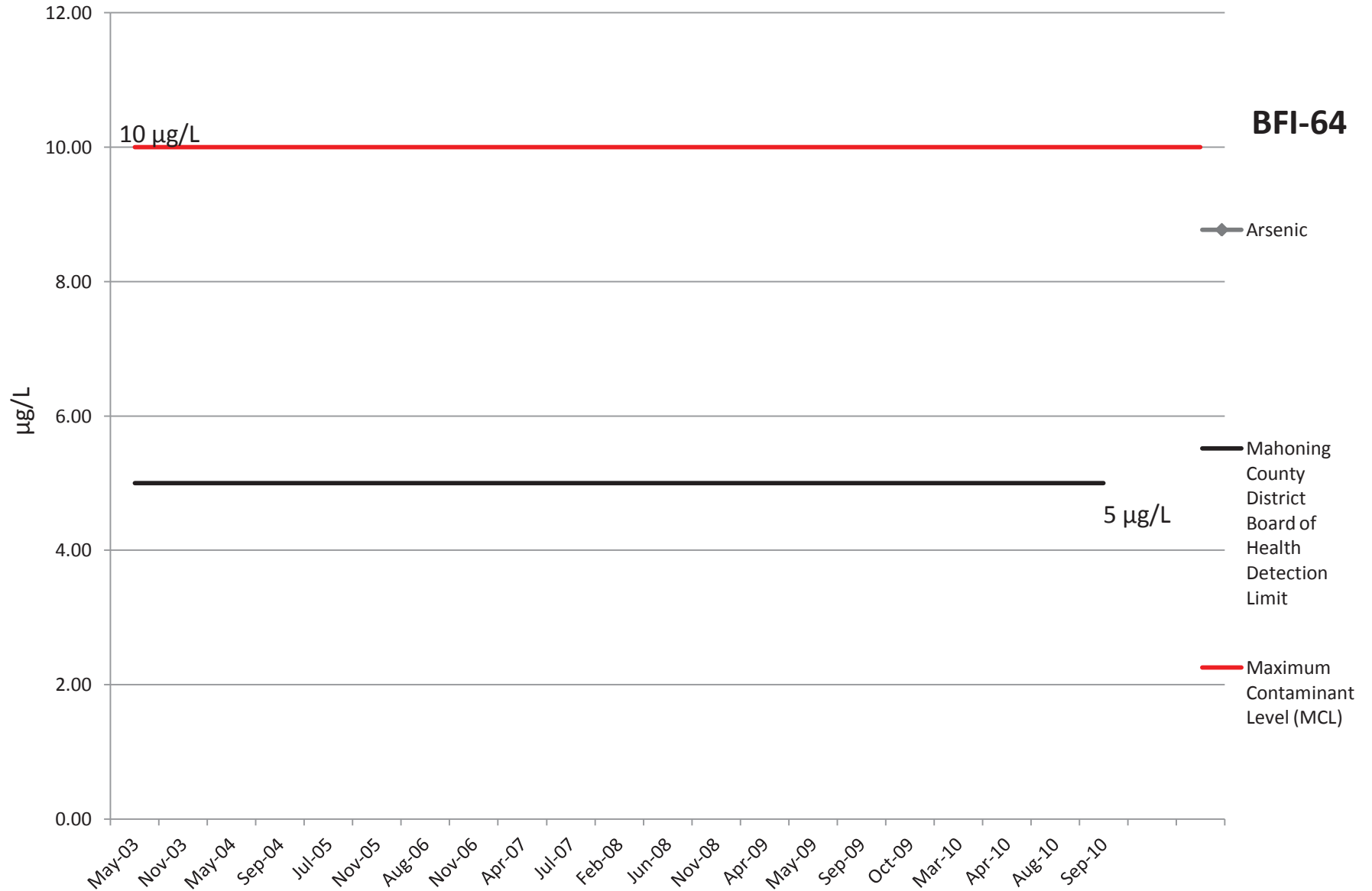
# Conductivity



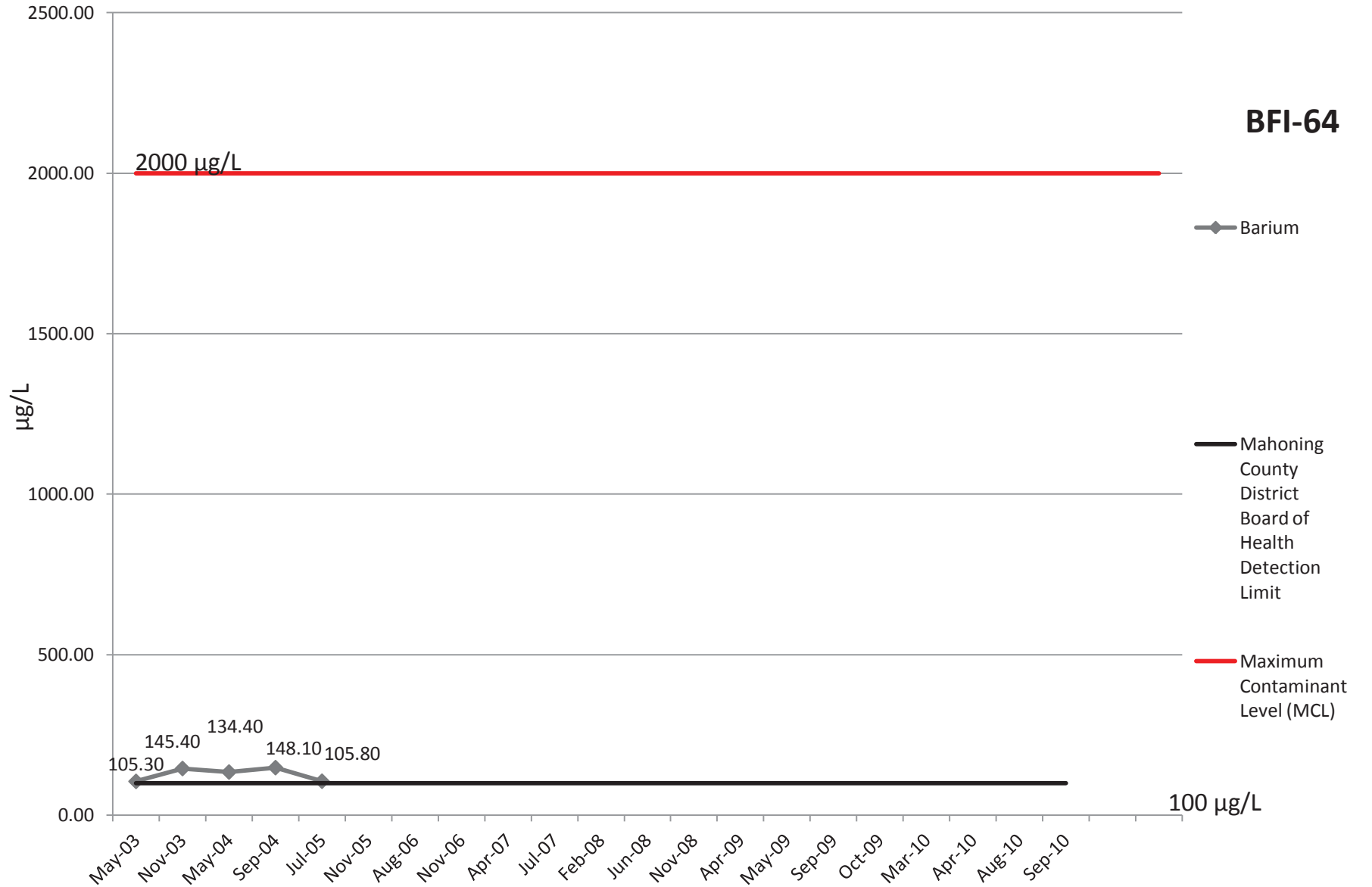
# Fluoride



# Arsenic



# Barium



# Cadmium

**BFI-64**

10 µg/L

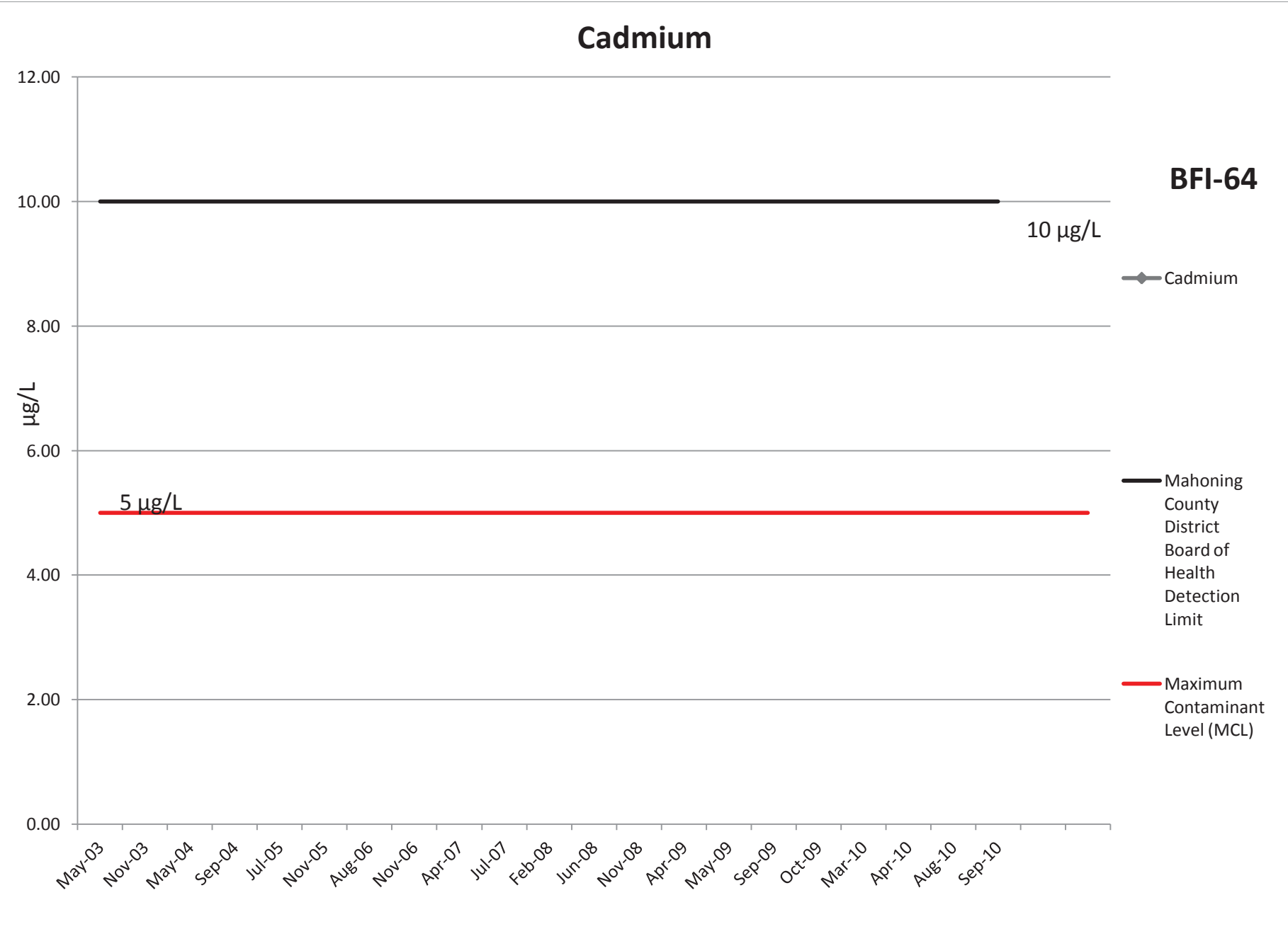
12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

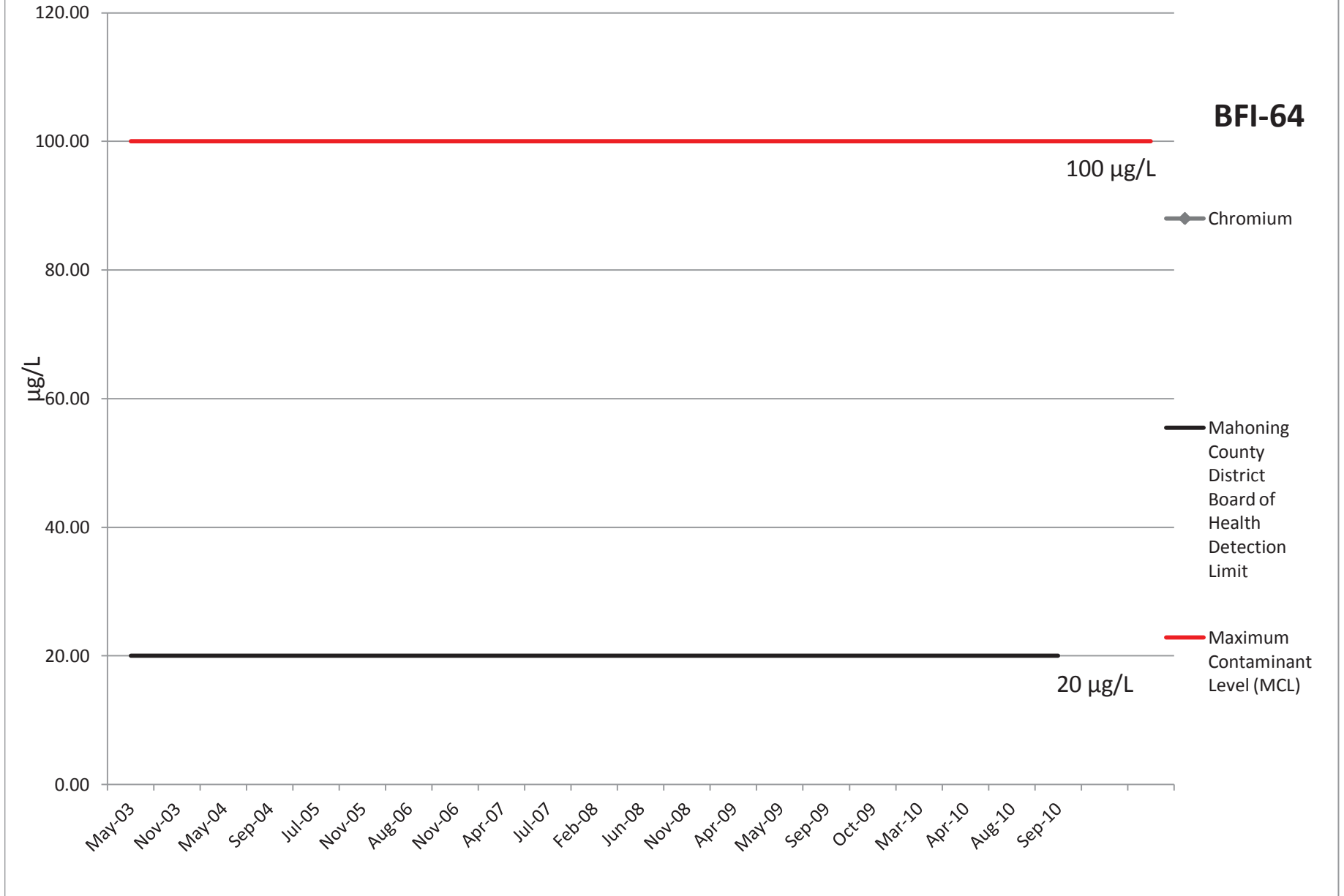
5 µg/L

- ◆ Cadmium
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

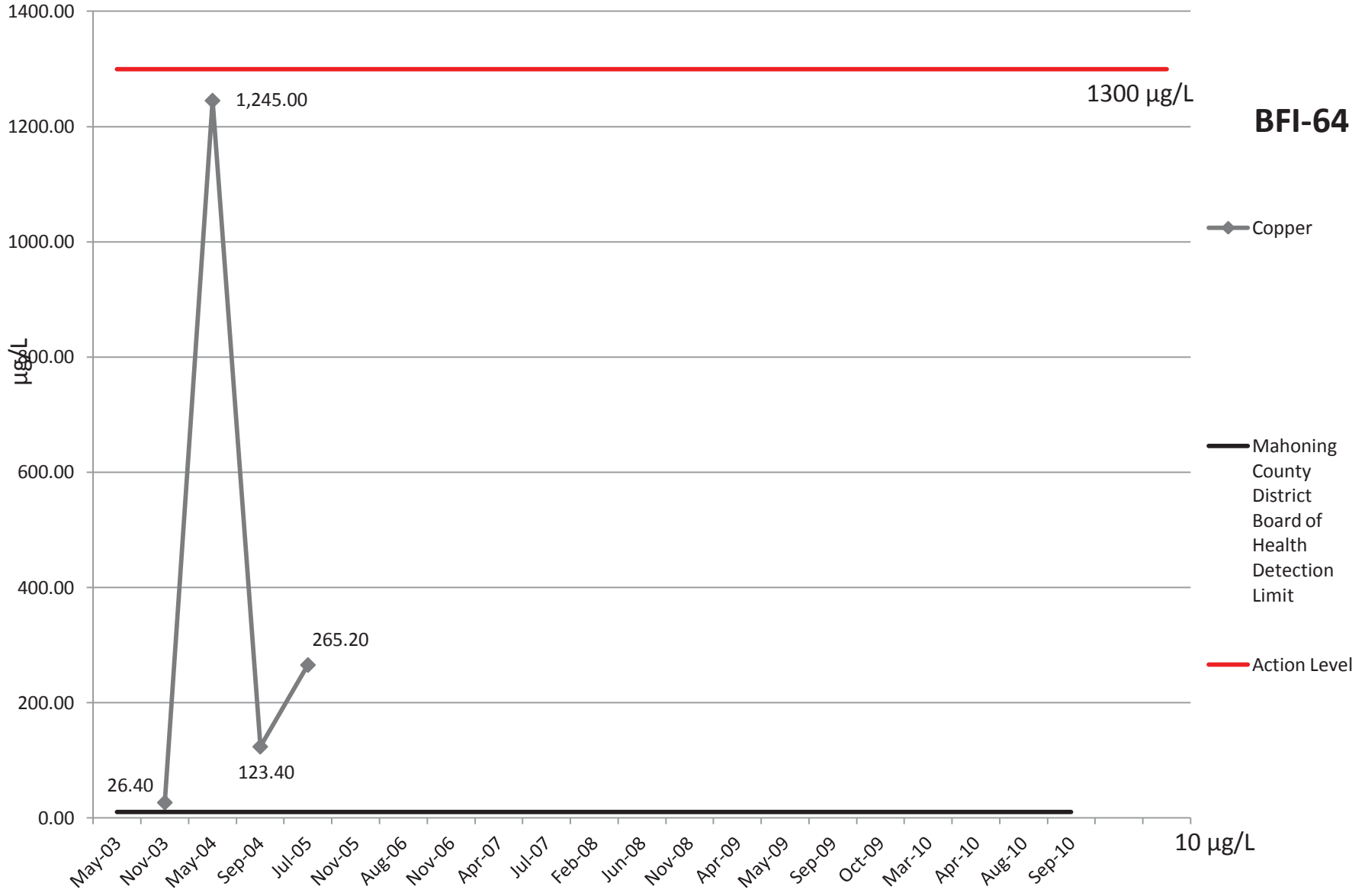


# Chromium



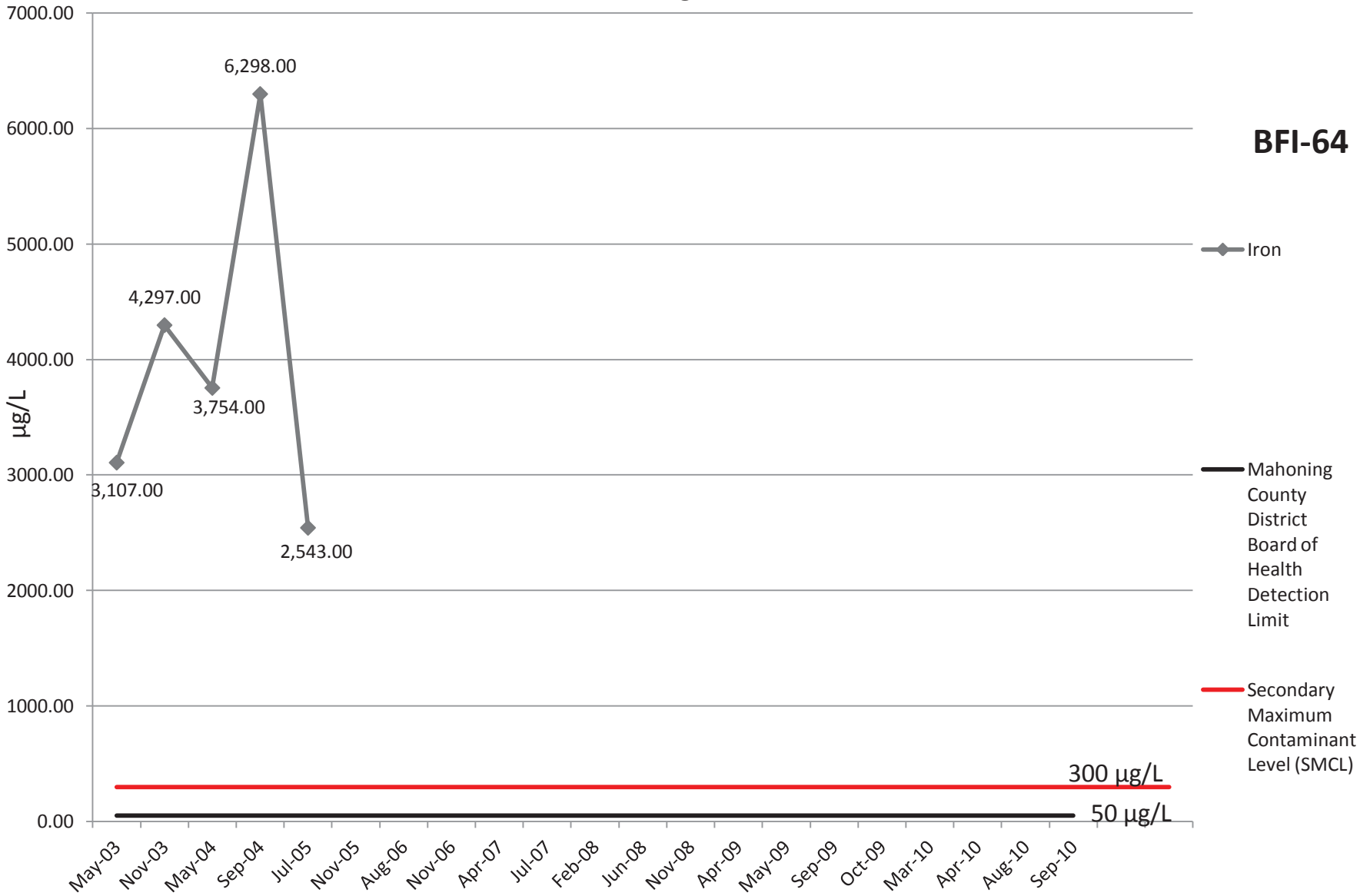


# Copper

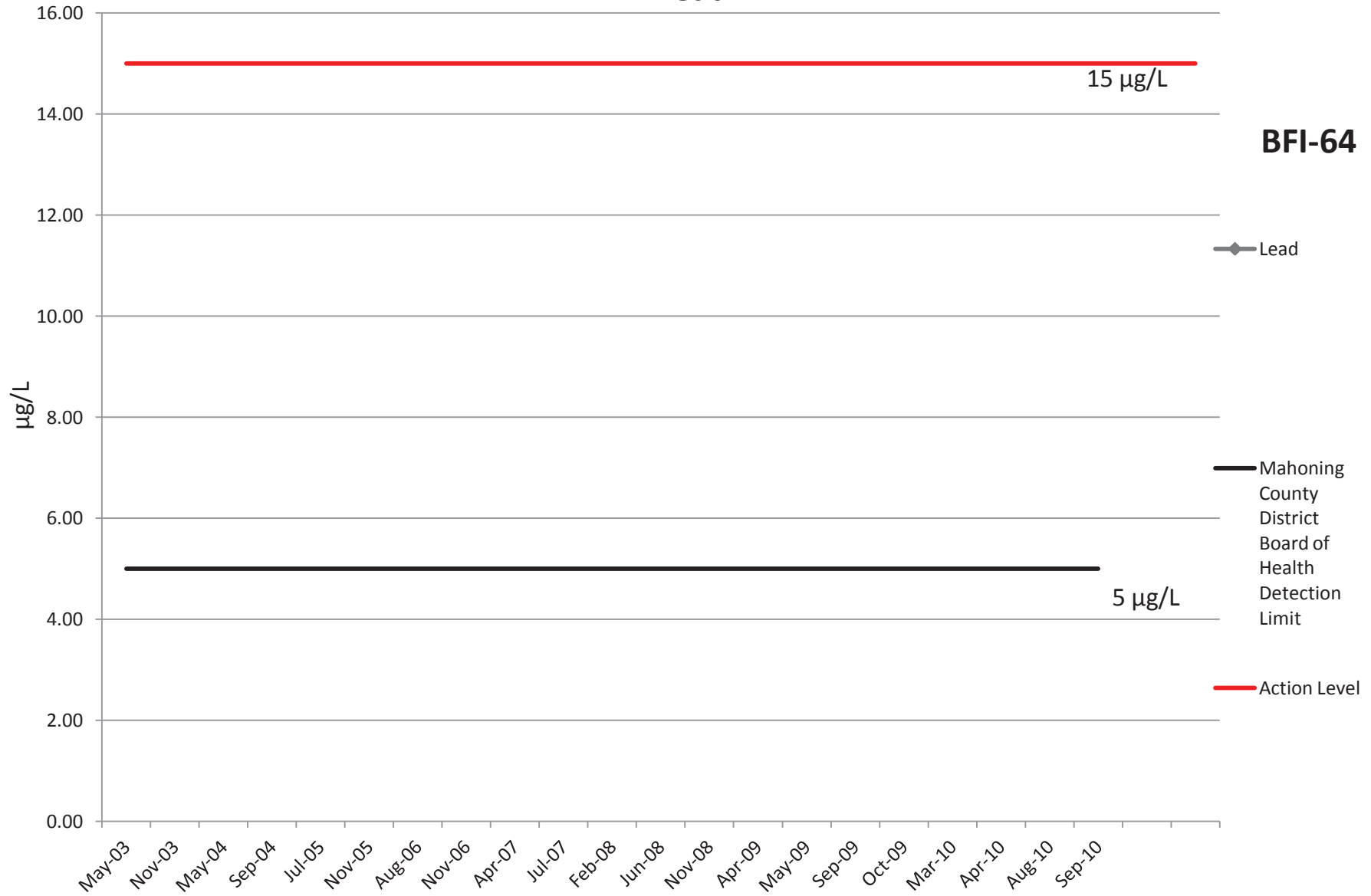


# Iron

**BFI-64**

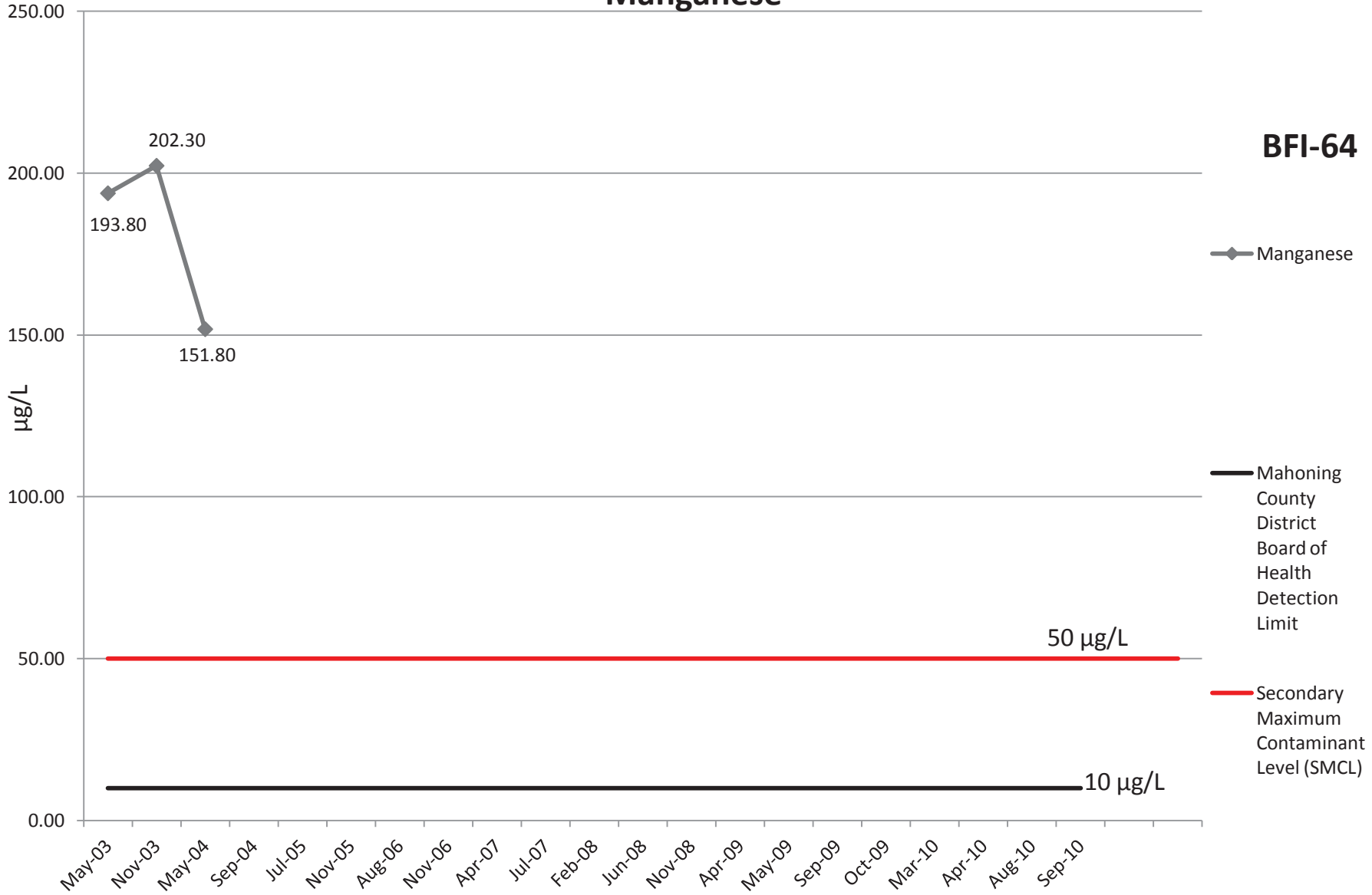


# Lead



# Manganese

**BFI-64**

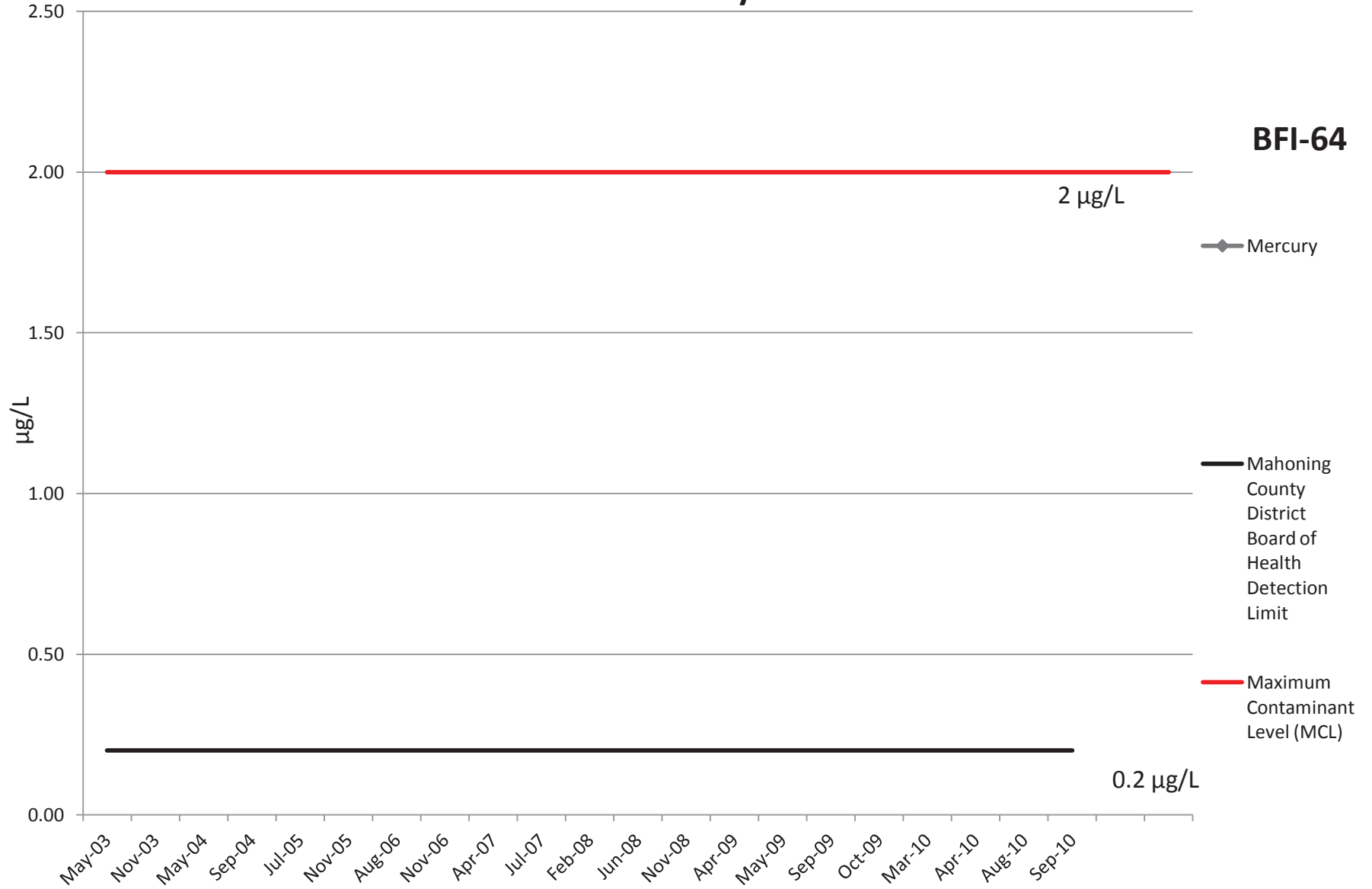


# Mercury

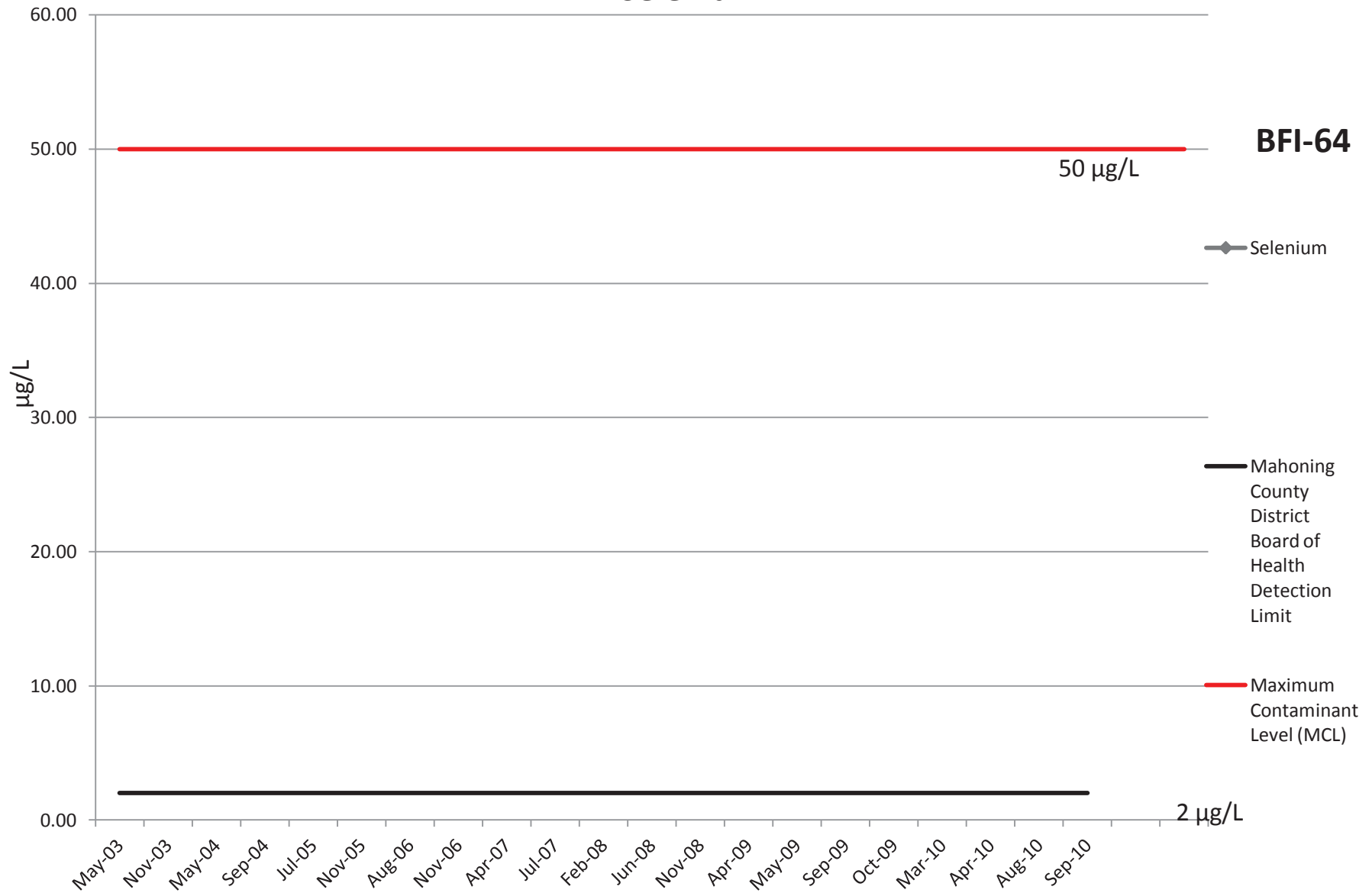
**BFI-64**

2 µg/L

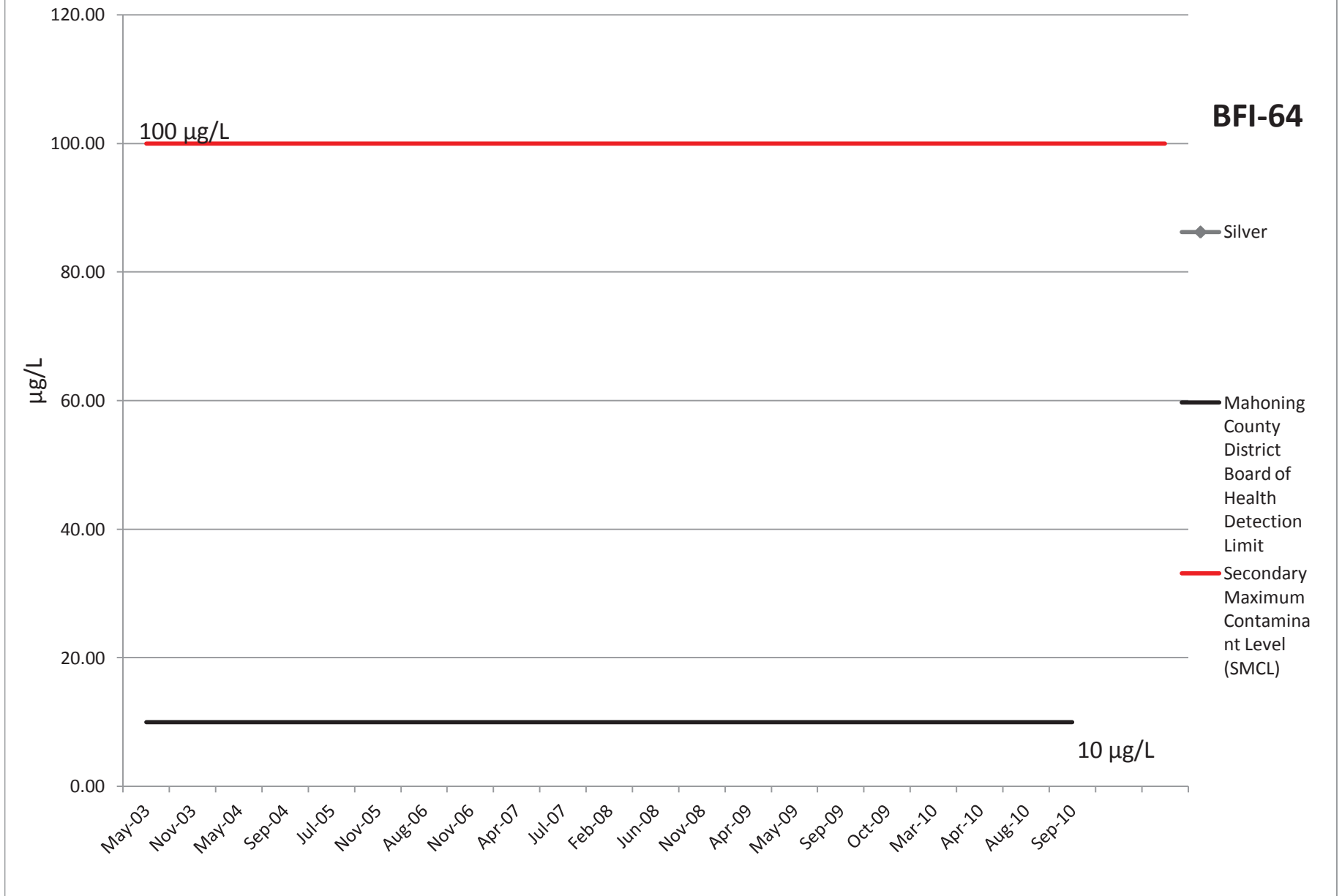
0.2 µg/L



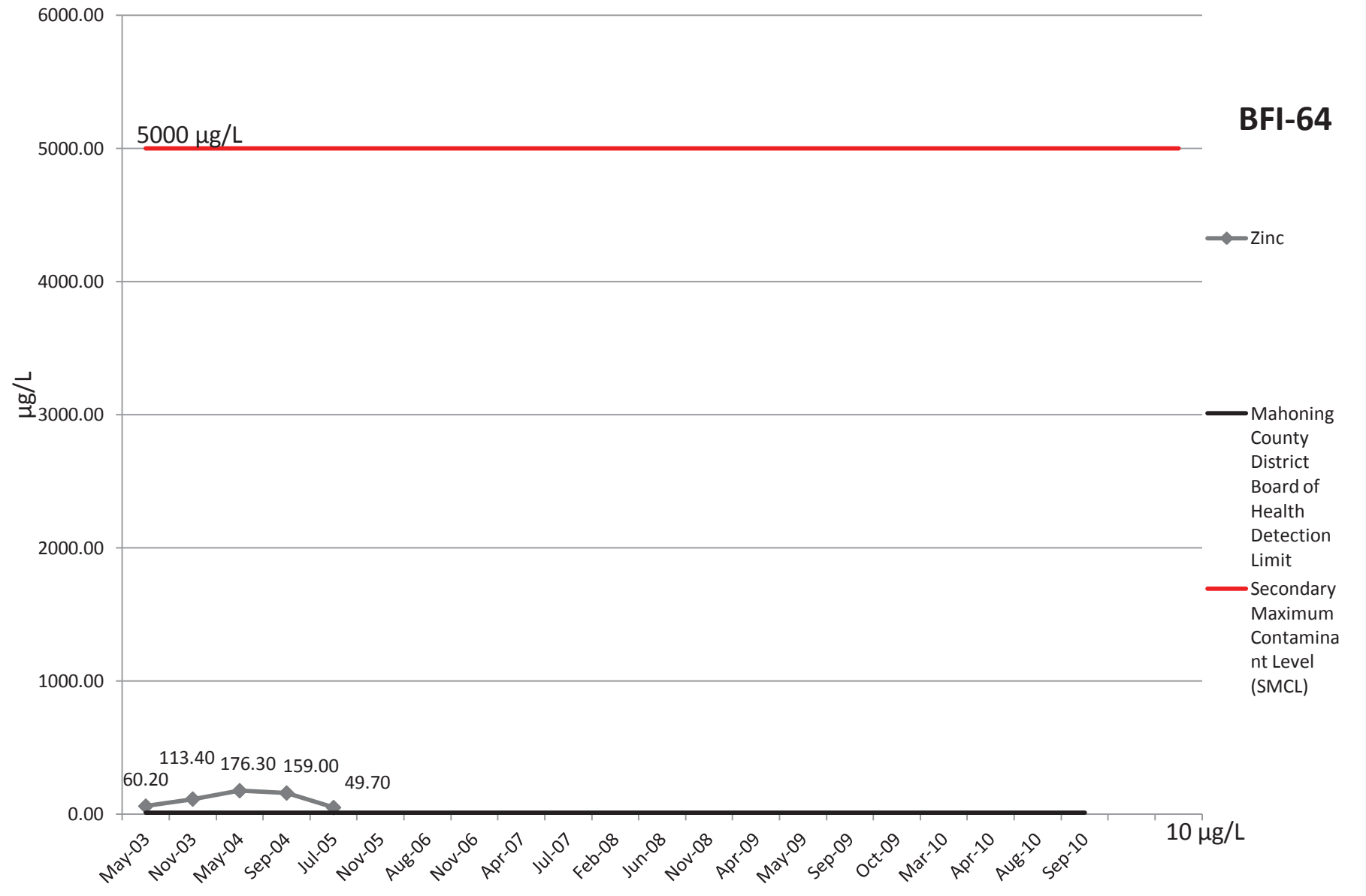
# Selenium



# Silver

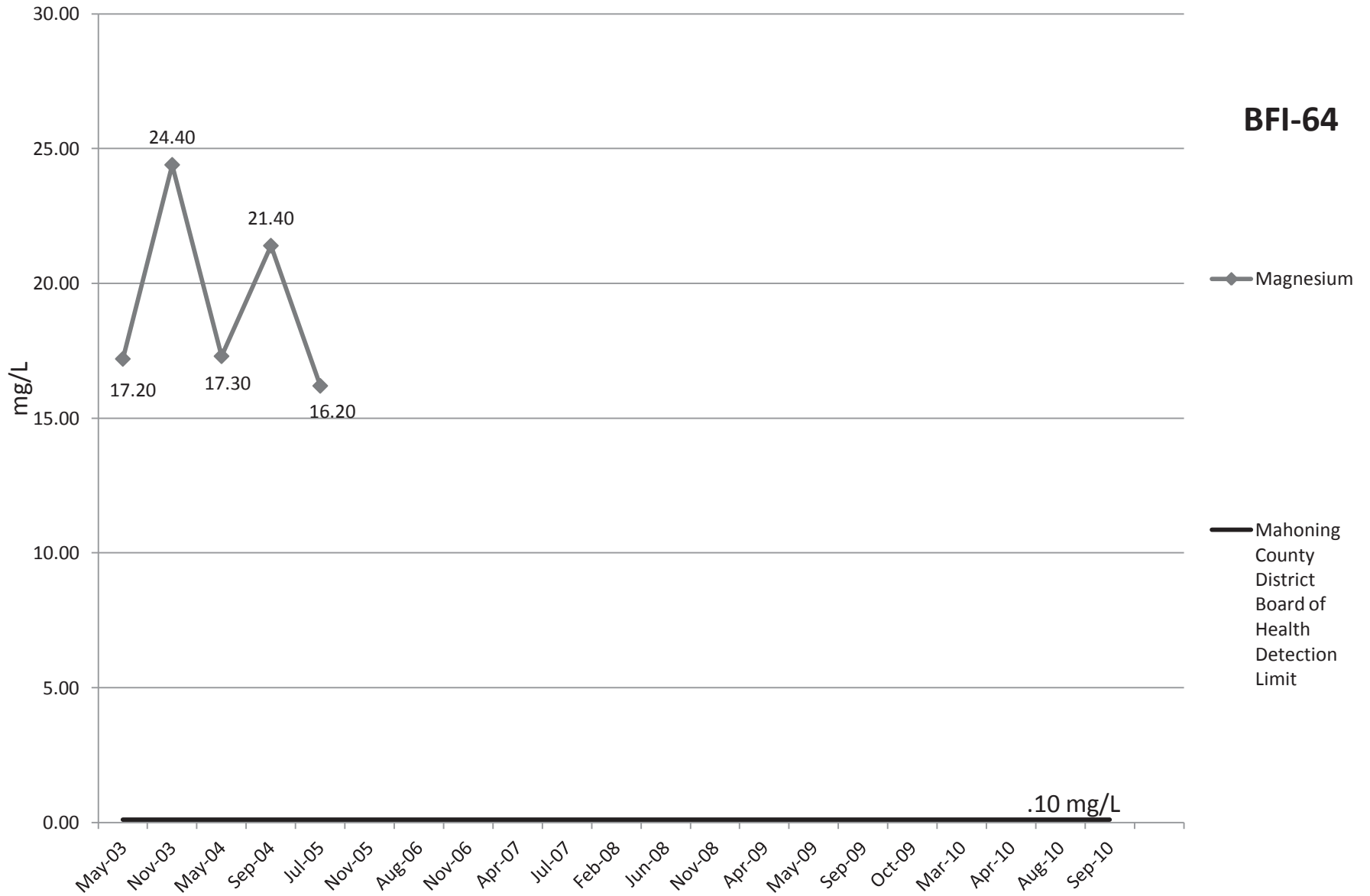


# Zinc

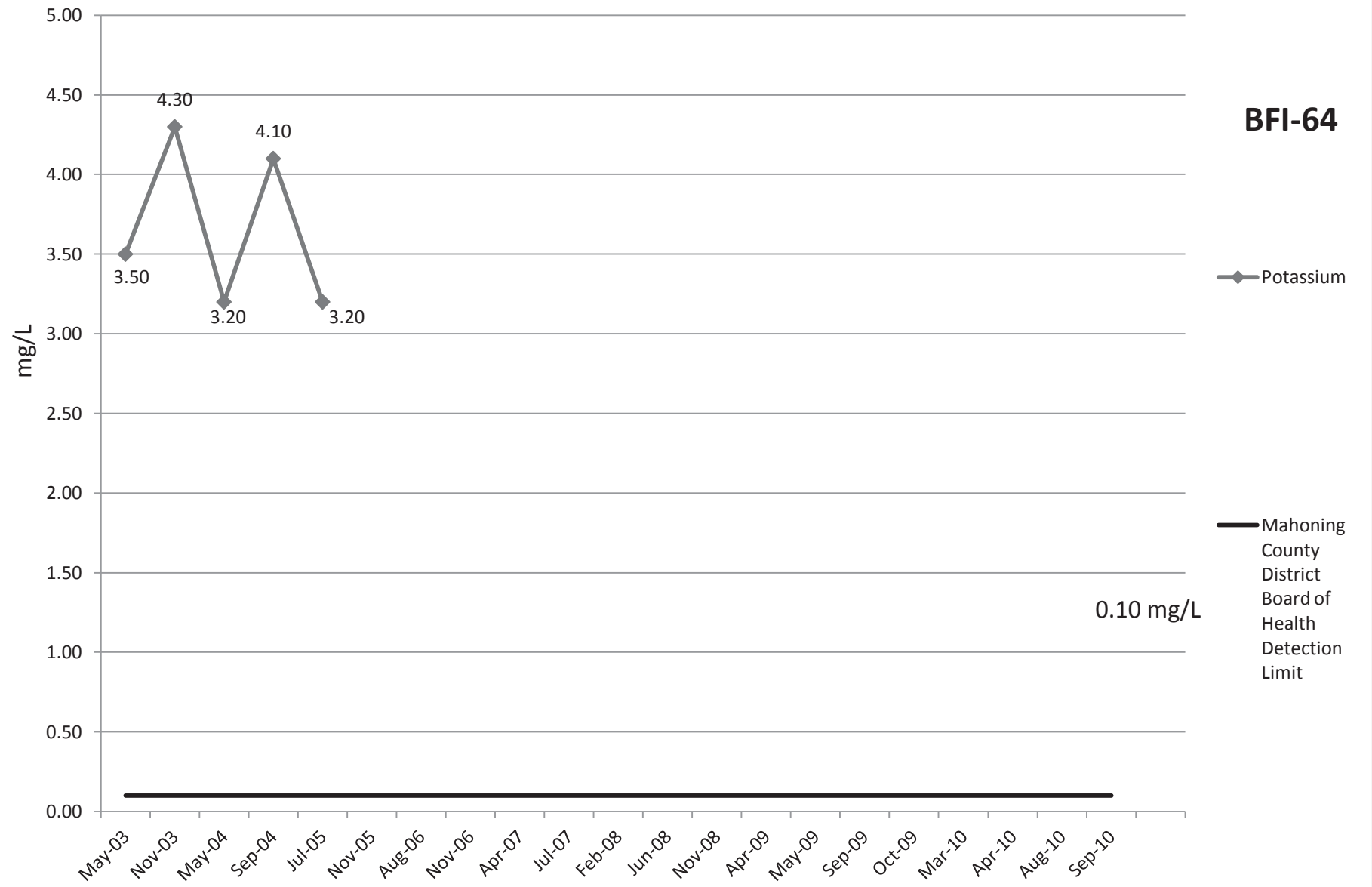




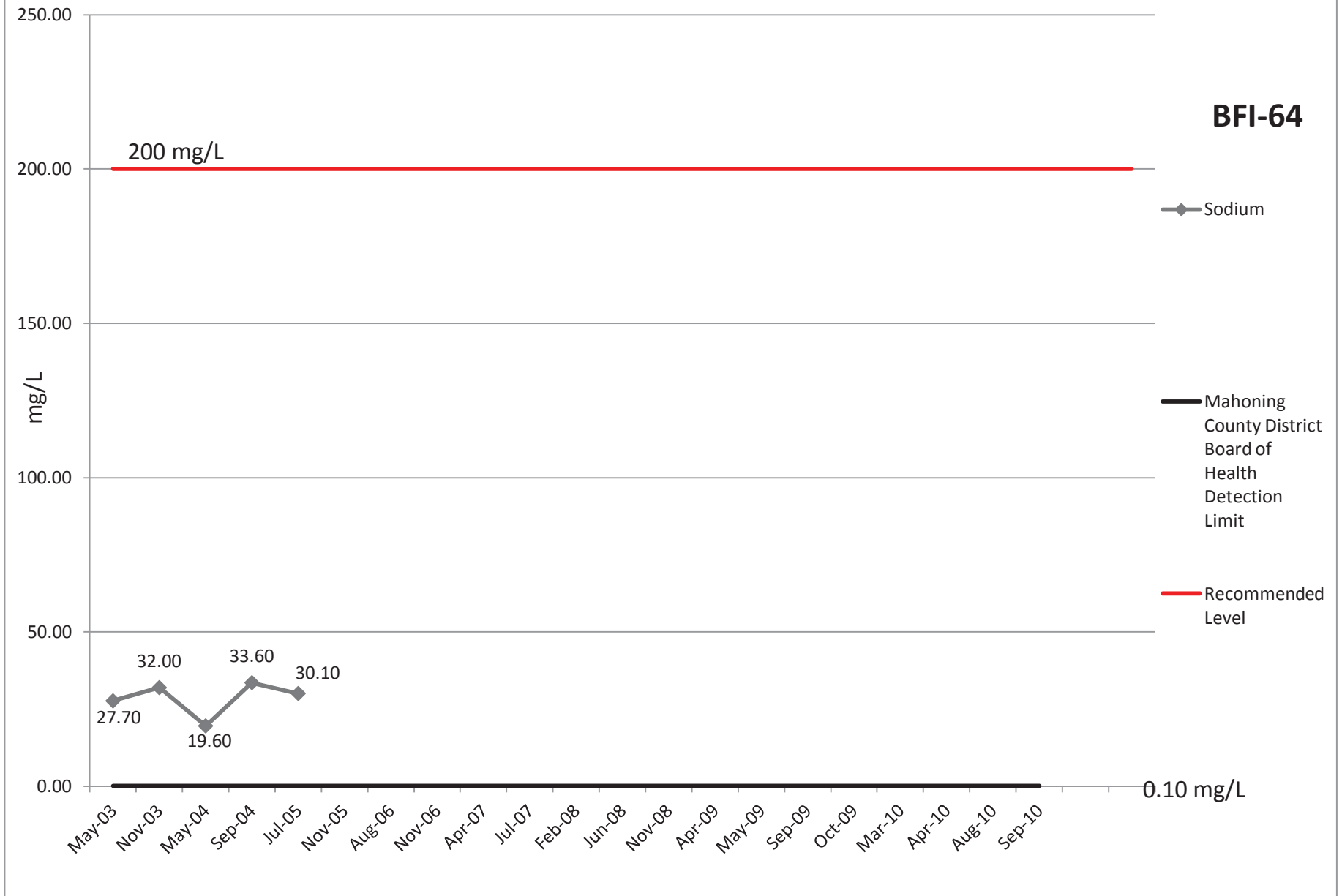
# Magnesium



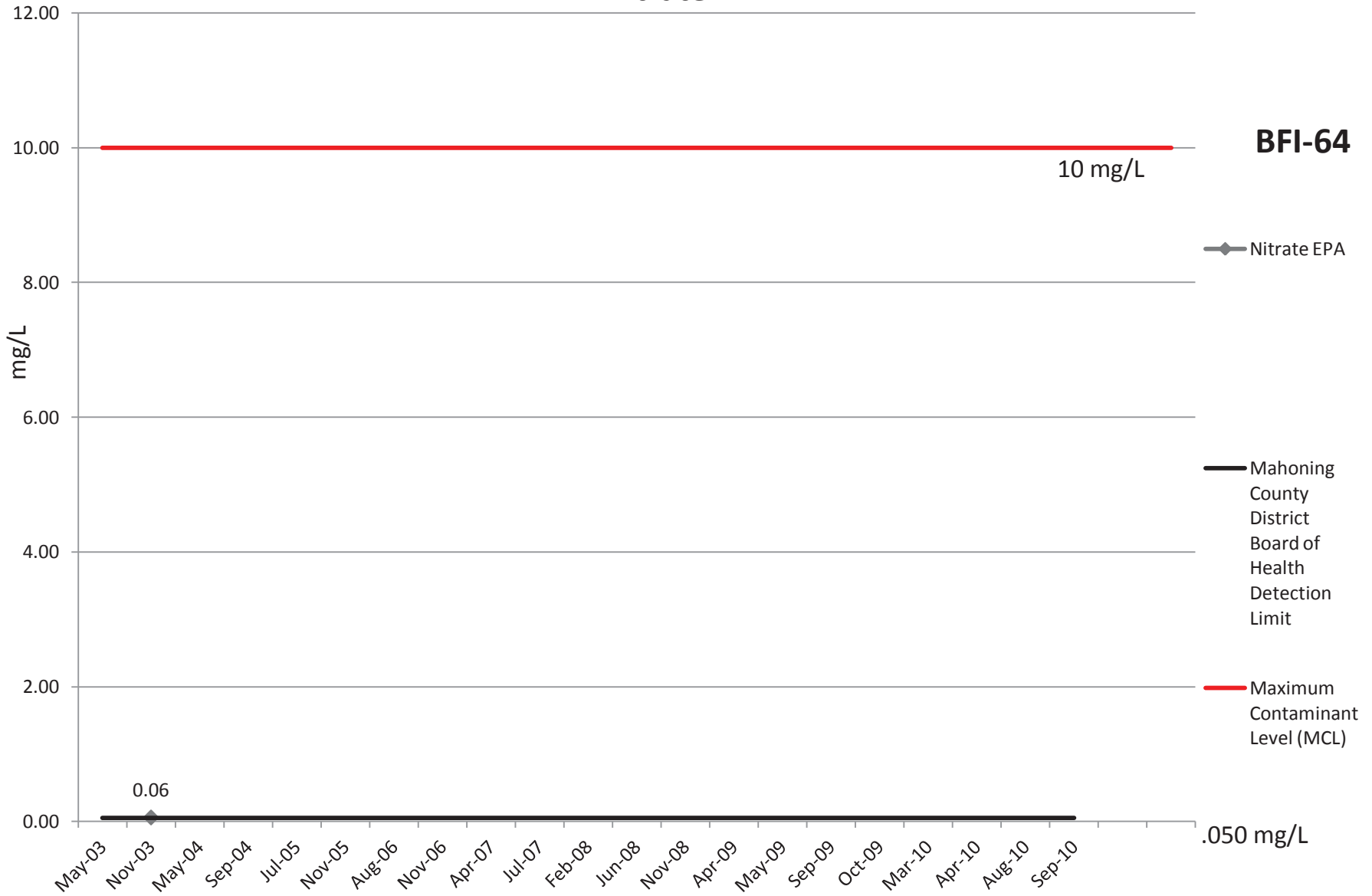
# Potassium



# Sodium



# Nitrate EPA



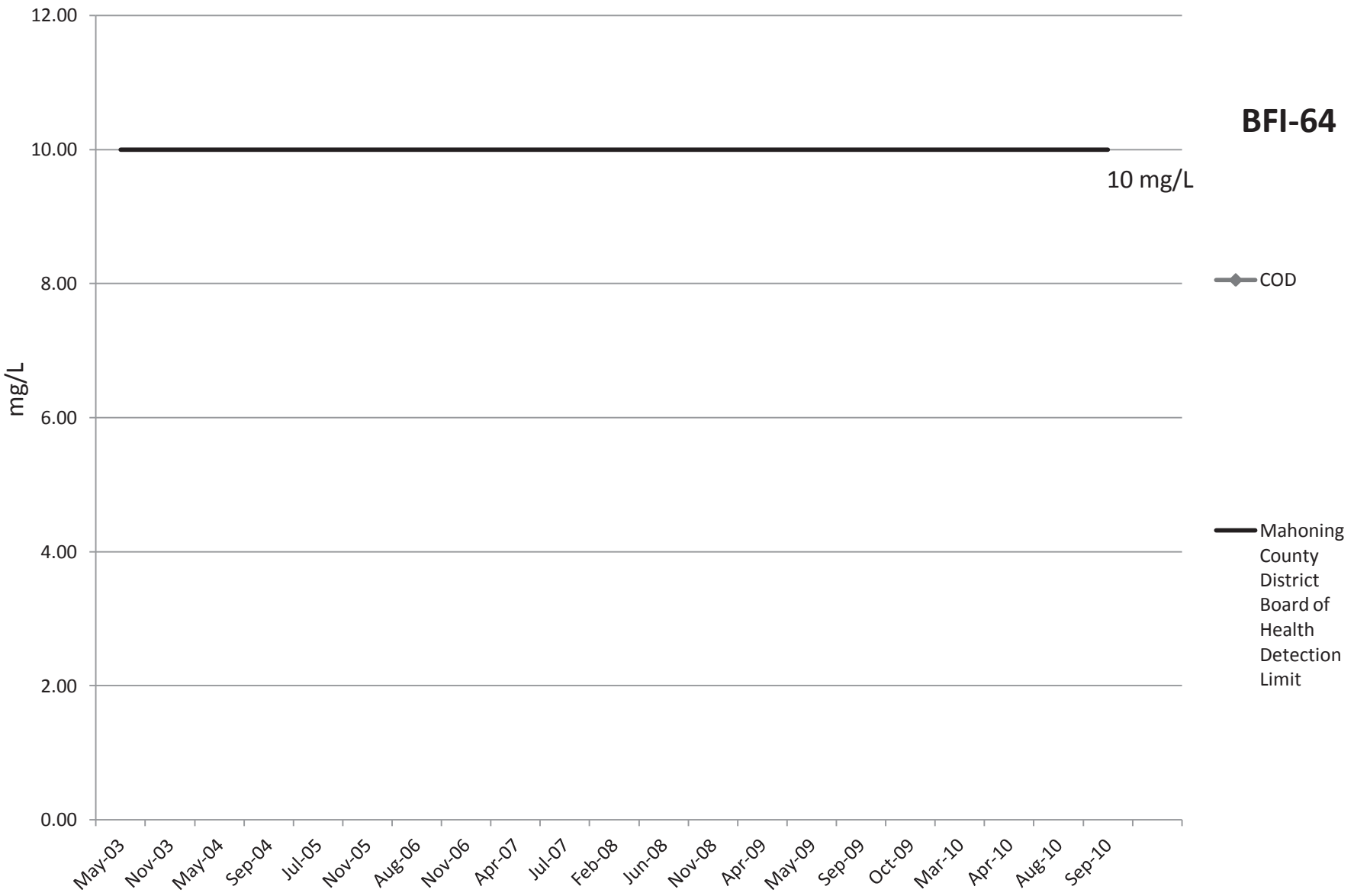
**BFI-64**

◆ Nitrate EPA

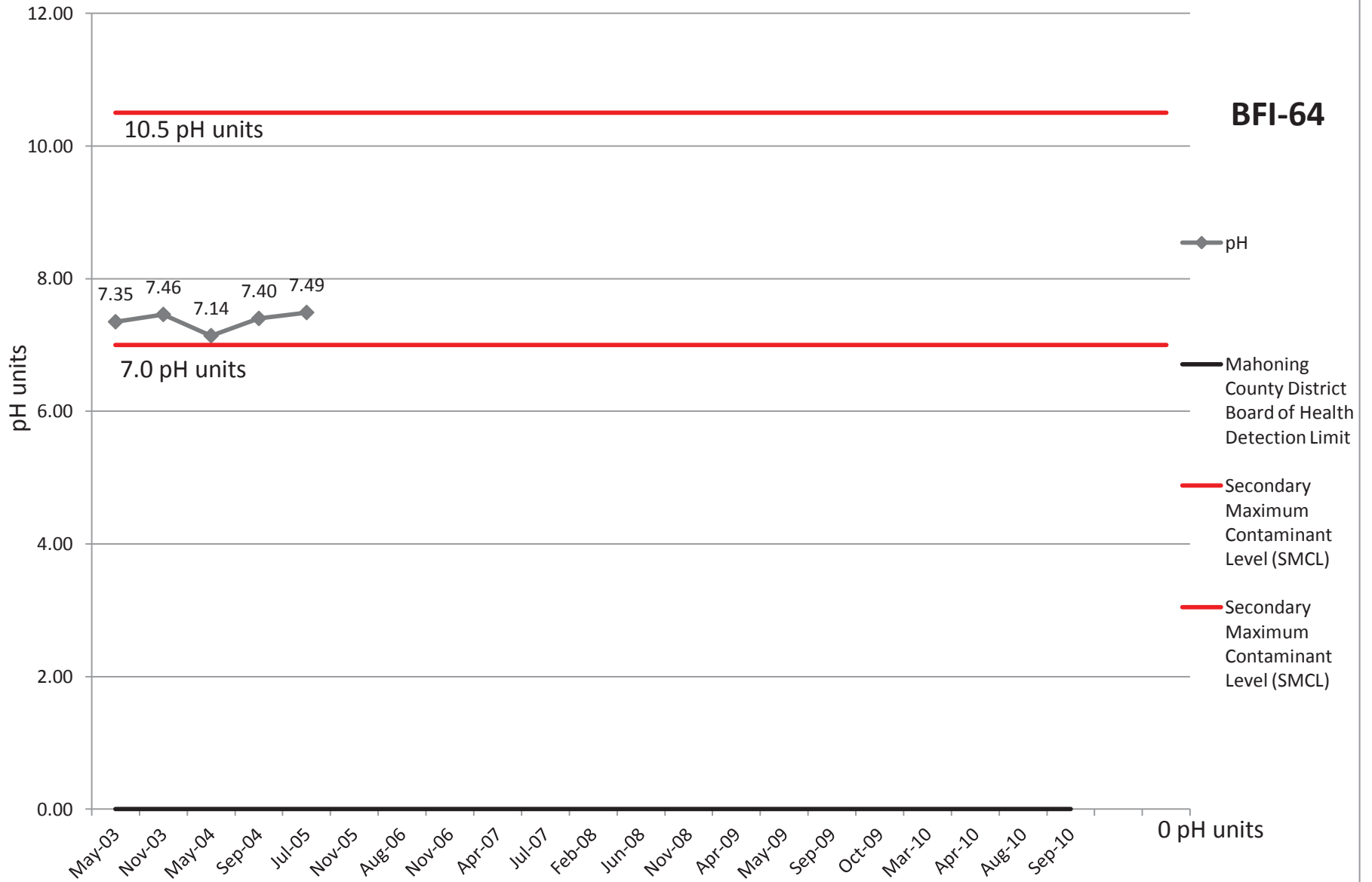
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

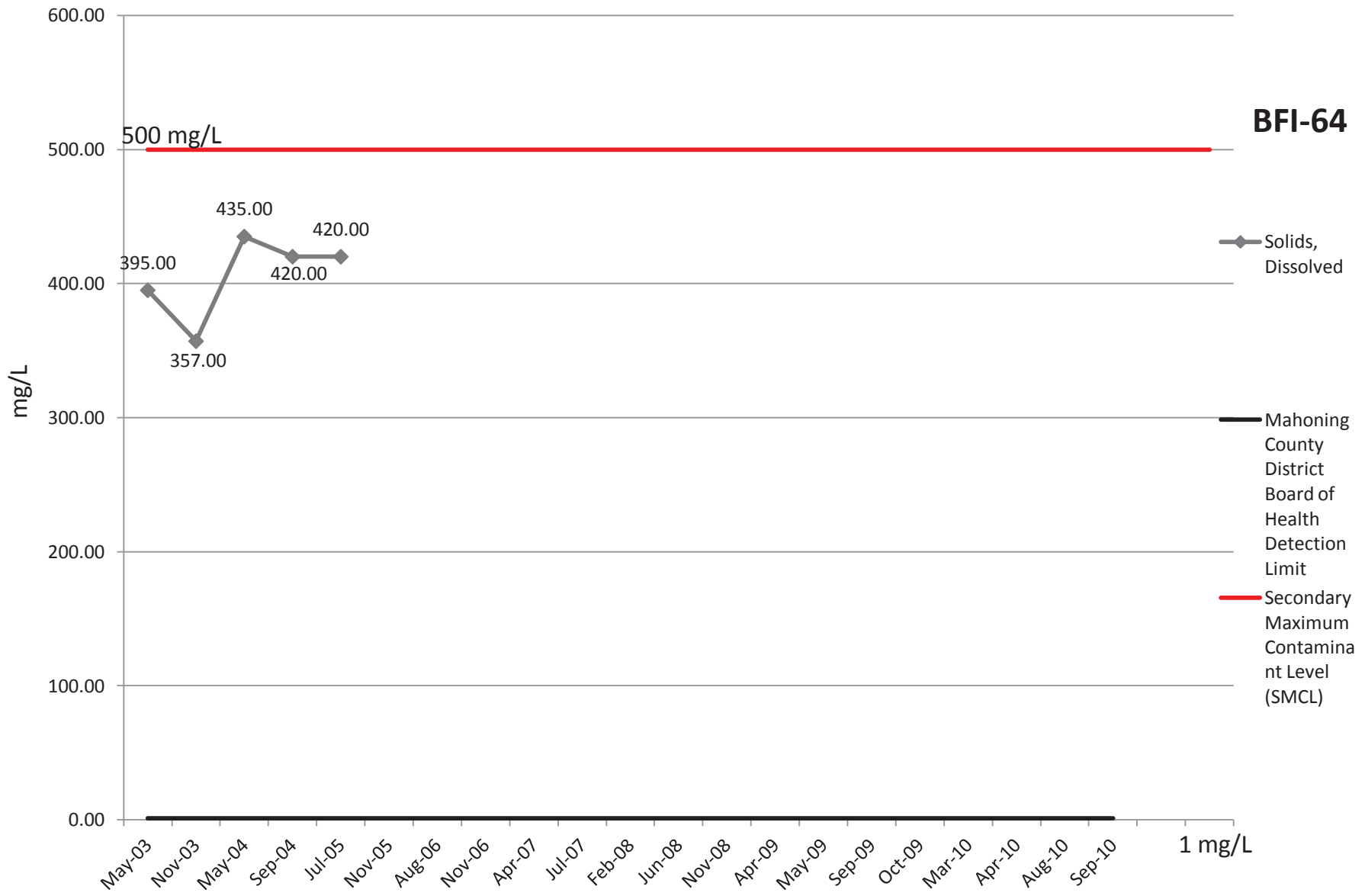
# COD



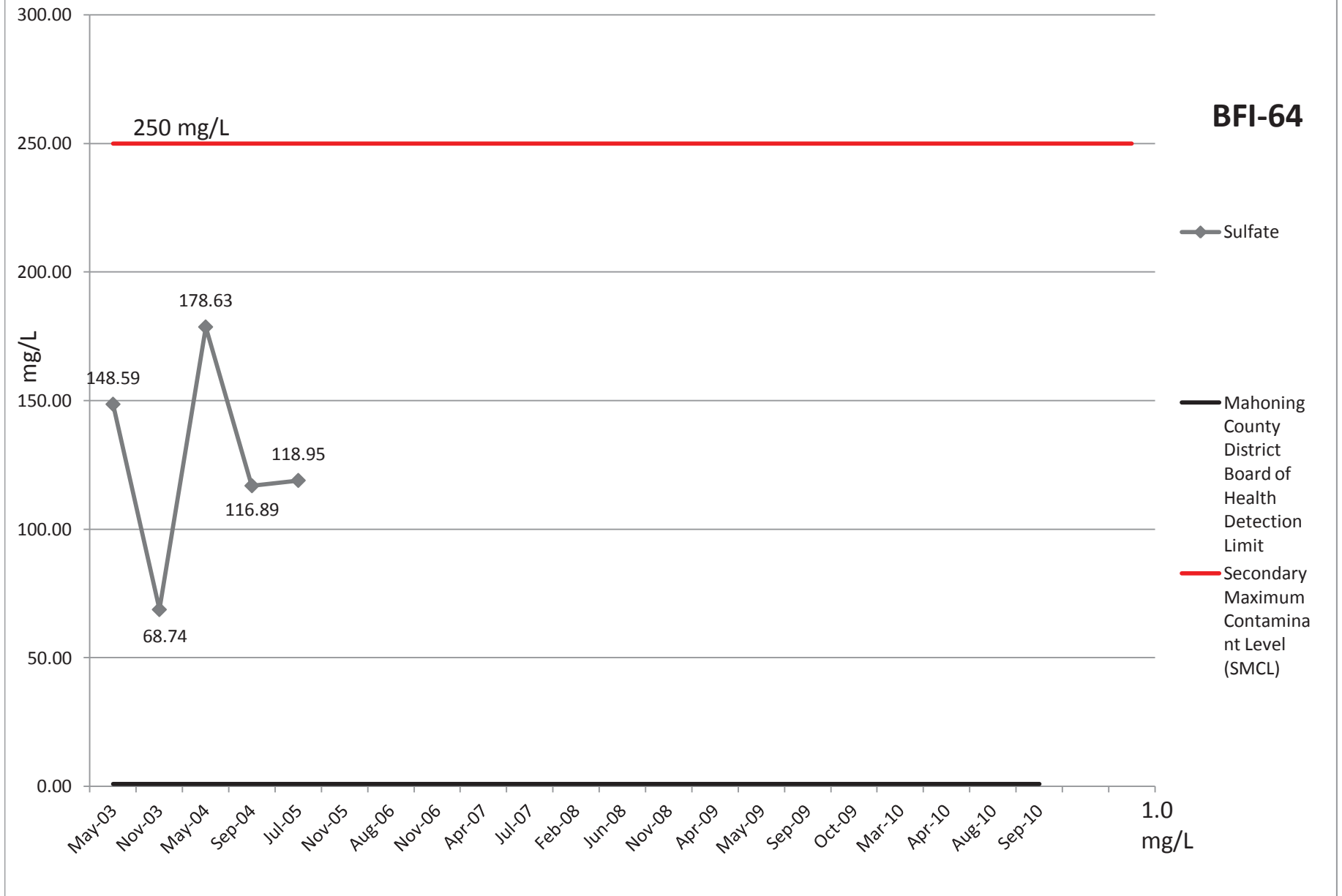
# pH



# Solids, Dissolved



# Sulfate





# Bacteria

positive (1)

**BFI-64**

Positive/Negative

◆ Bacteria

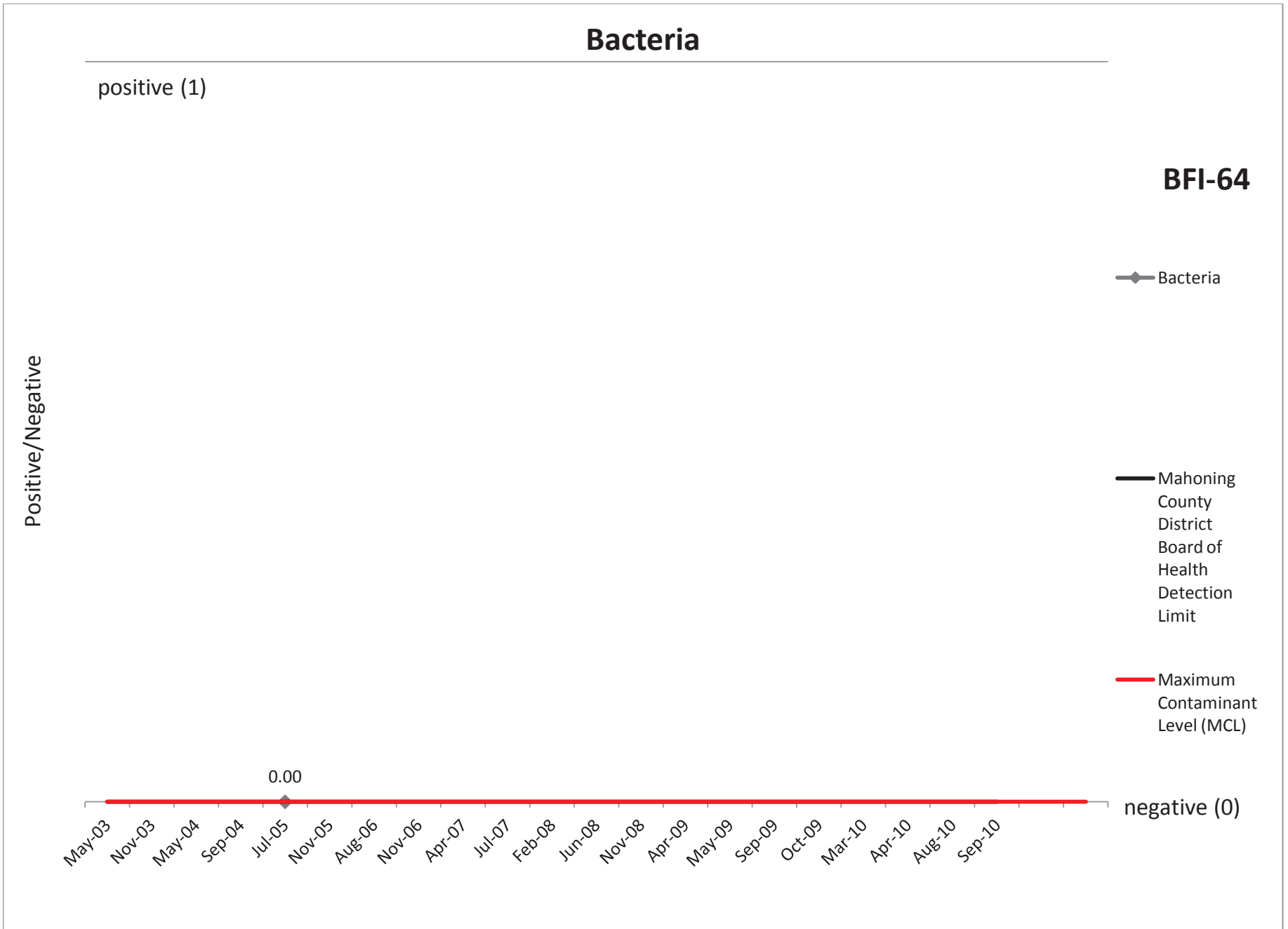
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

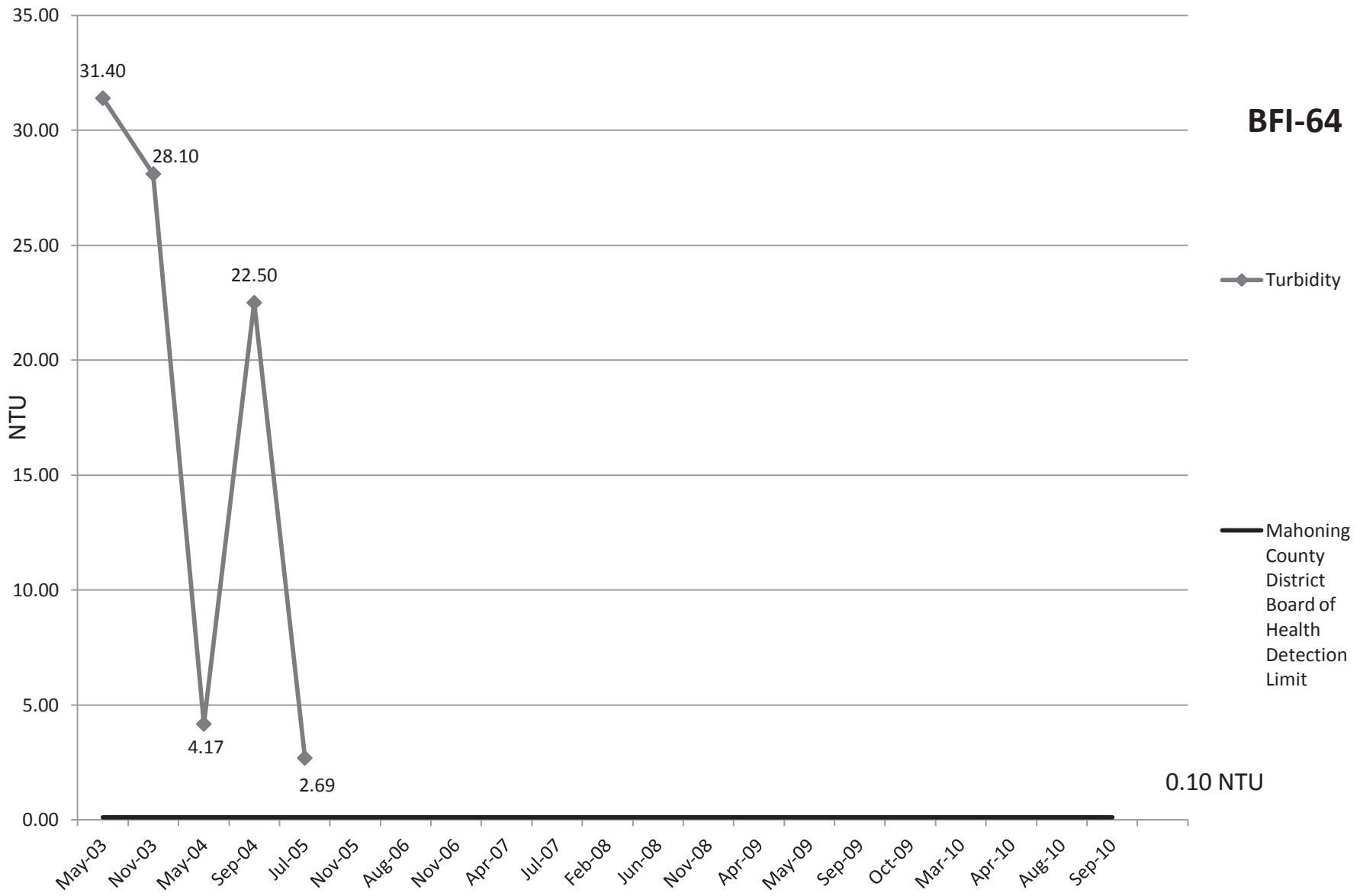
0.00

negative (0)

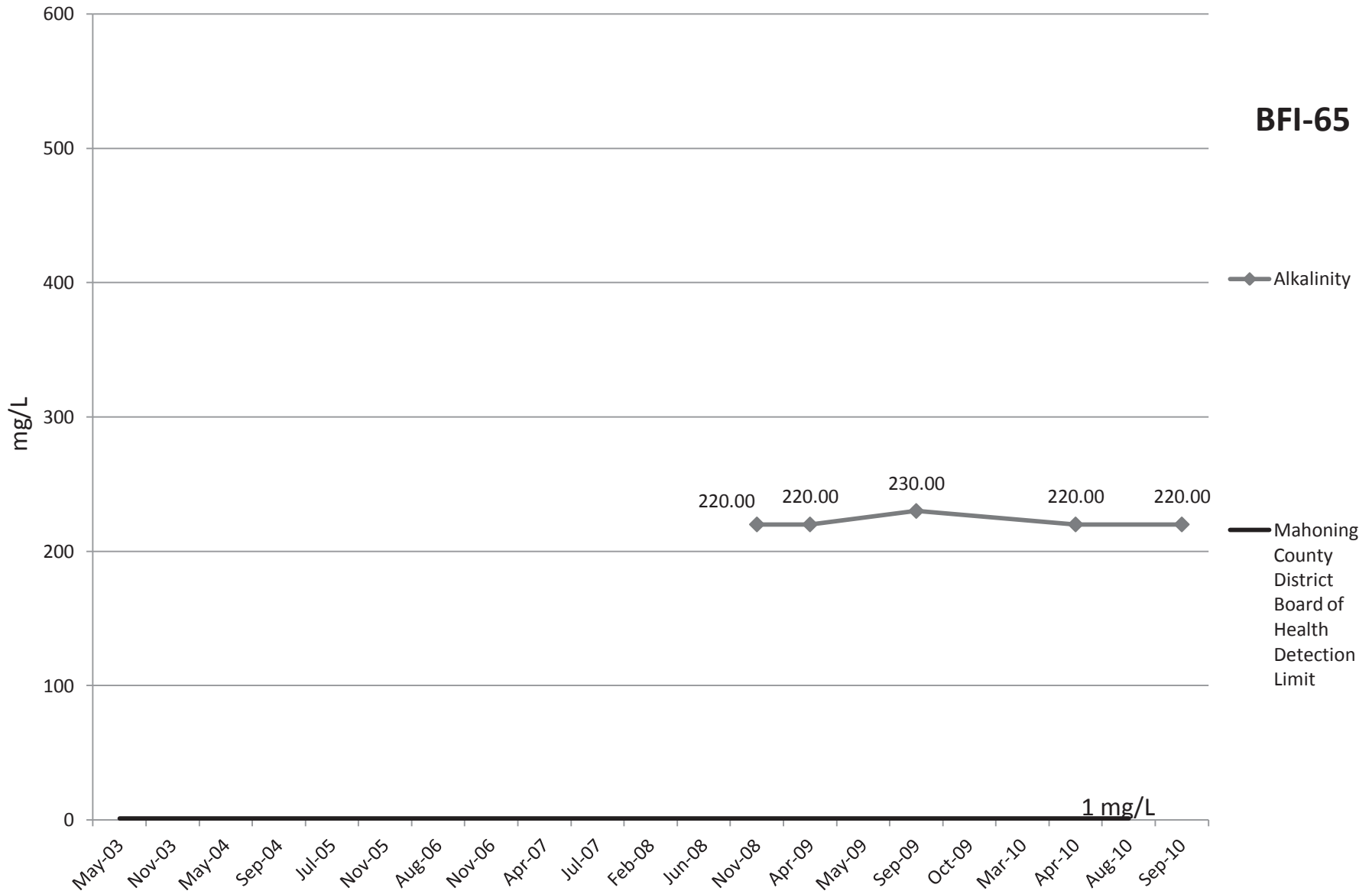
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



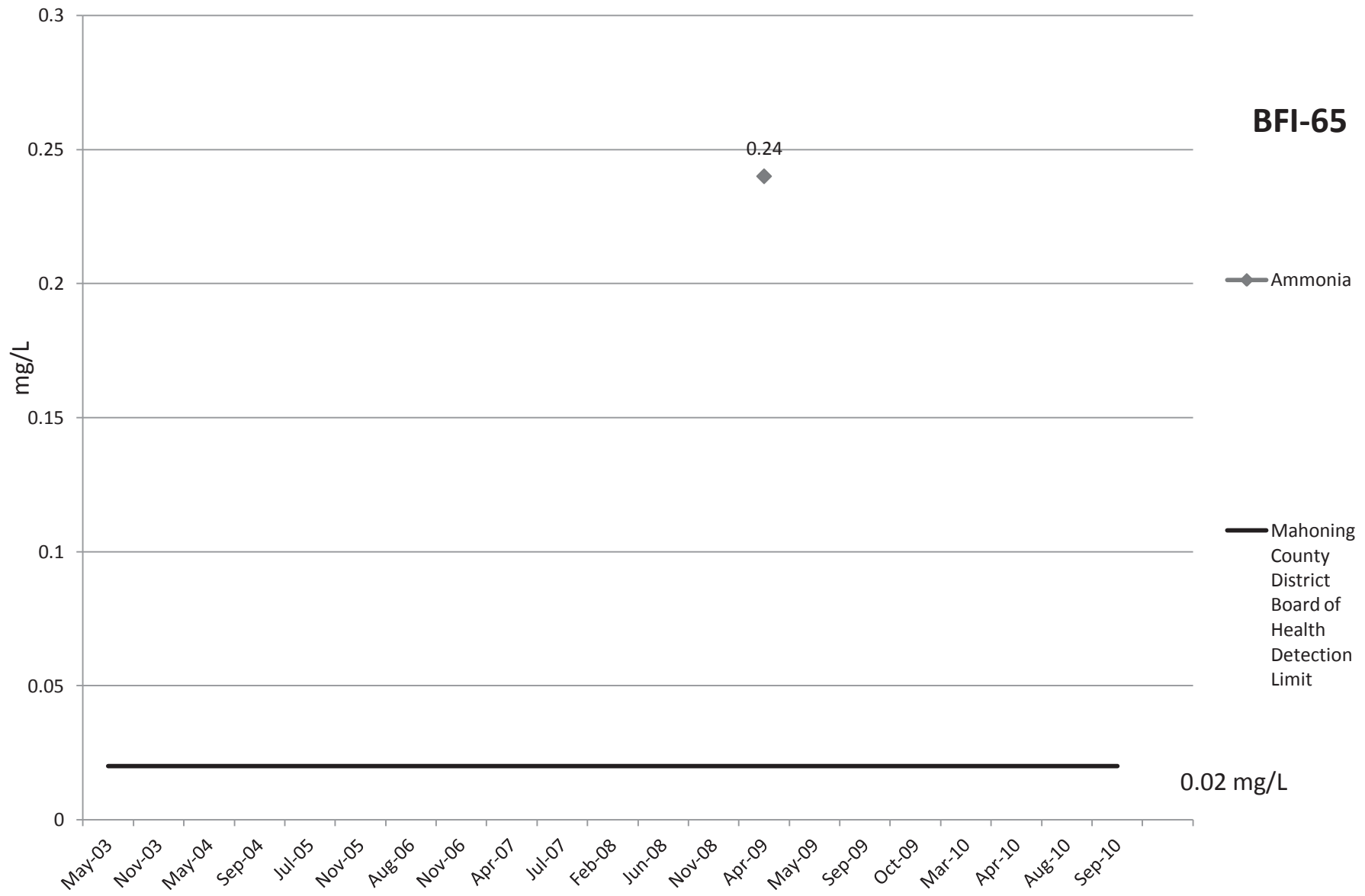
# Turbidity



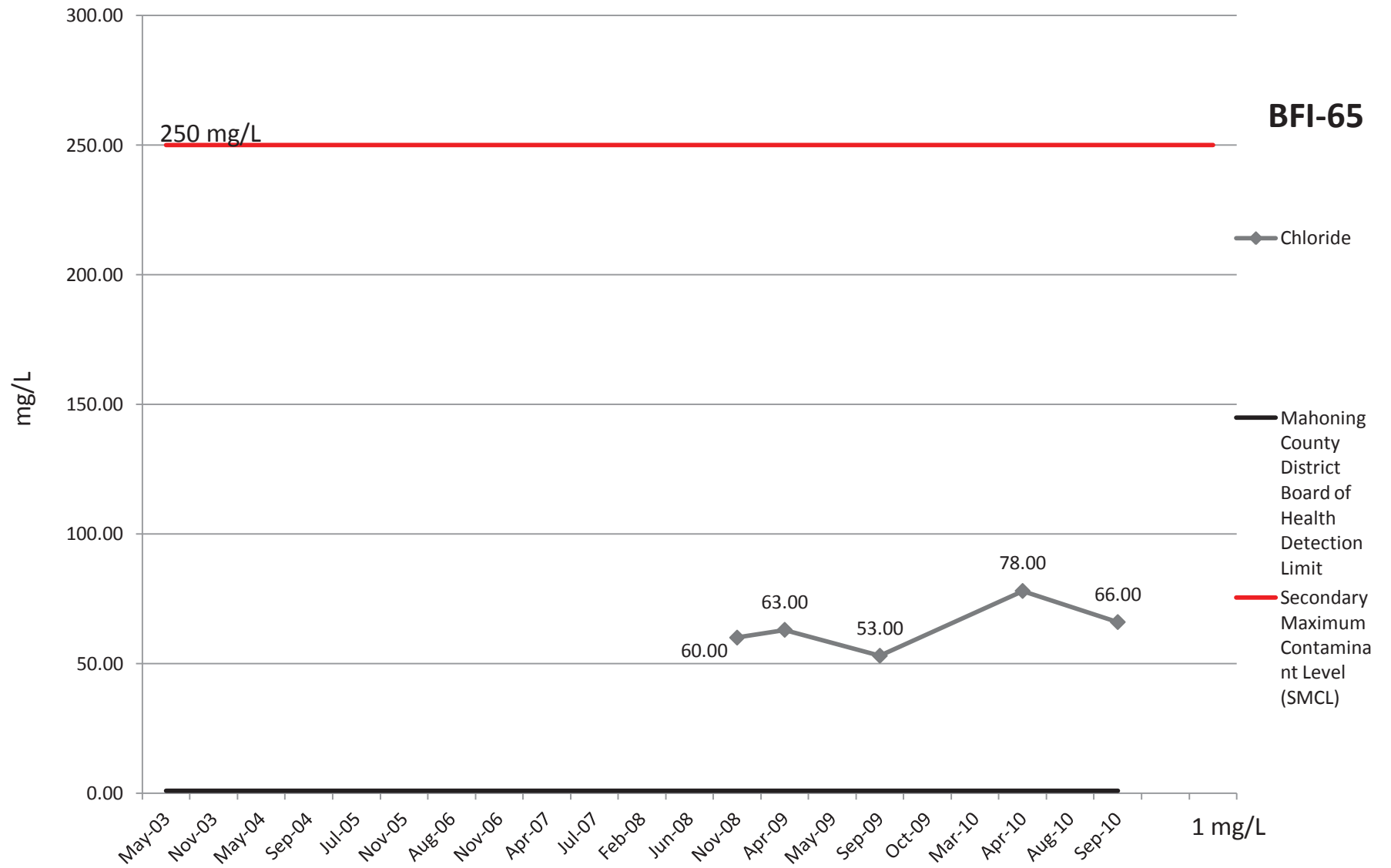
# Alkalinity



# Ammonia

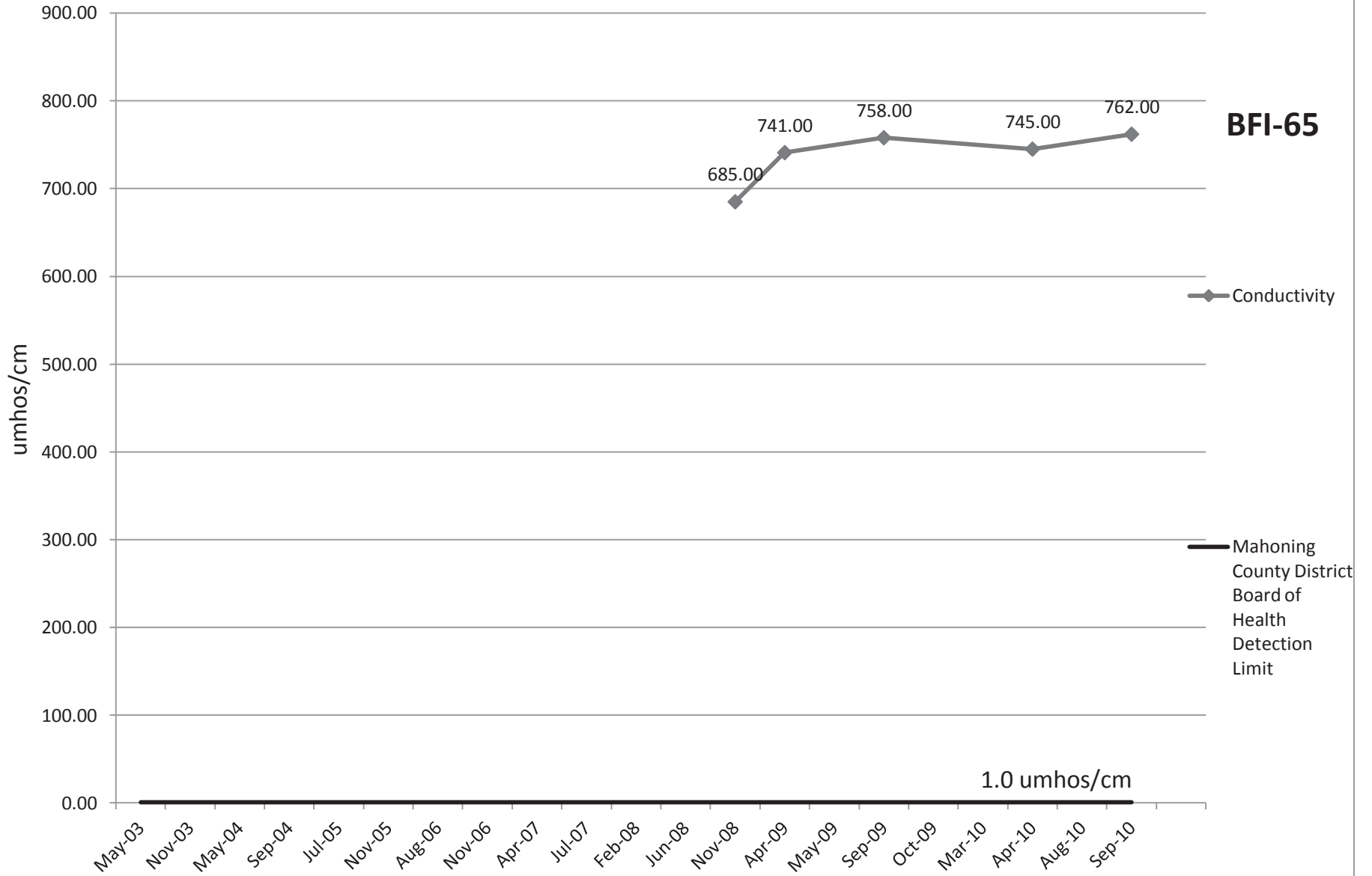


# Chloride

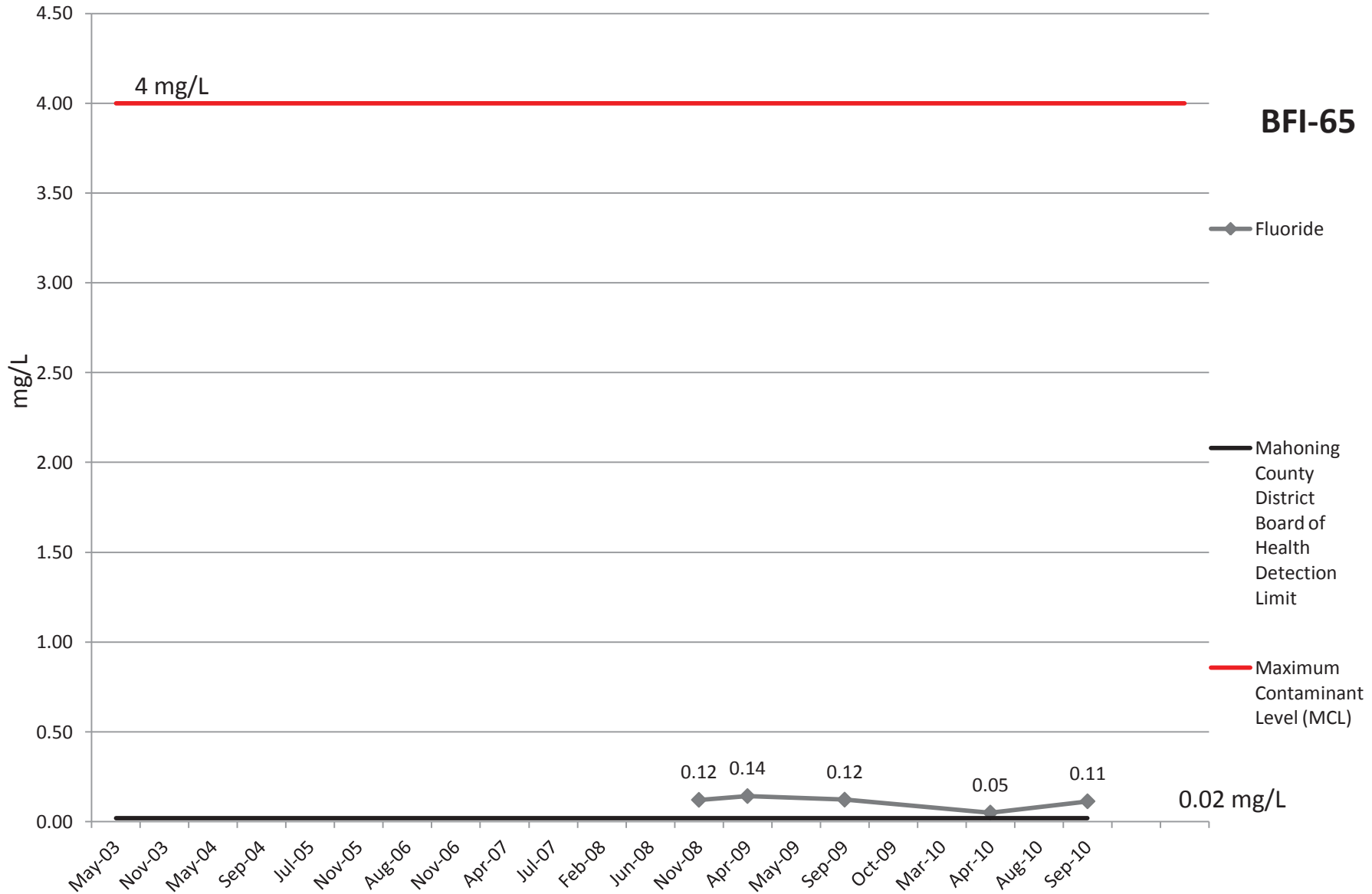


# Conductivity

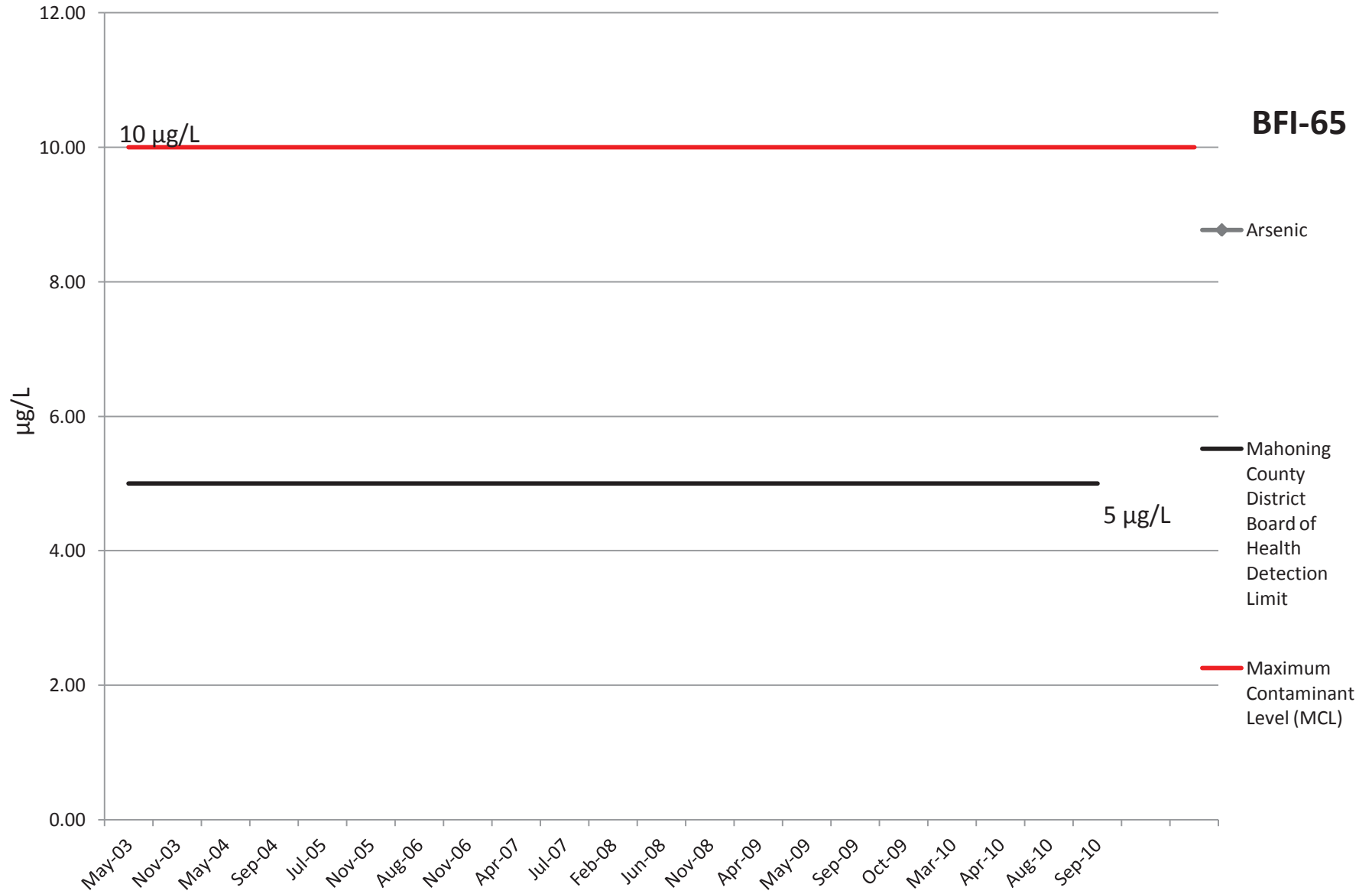
**BFI-65**



# Fluoride



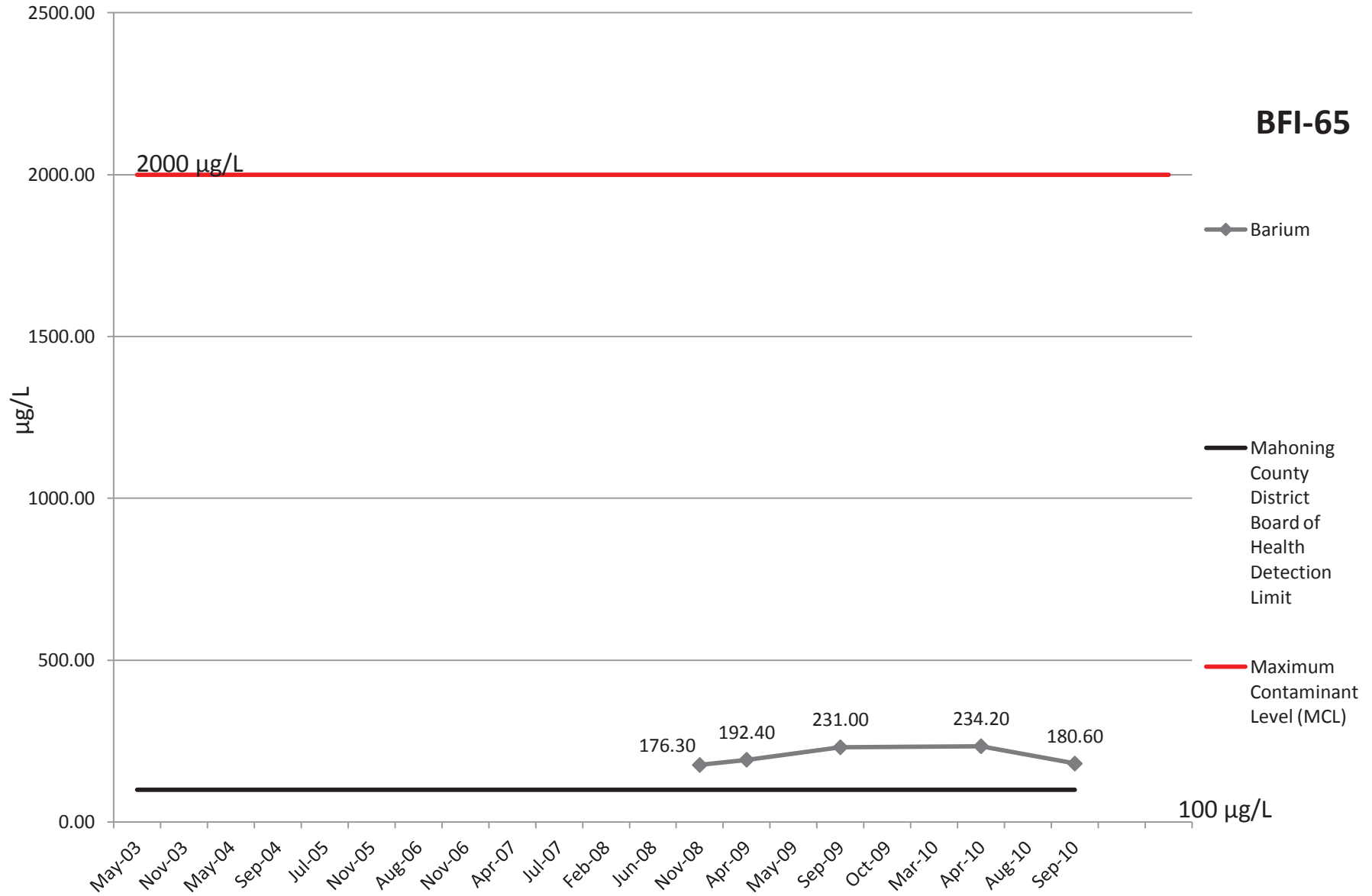
# Arsenic



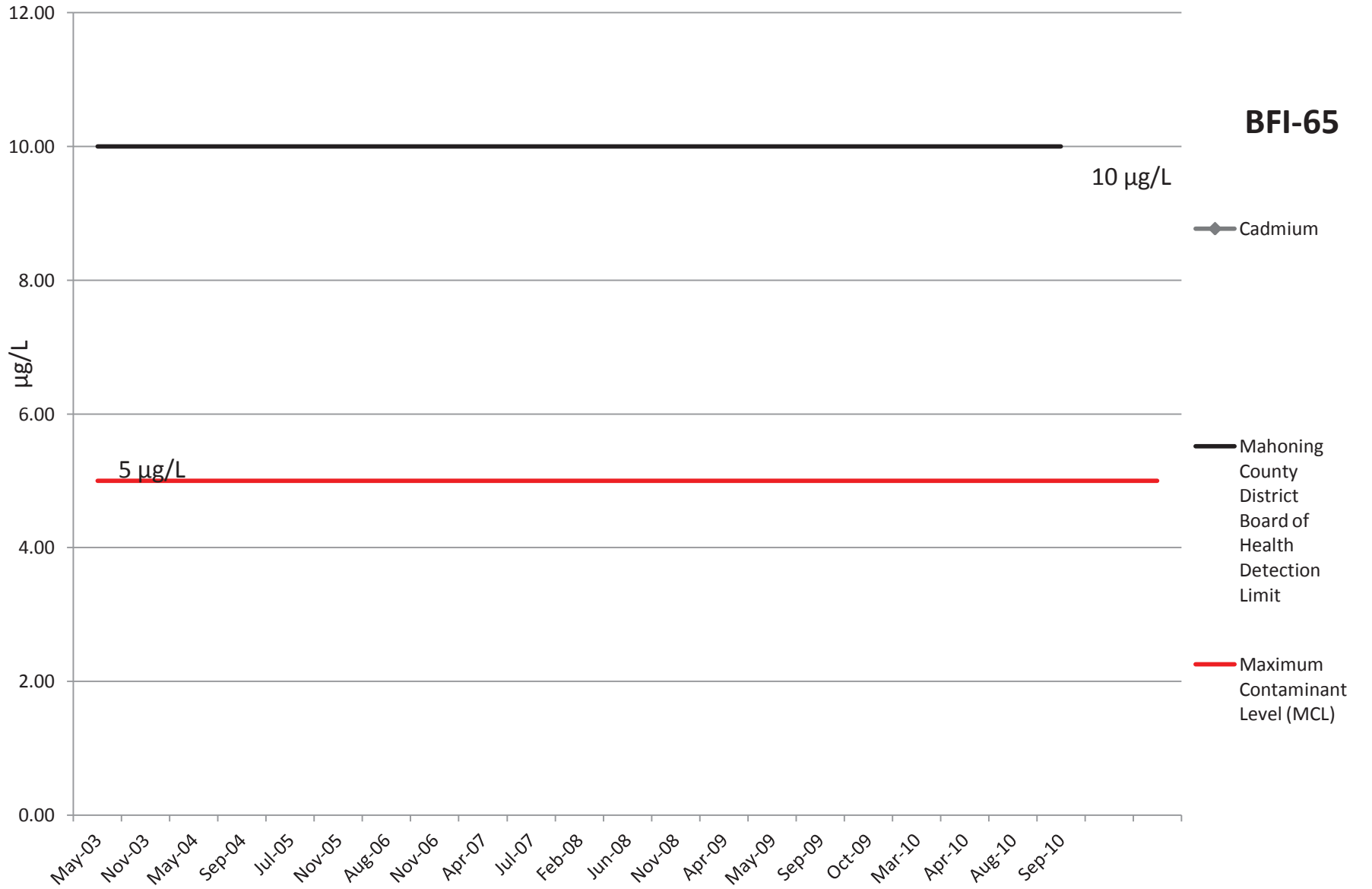


# Barium

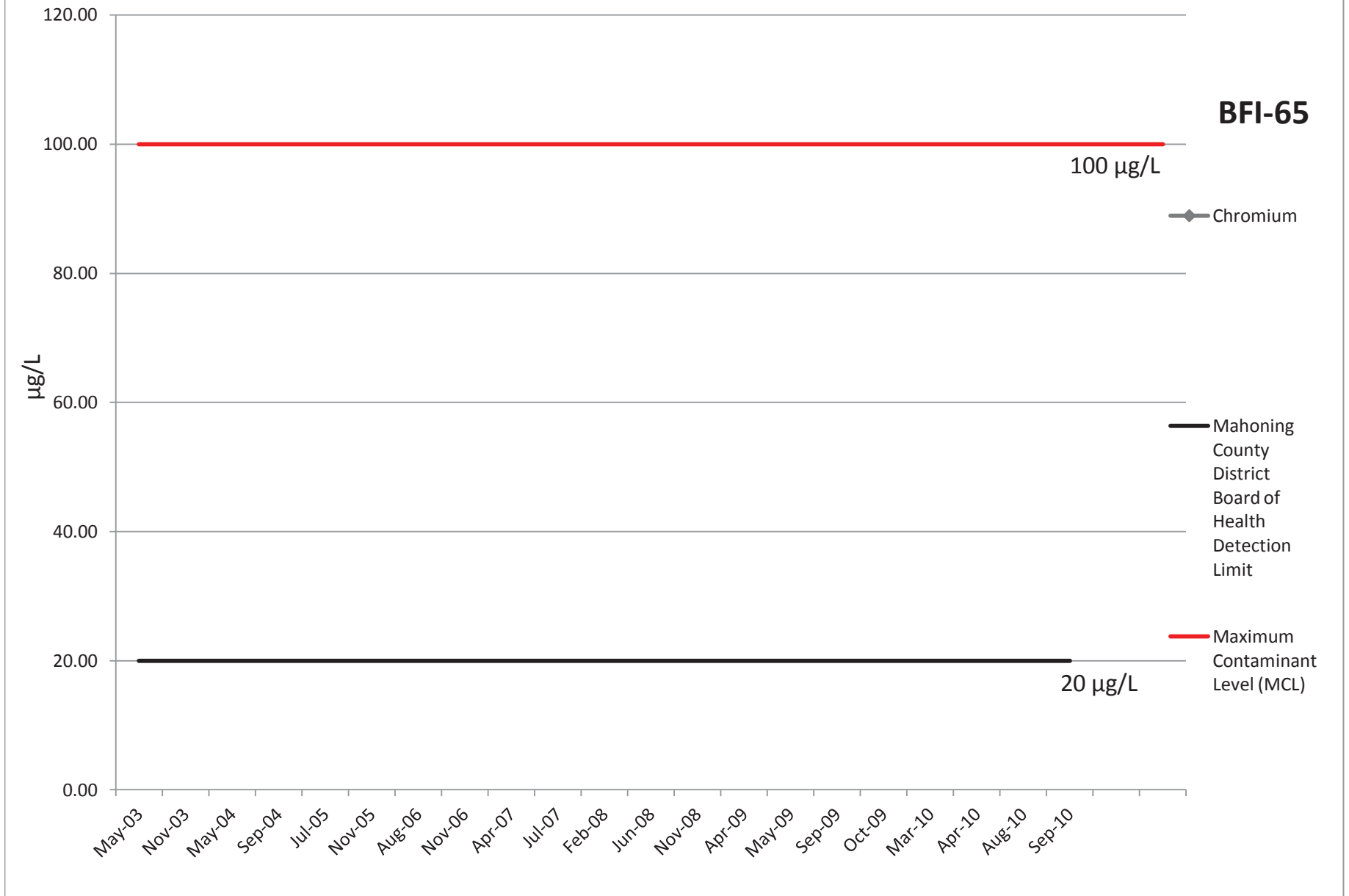
**BFI-65**



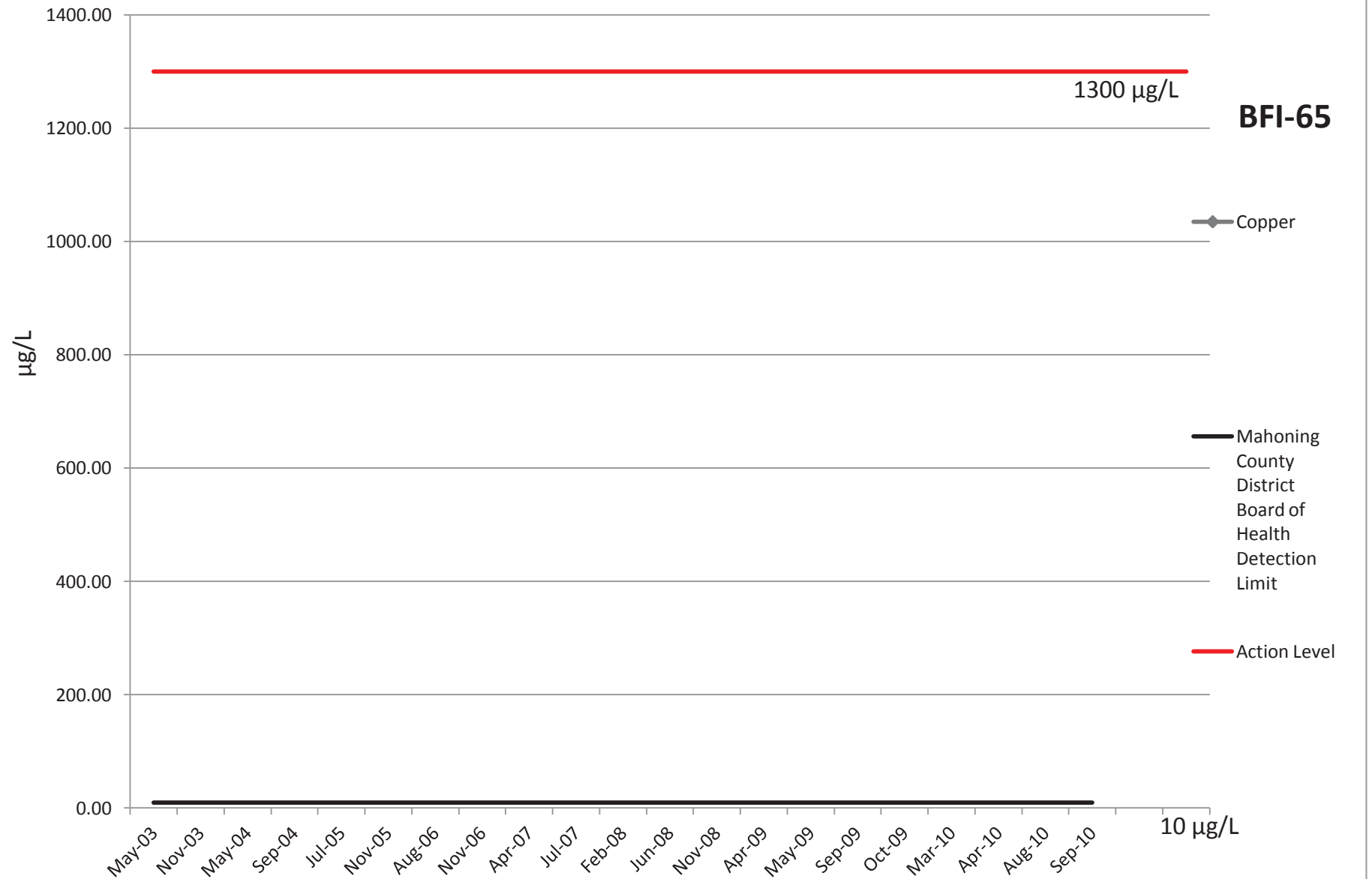
# Cadmium



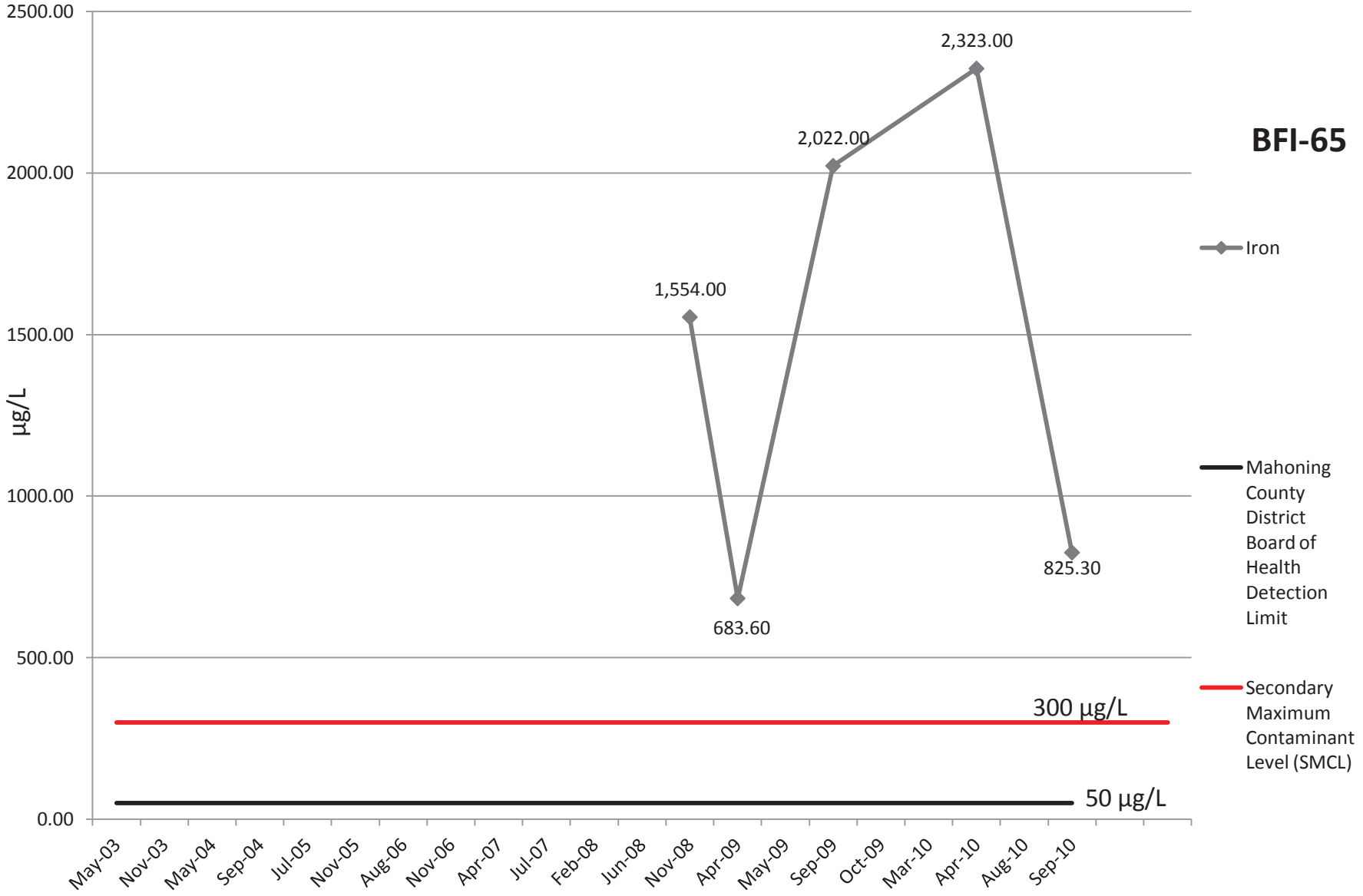
# Chromium



# Copper



# Iron

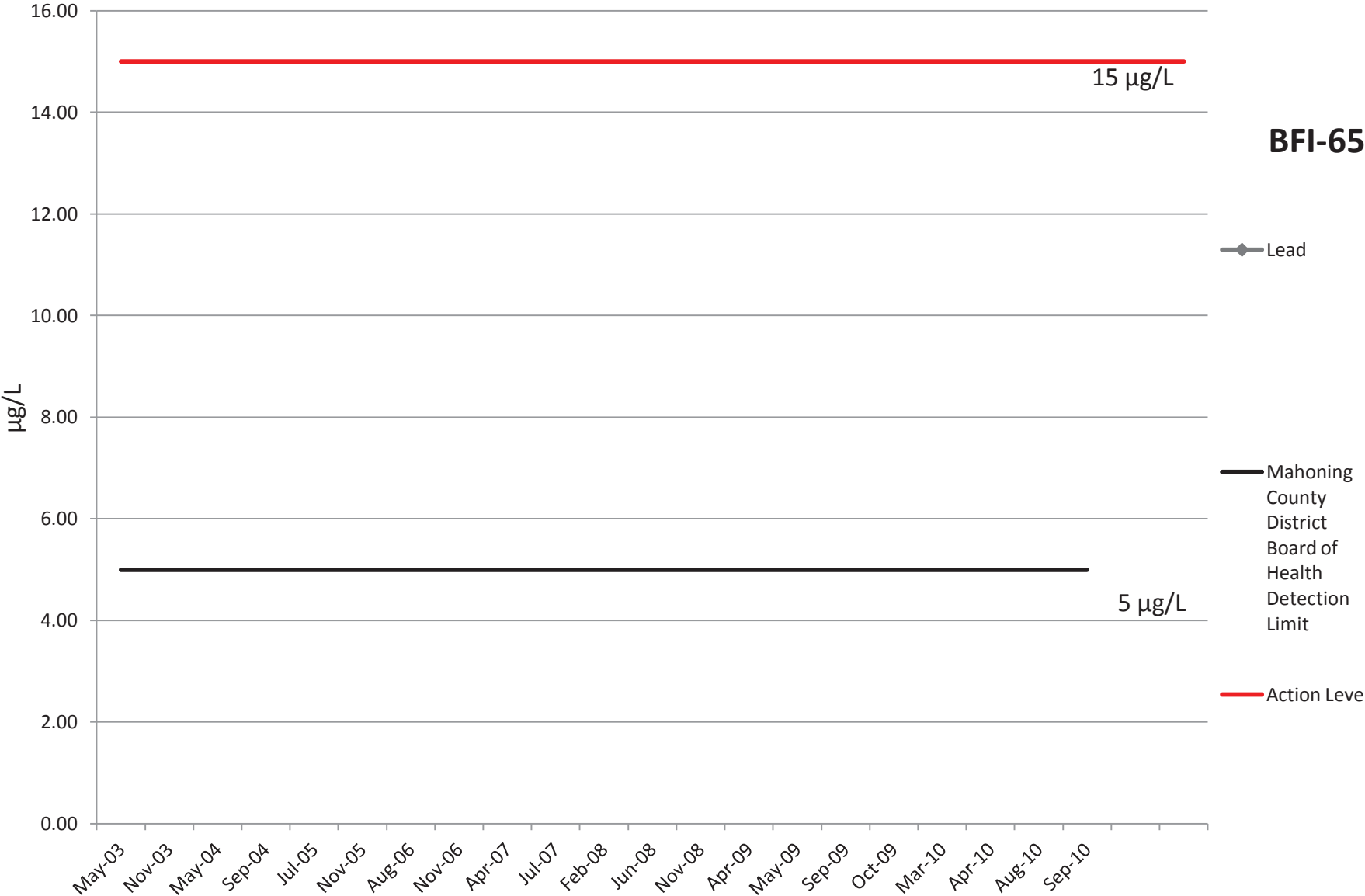


## BFI-65

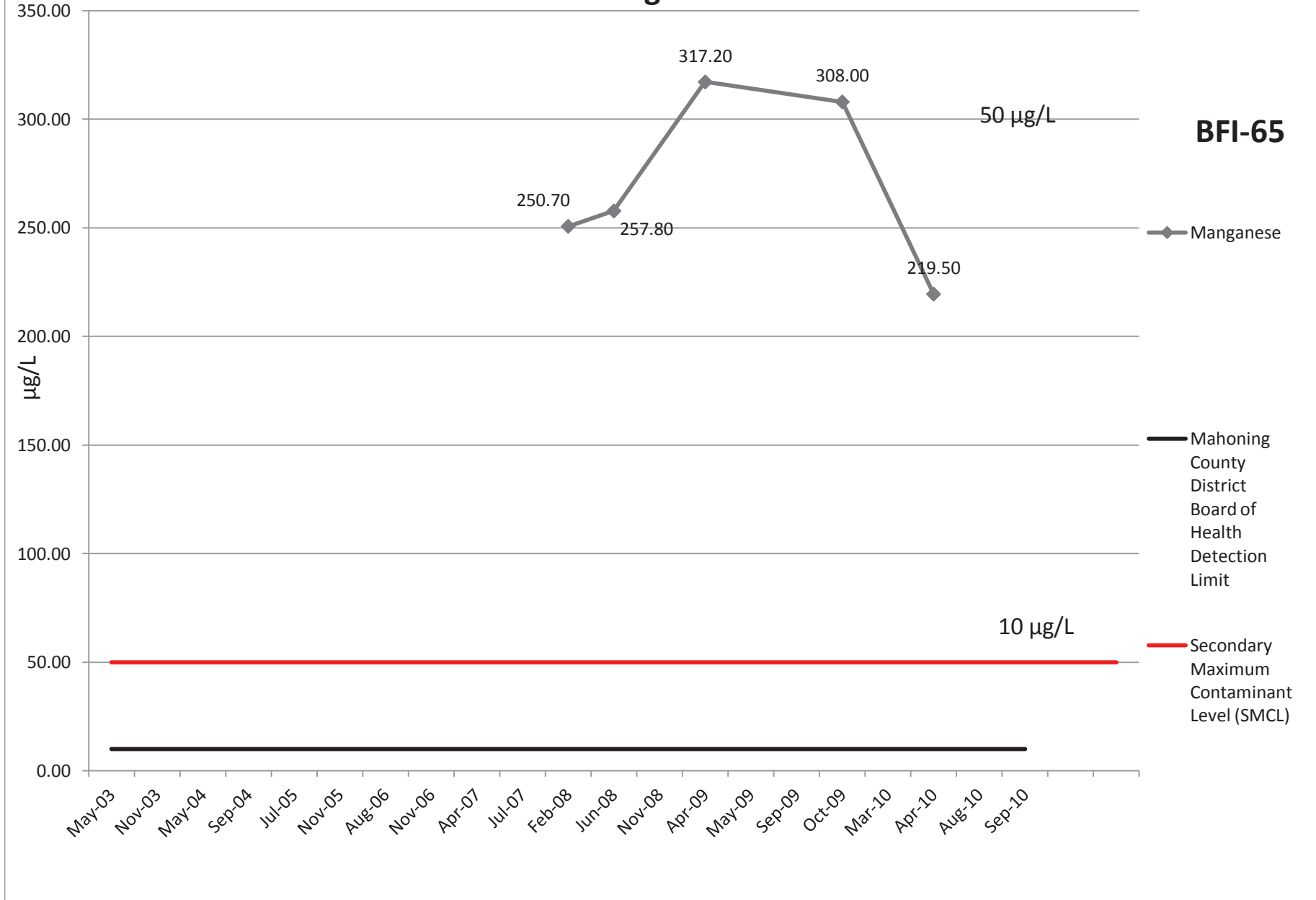
- ◆ Iron
- Mahoning County District Board of Health Detection Limit
- Secondary Maximum Contaminant Level (SMCL)

# Lead

**BFI-65**



# Manganese



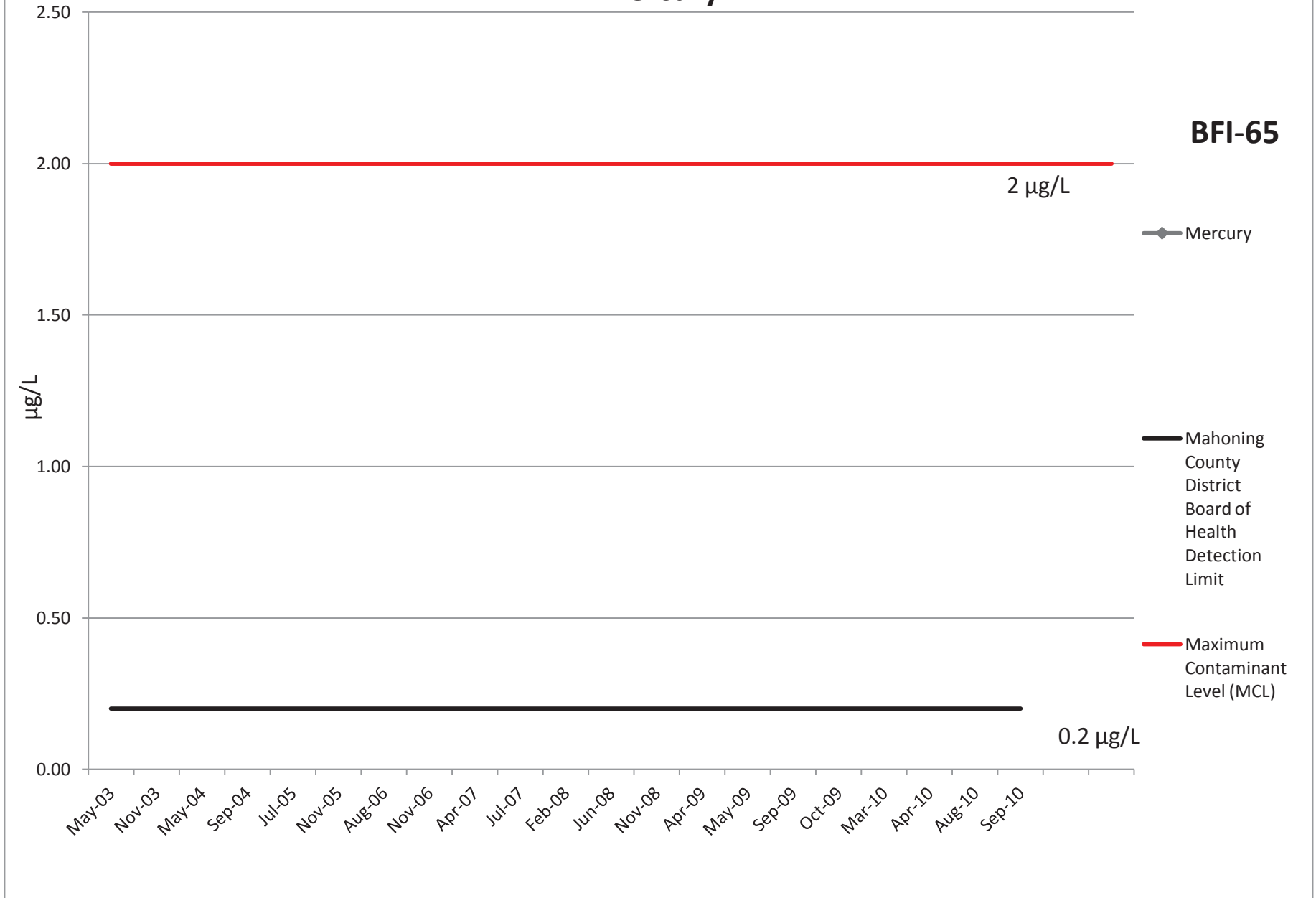
**BFI-65**

◆ Manganese

— Mahoning County District Board of Health Detection Limit

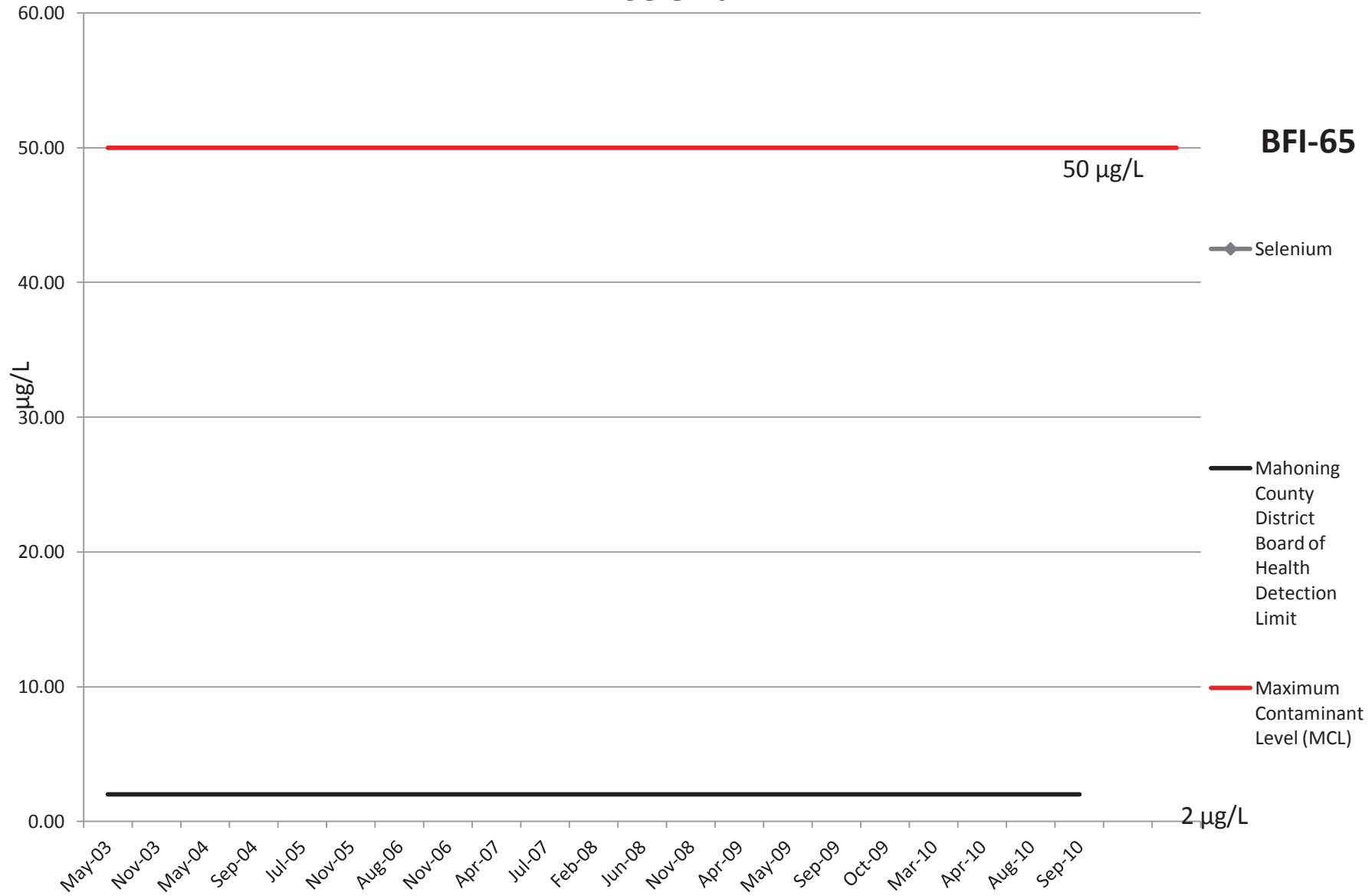
— Secondary Maximum Contaminant Level (SMCL)

# Mercury

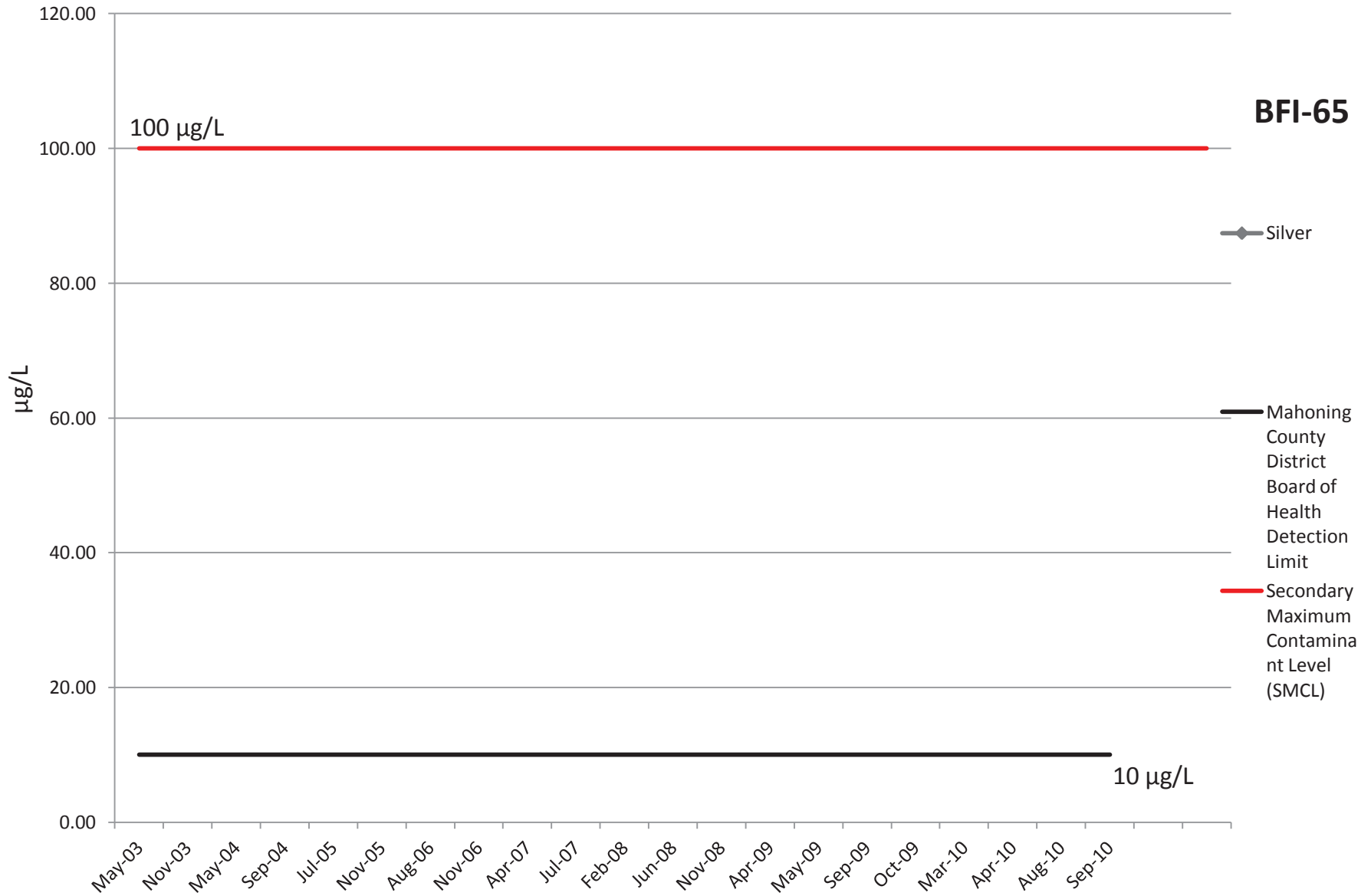




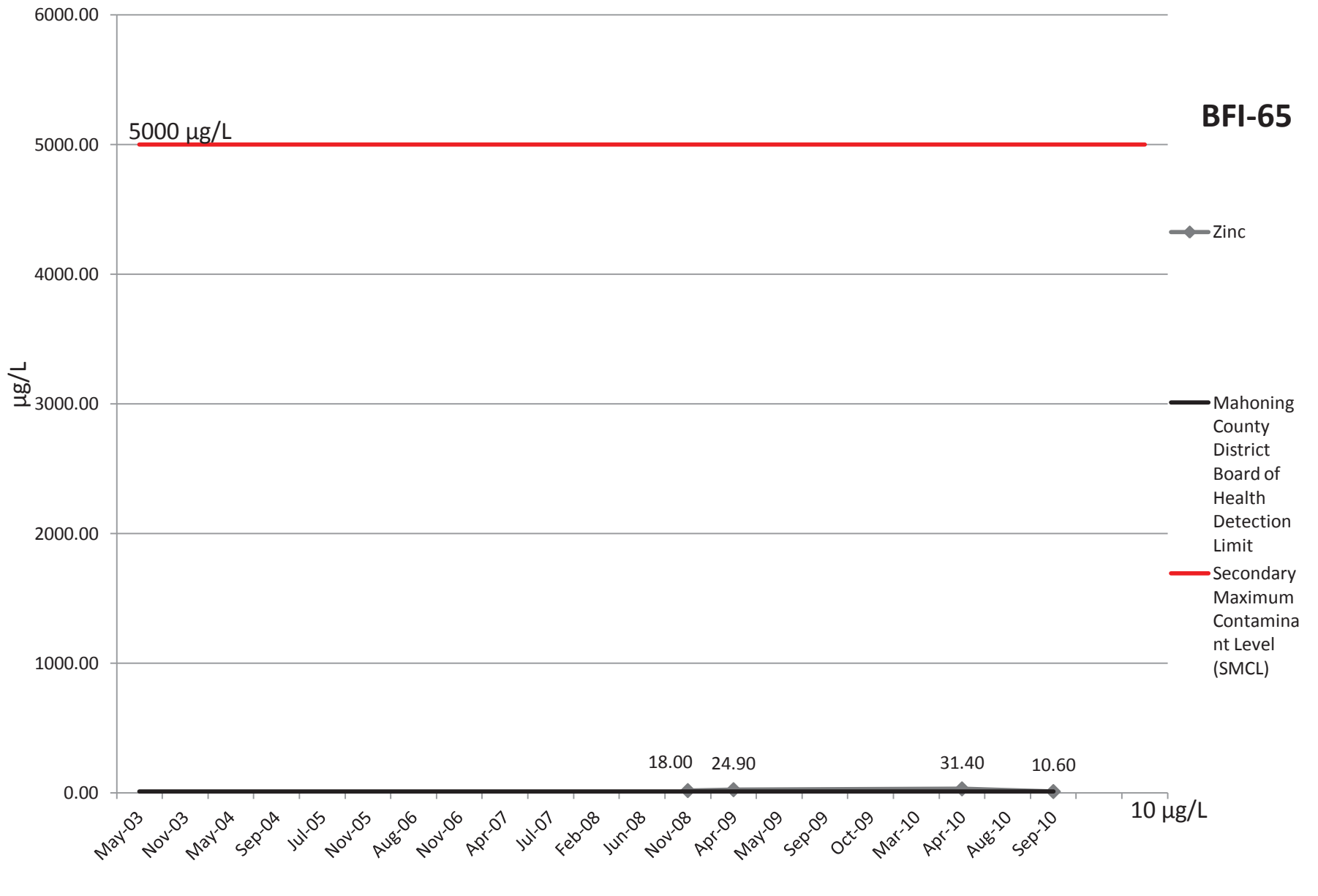
# Selenium



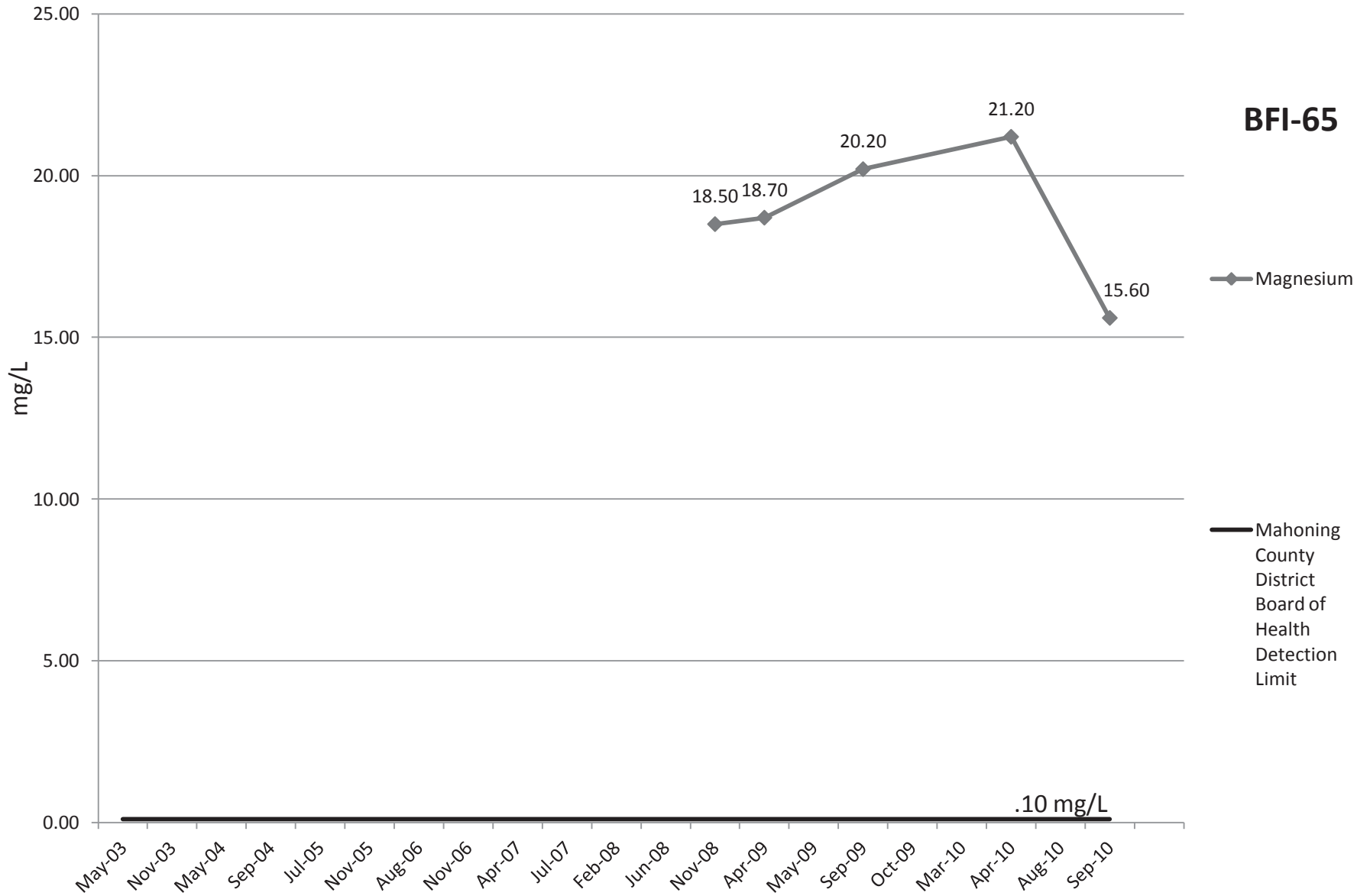
# Silver



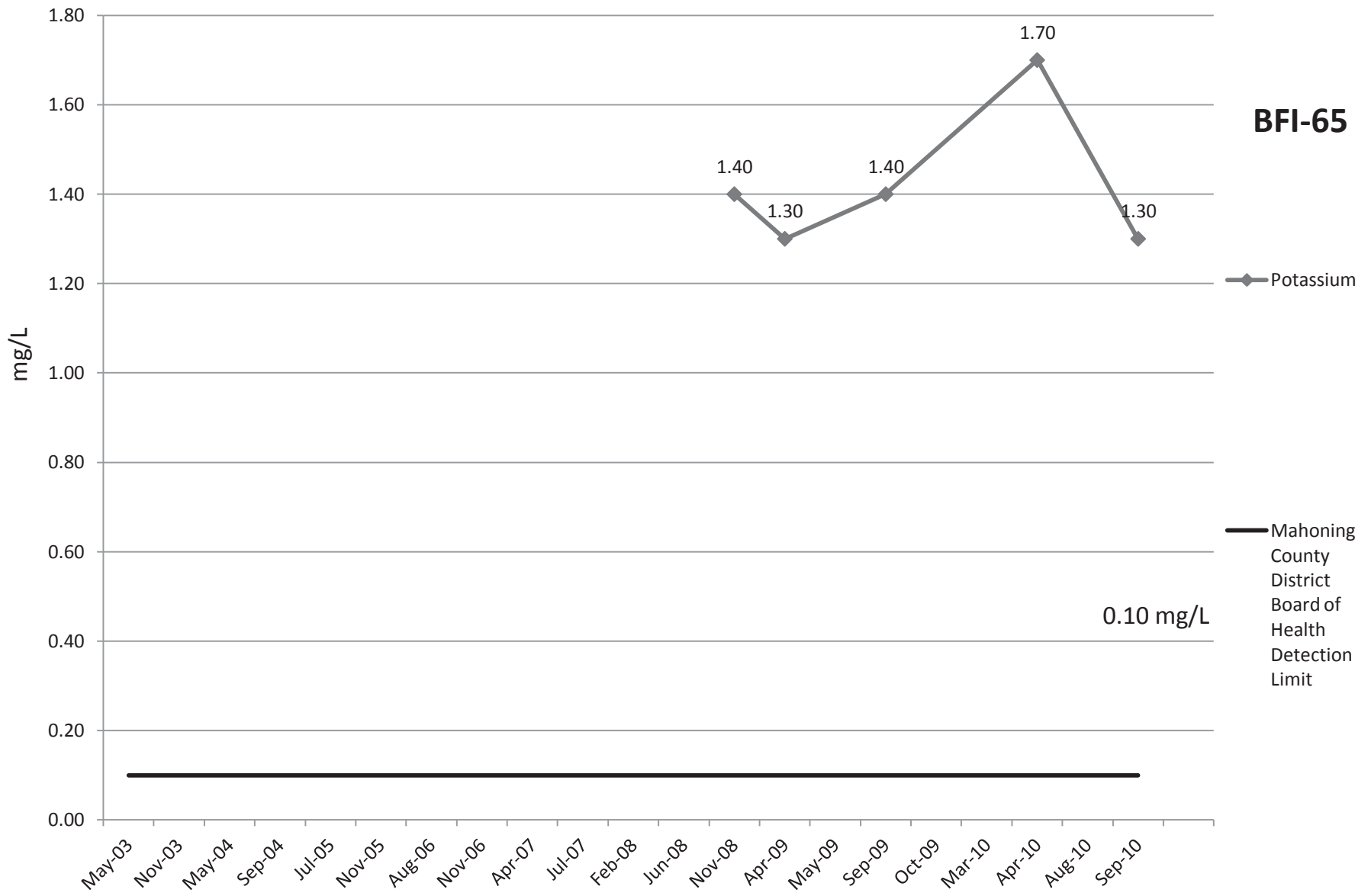
# Zinc



# Magnesium



# Potassium



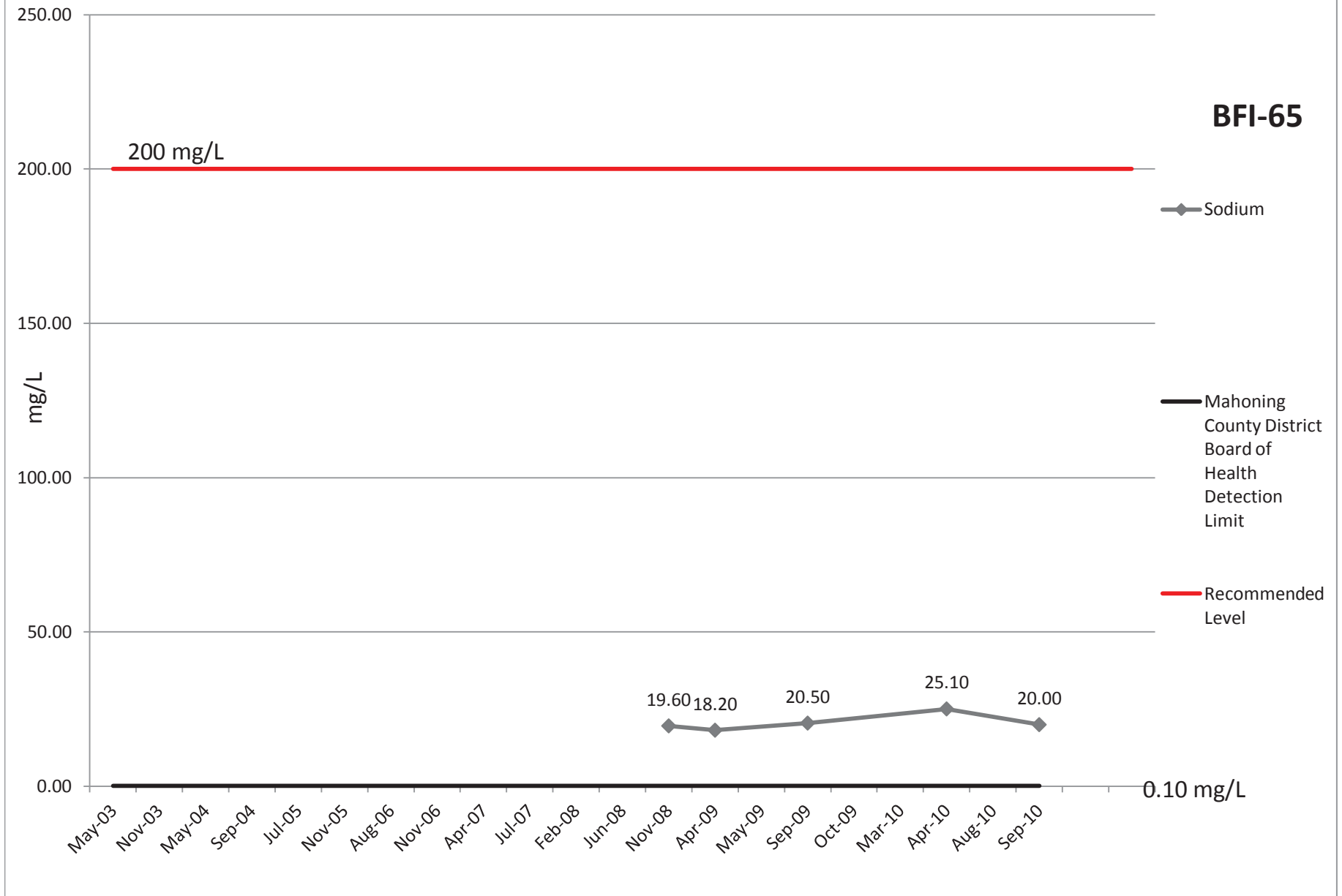
**BFI-65**

◆ Potassium

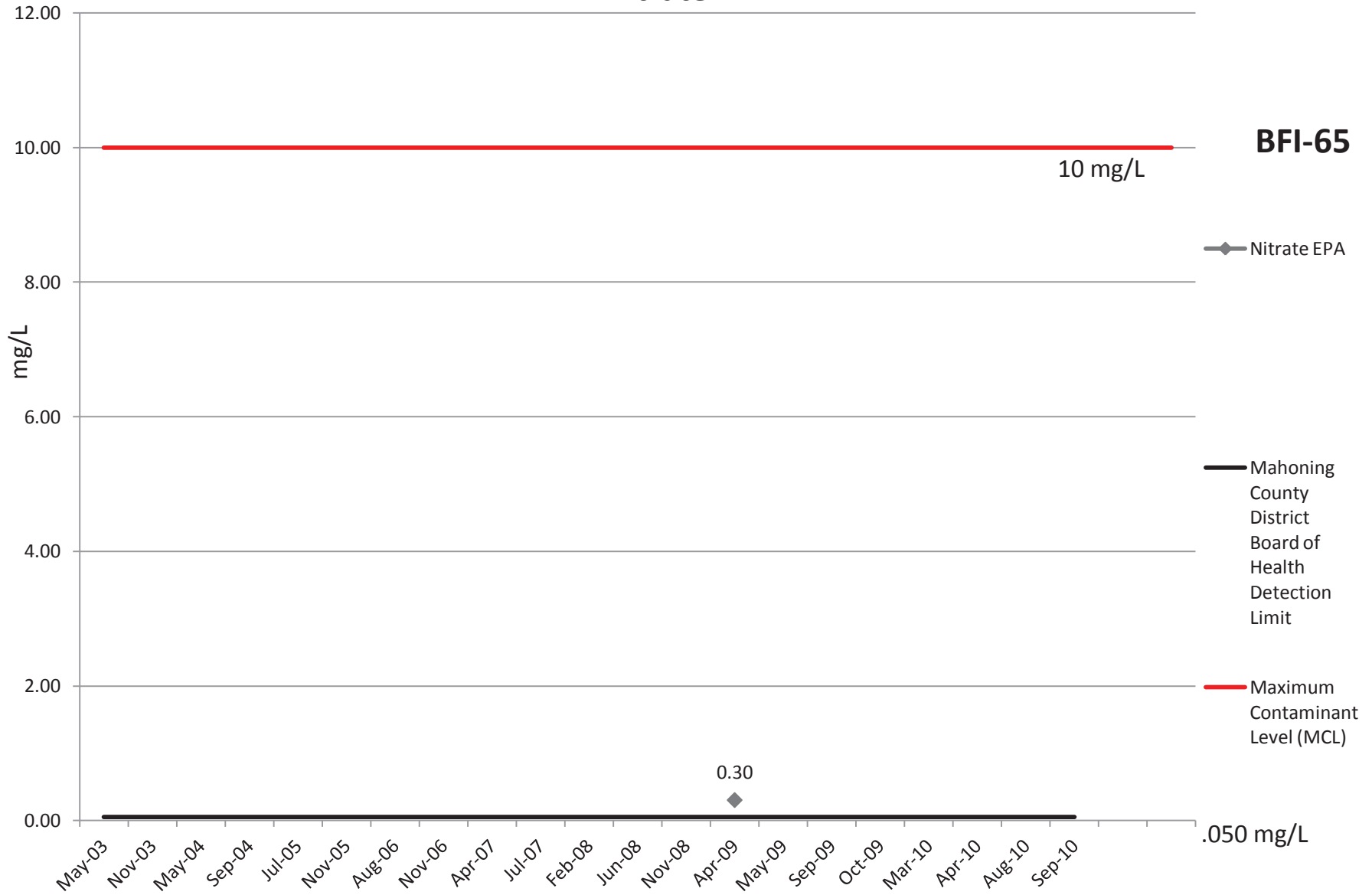
— Mahoning County District Board of Health Detection Limit

0.10 mg/L

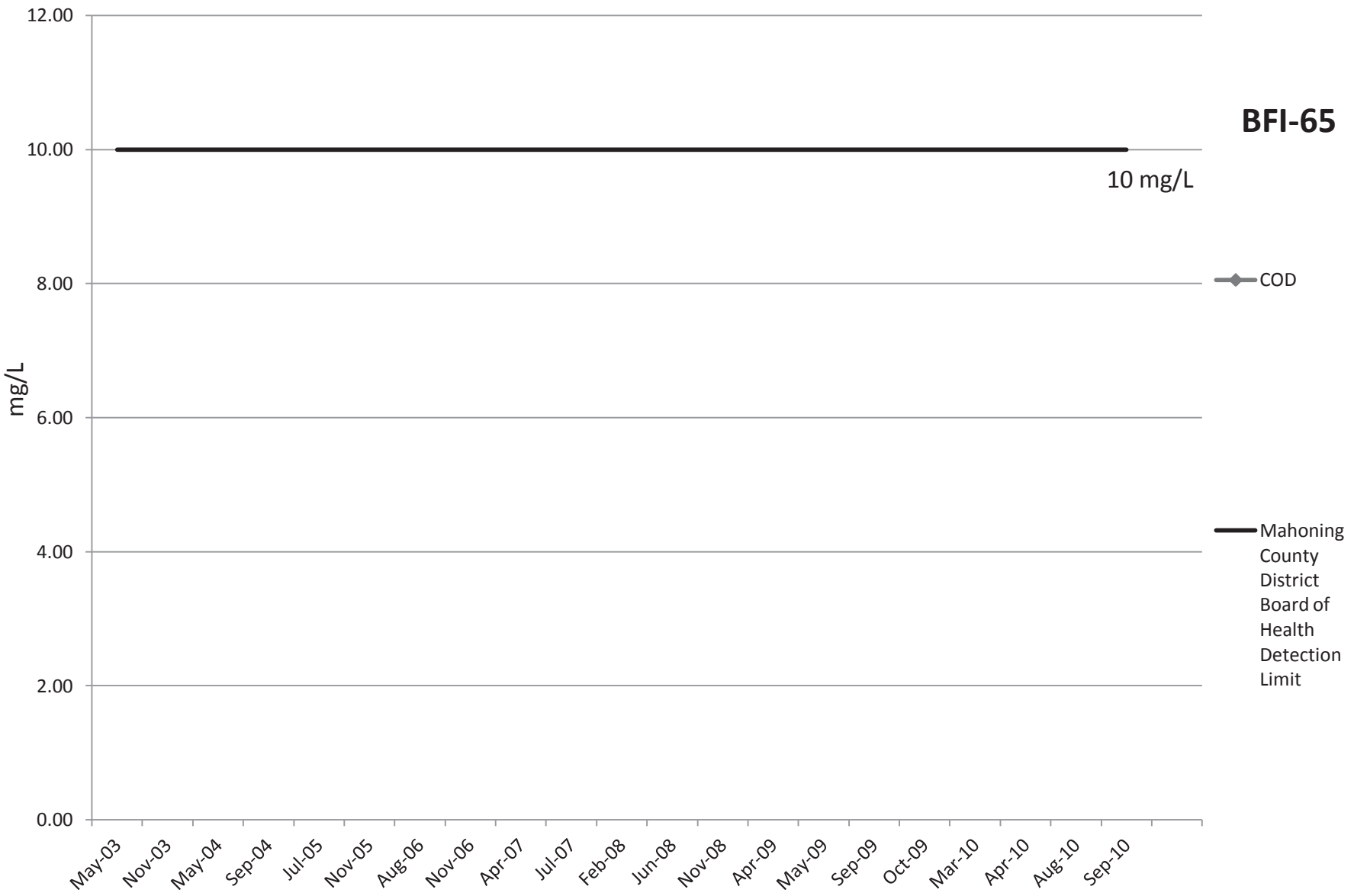
# Sodium



# Nitrate EPA



# COD



**BFI-65**

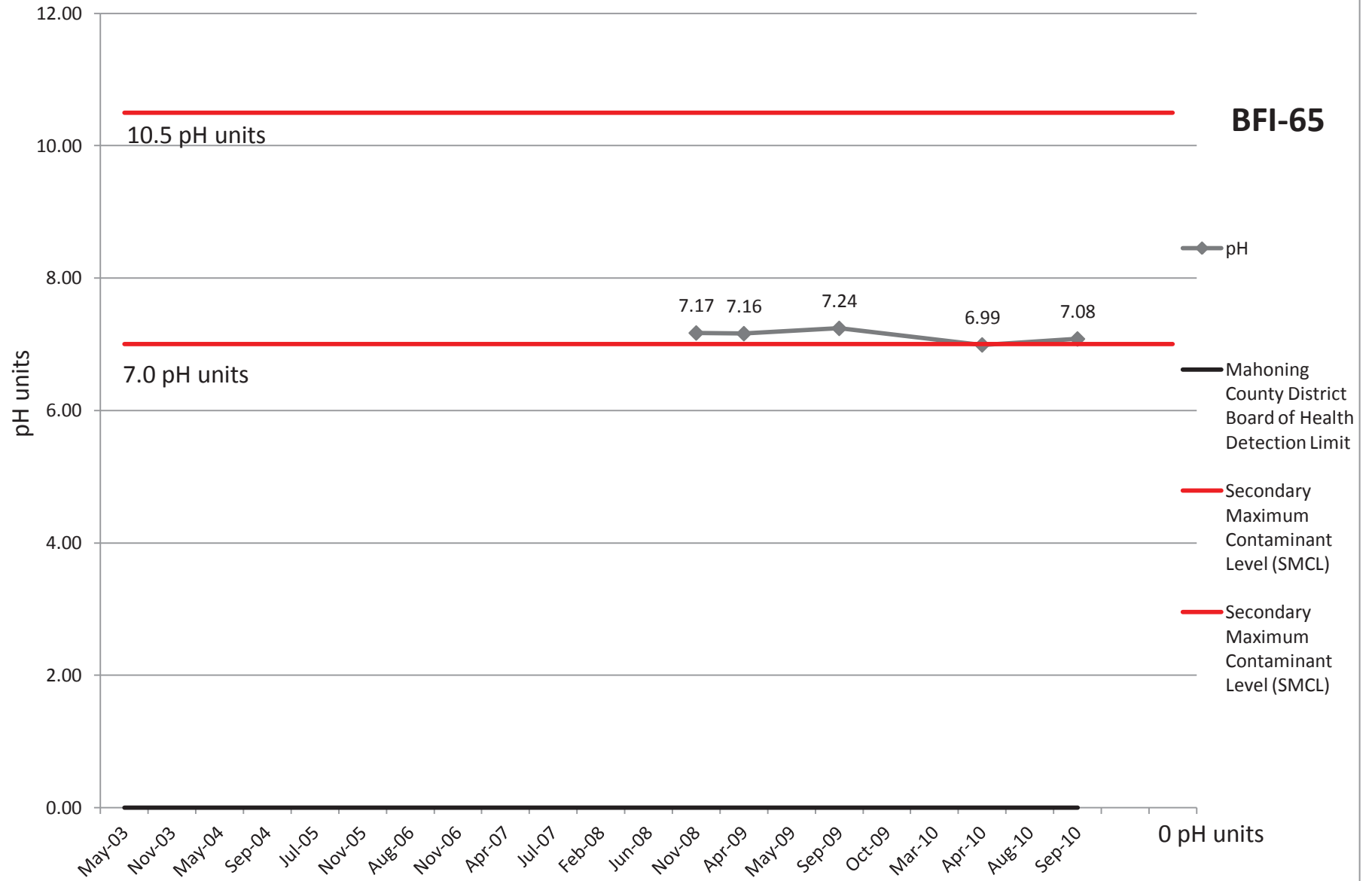
10 mg/L

◆ COD

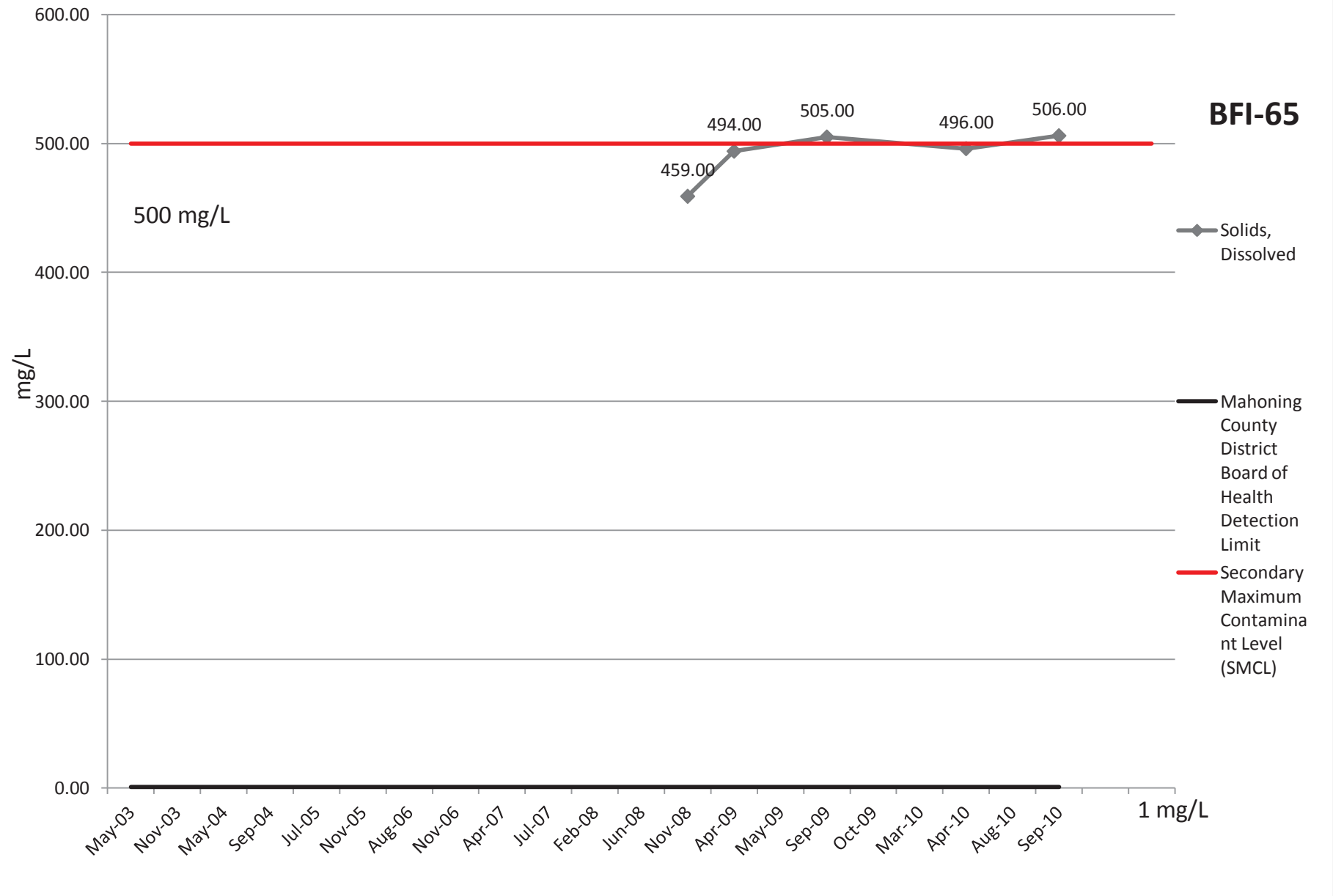
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit



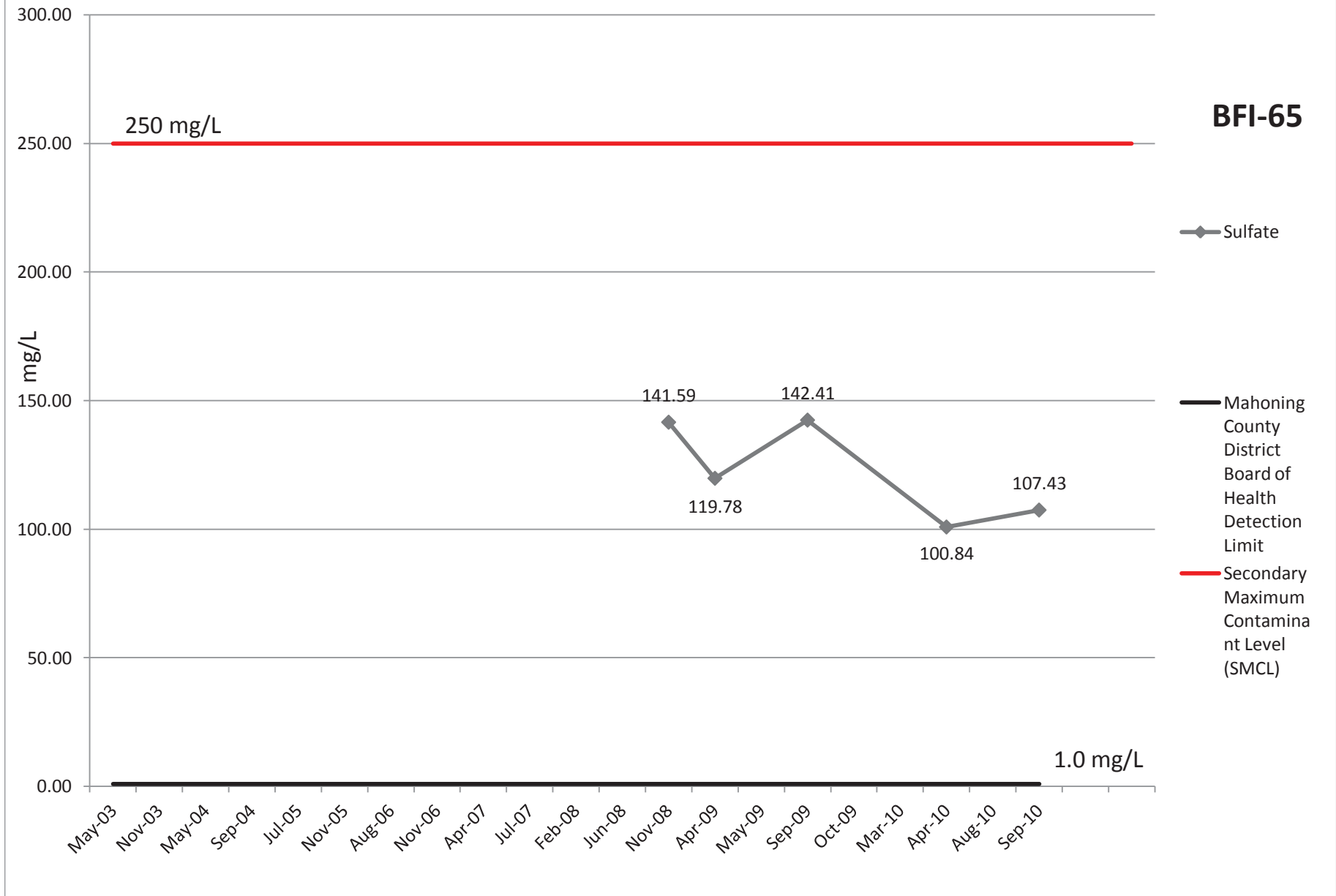
# pH



# Solids, Dissolved



# Sulfate



# Bacteria

positive (1)

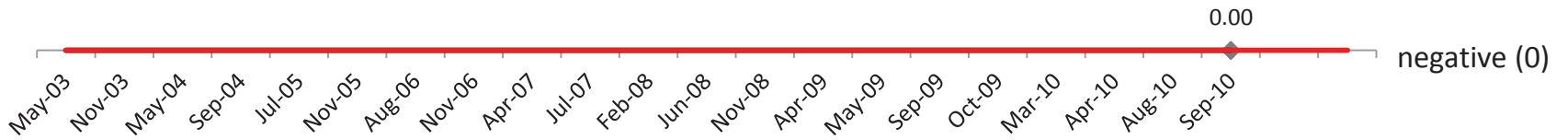
## BFI-65

Positive/Negative

◆ Bacteria

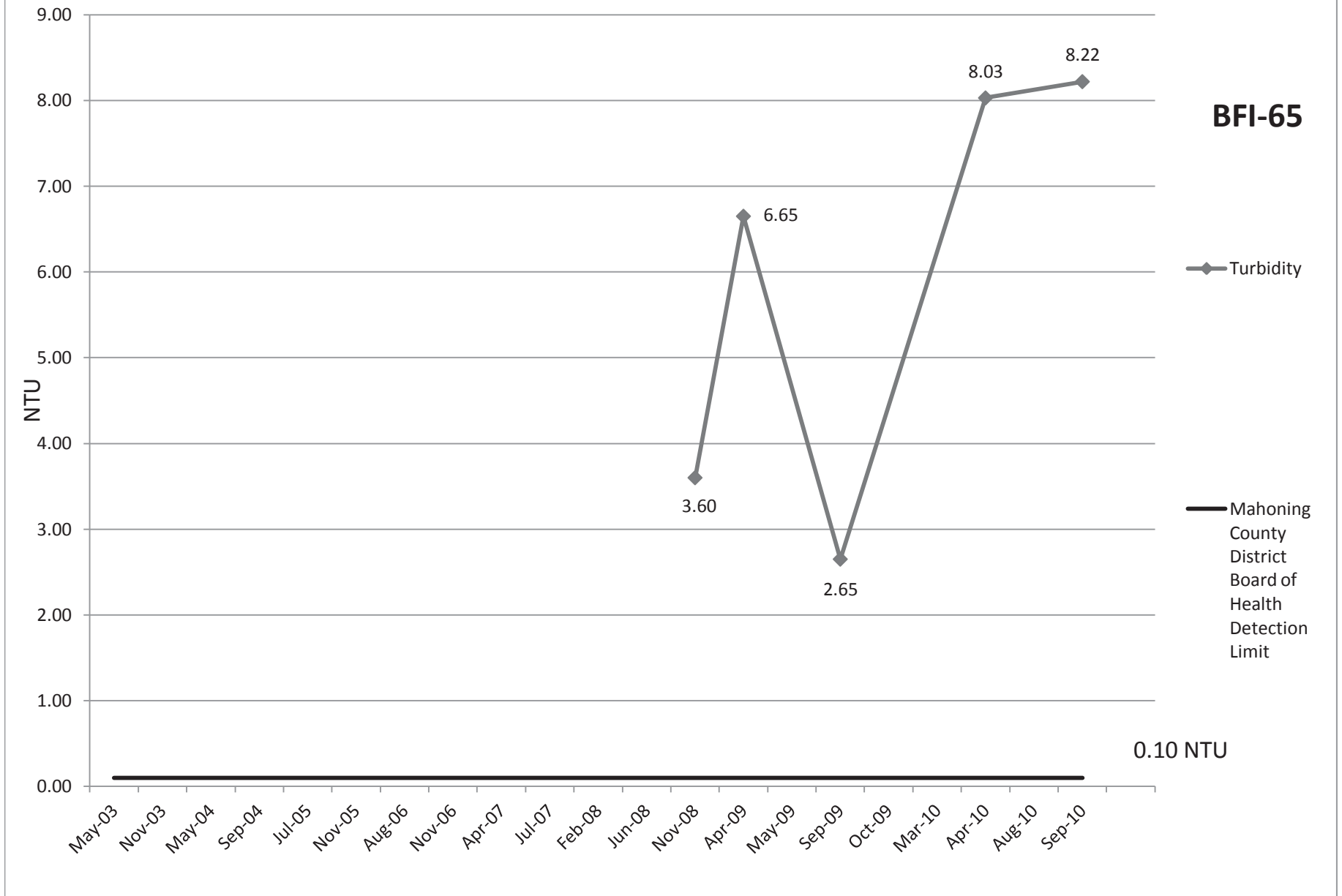
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

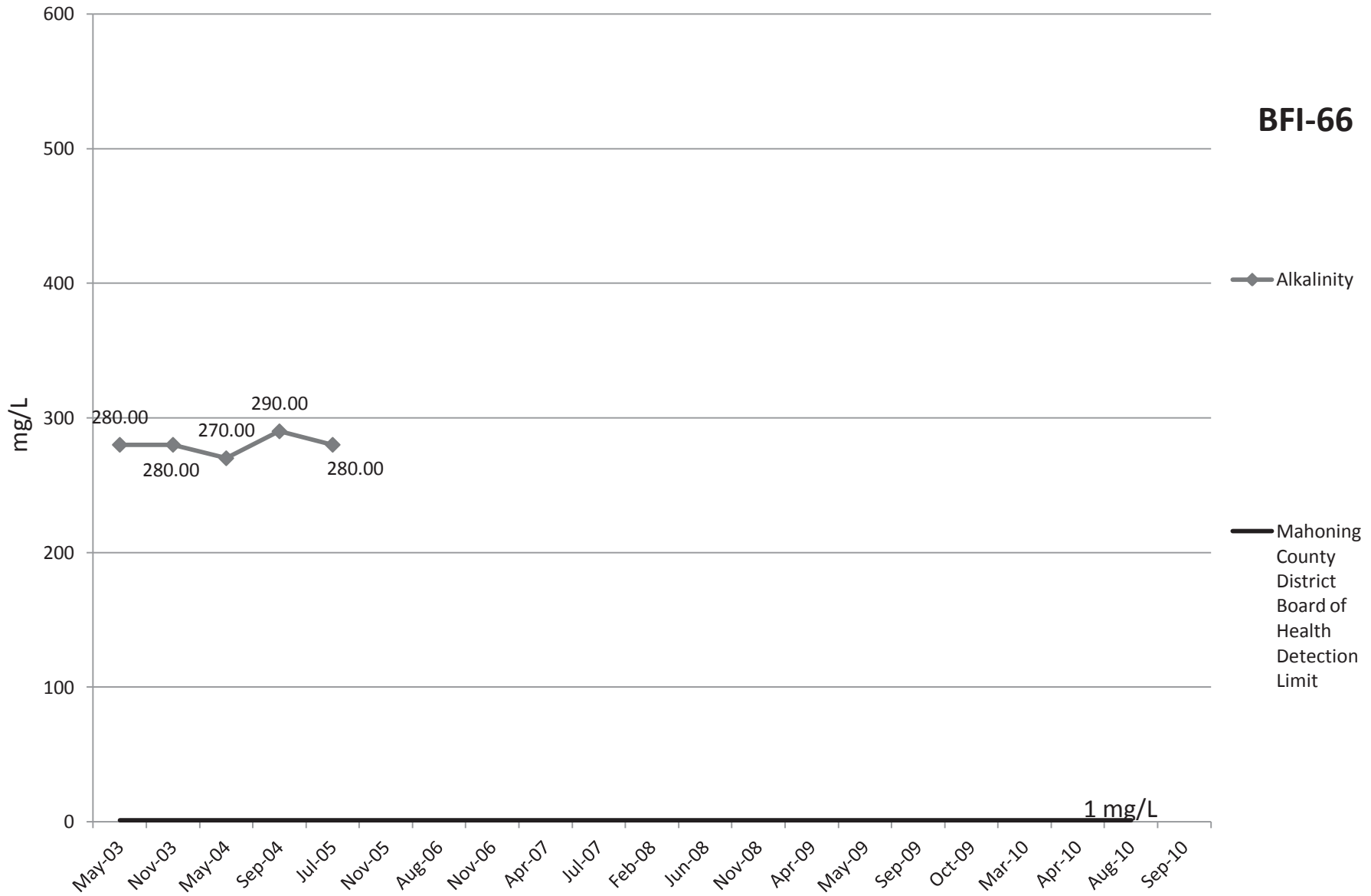


negative (0)

# Turbidity



# Alkalinity



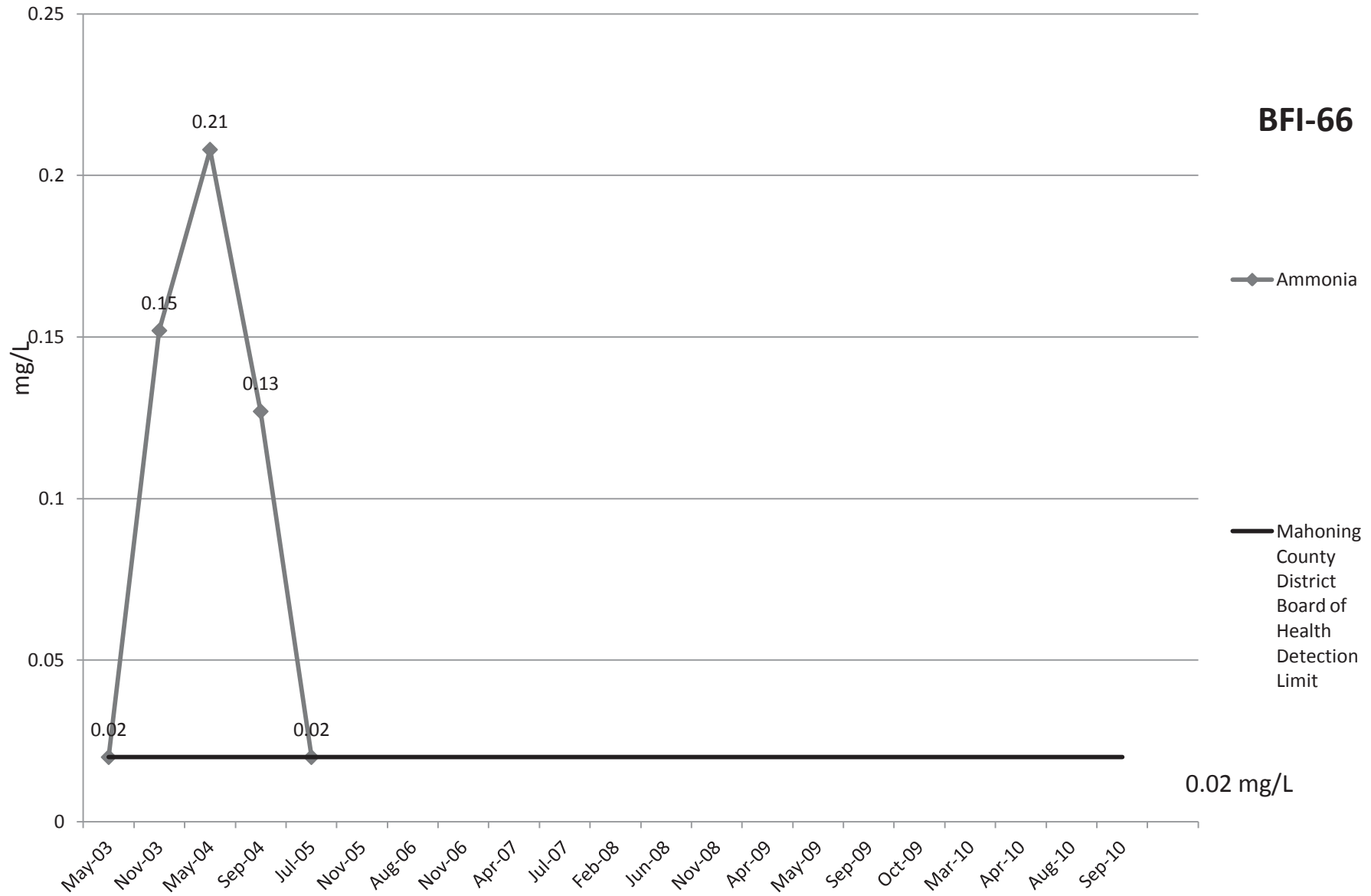
**BFI-66**

◆ Alkalinity

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

1 mg/L

# Ammonia



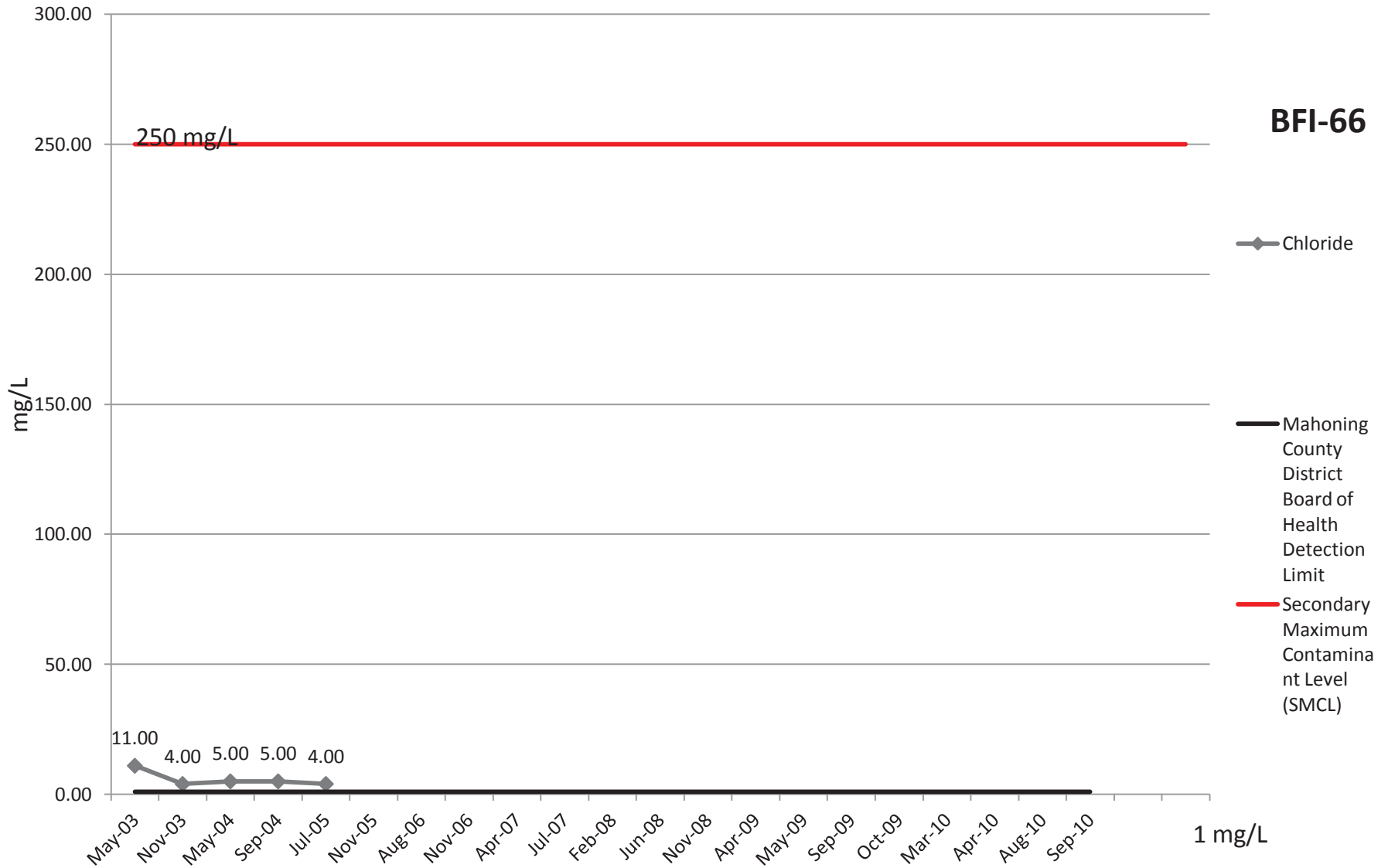
**BFI-66**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

0.02 mg/L

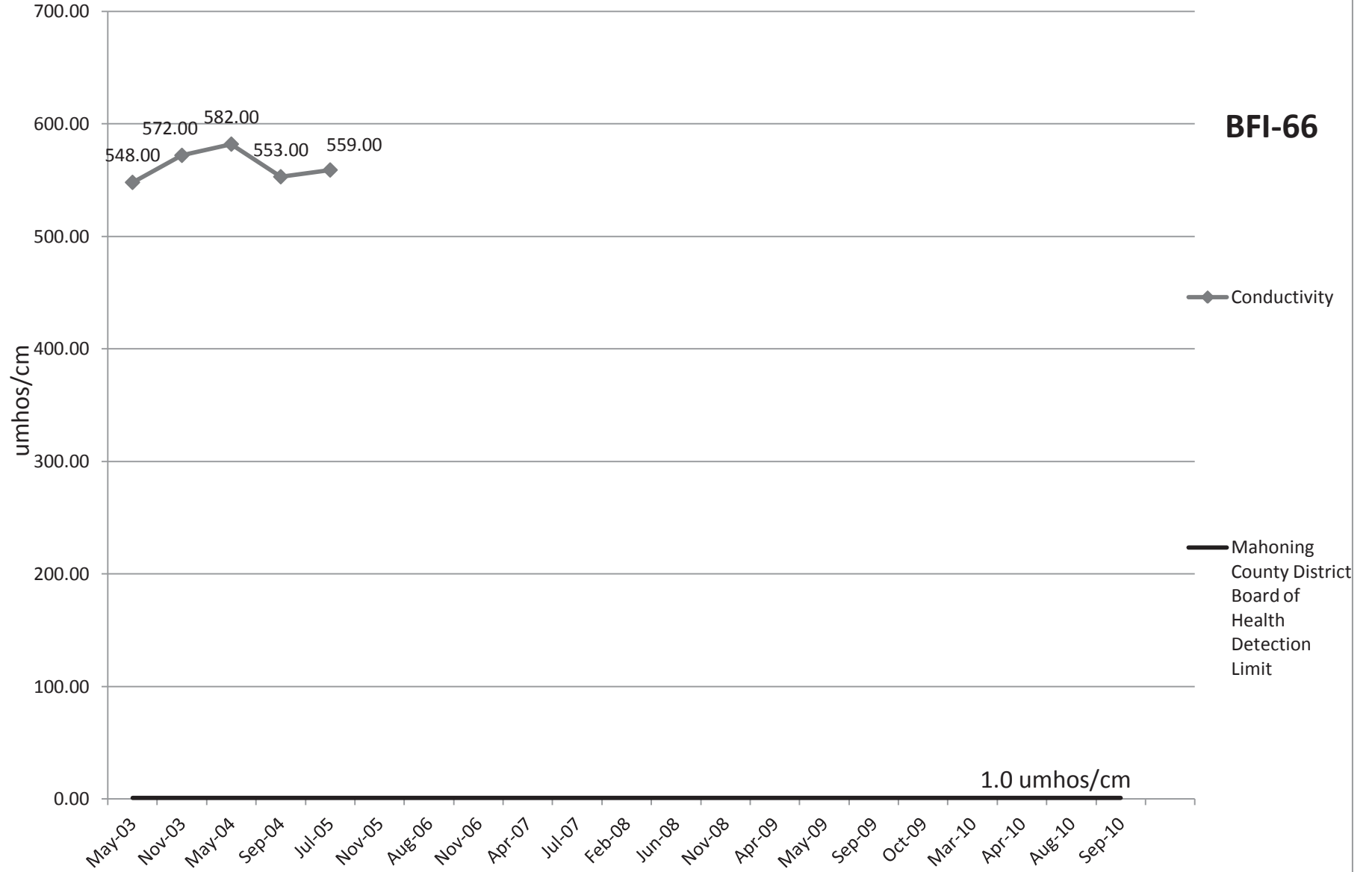
# Chloride



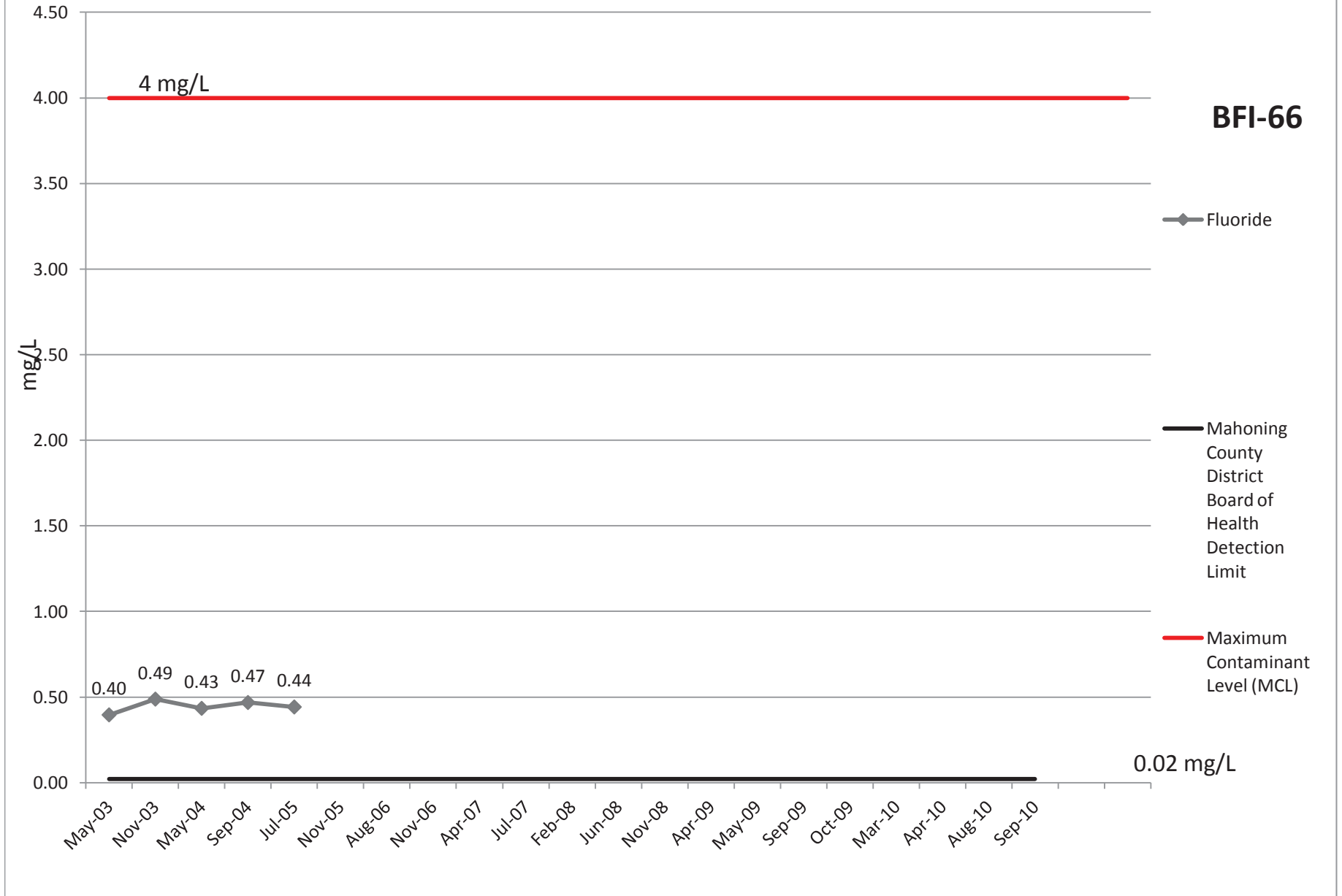


# Conductivity

**BFI-66**

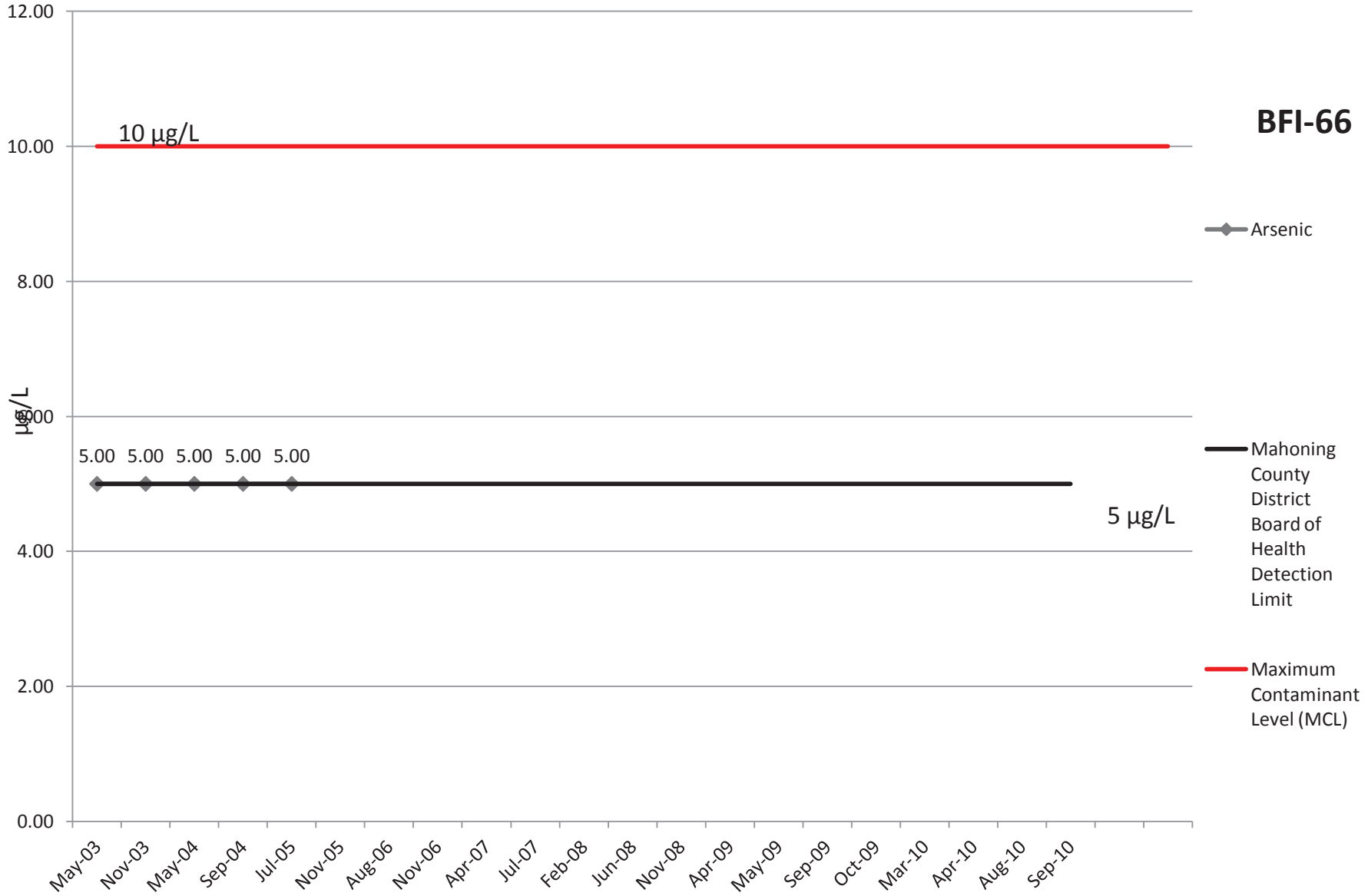


# Fluoride

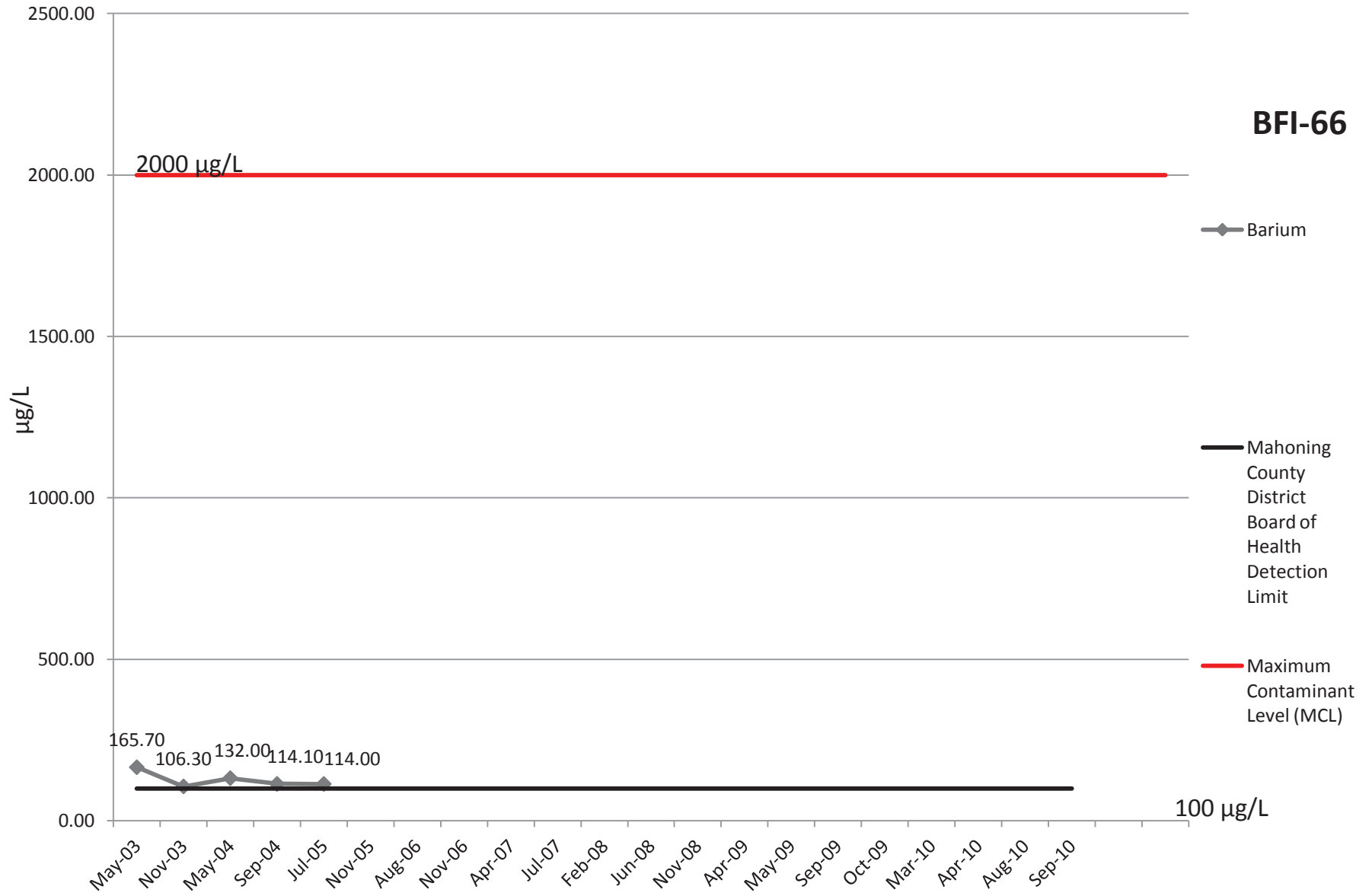


# Arsenic

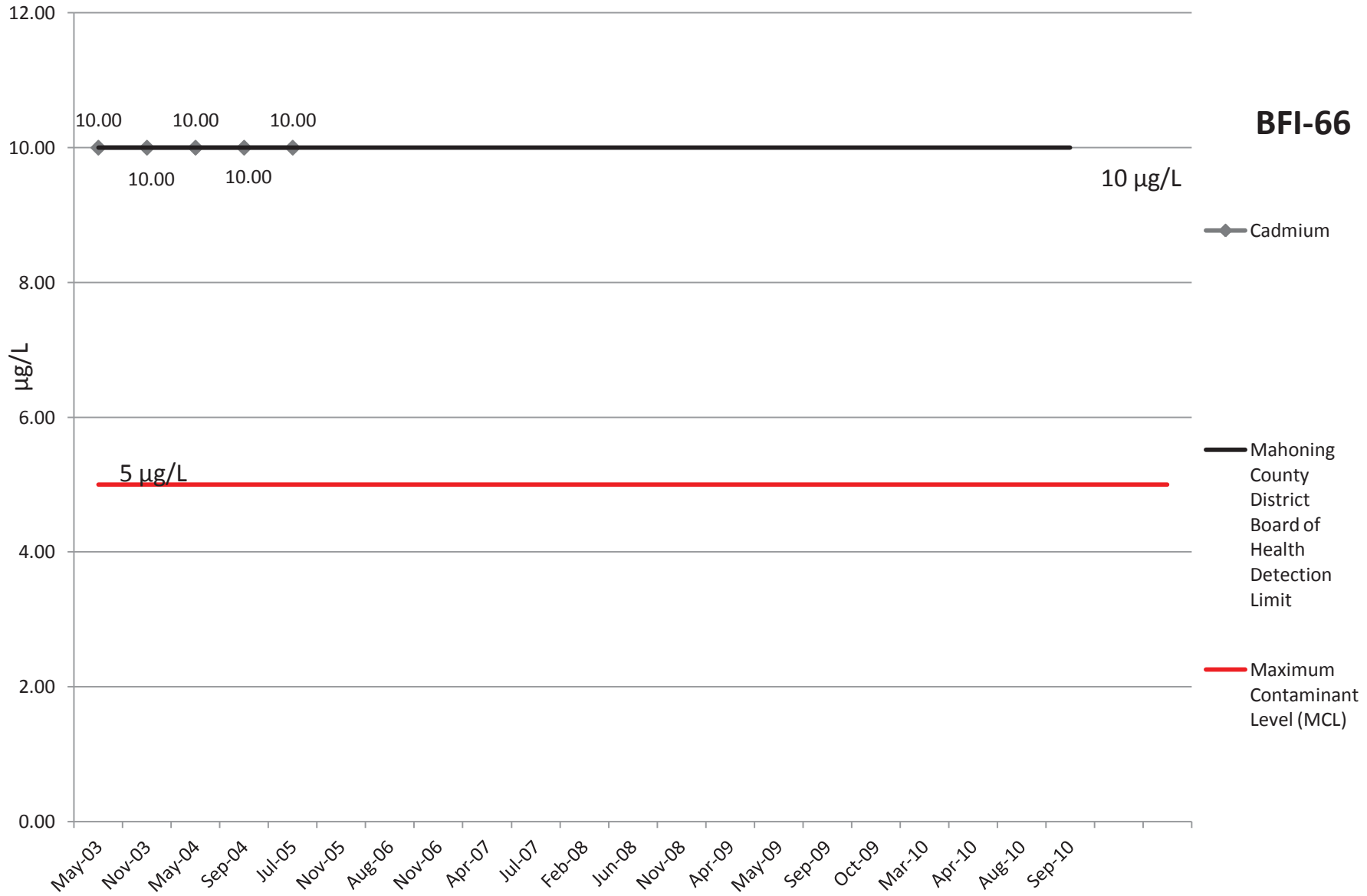
**BFI-66**



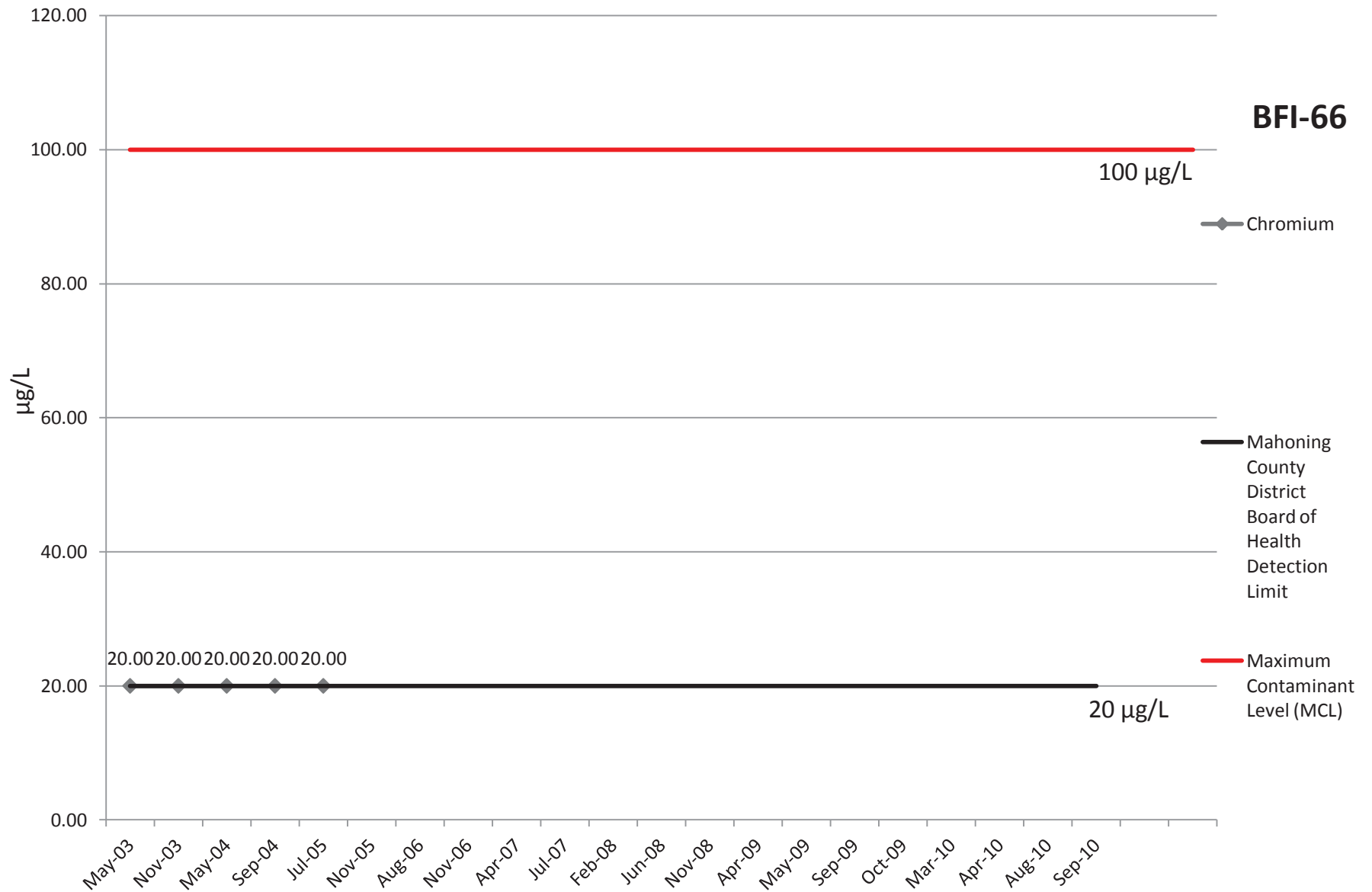
# Barium



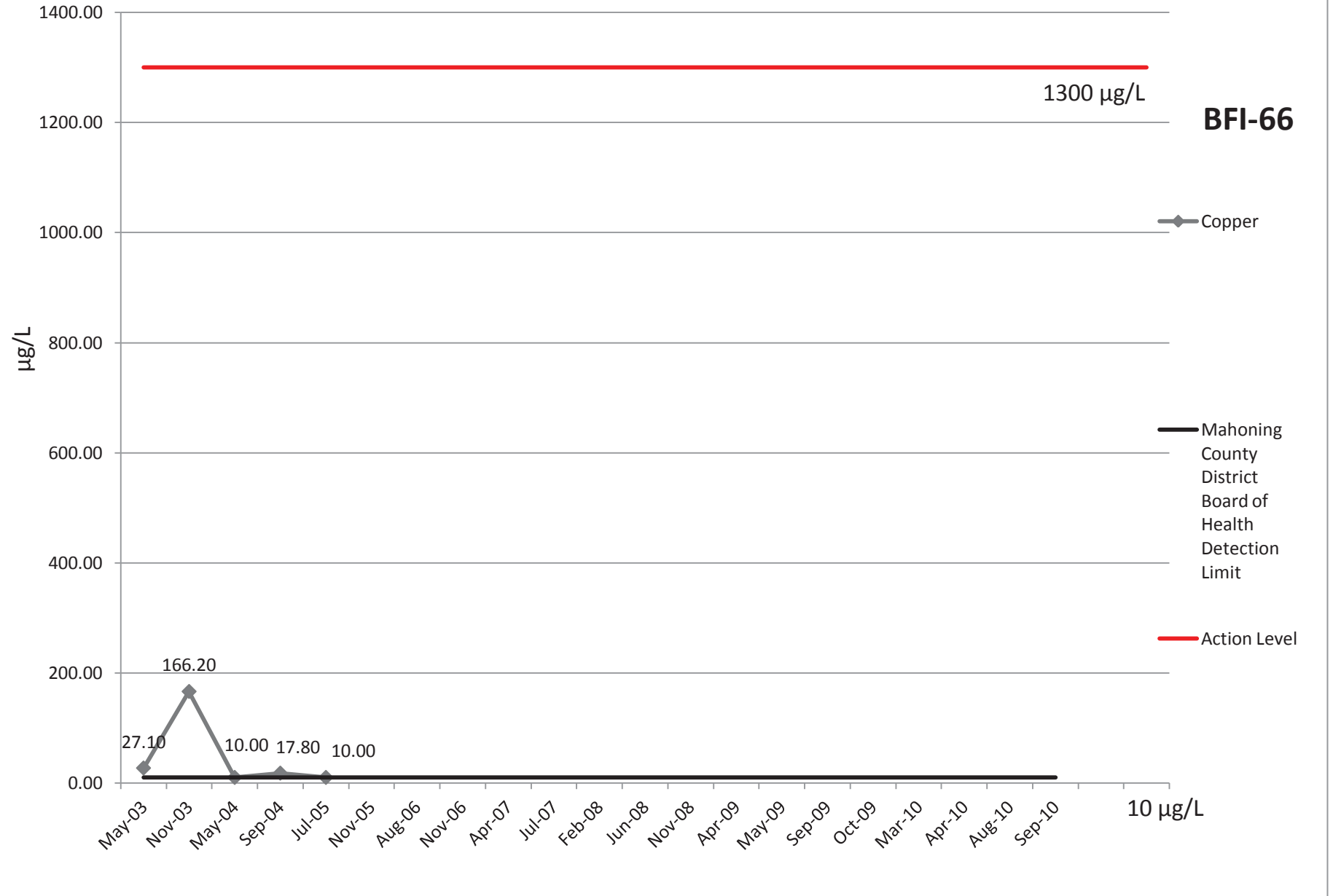
# Cadmium



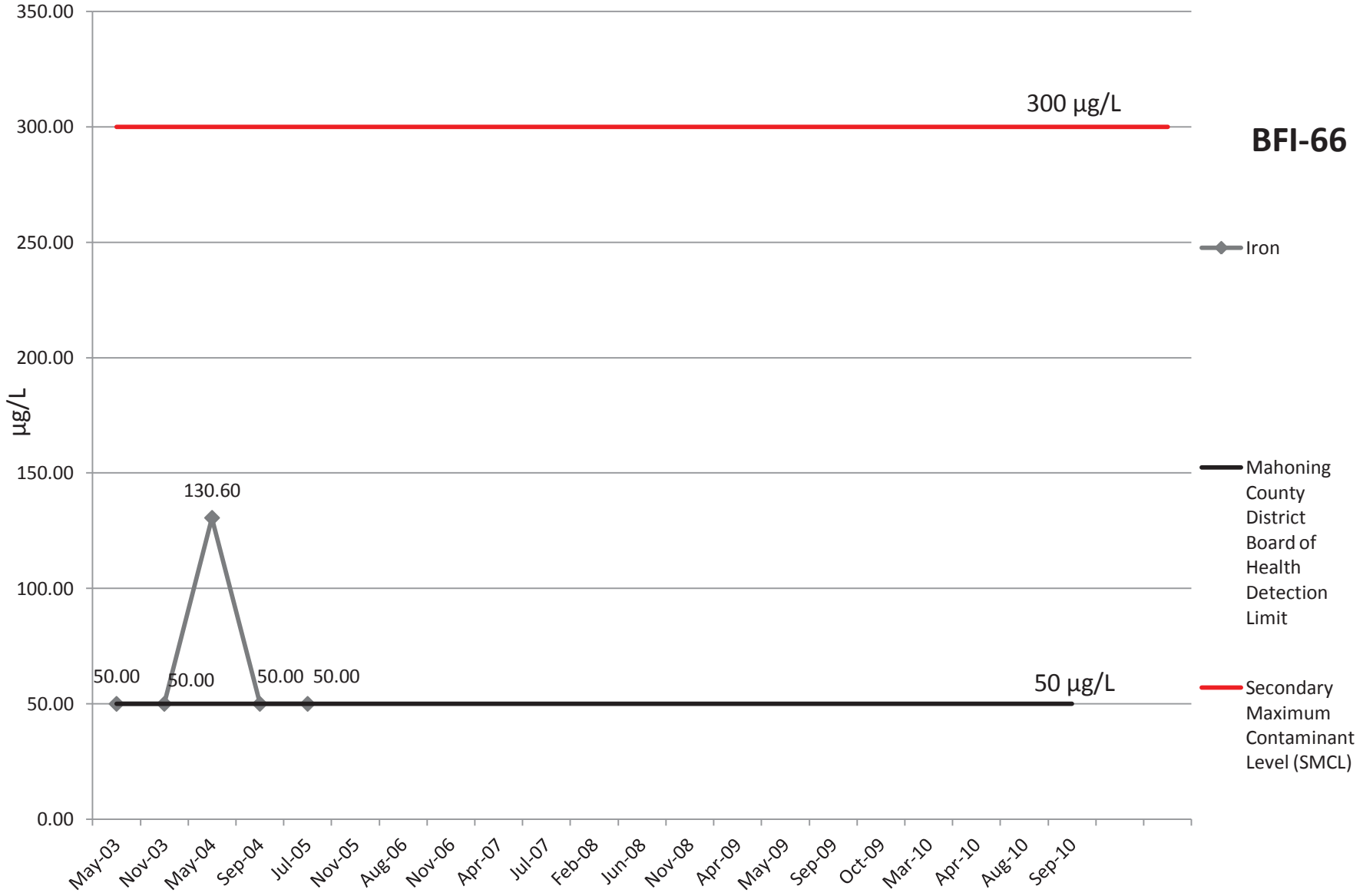
# Chromium



# Copper



# Iron



**BFI-66**

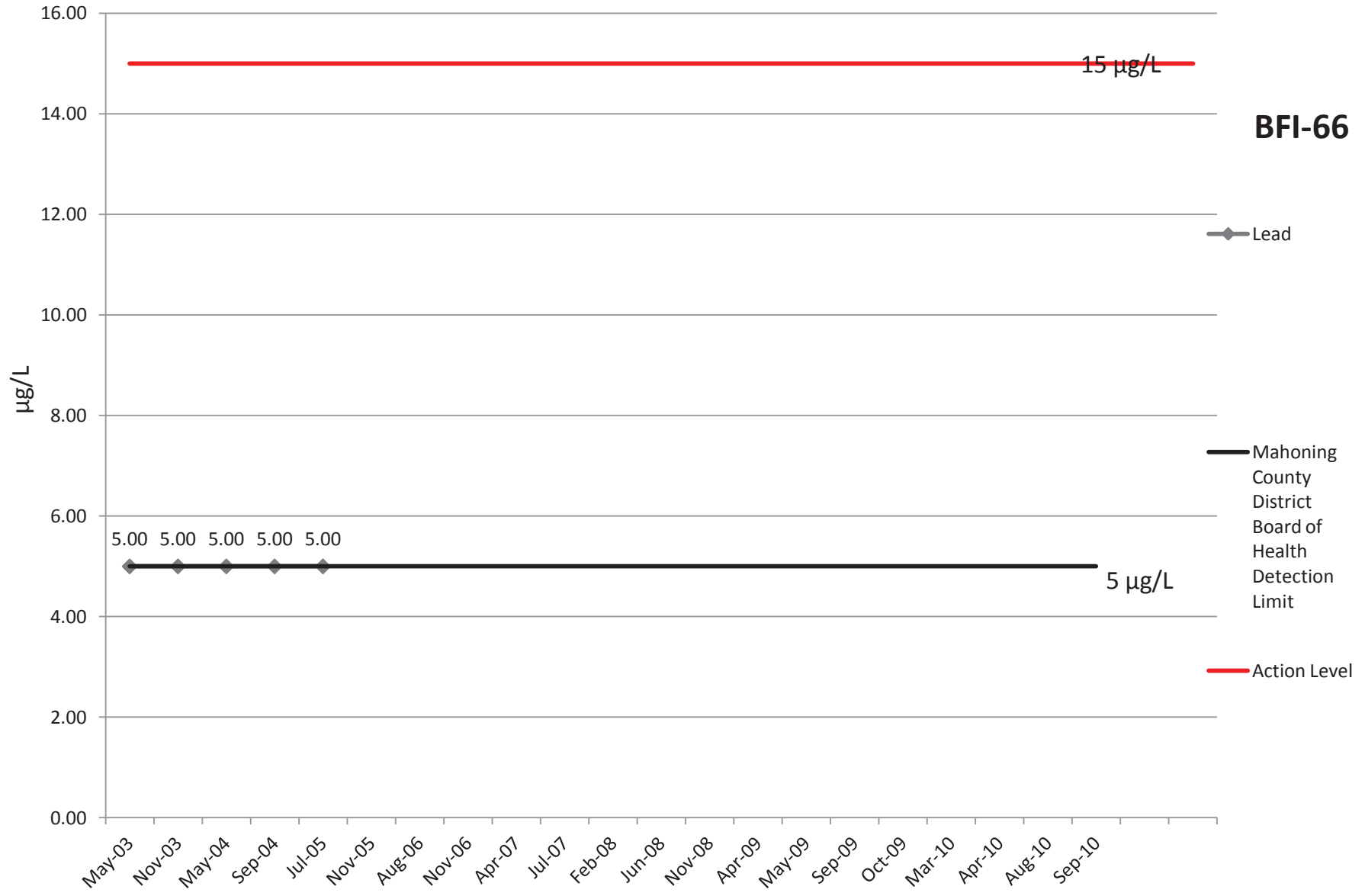
Iron

Mahoning County District Board of Health Detection Limit

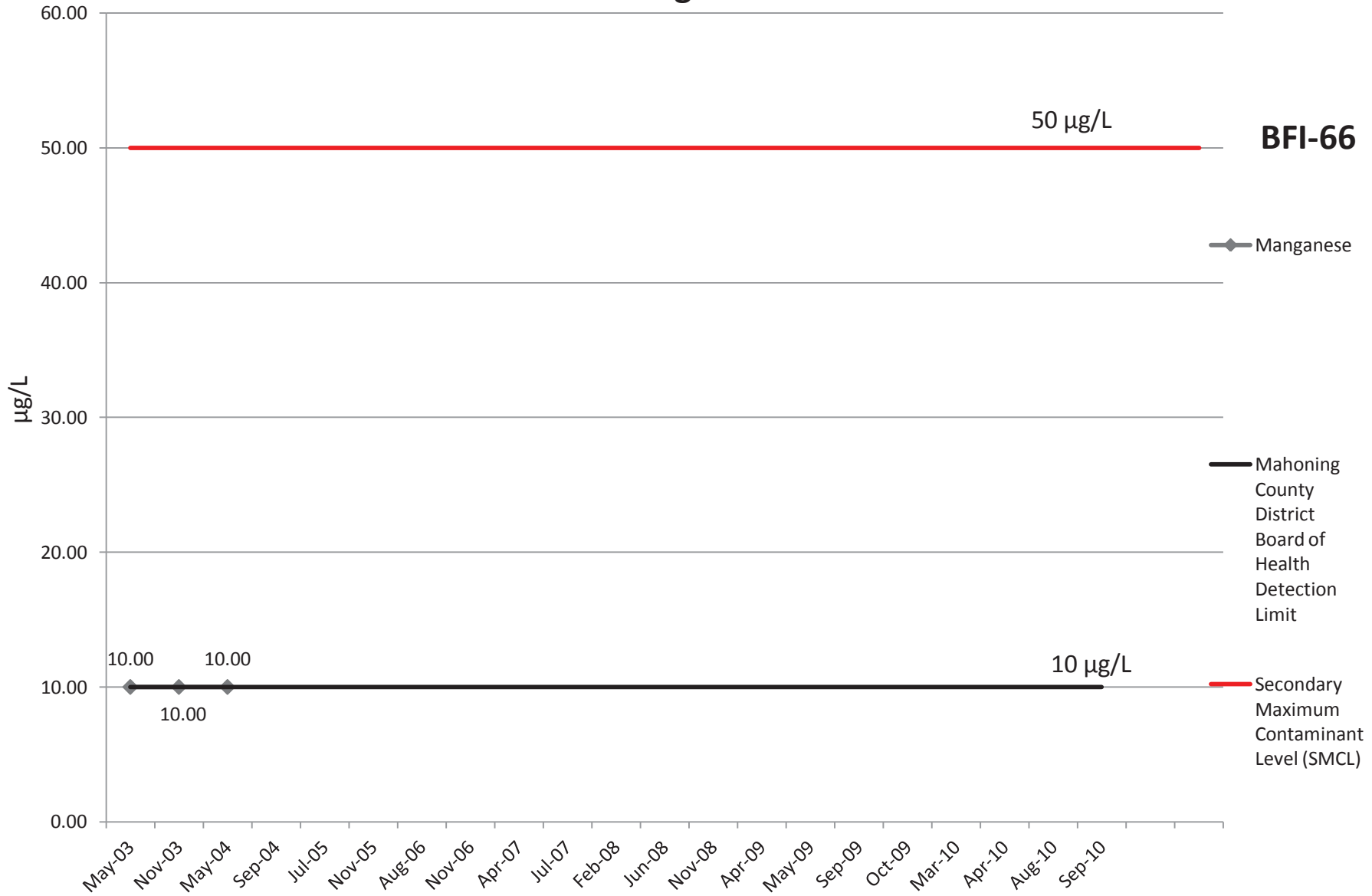
Secondary Maximum Contaminant Level (SMCL)



# Lead



# Manganese



# Mercury

**BFI-66**

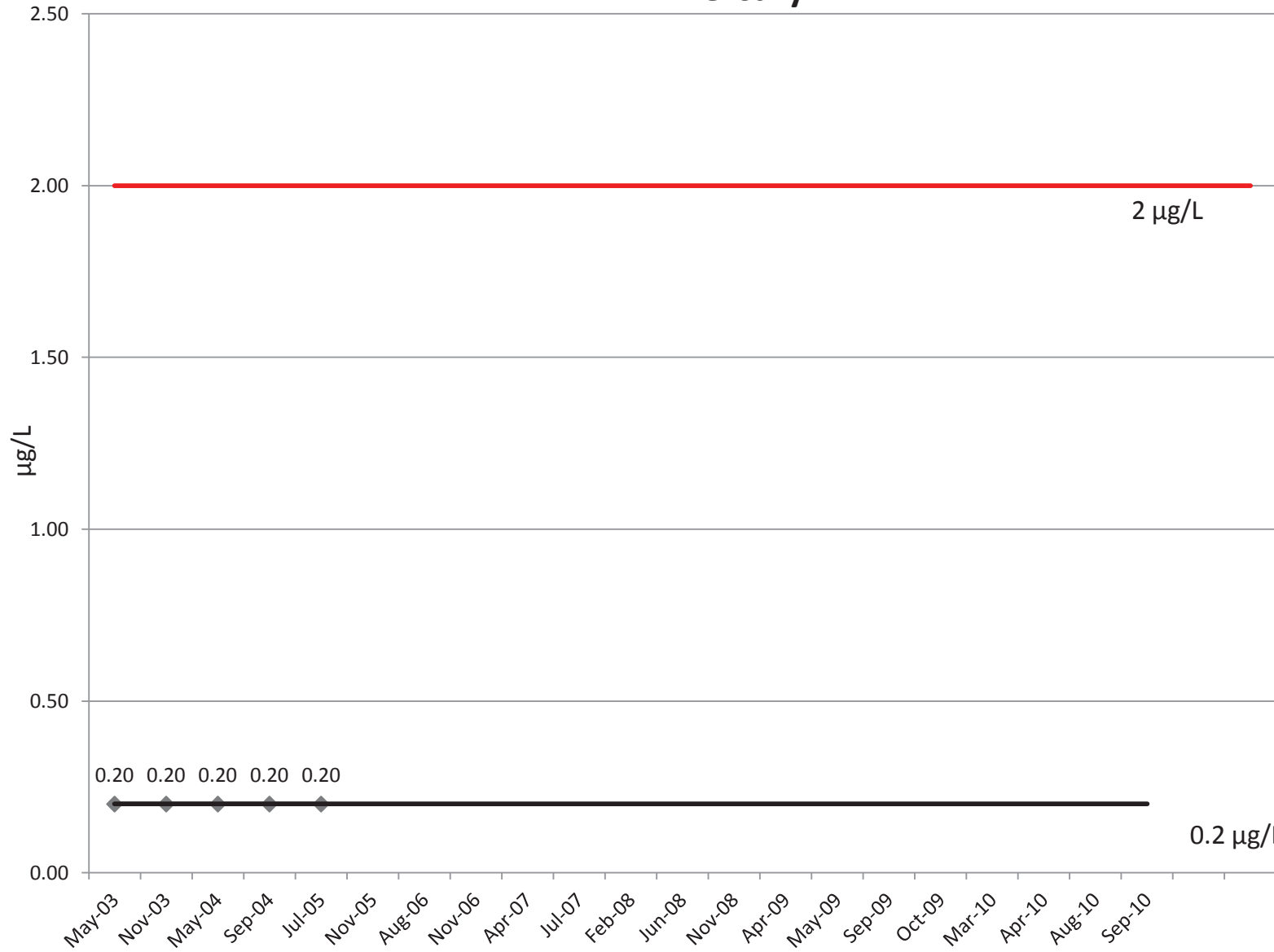
2 µg/L

Mercury

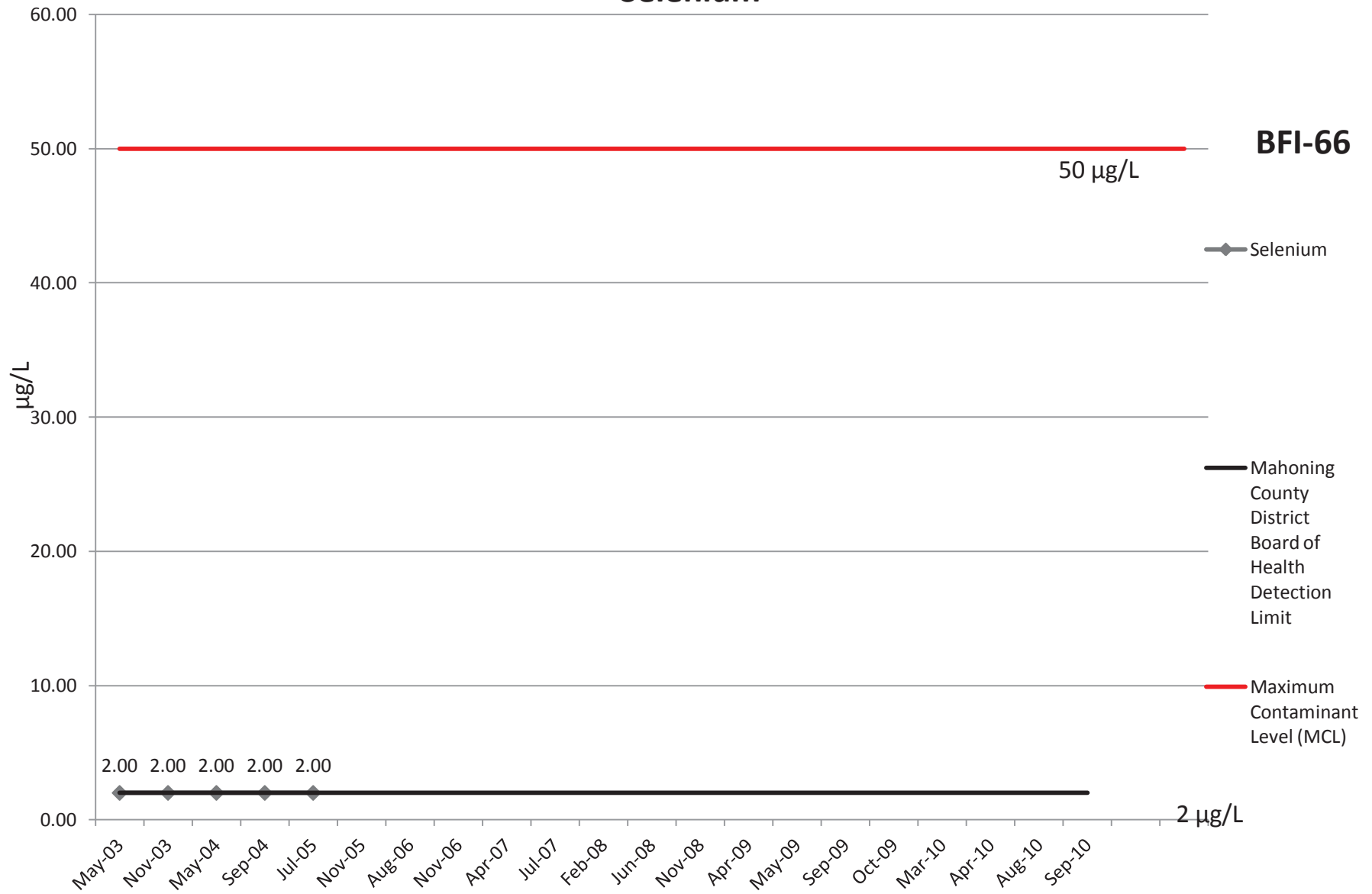
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Maximum  
Contaminant  
Level (MCL)

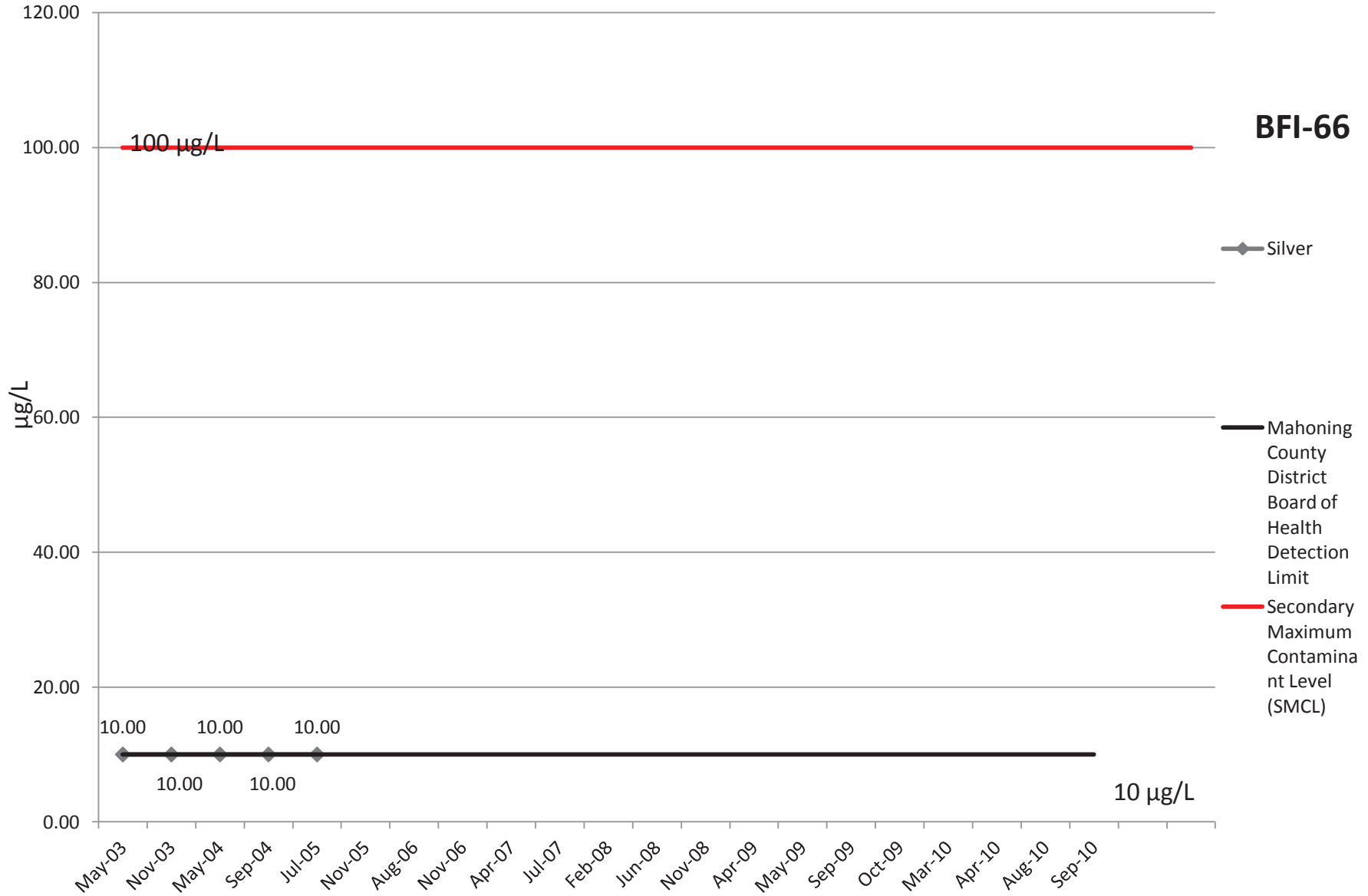
0.2 µg/L



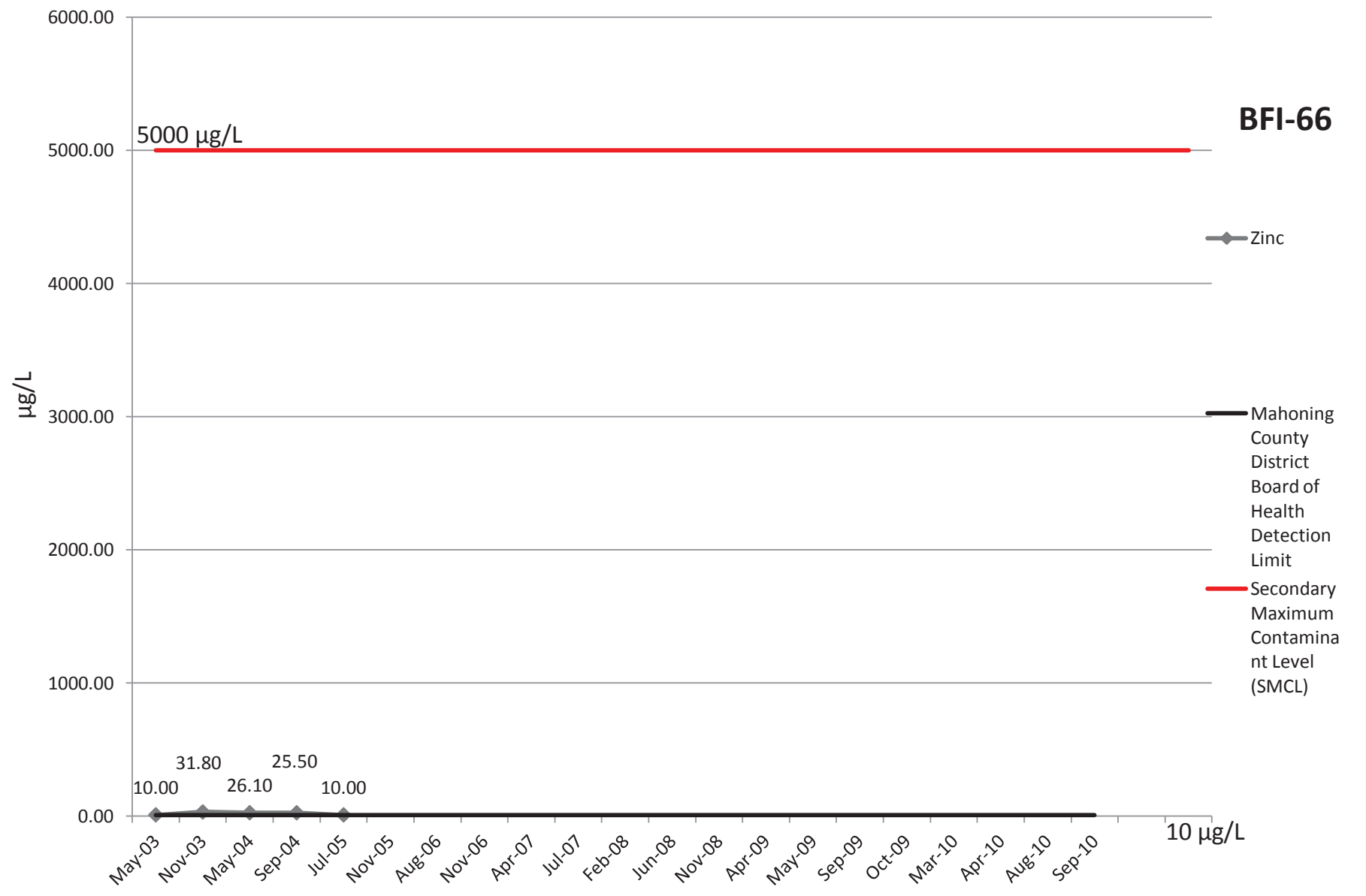
# Selenium



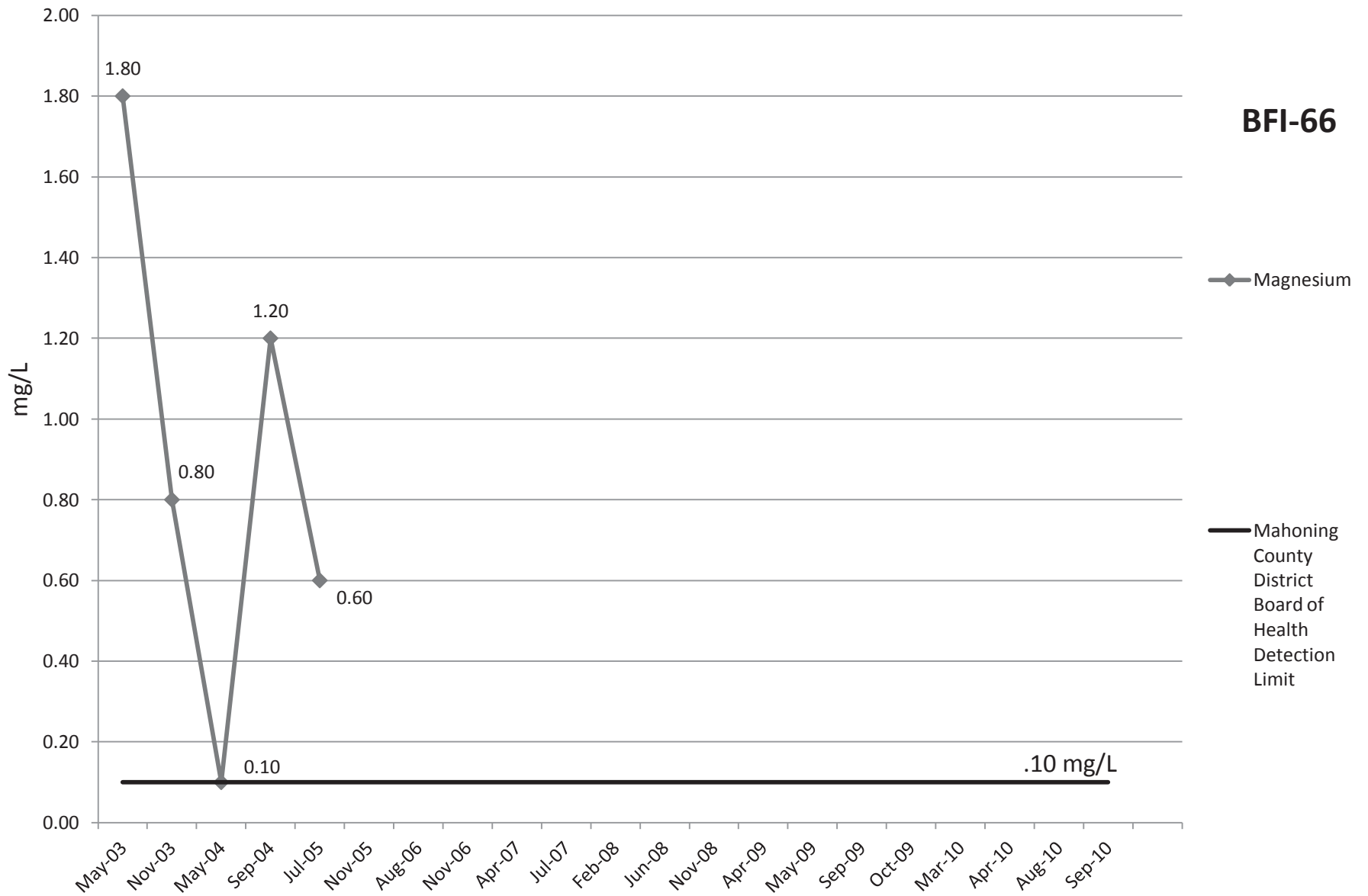
# Silver



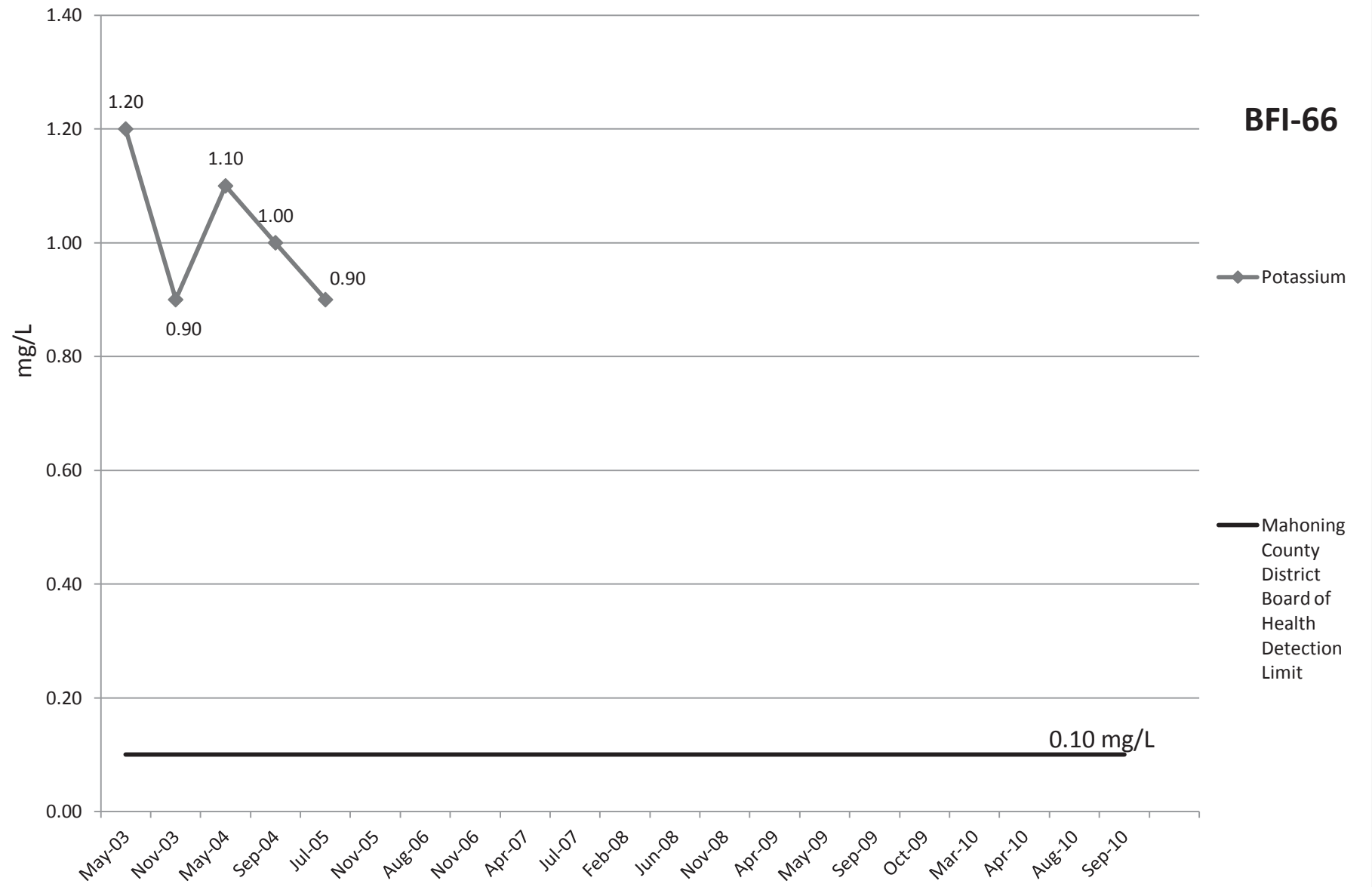
# Zinc



# Magnesium

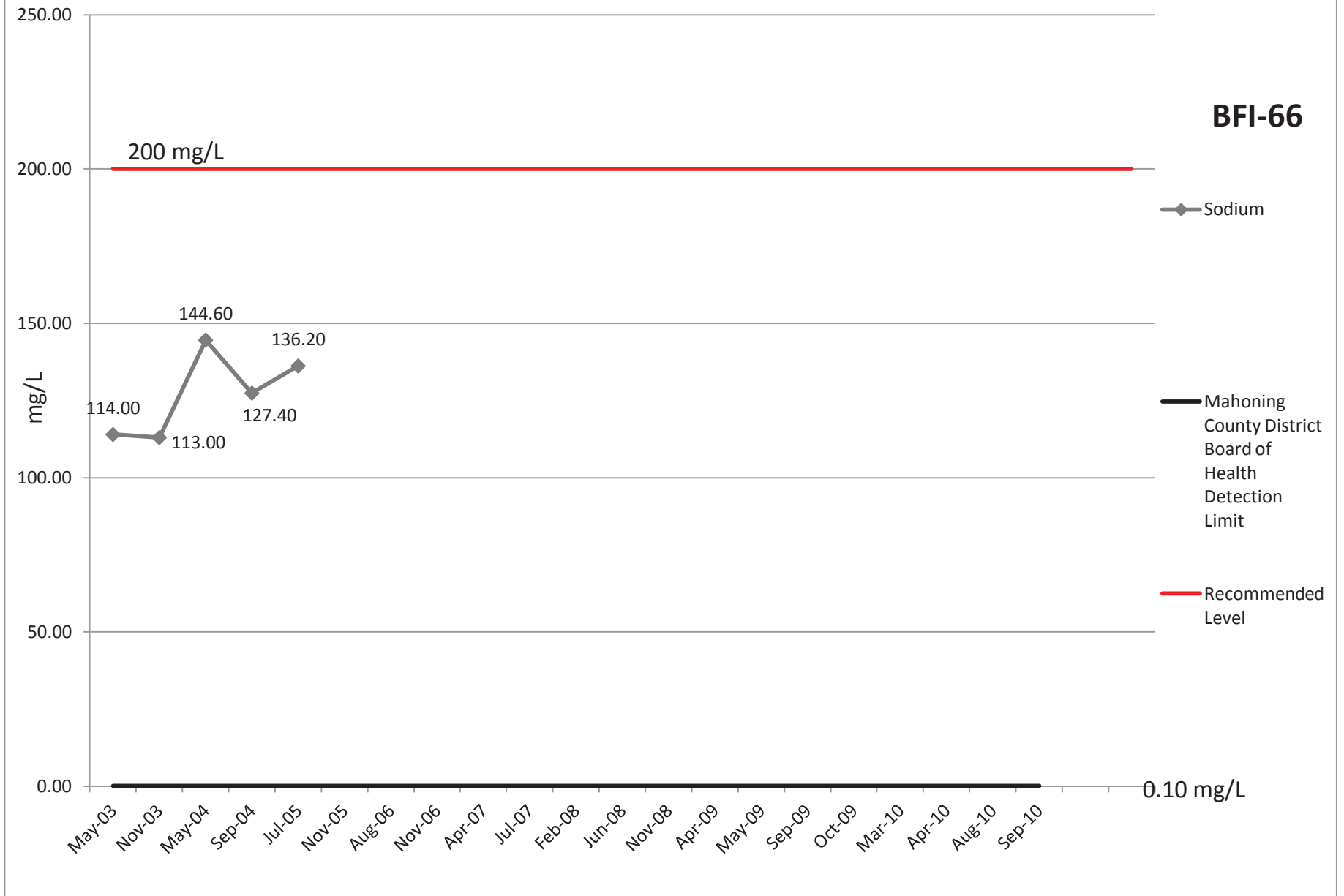


# Potassium

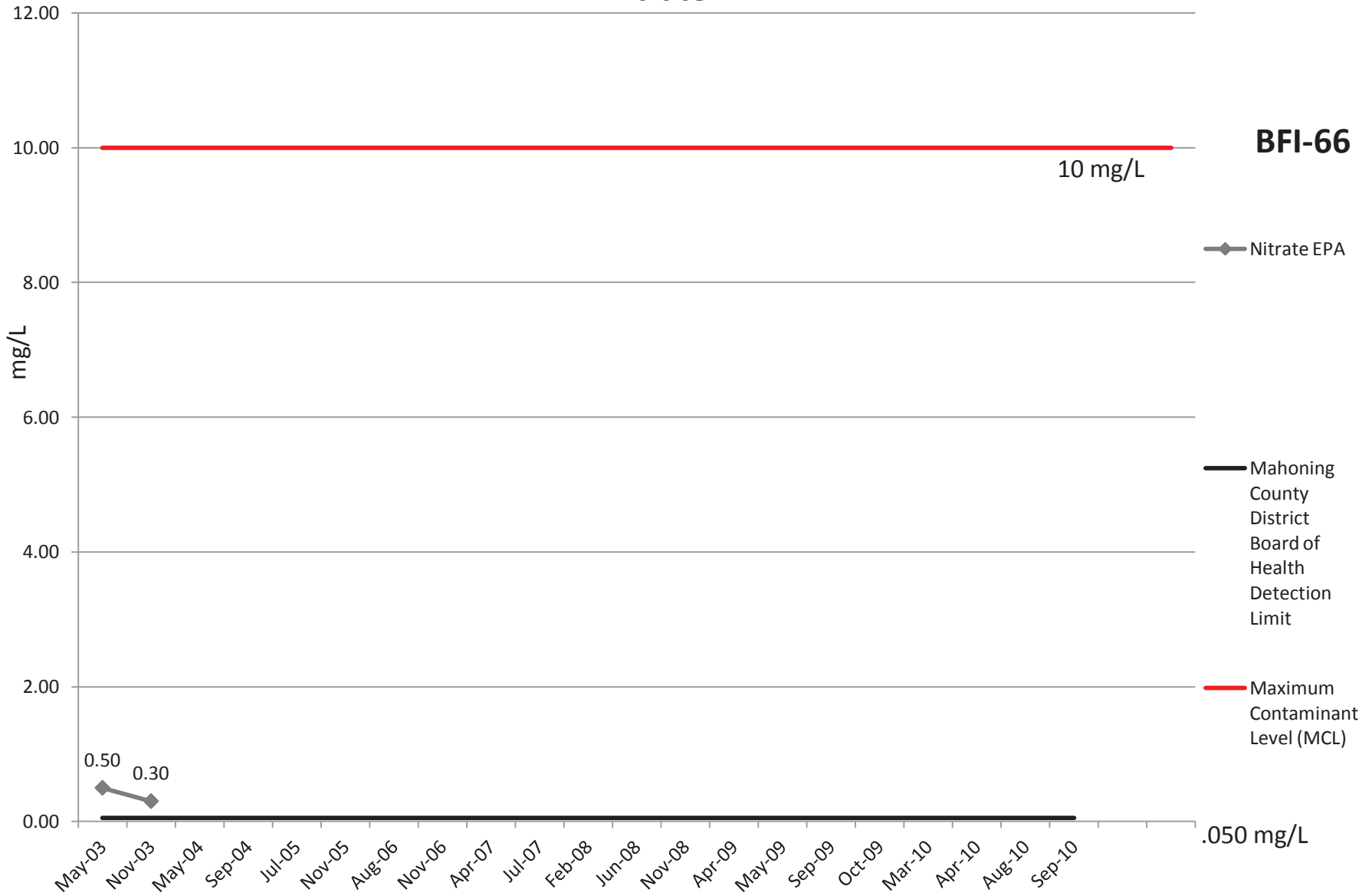




# Sodium

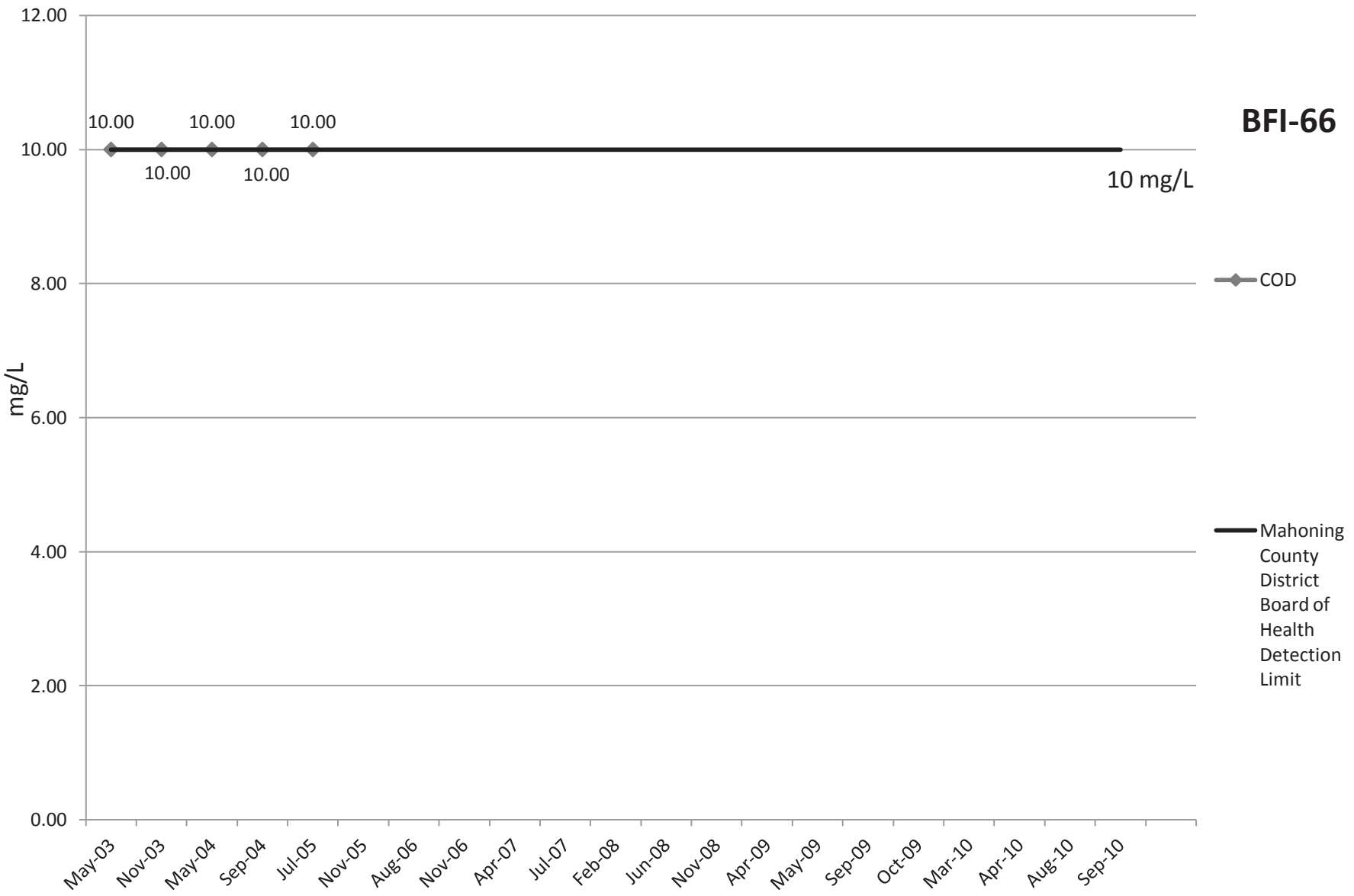


# Nitrate EPA



# COD

**BFI-66**

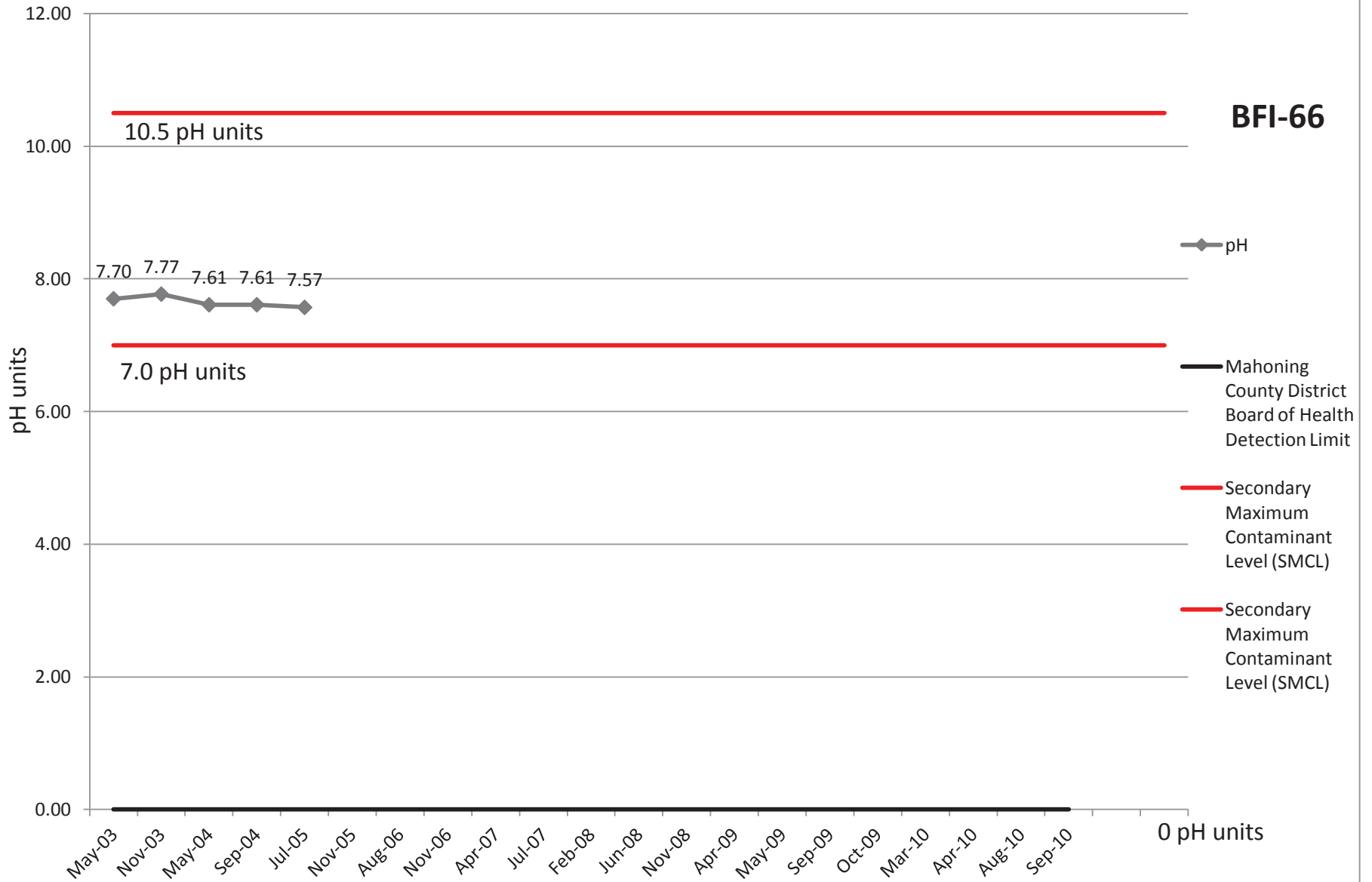


10 mg/L

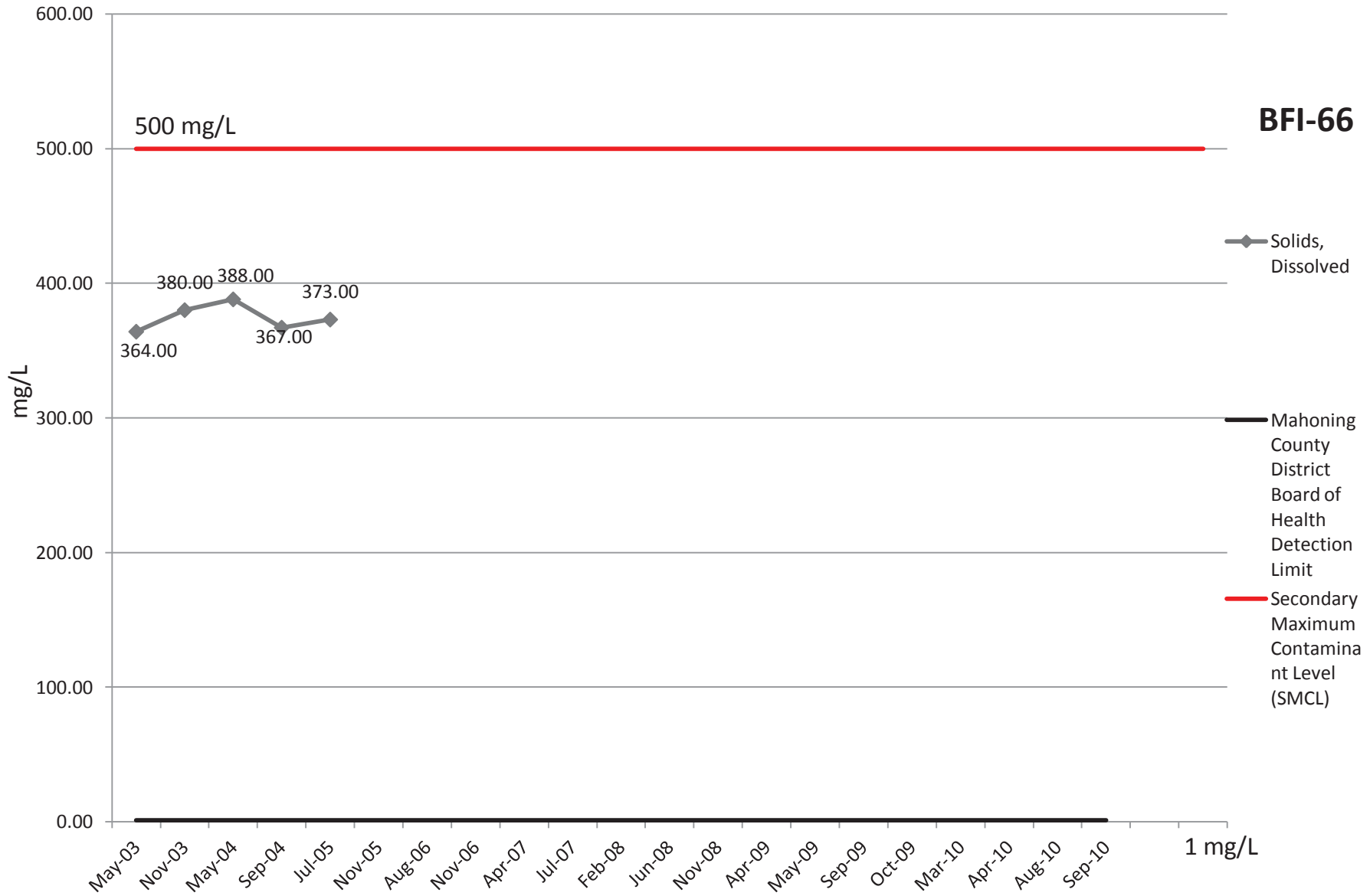
—◆— COD

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

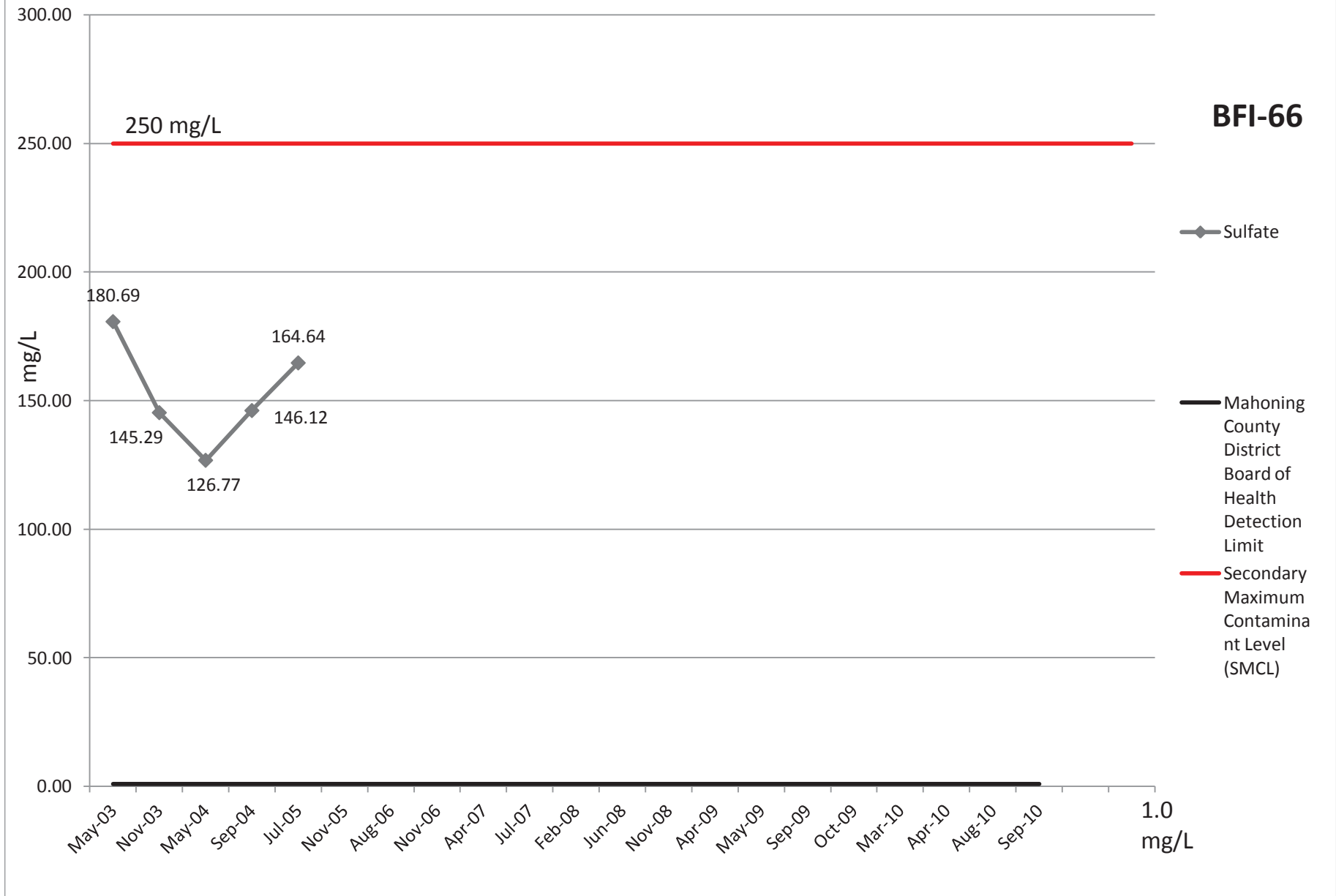
# pH



# Solids, Dissolved



# Sulfate



# Bacteria

## BFI-66

Positive/Negative

◆ Bacteria

1.00 1.00 1.00 1.00

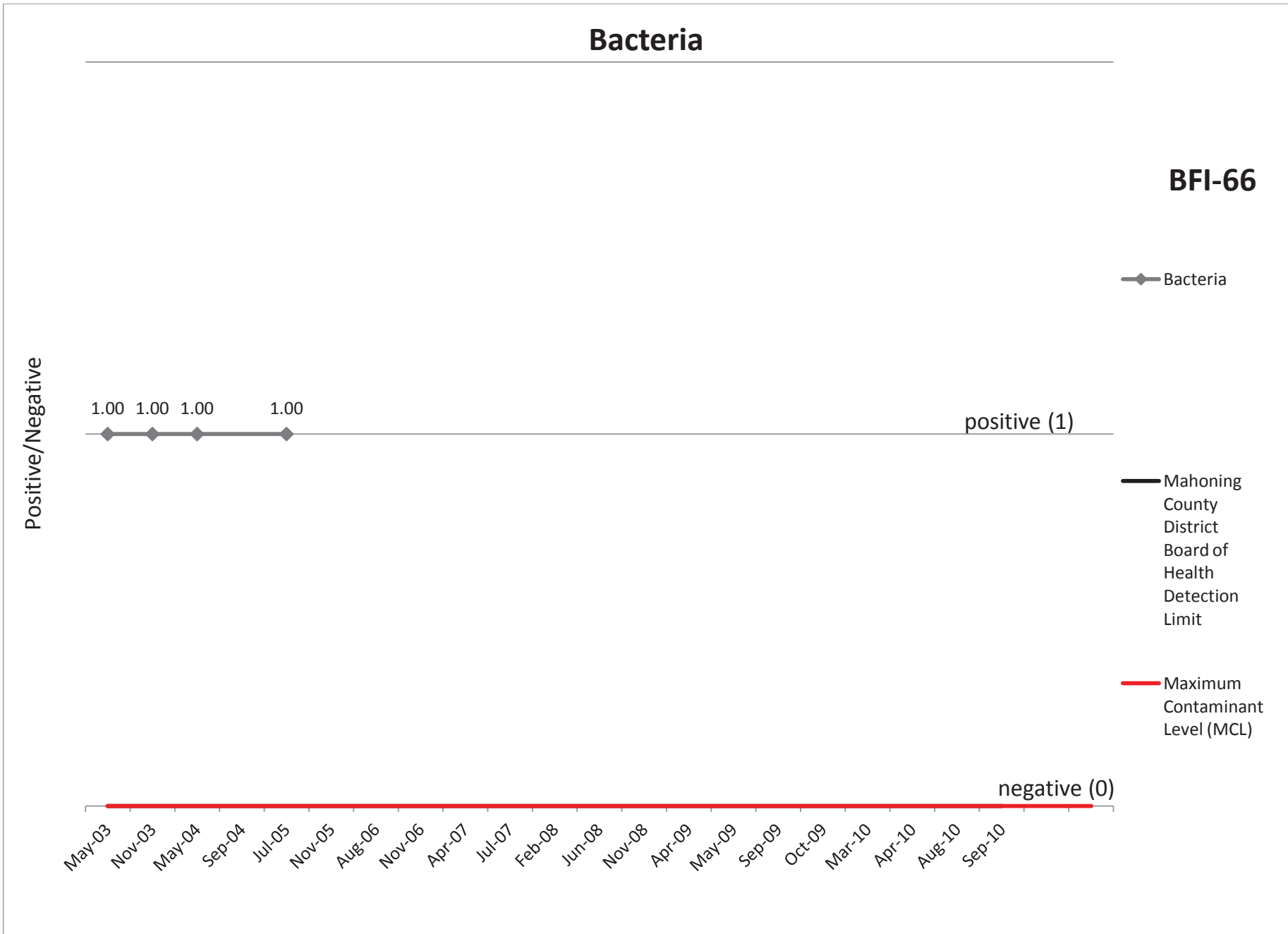
positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

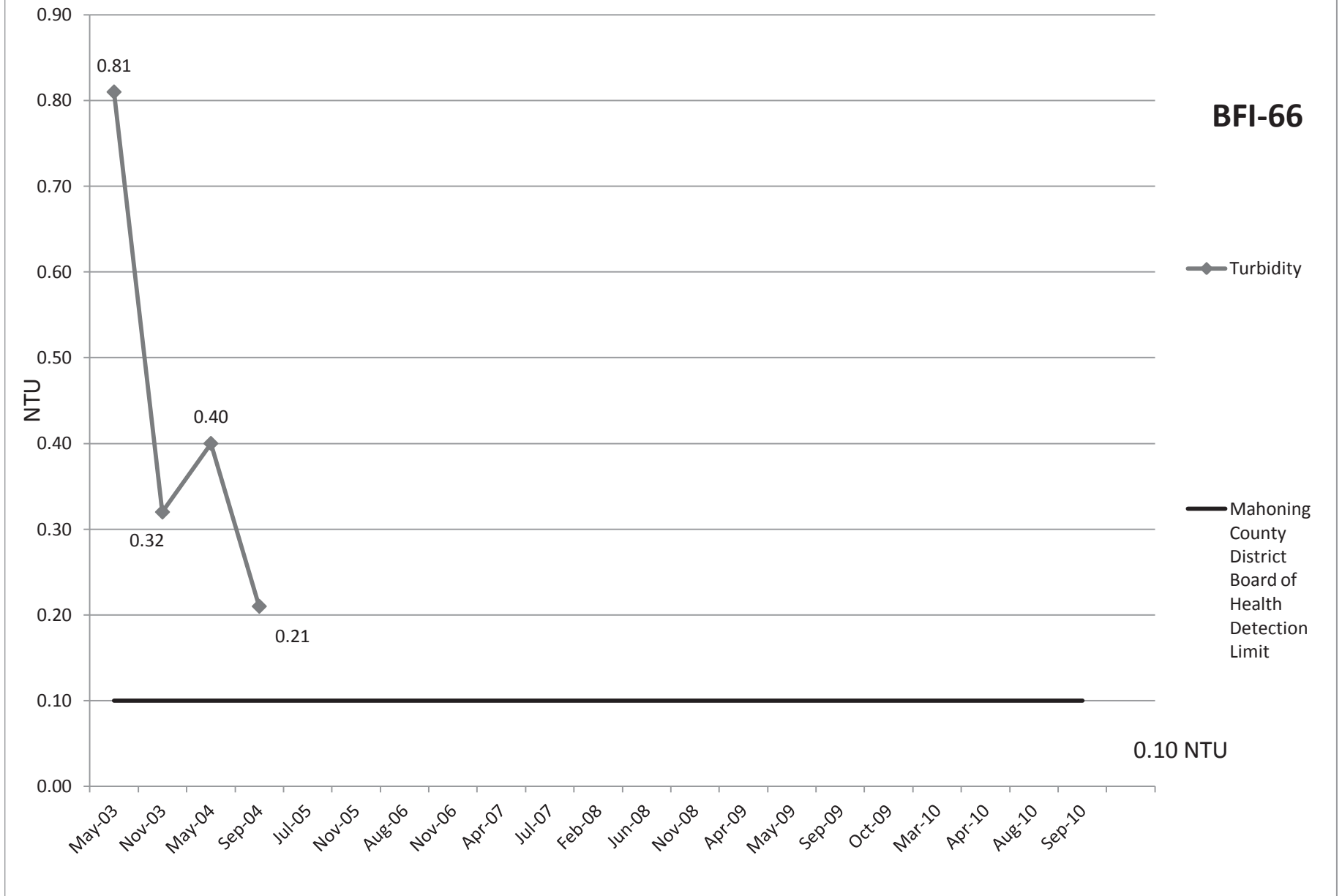
— Maximum  
Contaminant  
Level (MCL)

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

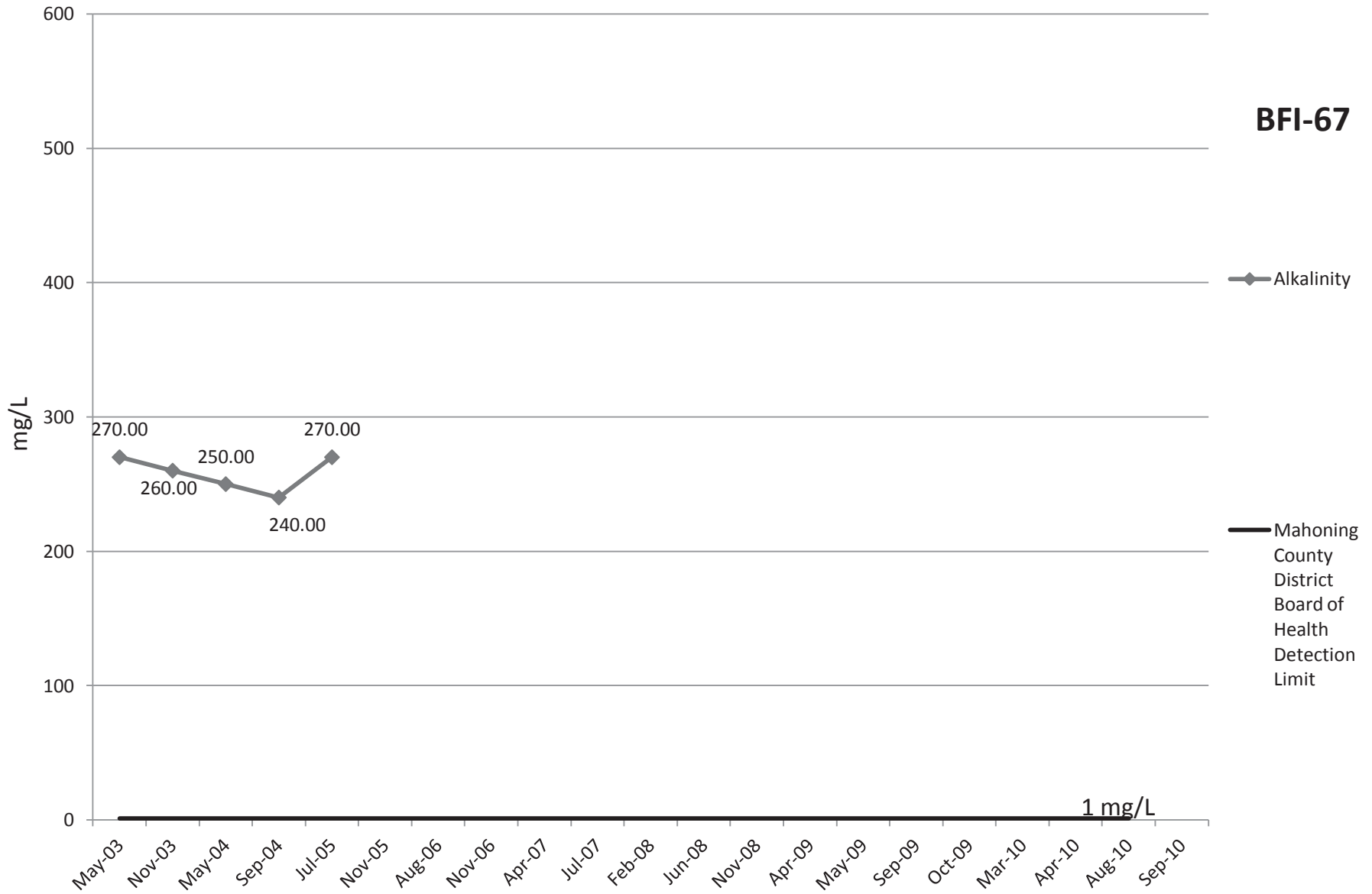


# Turbidity

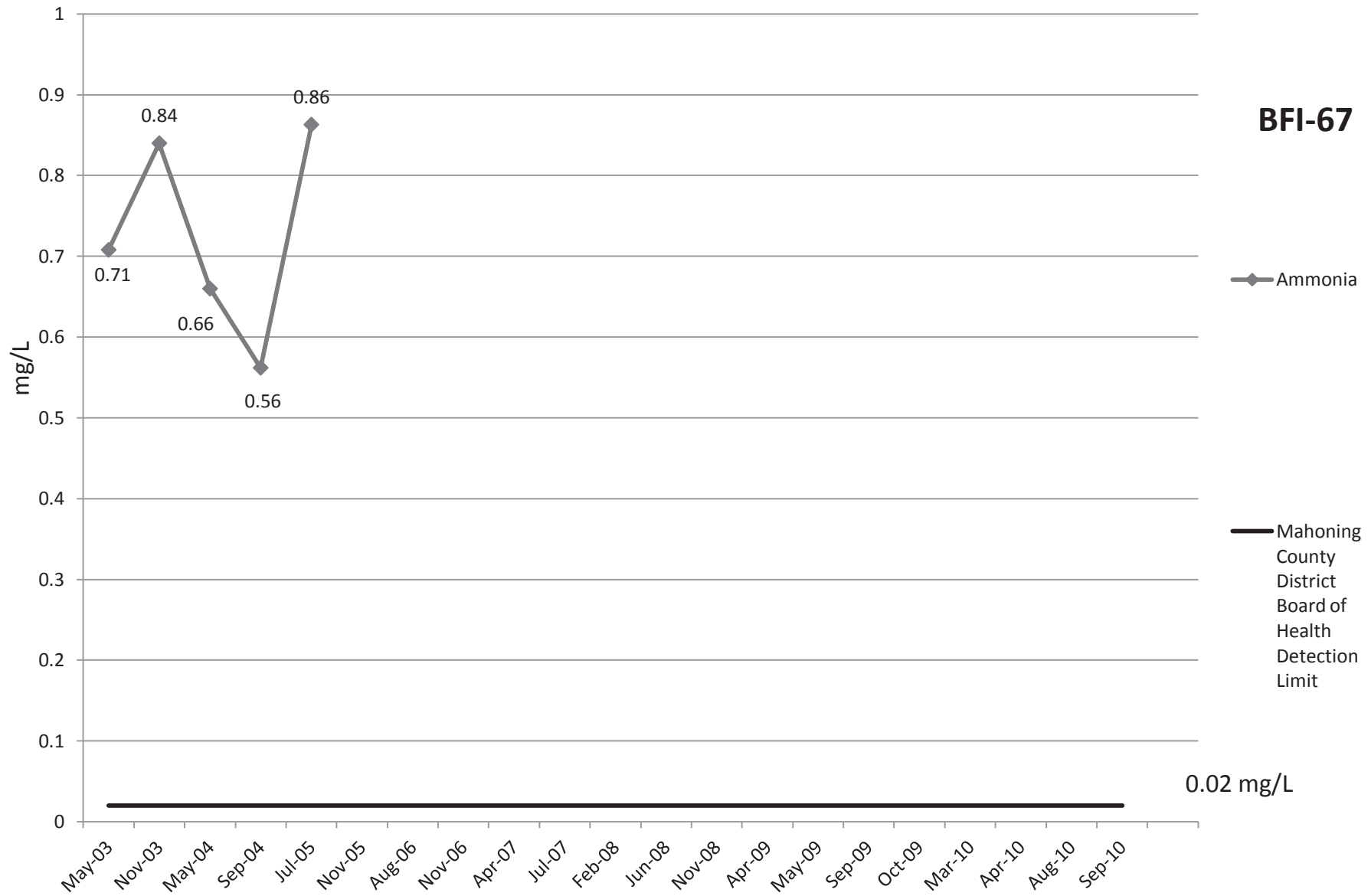




# Alkalinity



# Ammonia



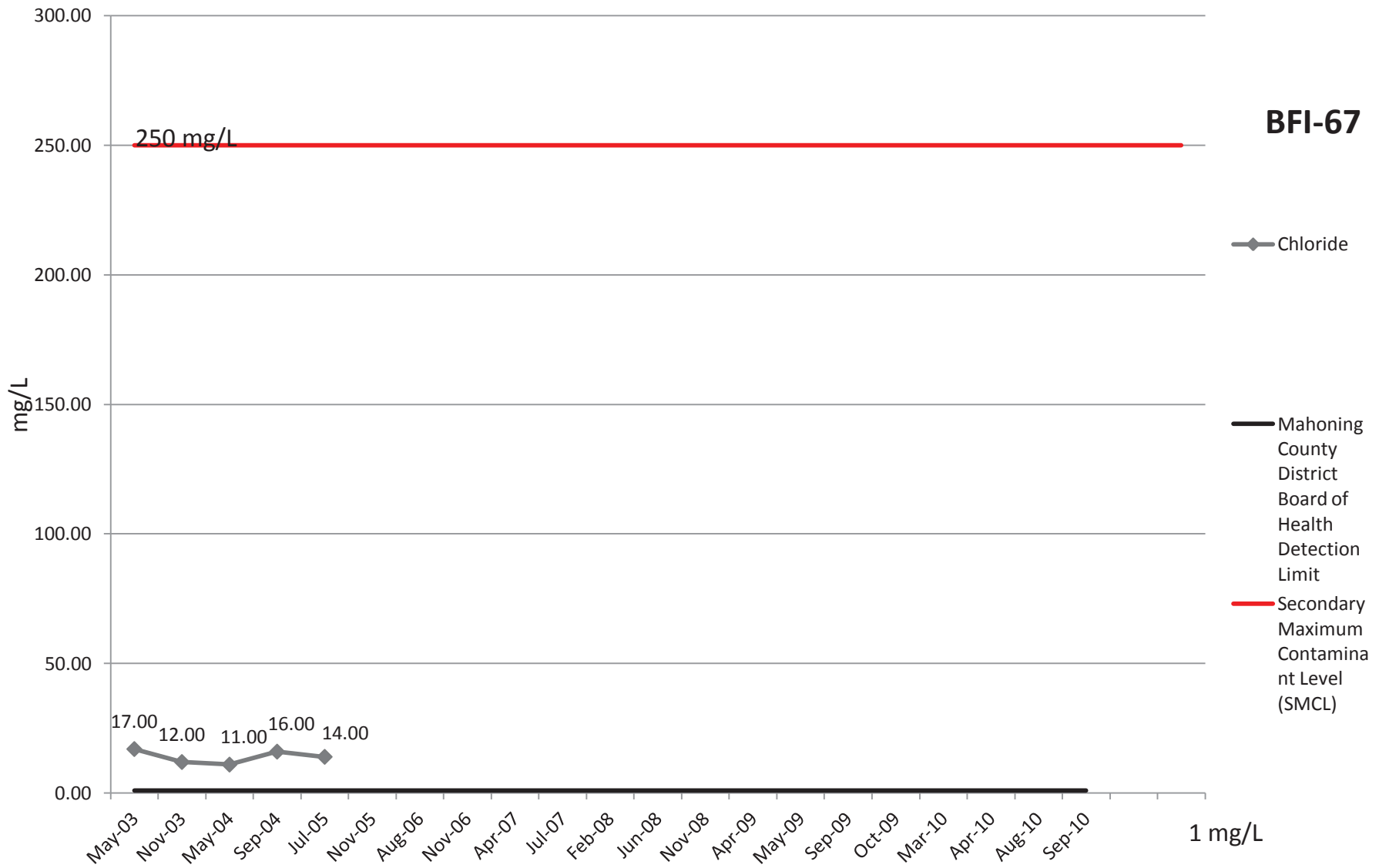
**BFI-67**

◆ Ammonia

— Mahoning County District Board of Health Detection Limit

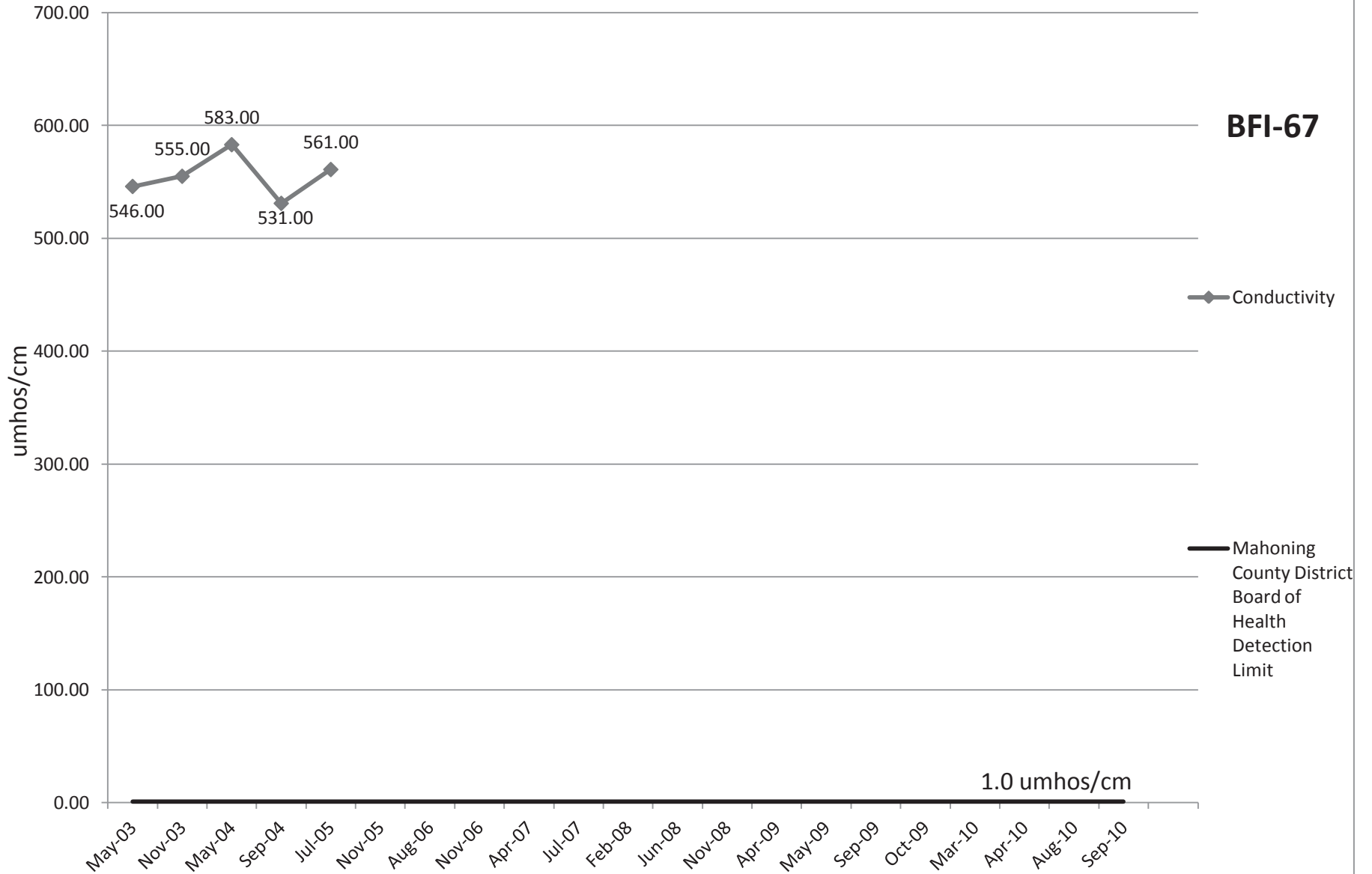
0.02 mg/L

# Chloride

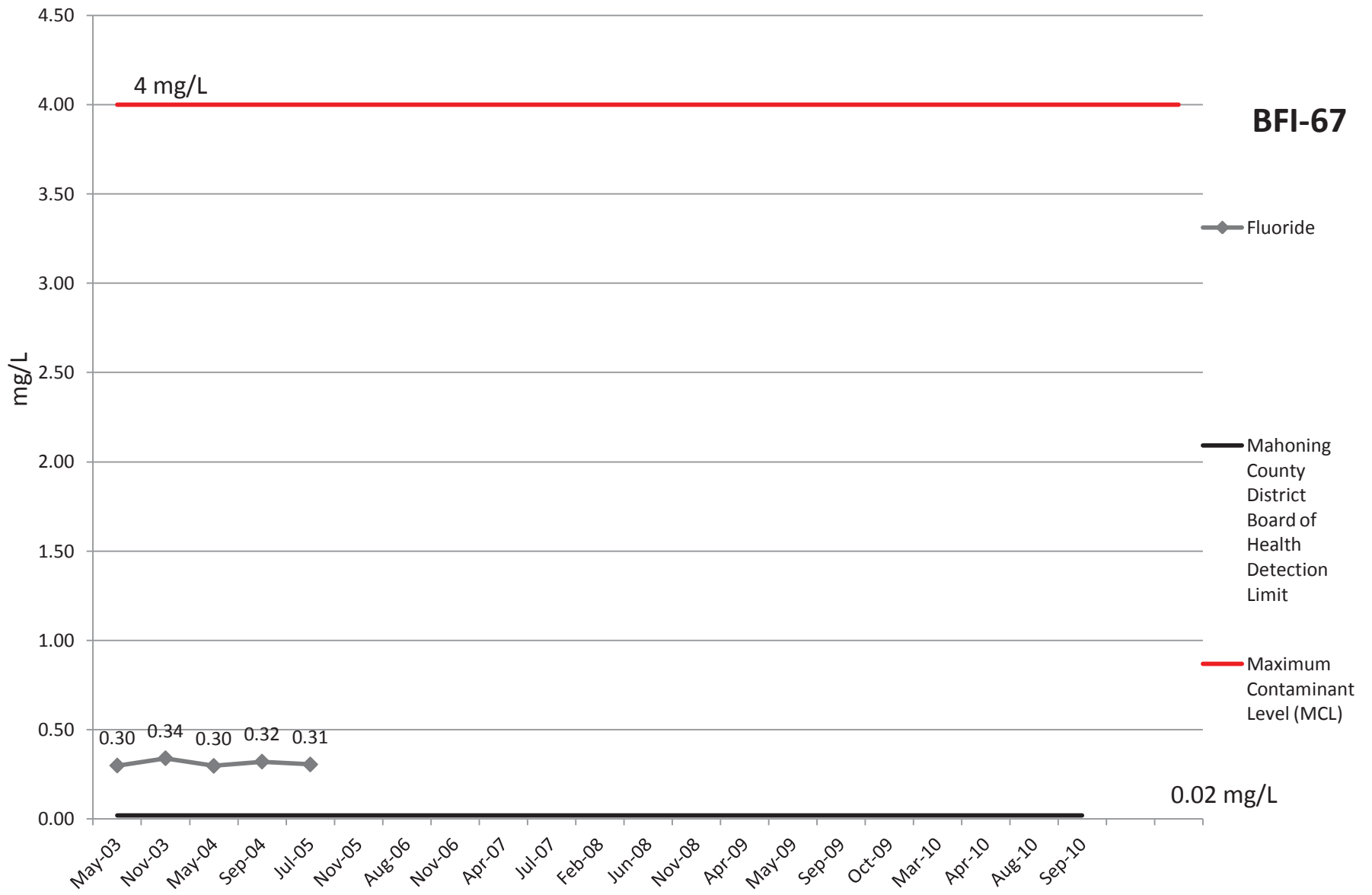


# Conductivity

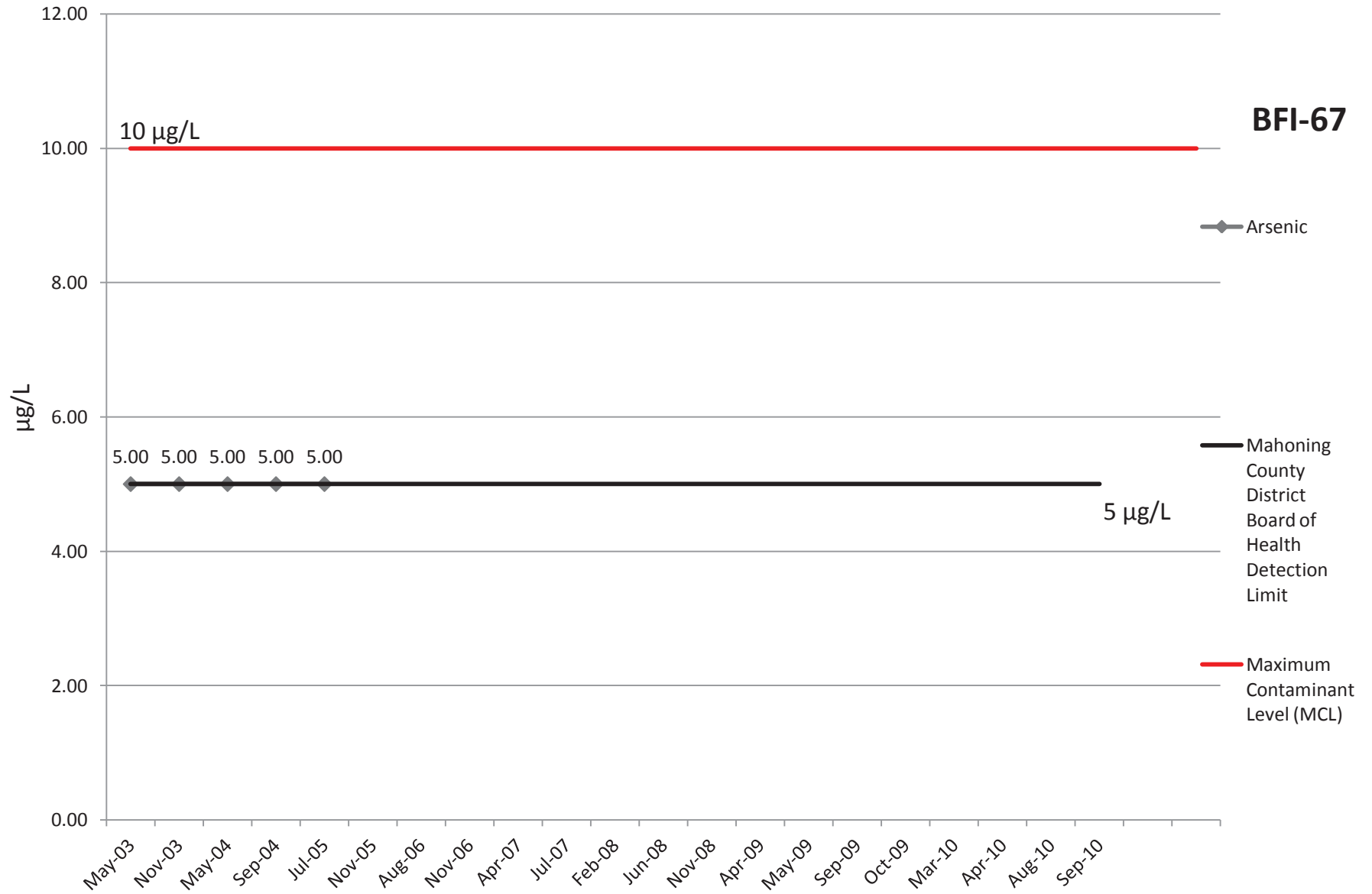
**BFI-67**



# Fluoride

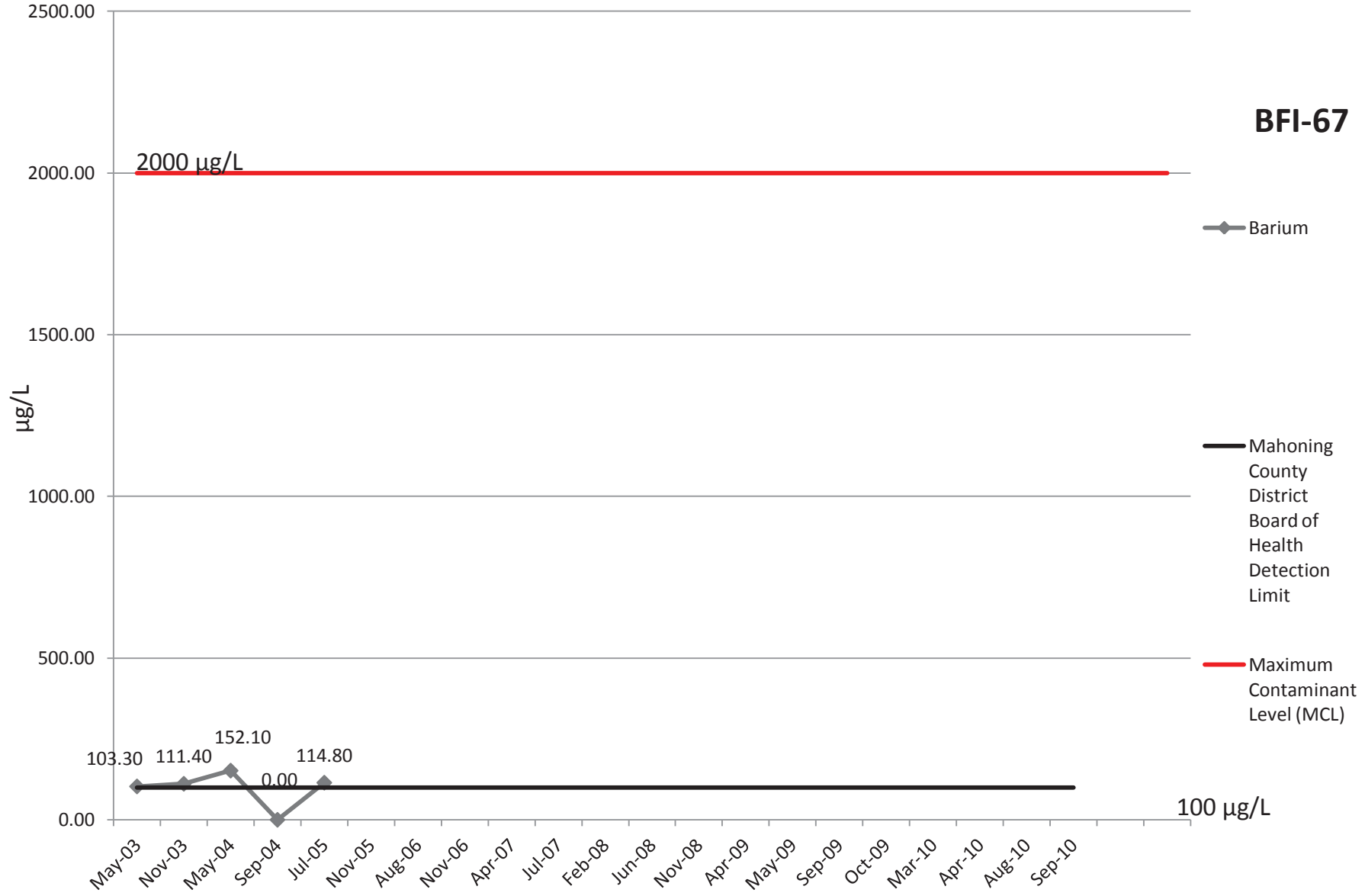


# Arsenic



# Barium

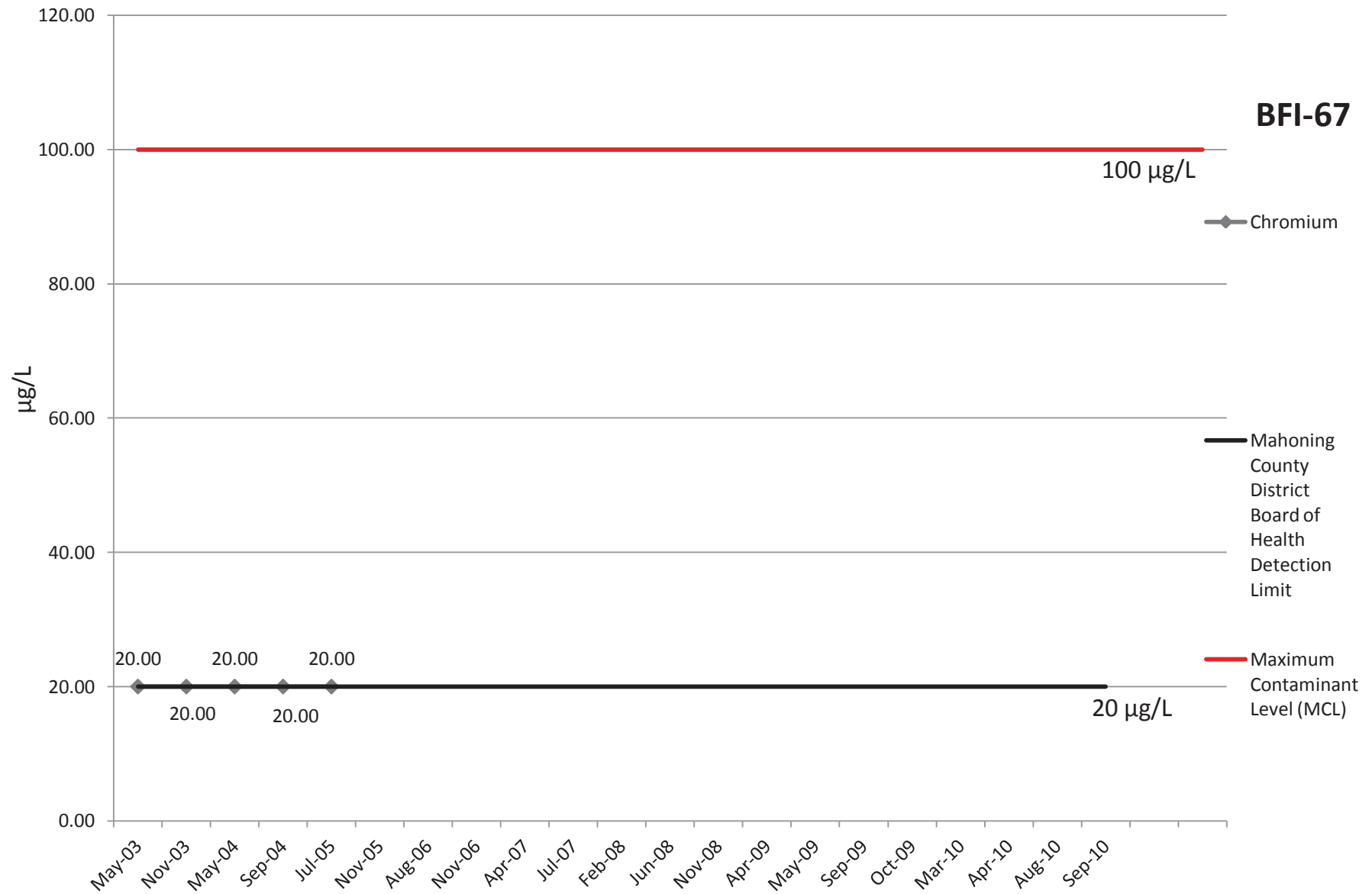
**BFI-67**



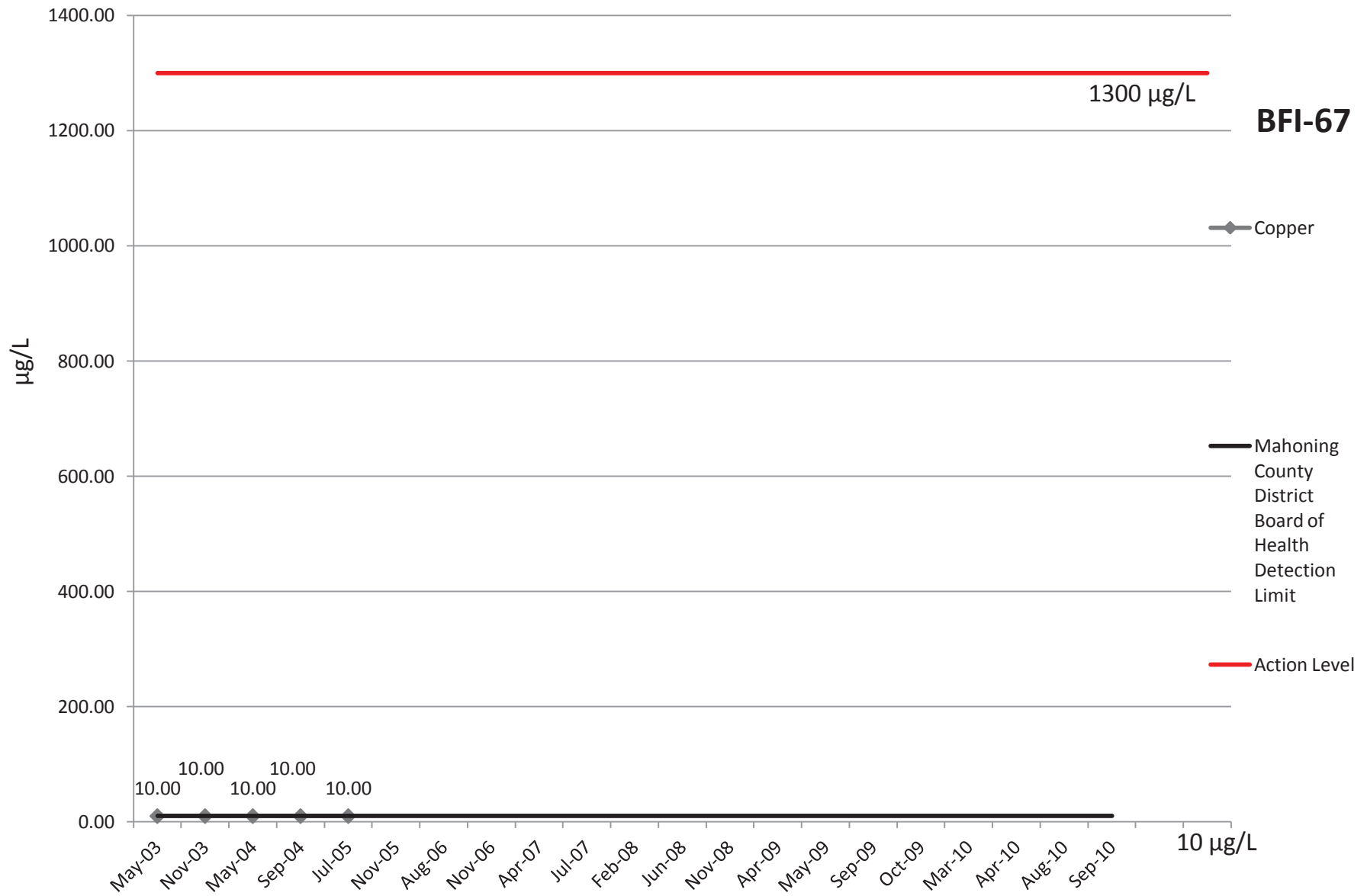




# Chromium

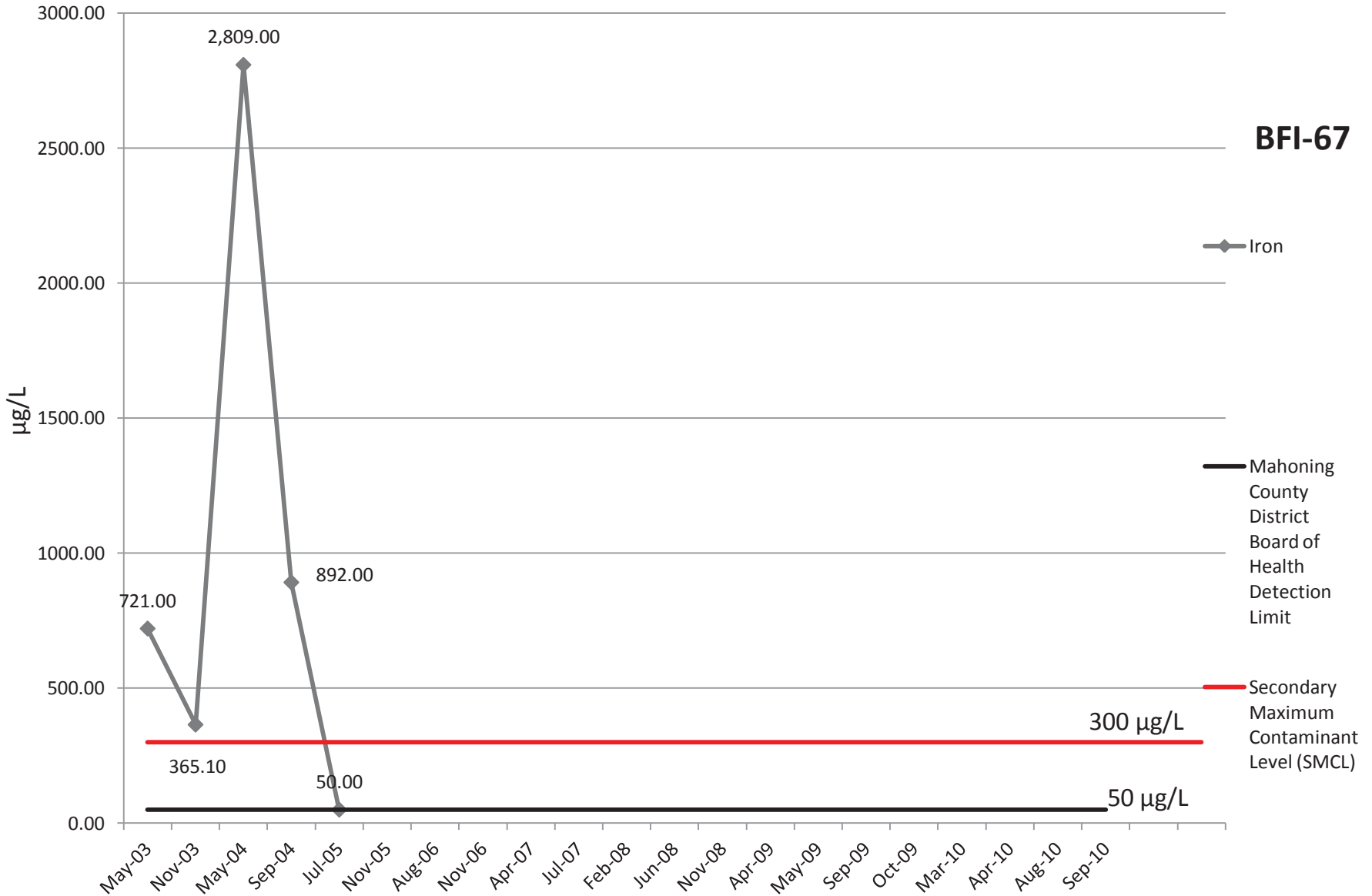


# Copper



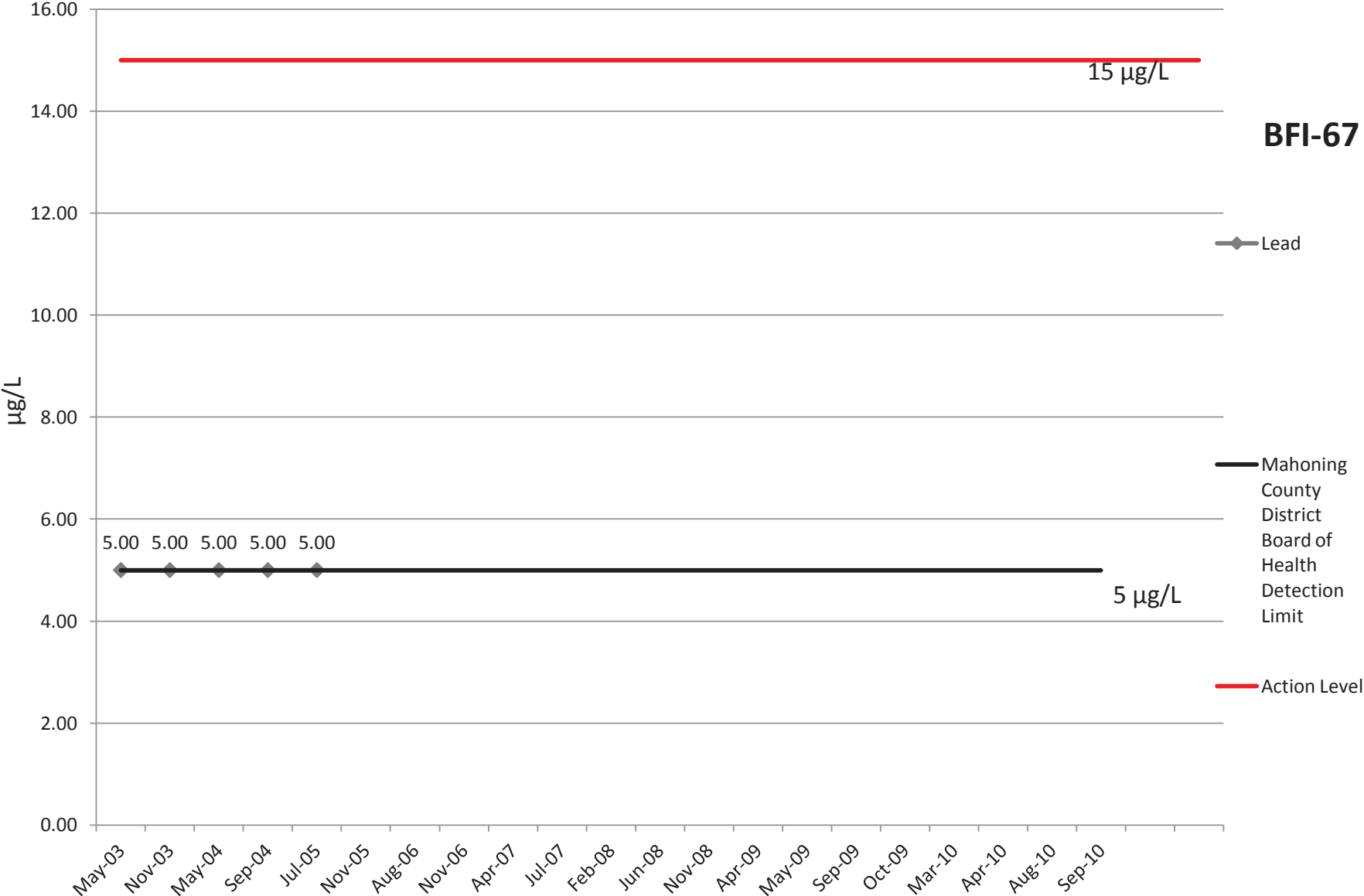
# Iron

**BFI-67**



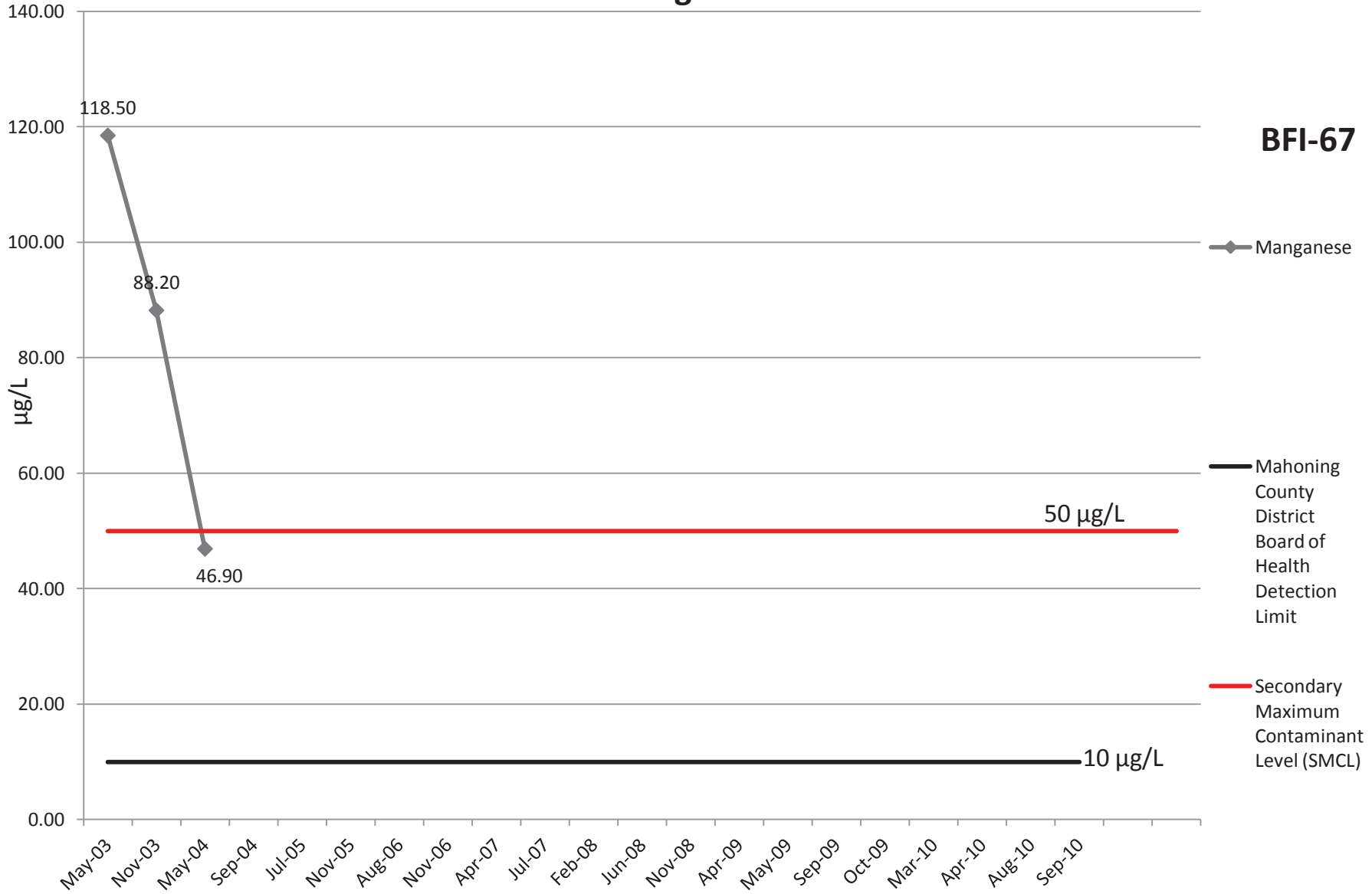
# Lead

**BFI-67**



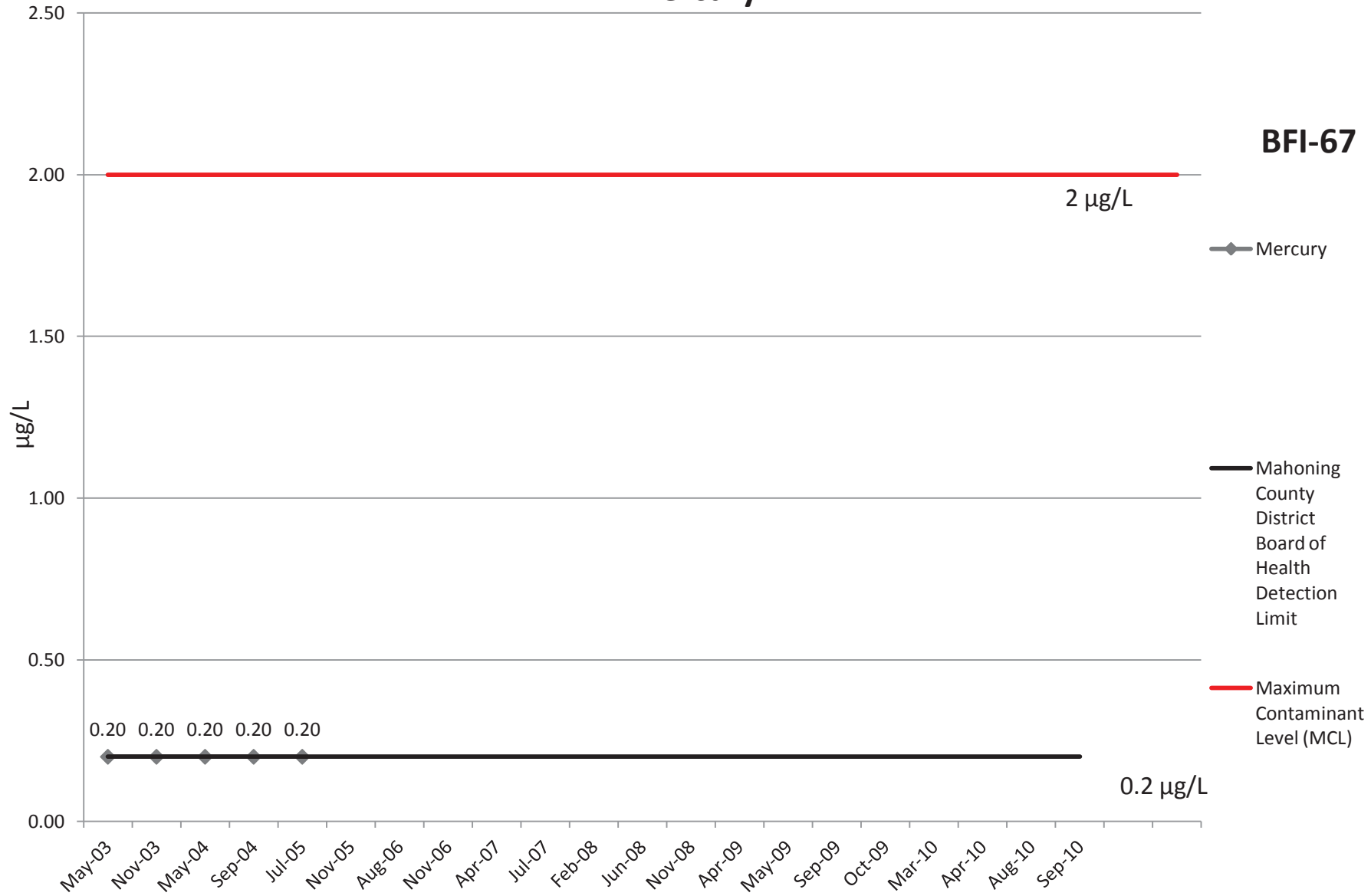
# Manganese

**BFI-67**

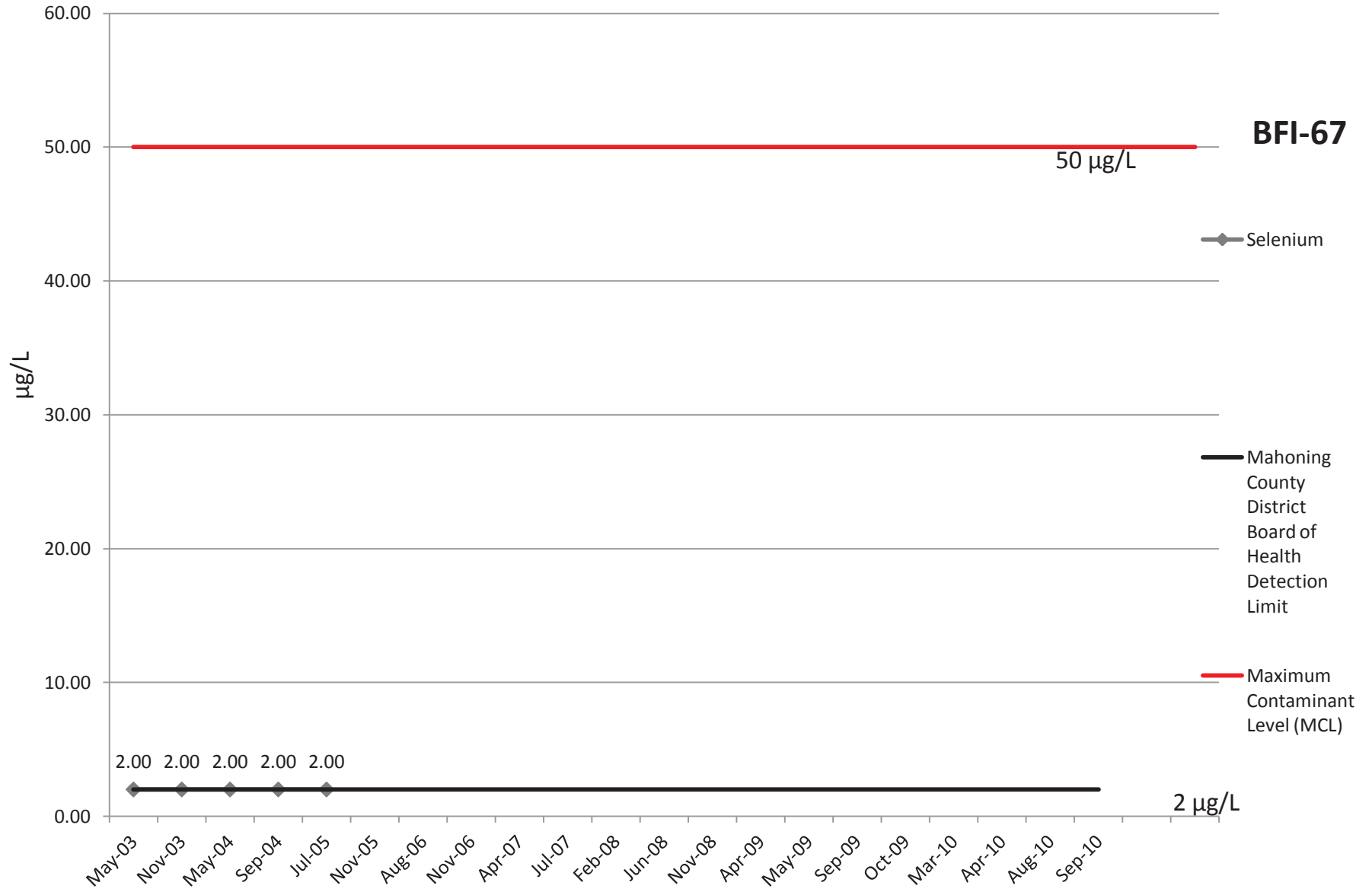


# Mercury

**BFI-67**

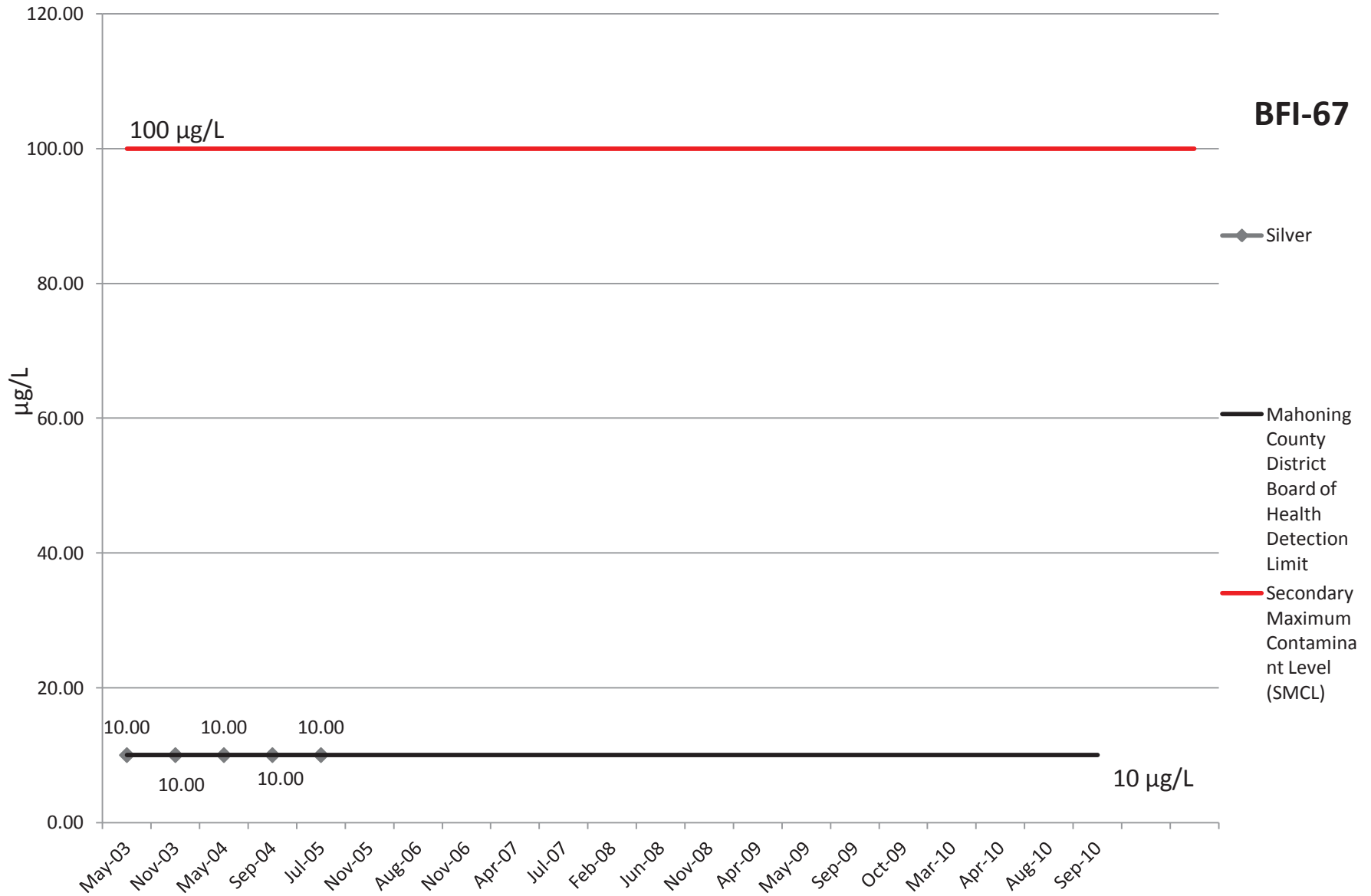


# Selenium



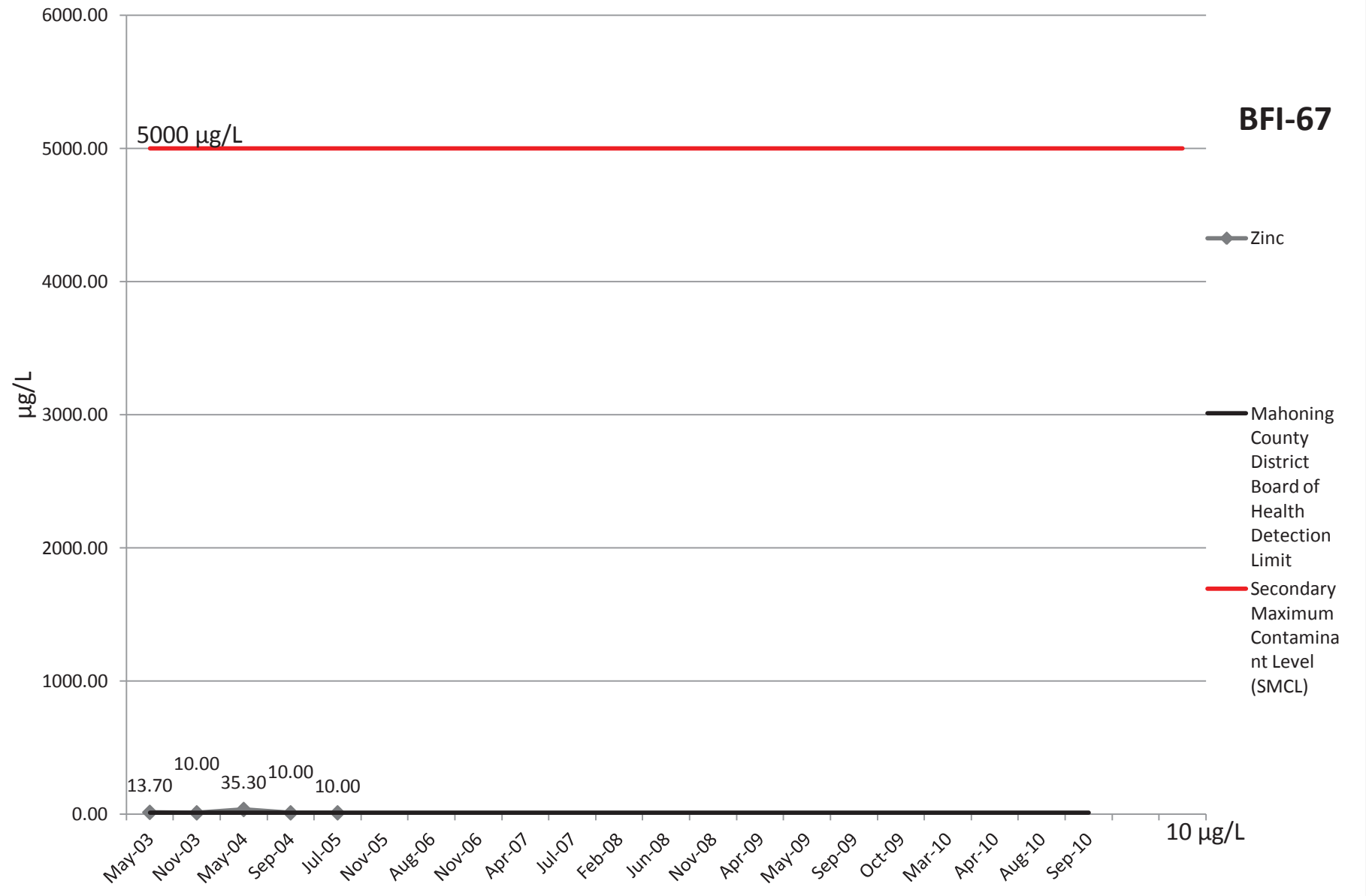
# Silver

**BFI-67**

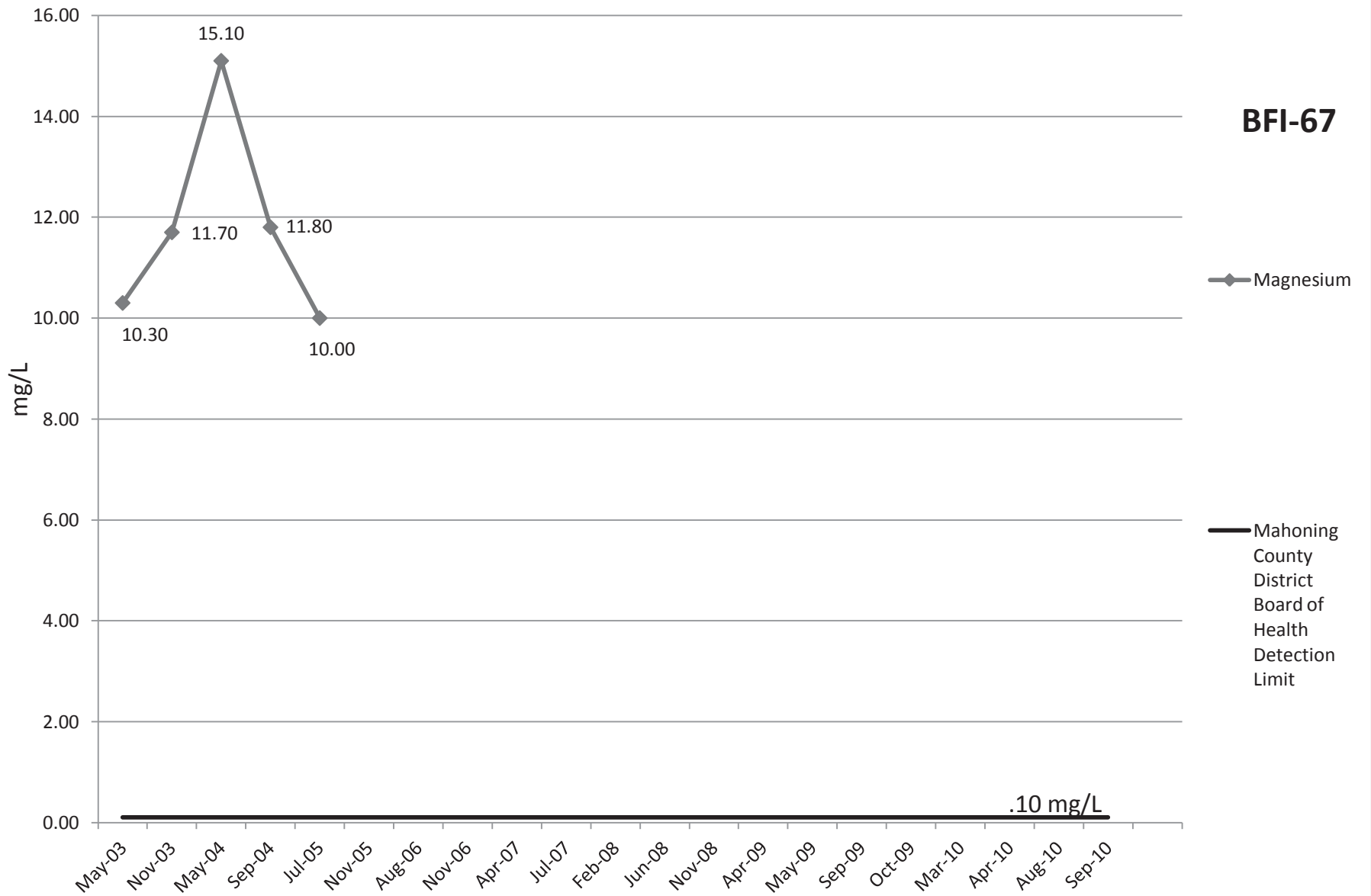




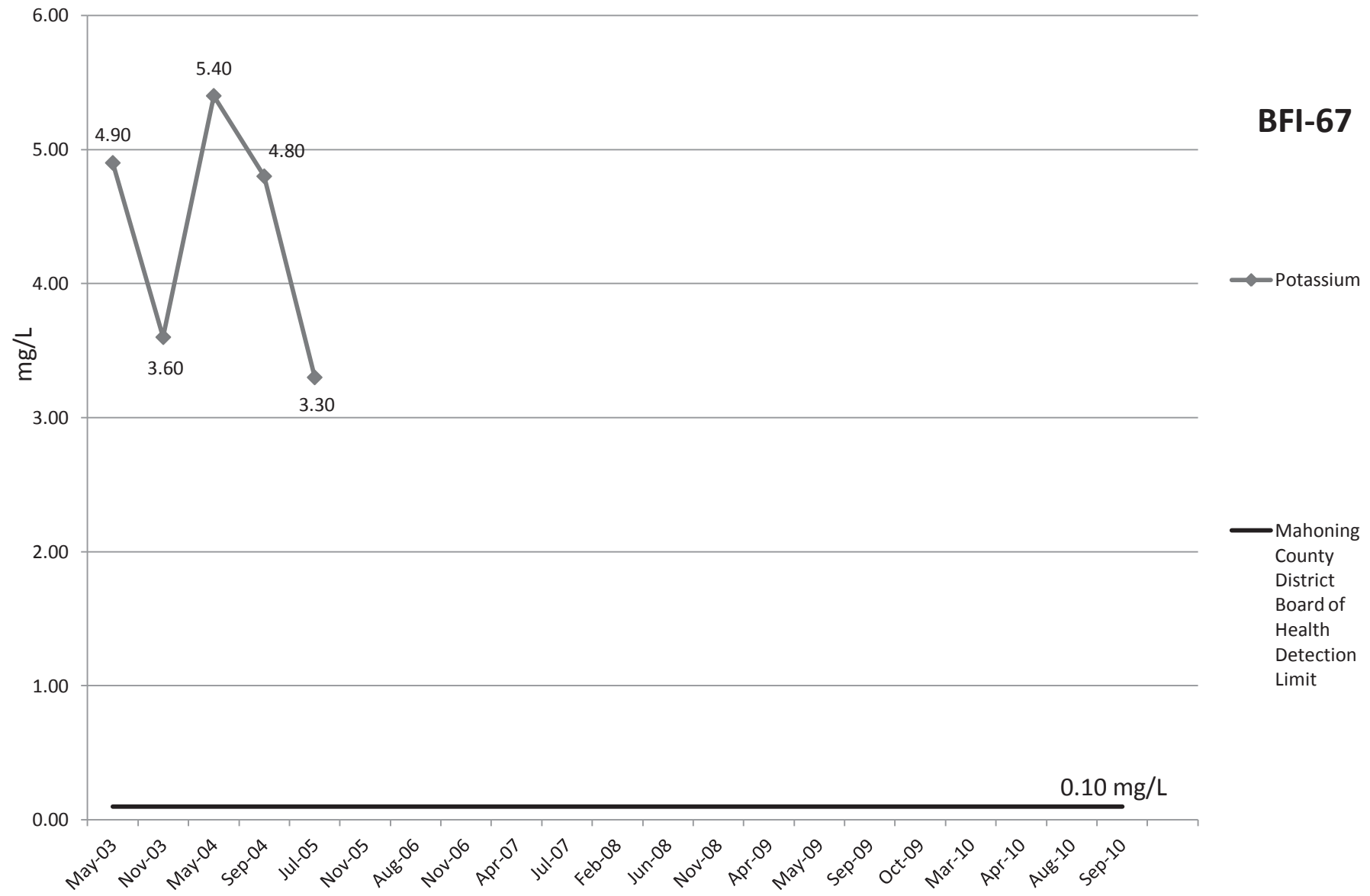
# Zinc



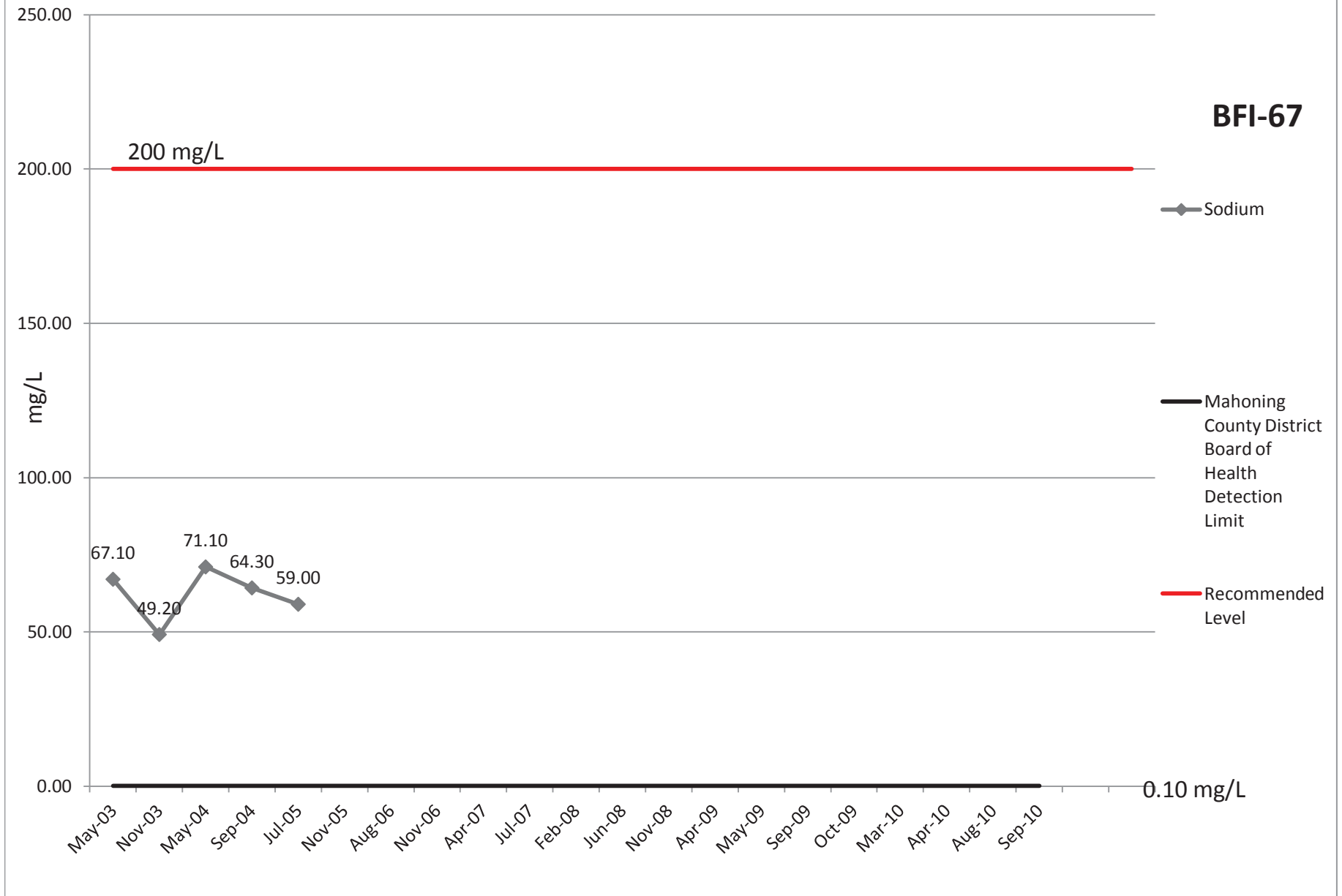
# Magnesium



# Potassium



# Sodium



# Nitrate EPA

**BFI-67**

10 mg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

mg/L

◆ Nitrate EPA

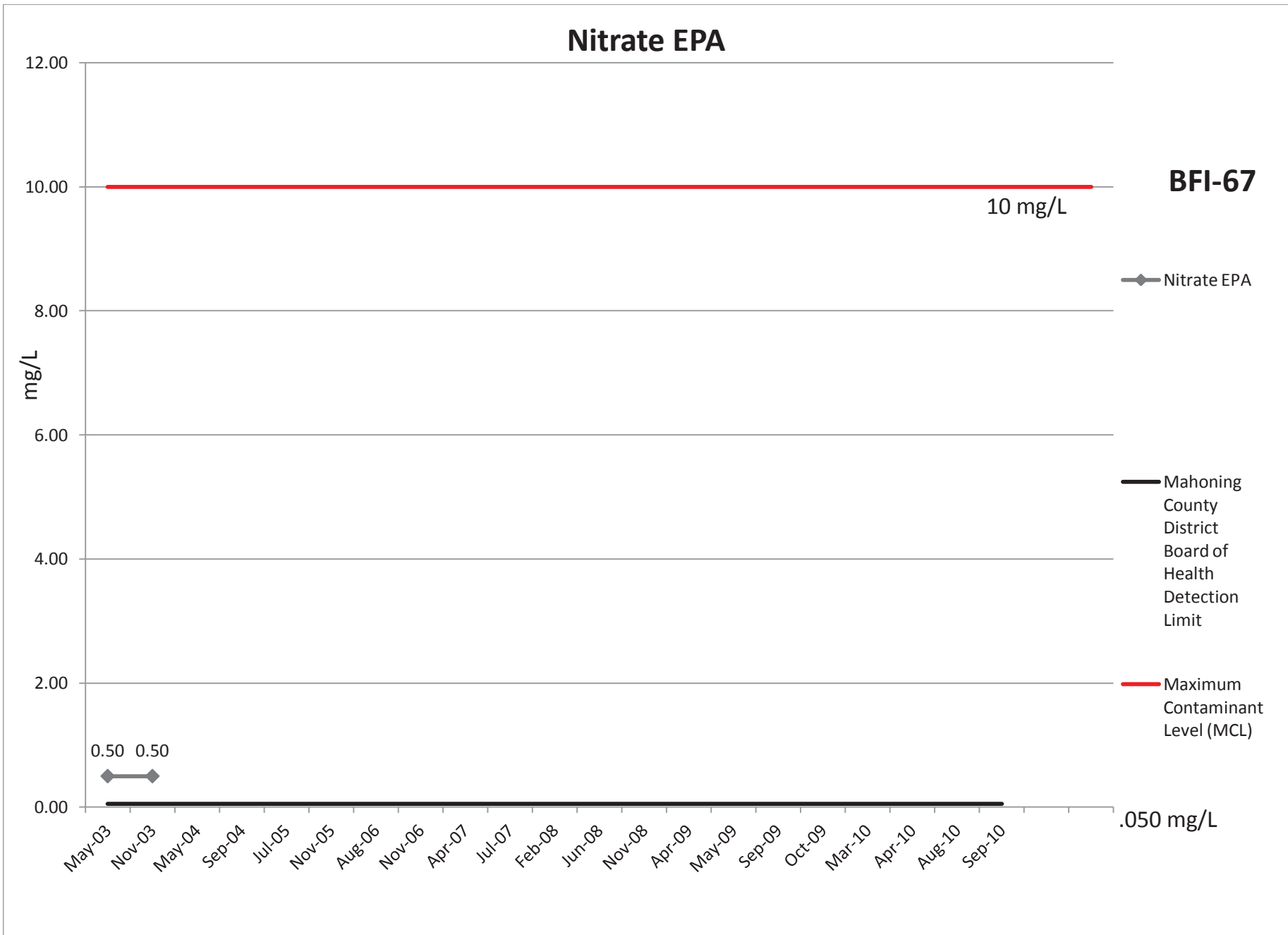
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

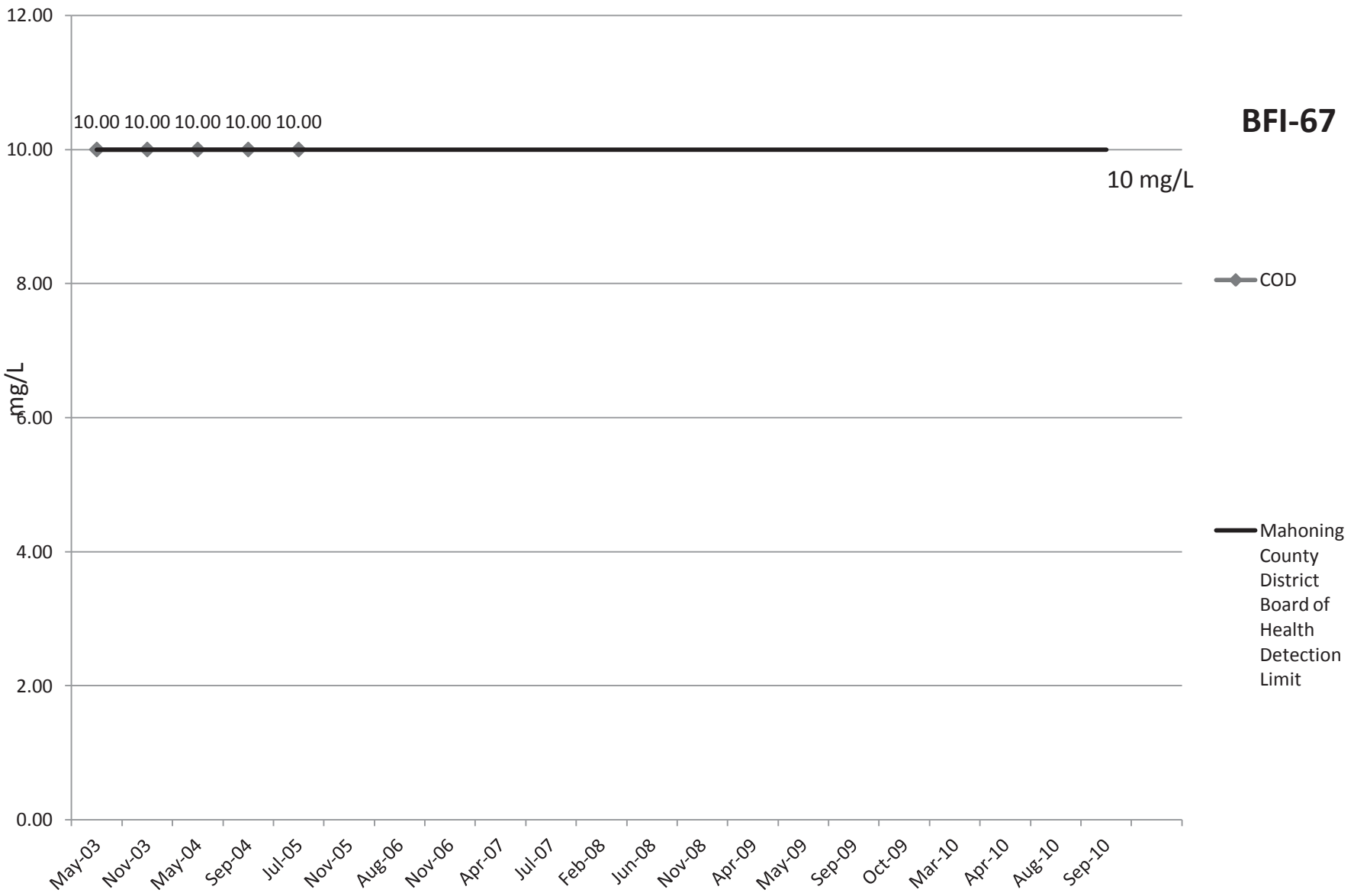
0.50 0.50

.050 mg/L

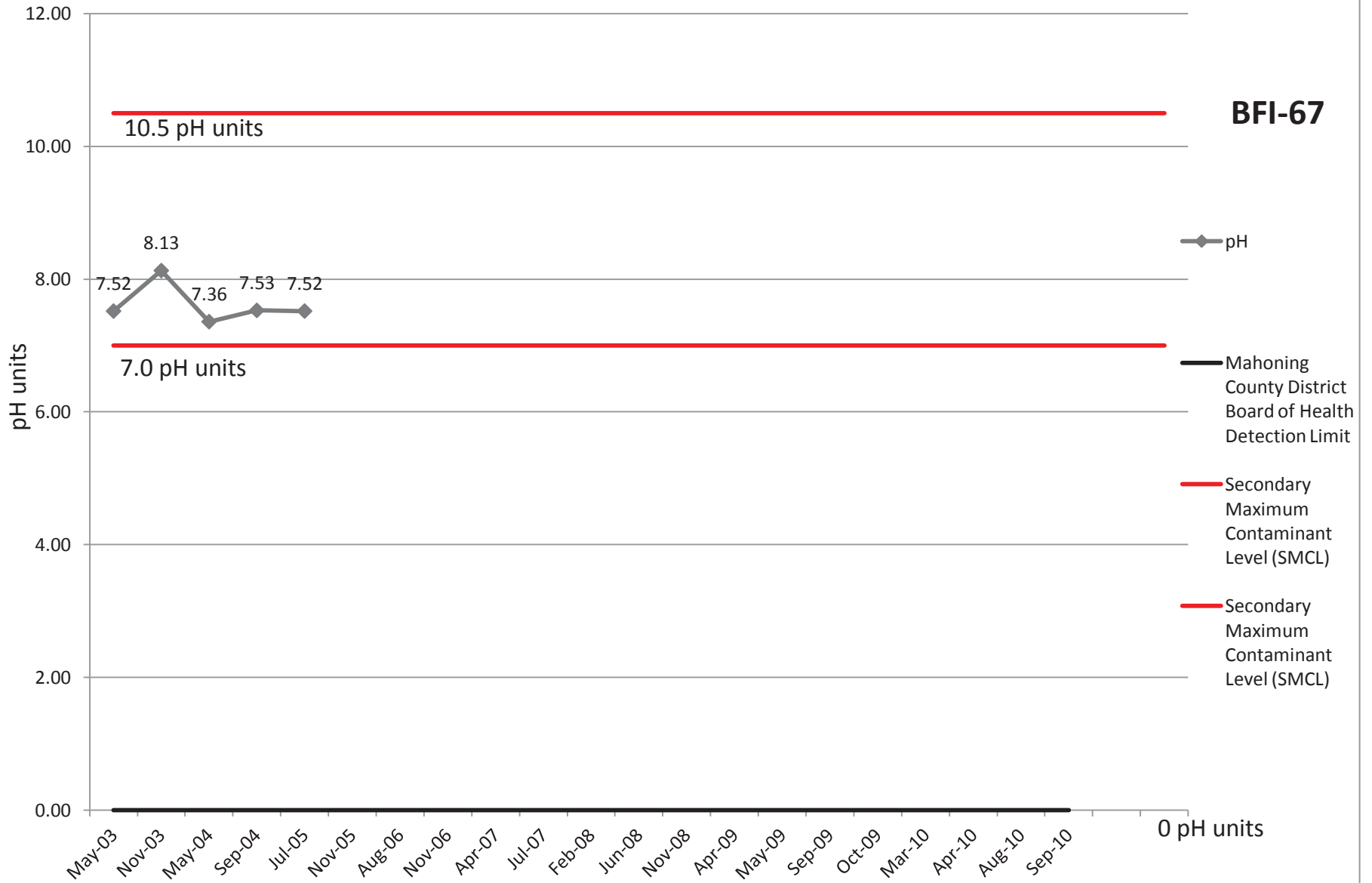
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



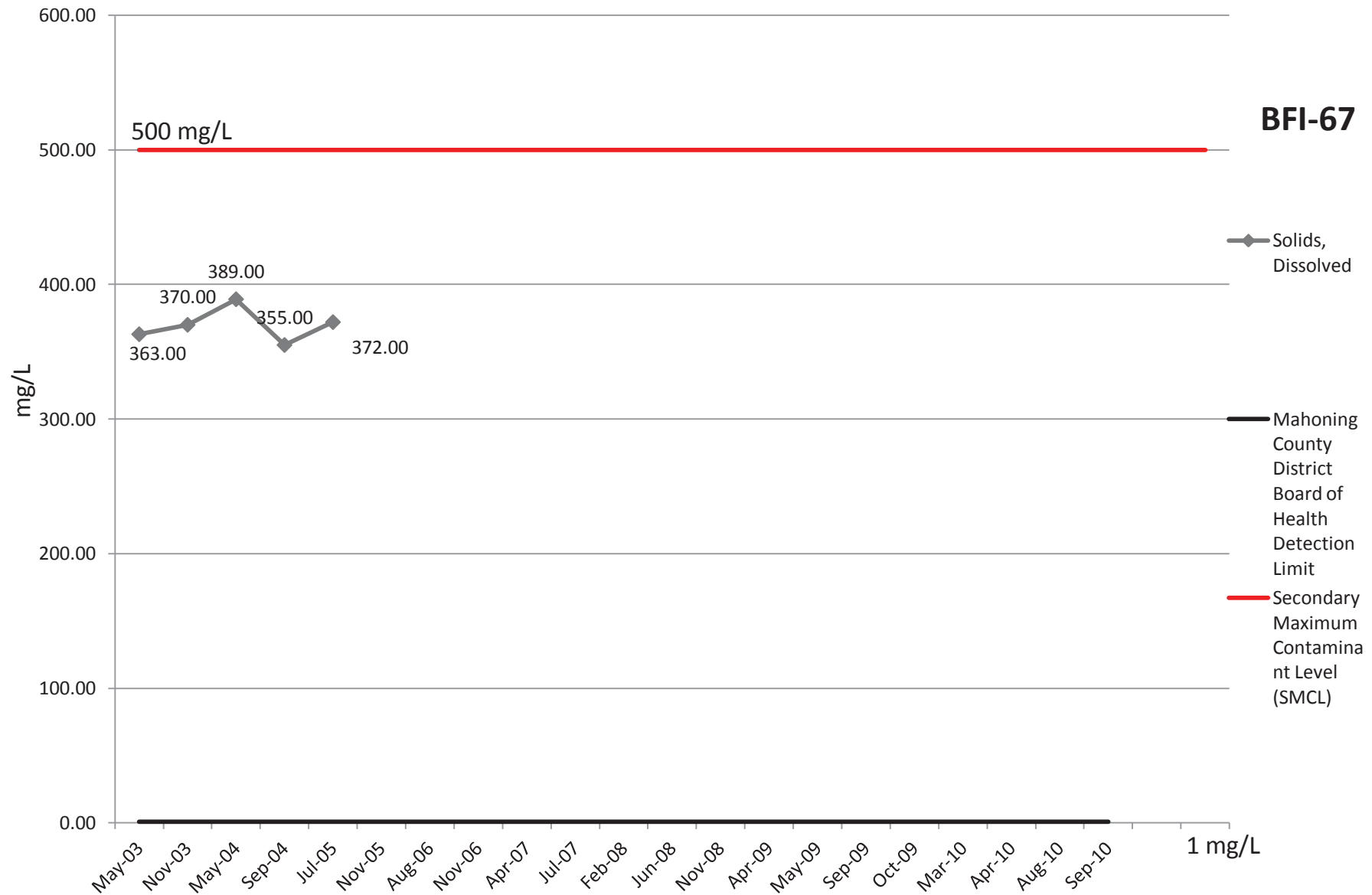
# COD



# pH

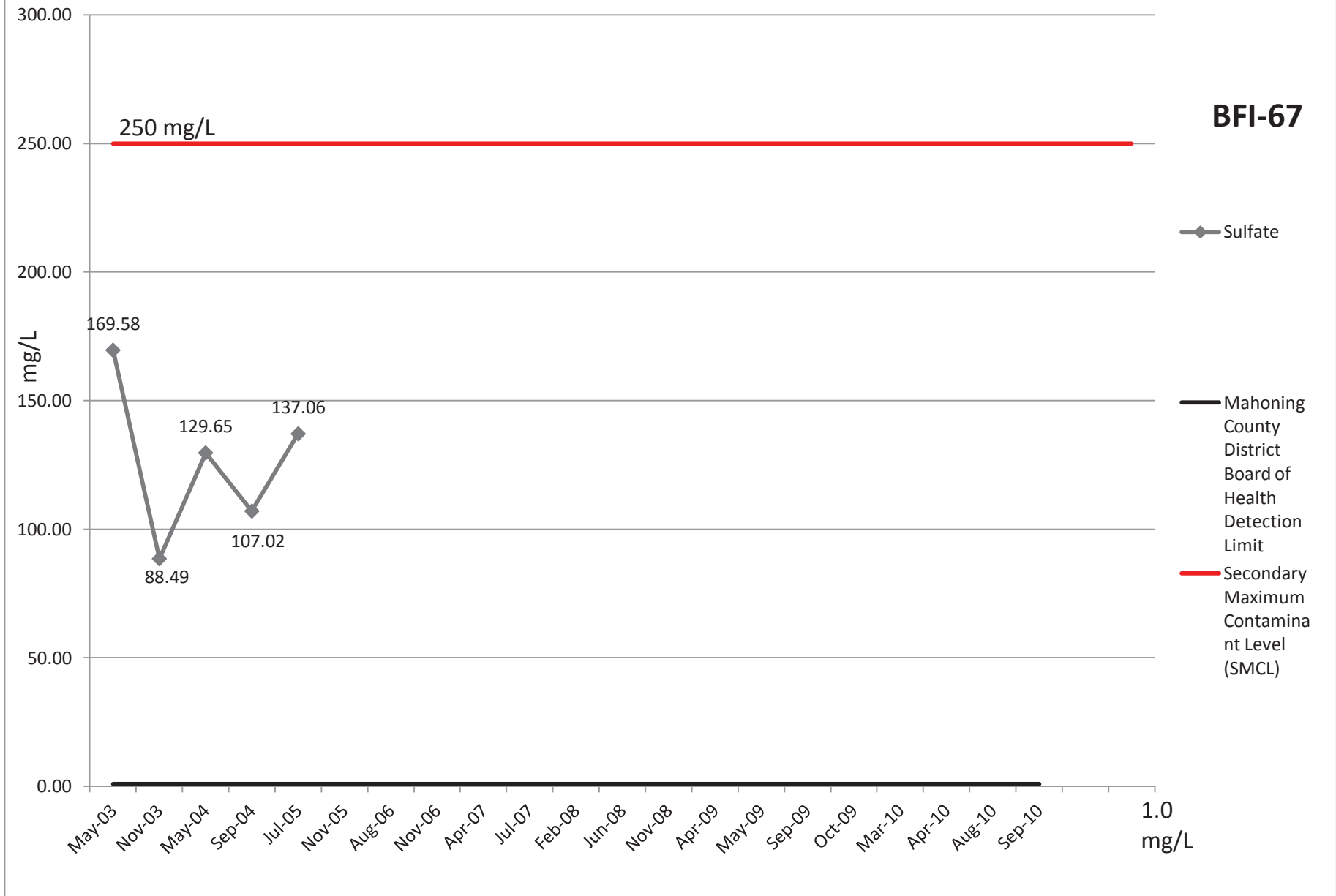


# Solids, Dissolved





# Sulfate



# Bacteria

**BFI-67**

Positive/Negative

◆ Bacteria

1.00      1.00      1.00

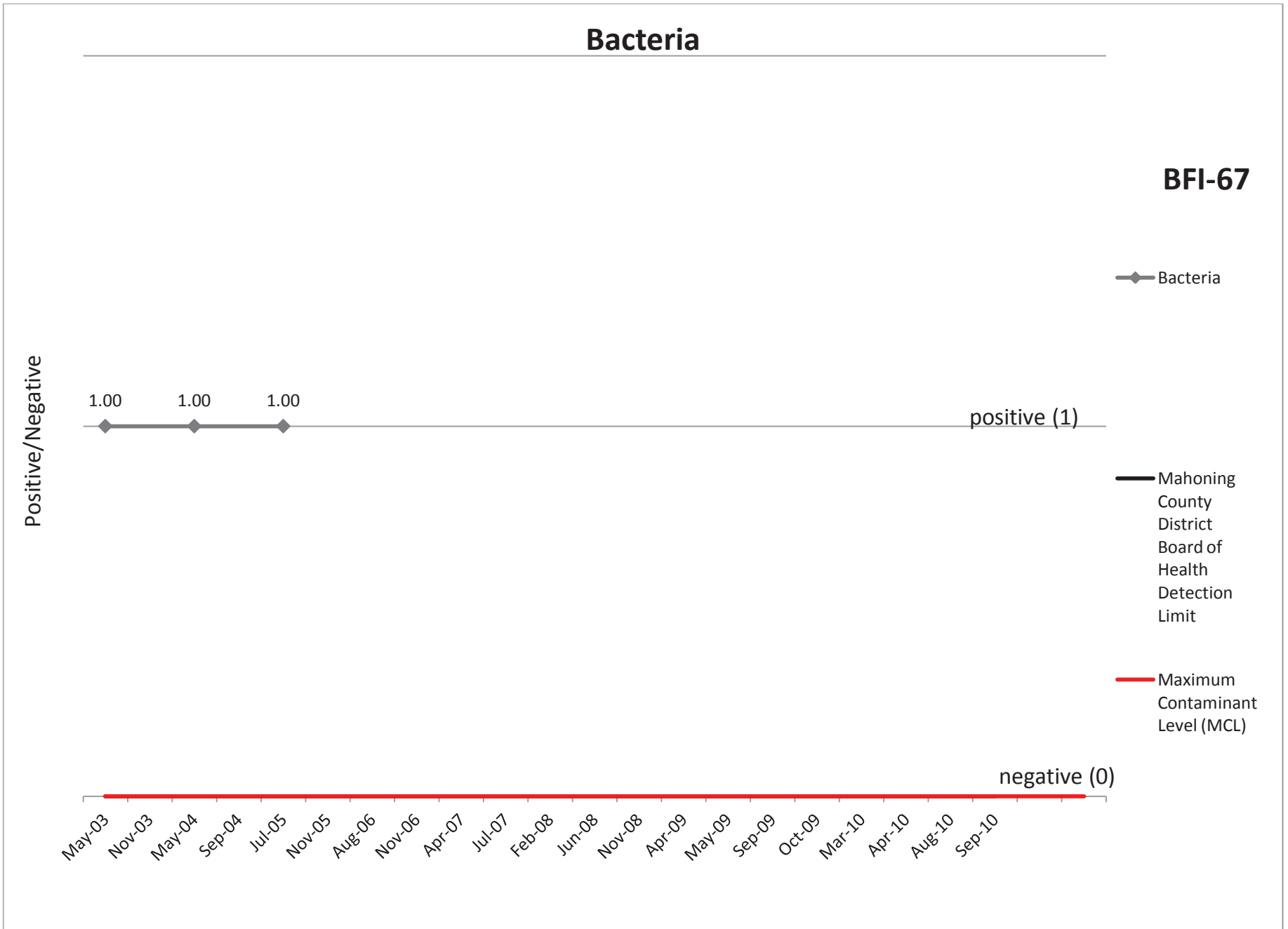
positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

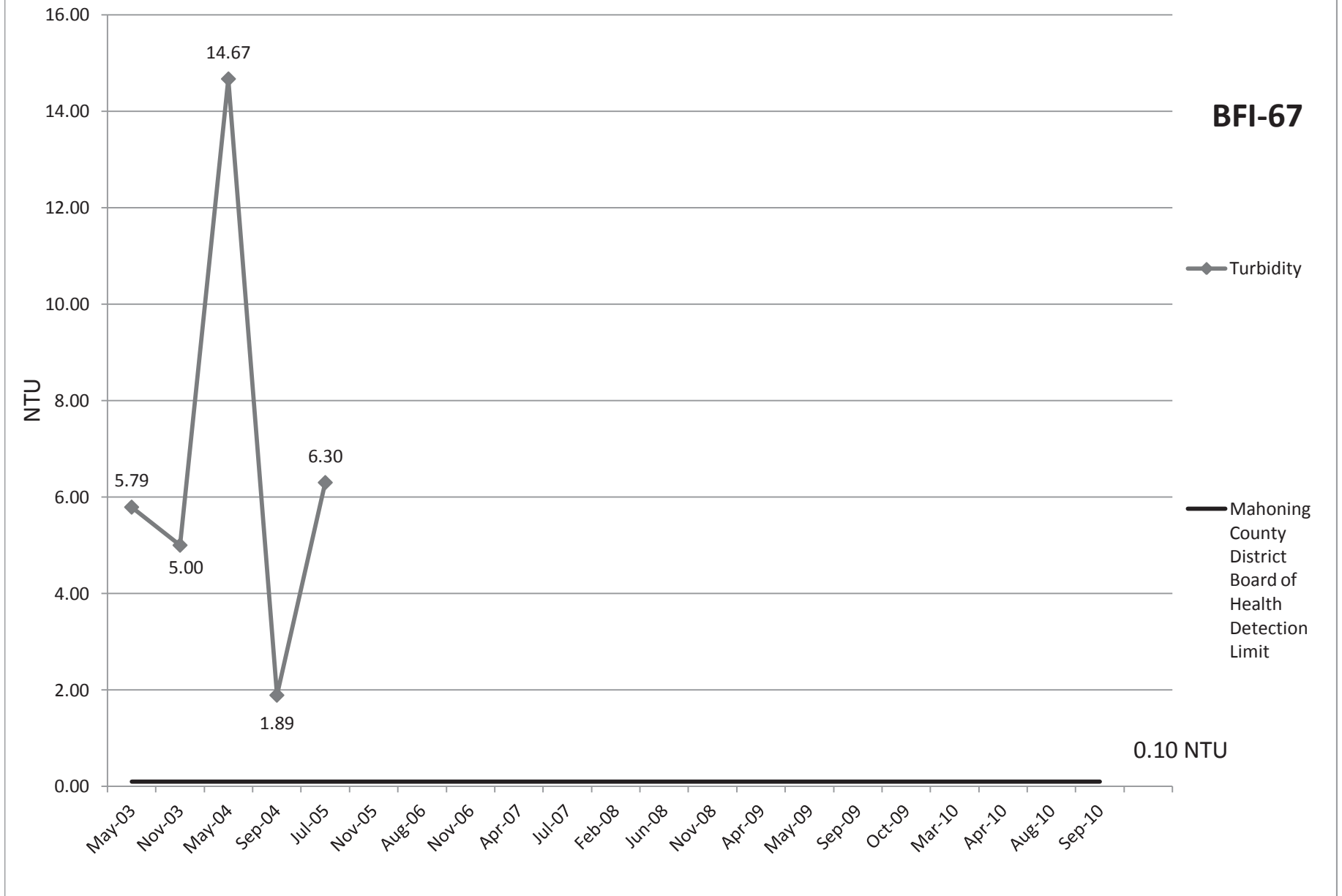
— Maximum  
Contaminant  
Level (MCL)

negative (0)

May-03    Nov-03    May-04    Sep-04    Jul-05    Nov-05    Aug-06    Nov-06    Apr-07    Jul-07    Feb-08    Jun-08    Nov-08    Apr-09    May-09    Sep-09    Oct-09    Mar-10    Apr-10    Aug-10    Sep-10

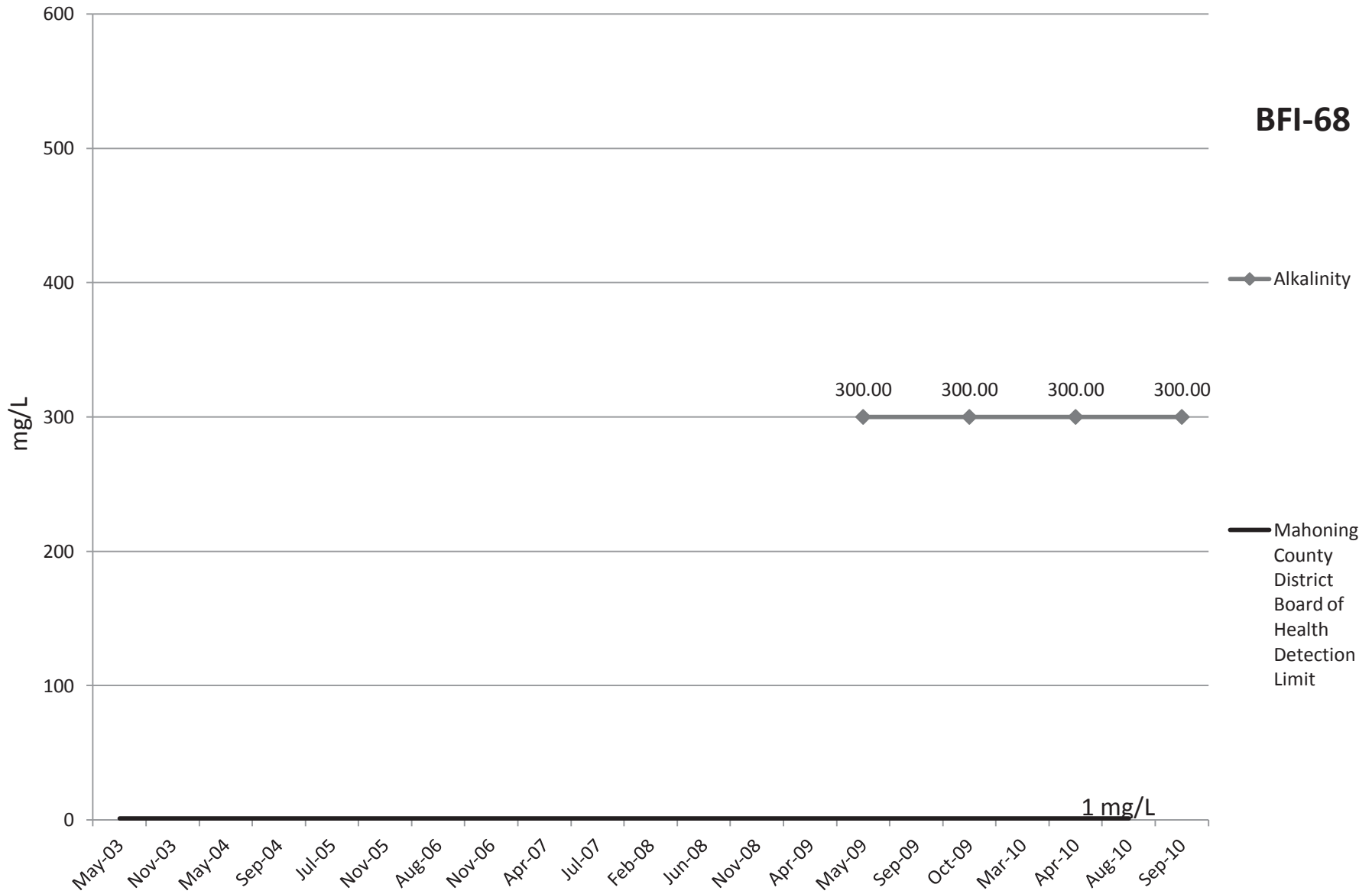


# Turbidity

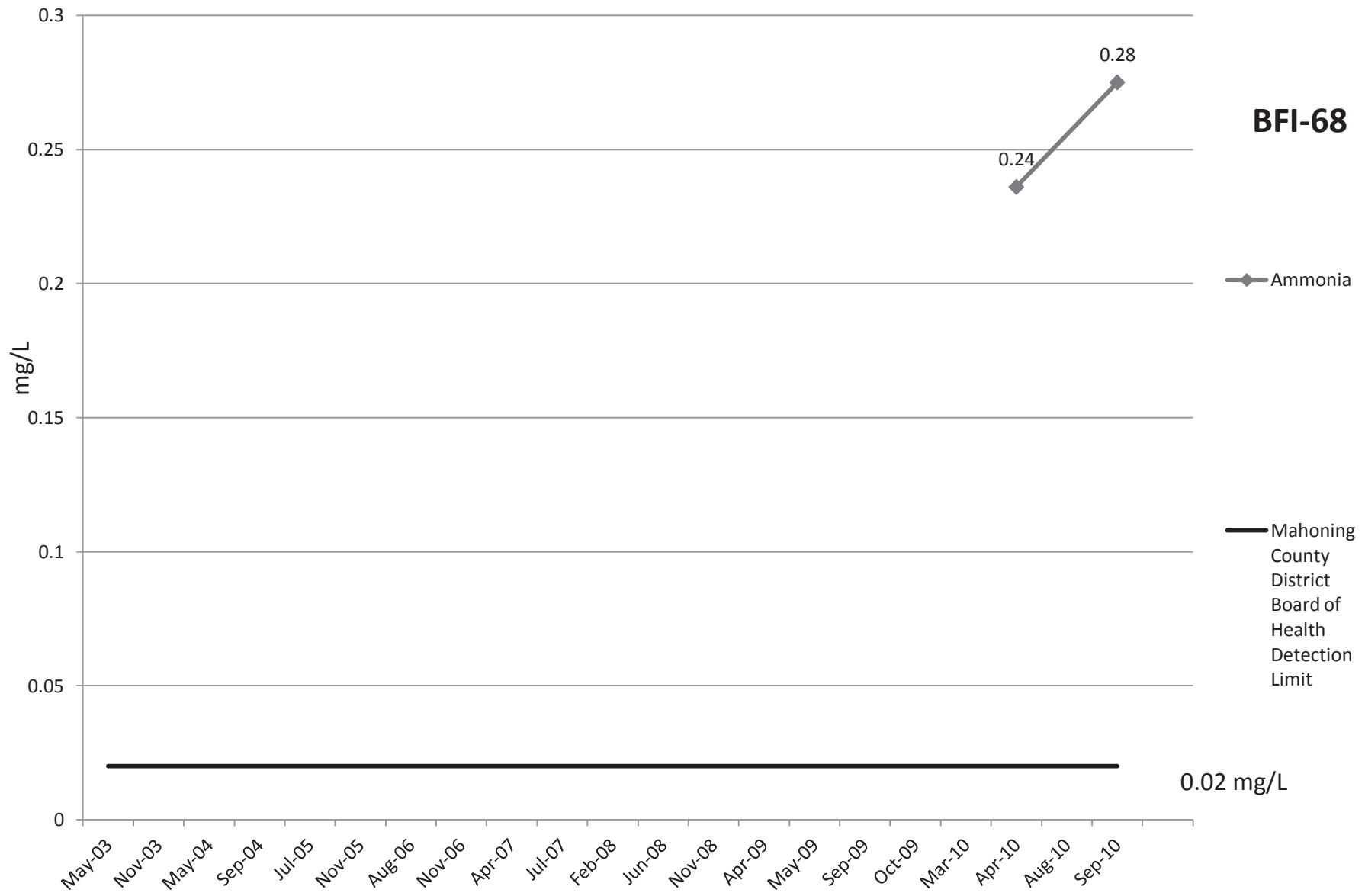


# Alkalinity

**BFI-68**



# Ammonia



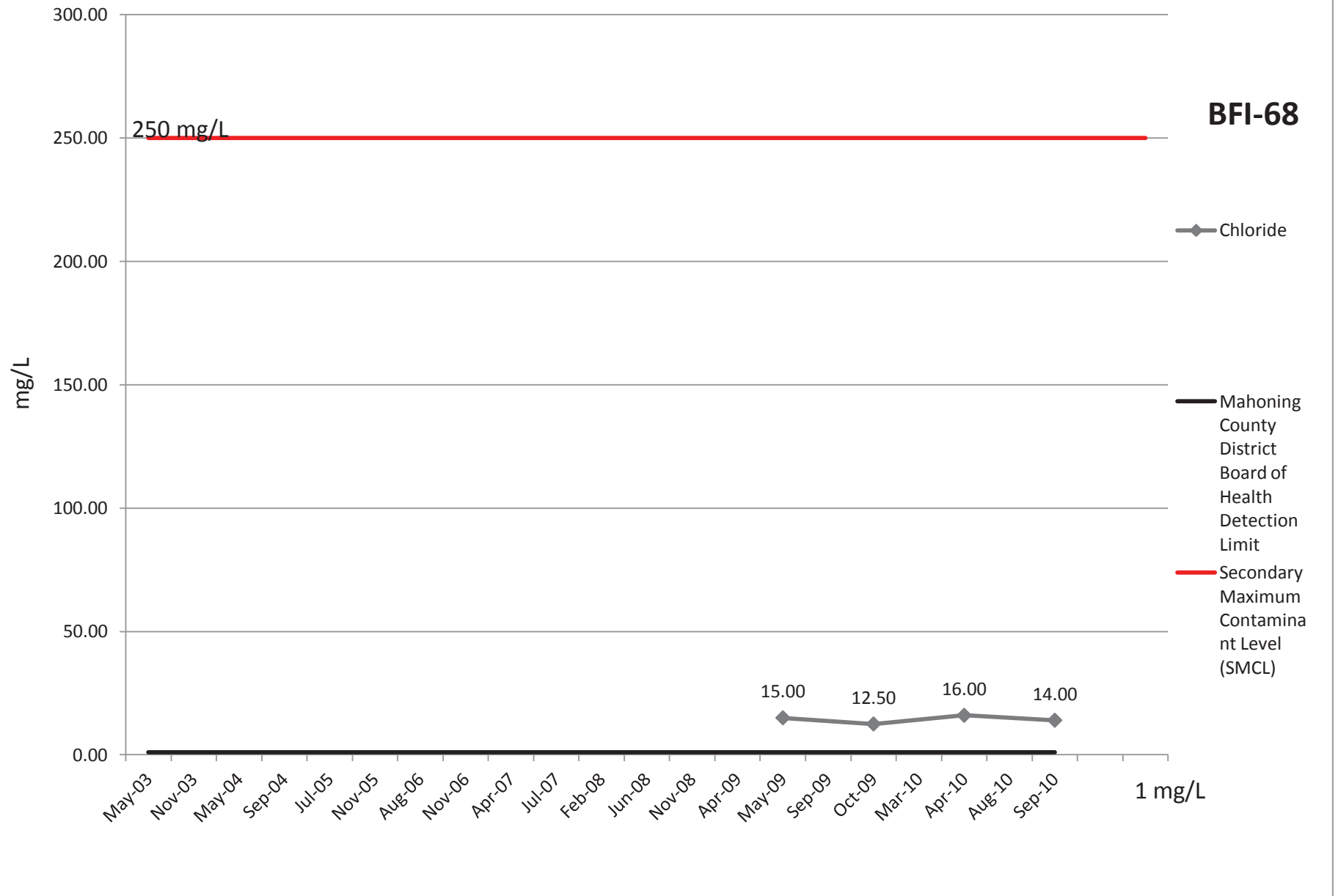
**BFI-68**

◆ Ammonia

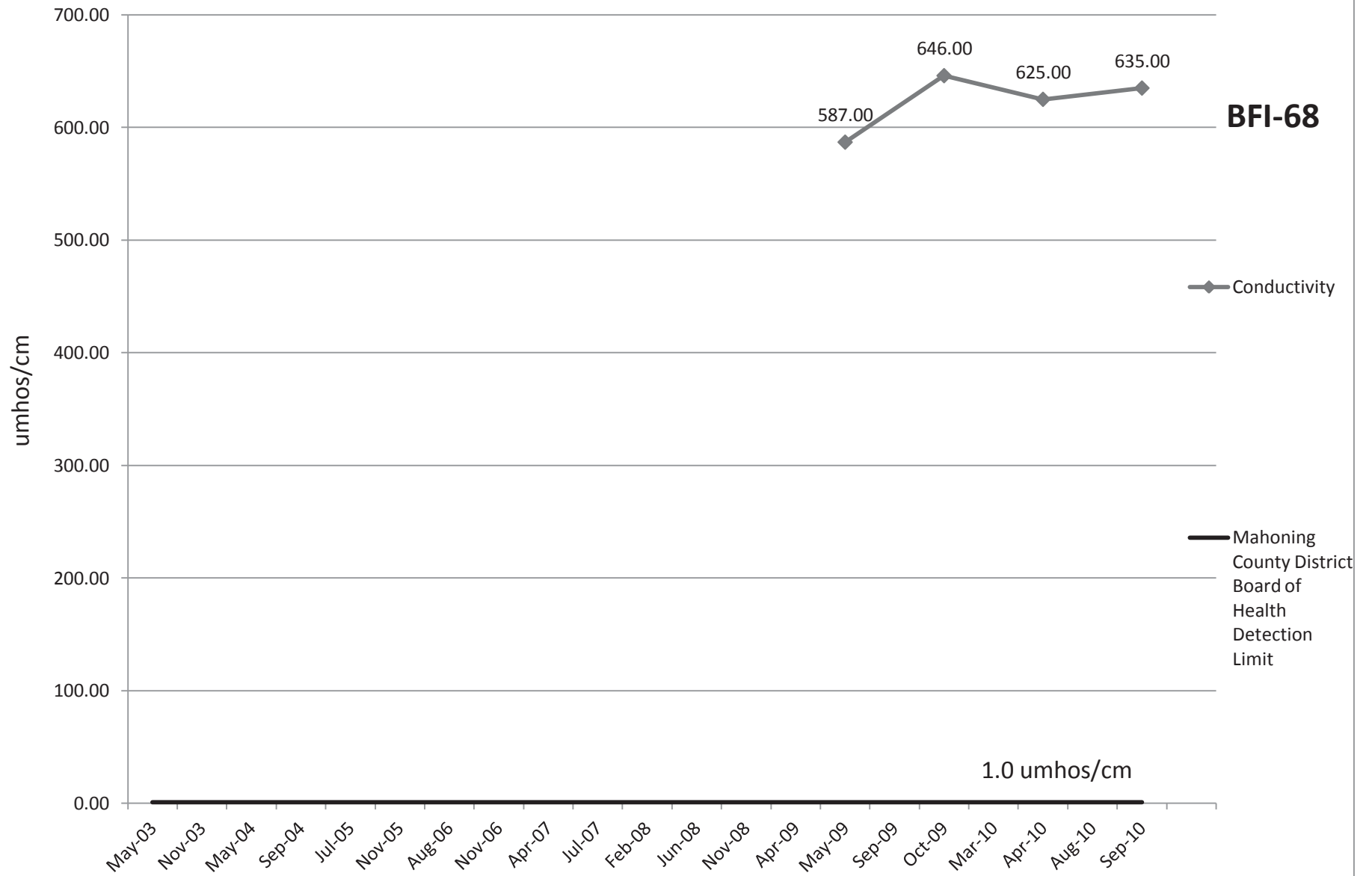
— Mahoning County District Board of Health Detection Limit

0.02 mg/L

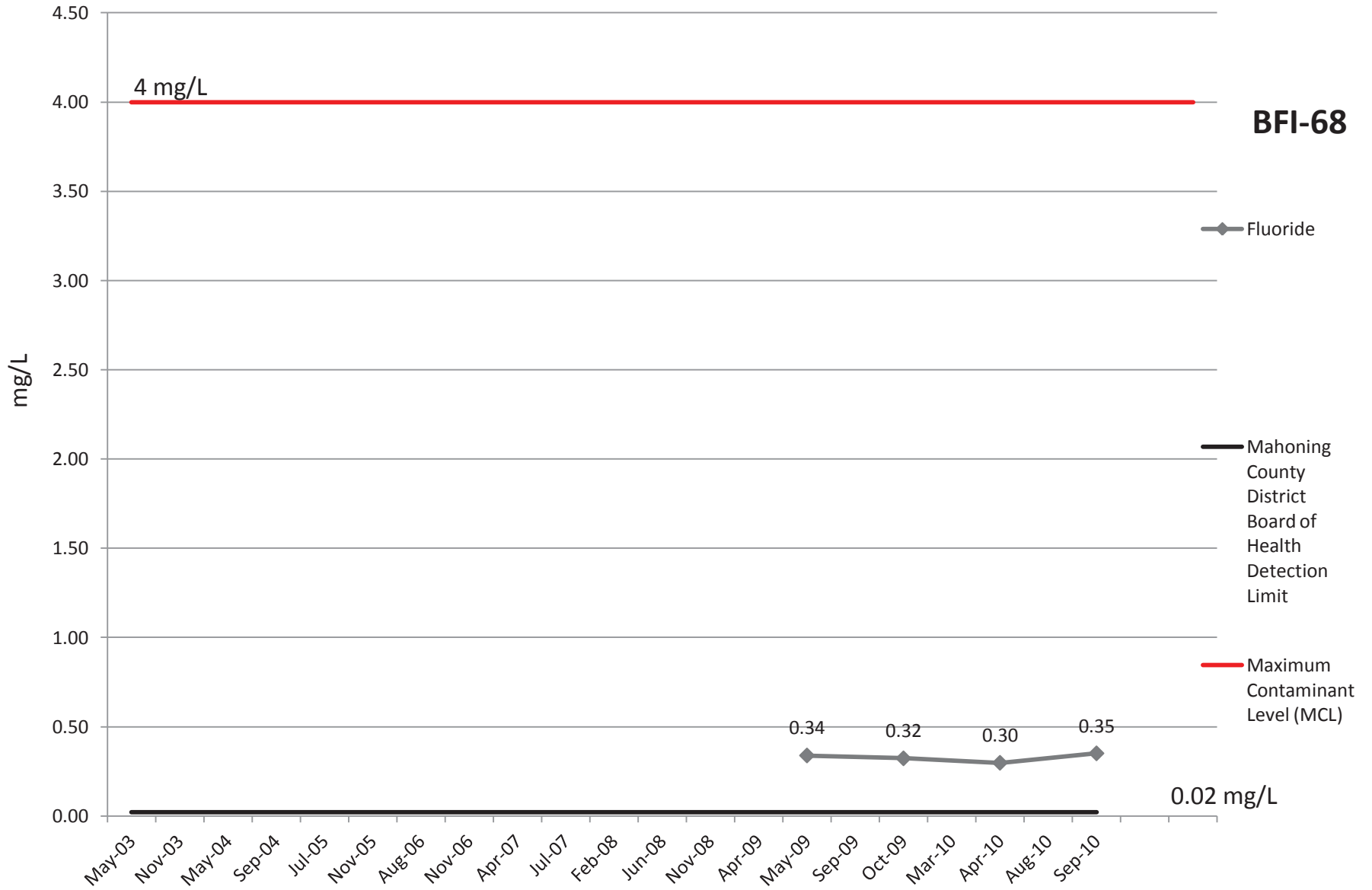
# Chloride



# Conductivity

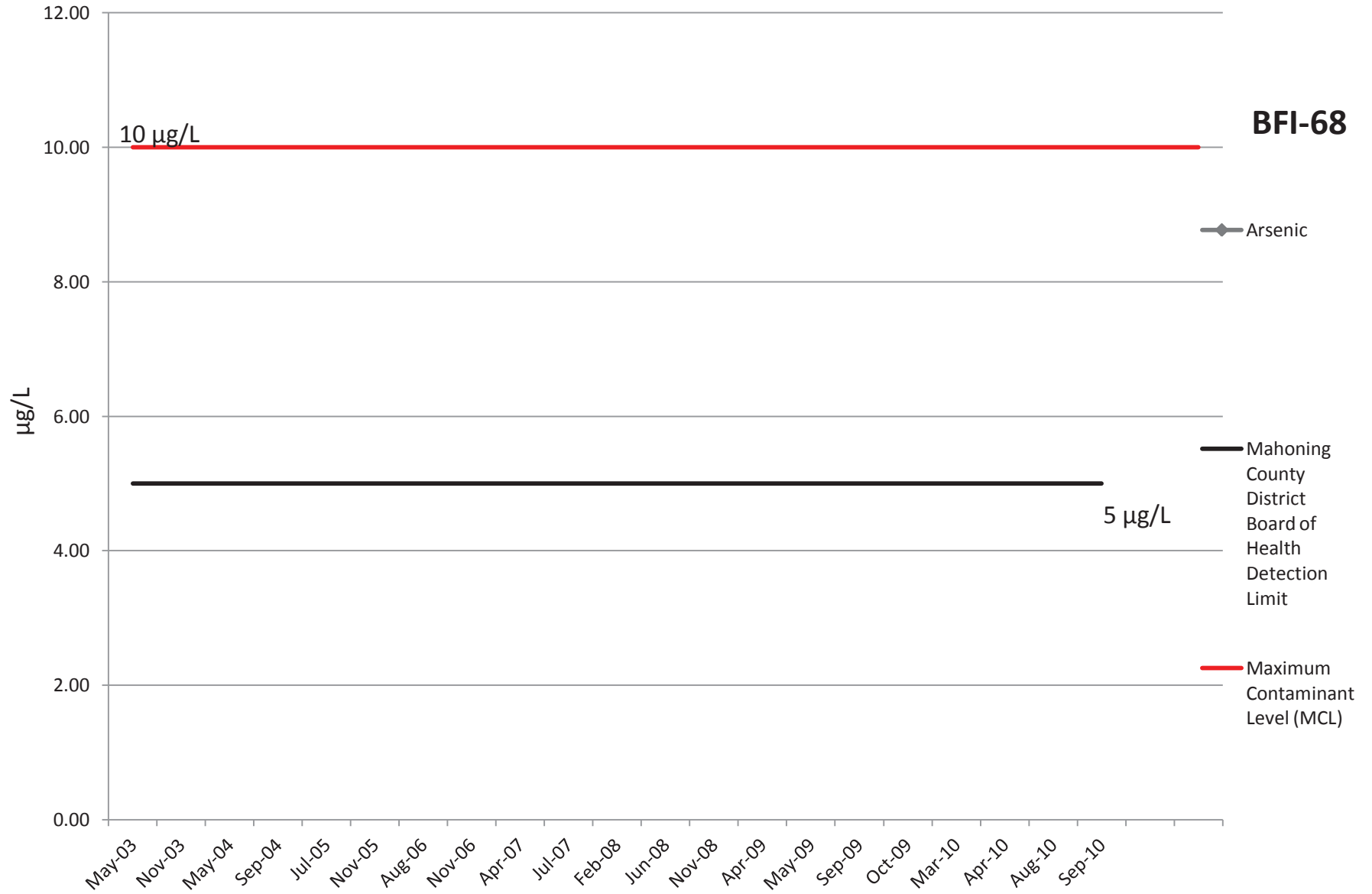


# Fluoride



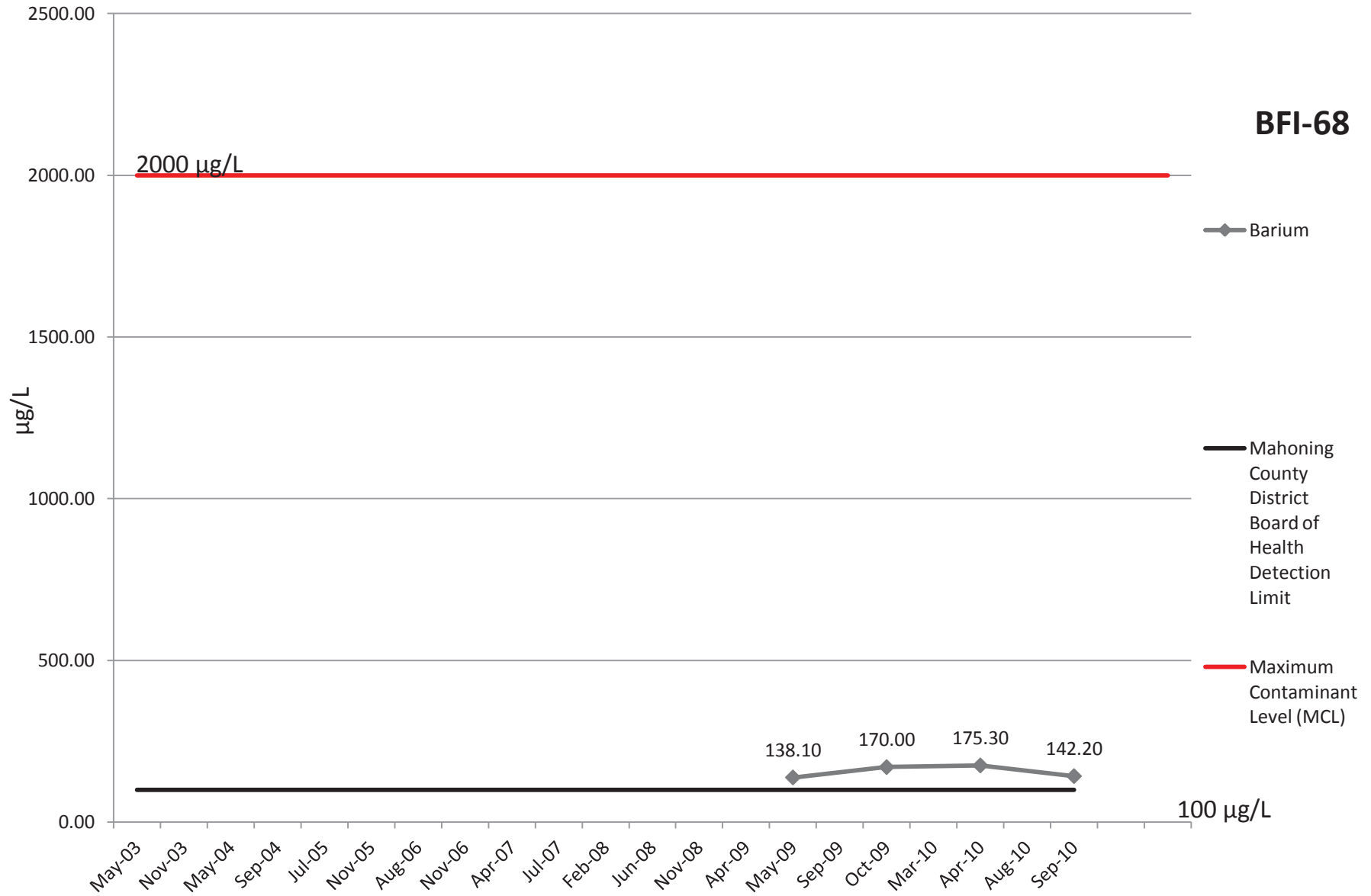


# Arsenic



# Barium

**BFI-68**



# Cadmium

**BFI-68**

10 µg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

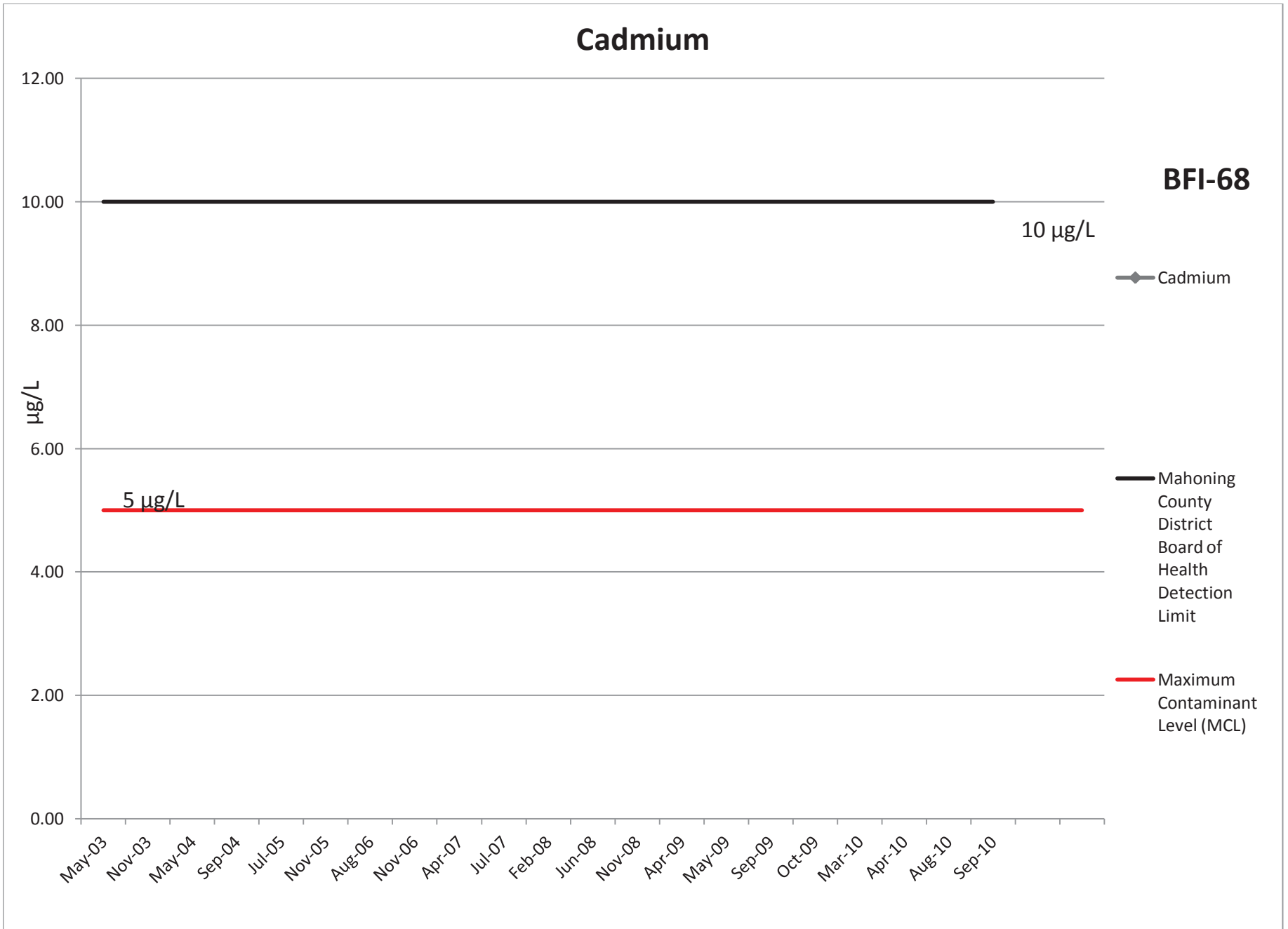
5 µg/L

◆ Cadmium

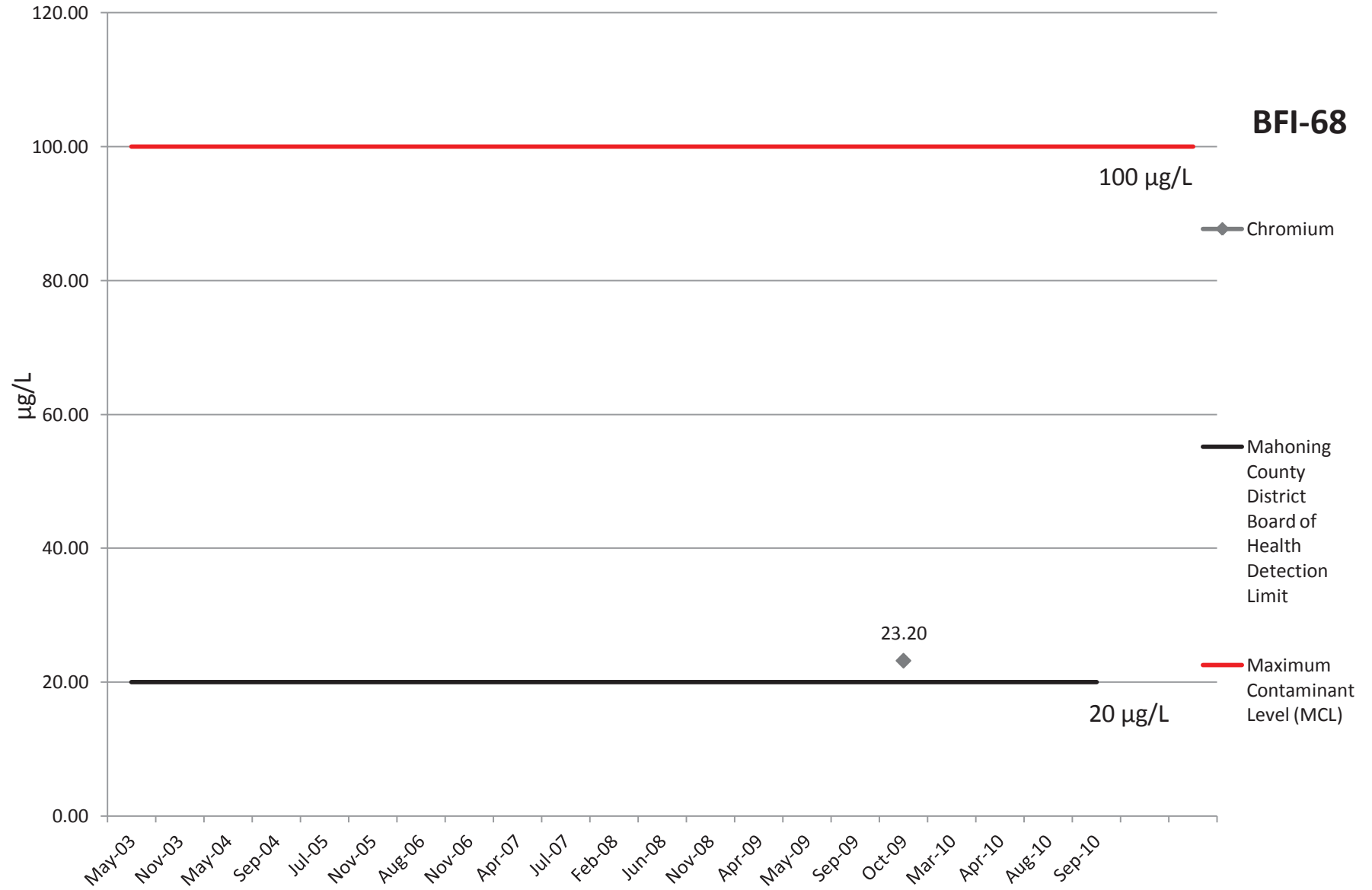
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

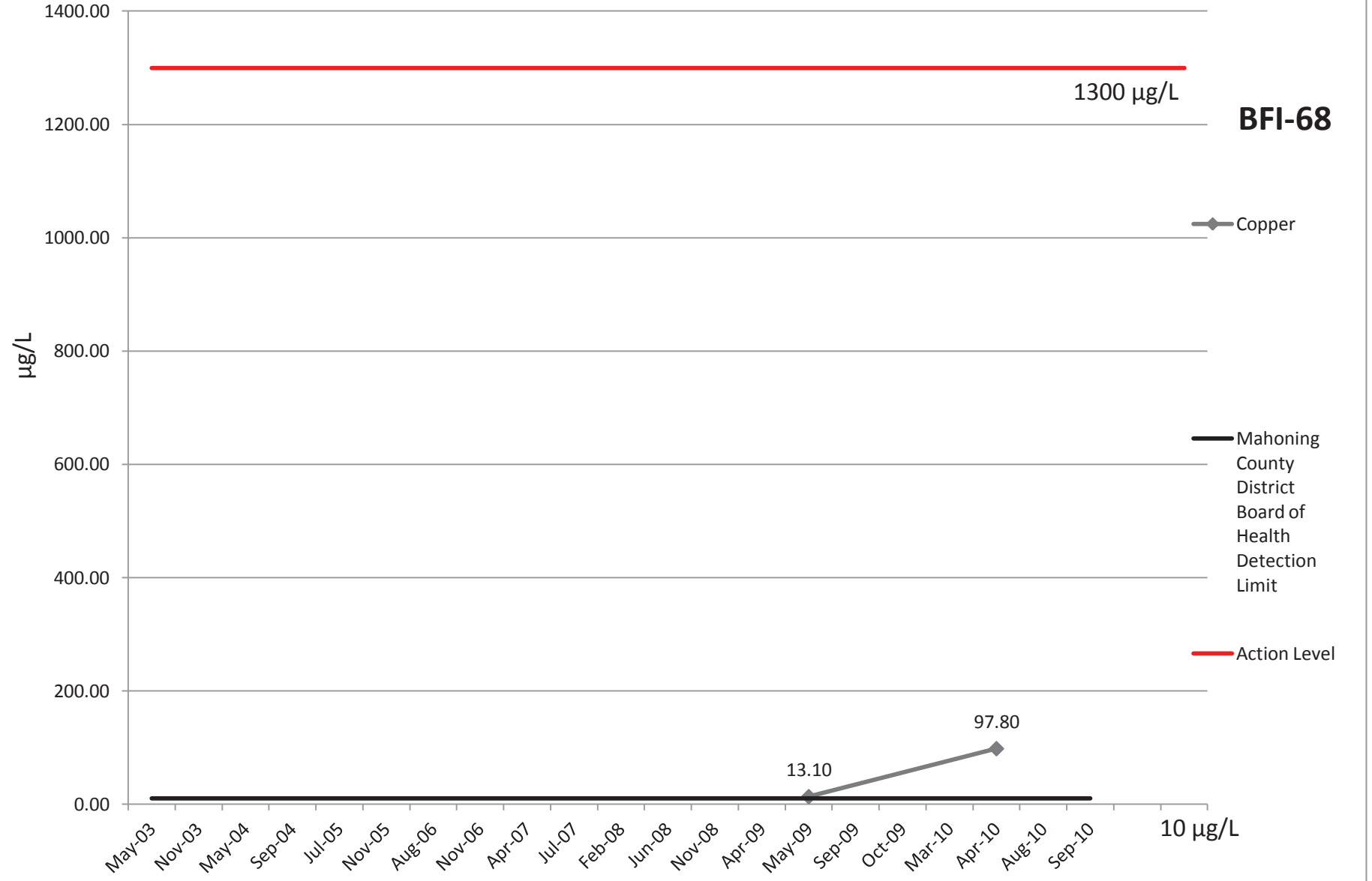
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# Chromium



# Copper



1300 µg/L

**BFI-68**

◆ Copper

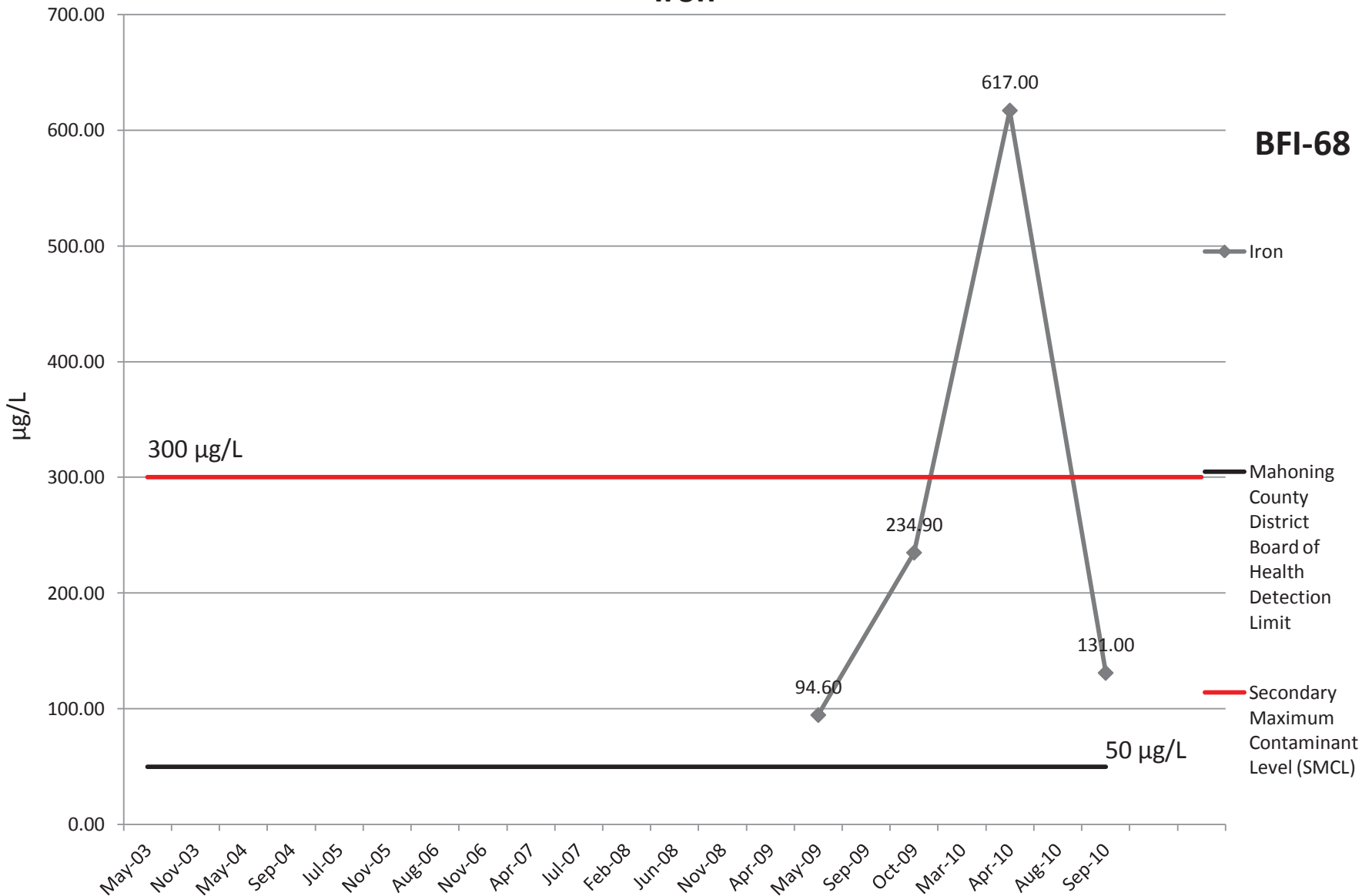
— Mahoning County District Board of Health Detection Limit

— Action Level

10 µg/L

# Iron

**BFI-68**

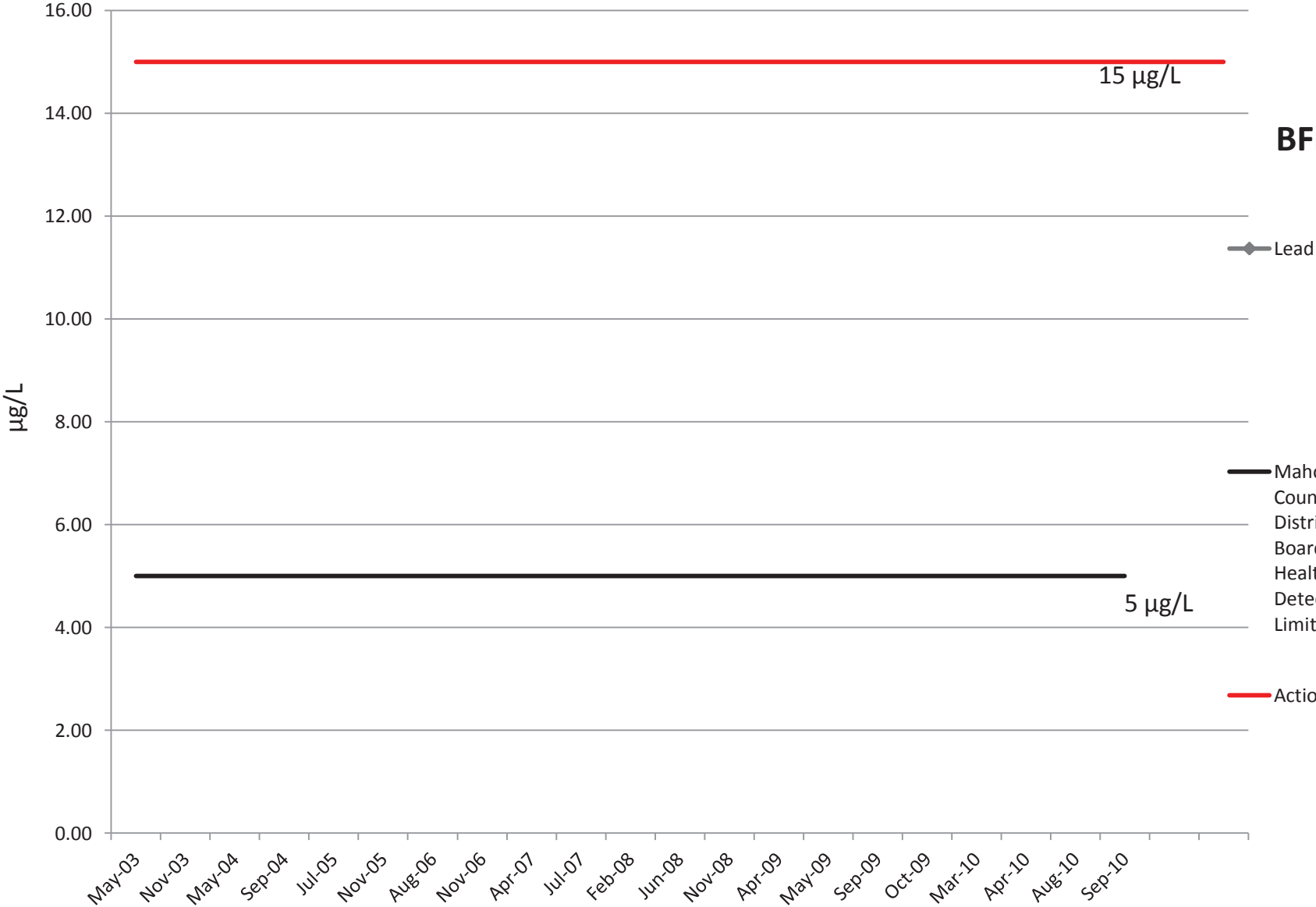


# Lead

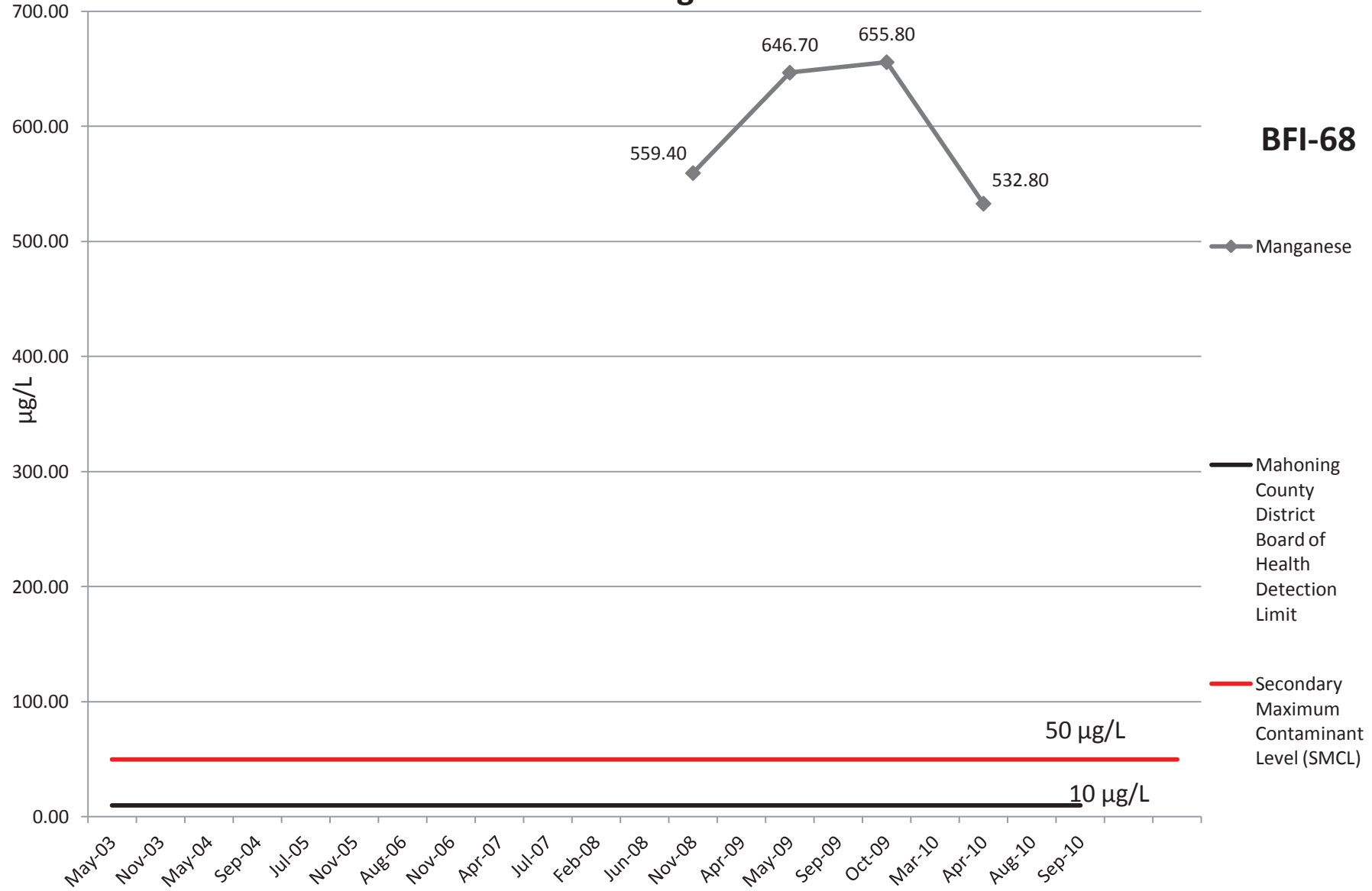
**BFI-68**

15 µg/L

5 µg/L



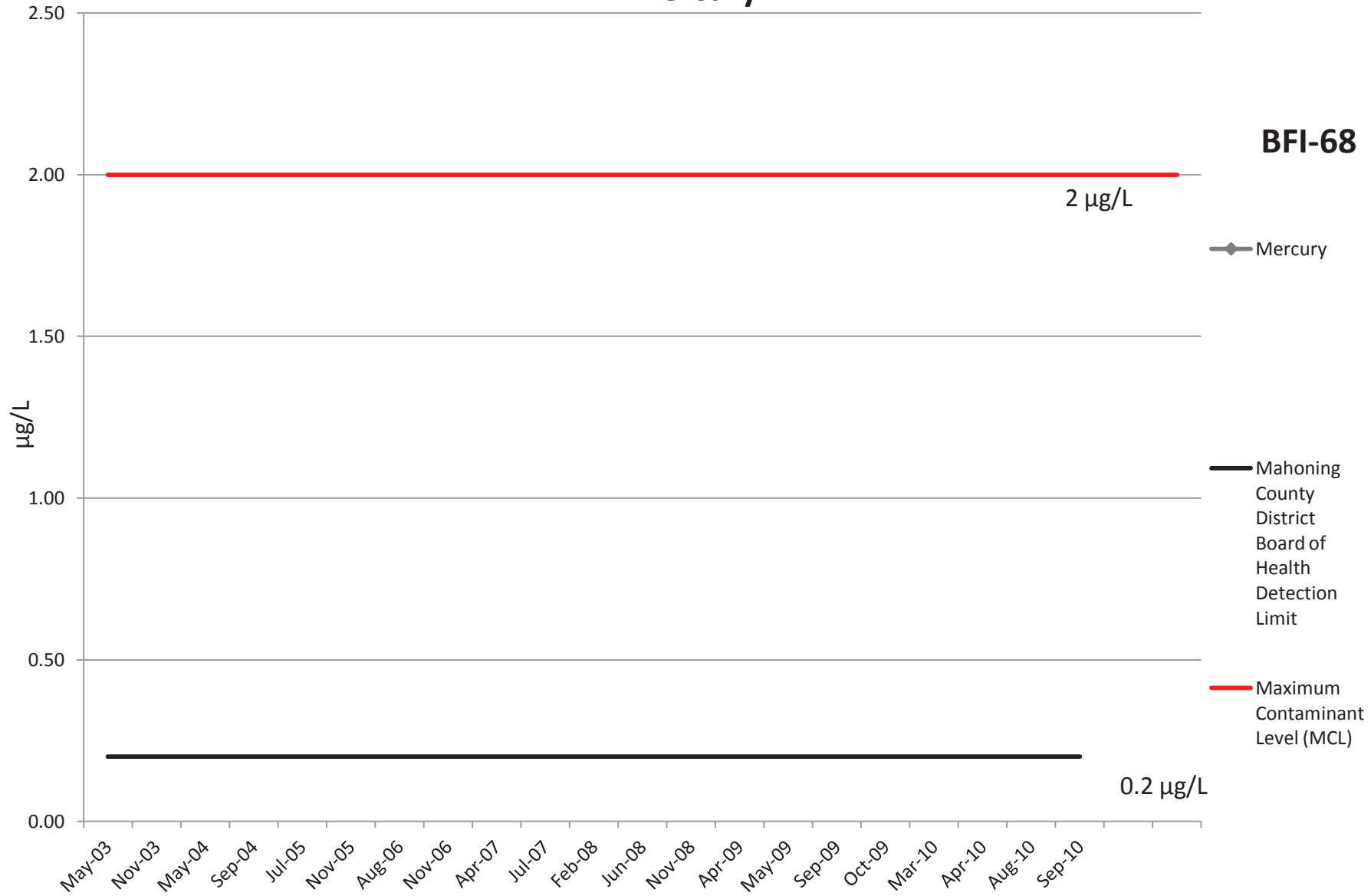
# Manganese



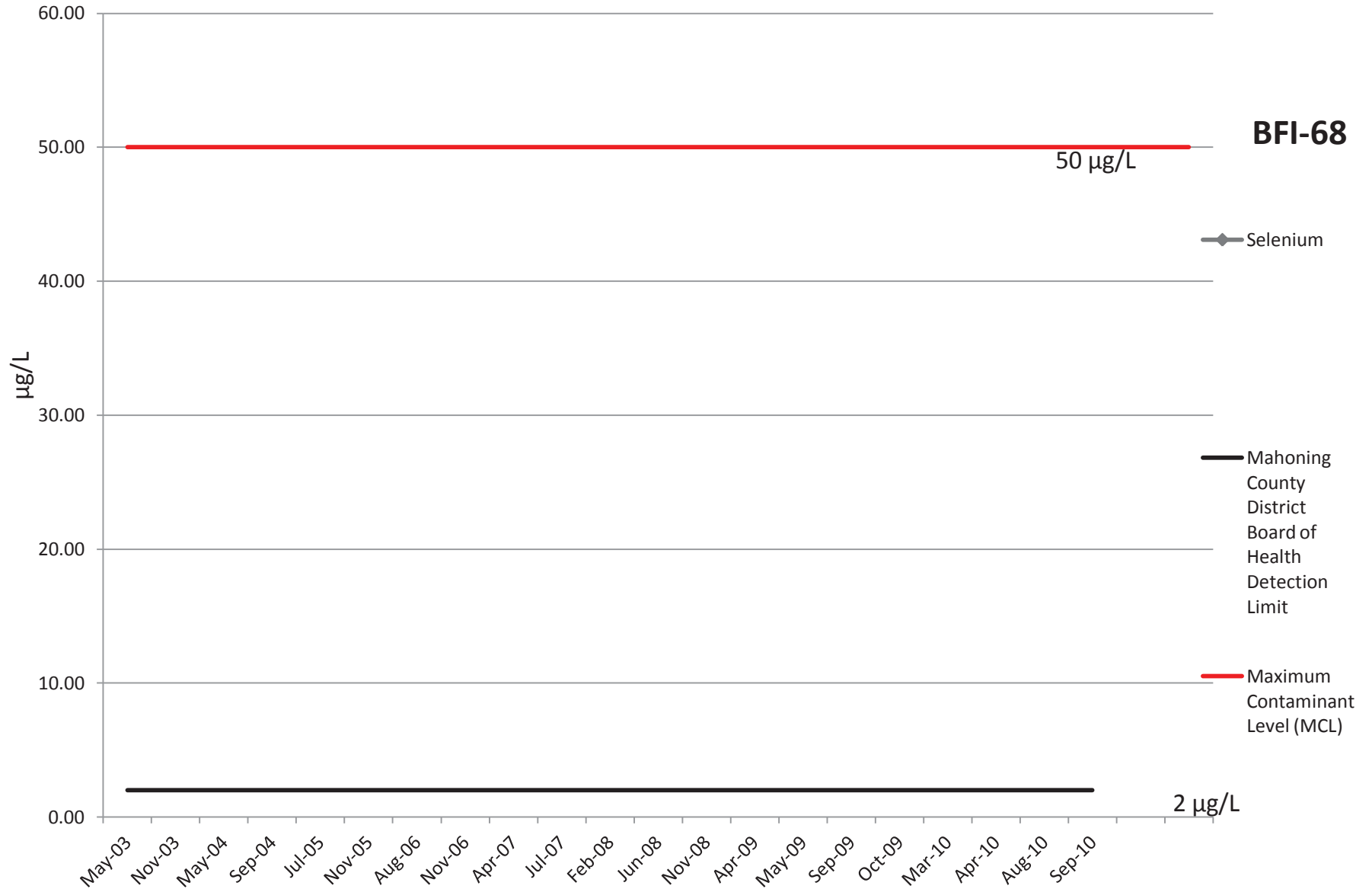


# Mercury

**BFI-68**

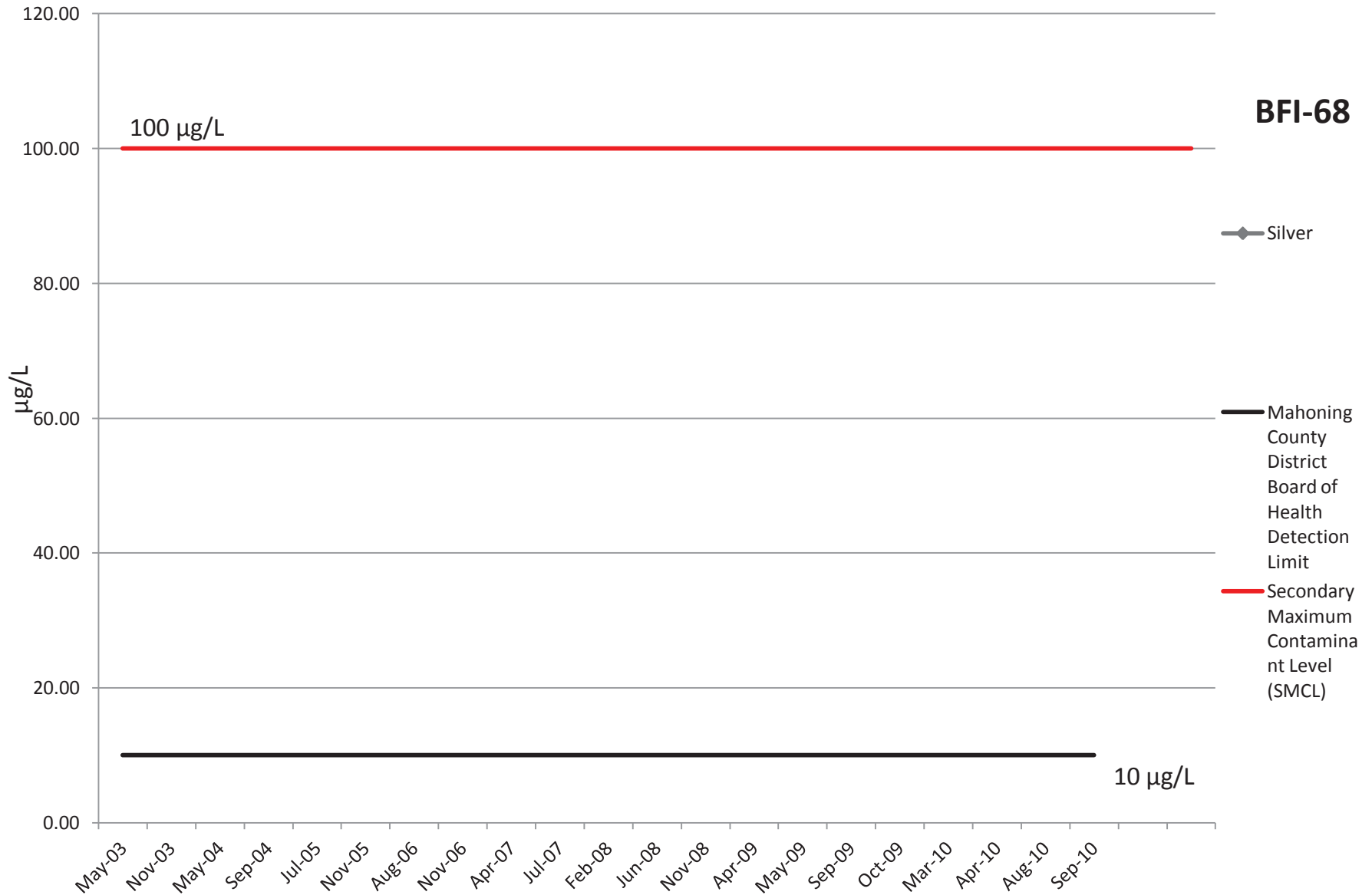


# Selenium

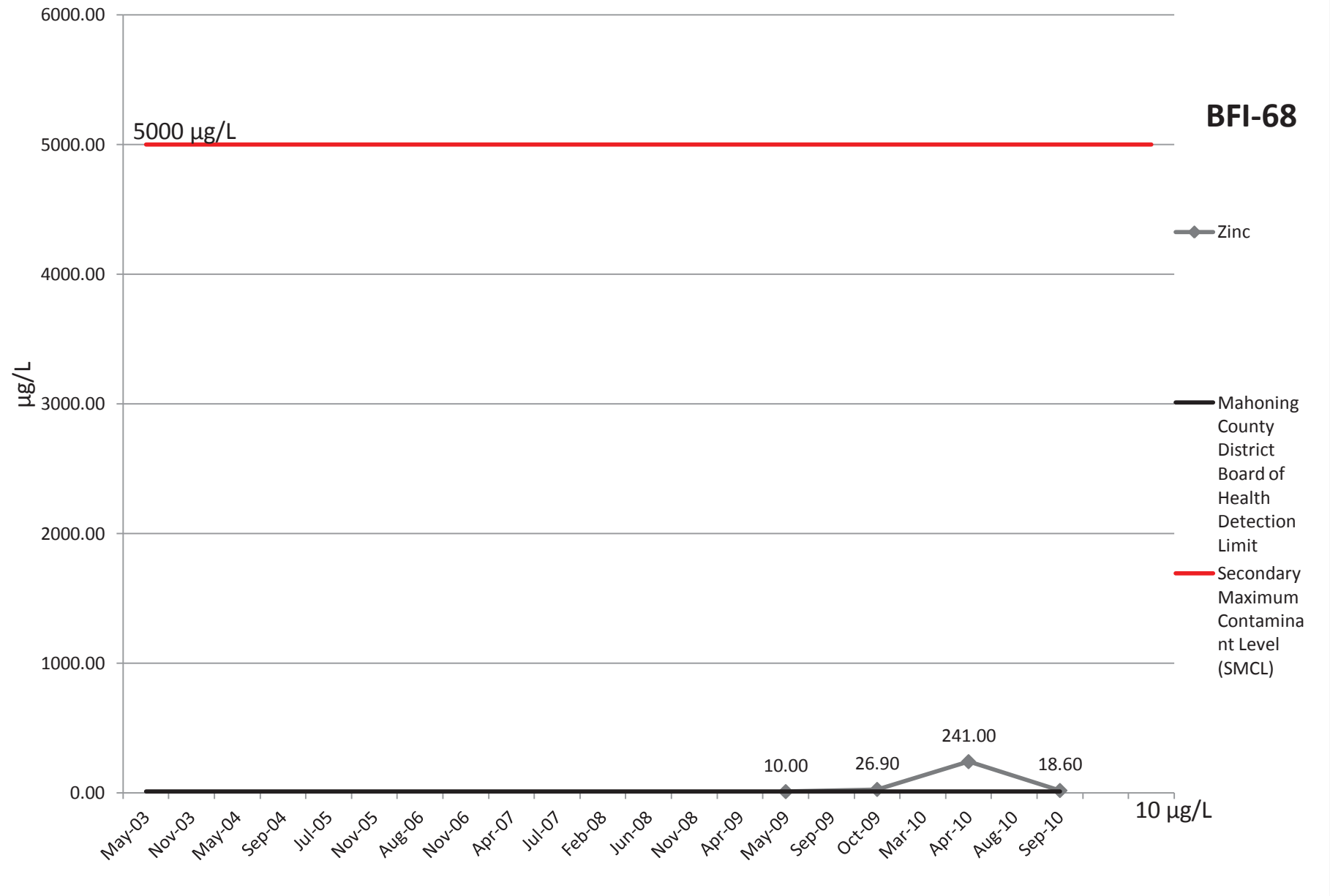


# Silver

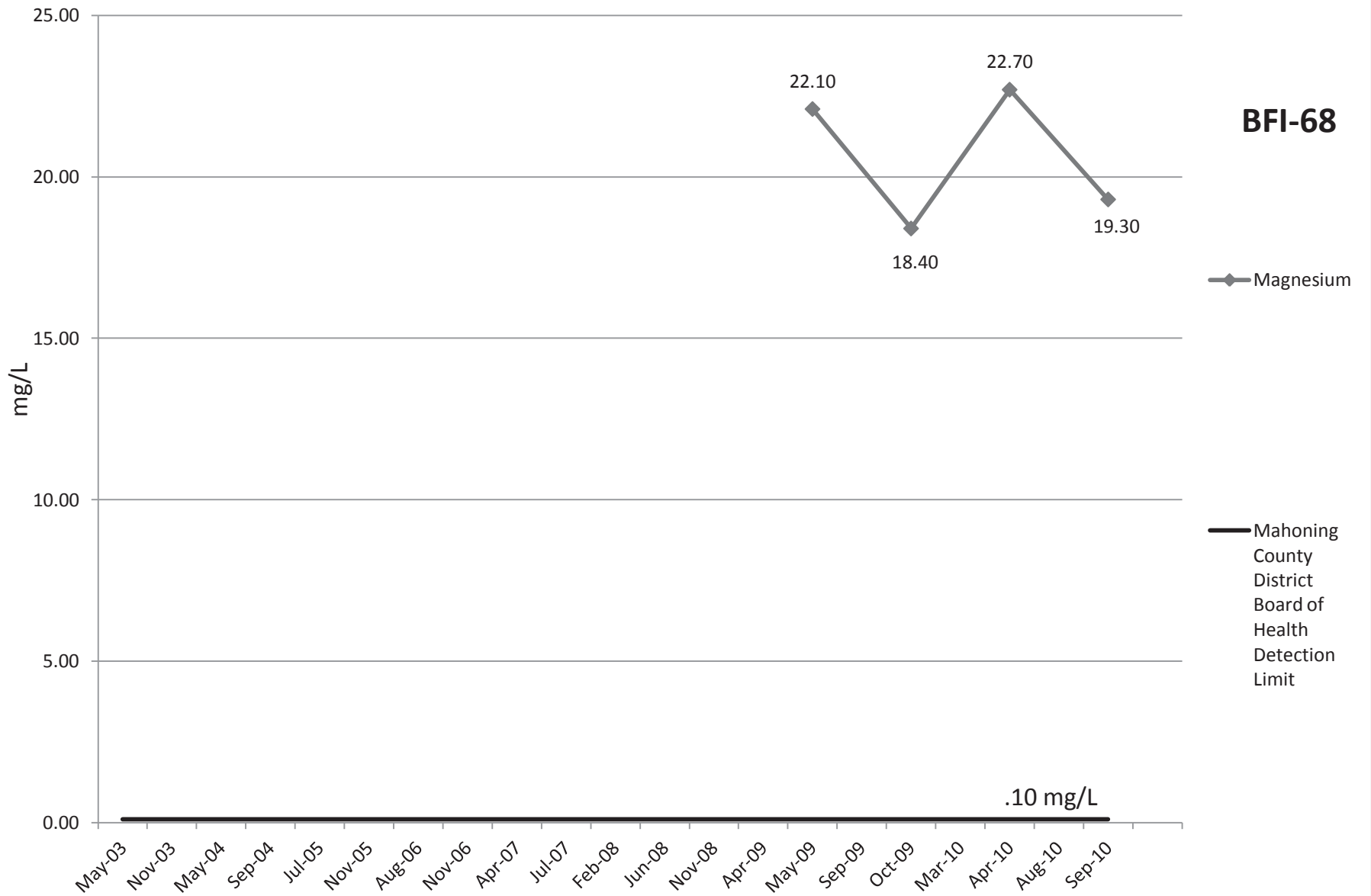
**BFI-68**



# Zinc



# Magnesium



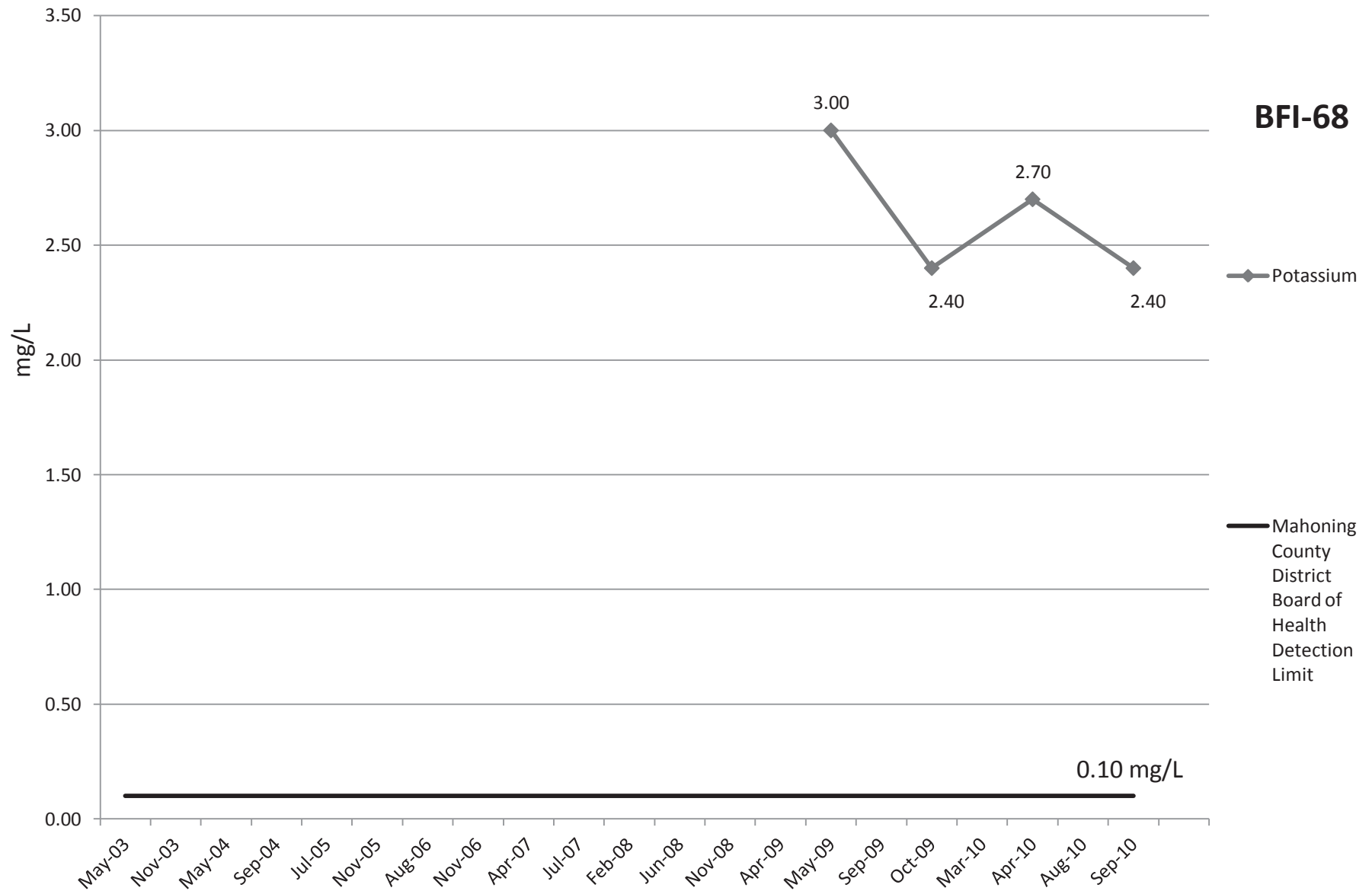
**BFI-68**

◆ Magnesium

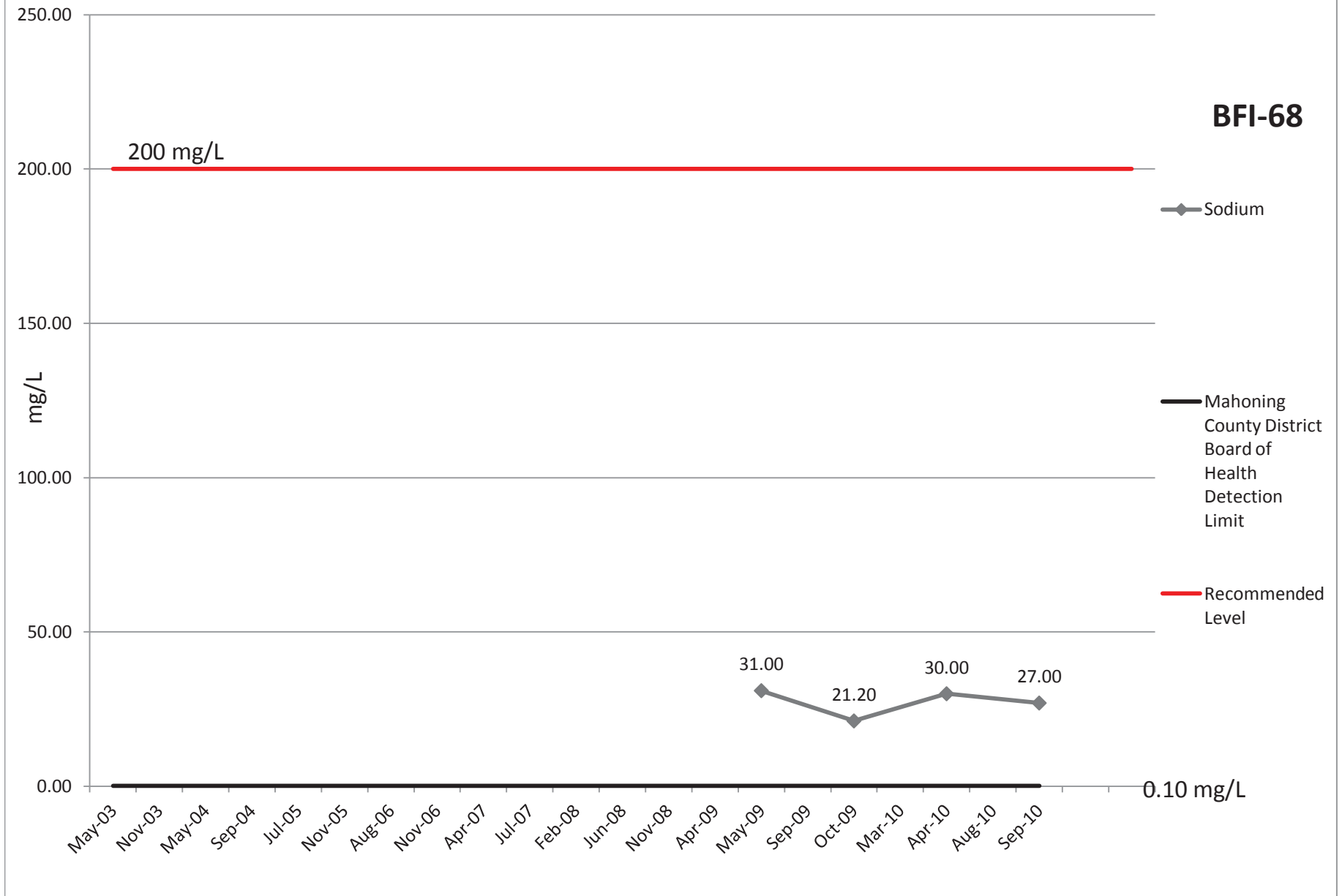
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

.10 mg/L

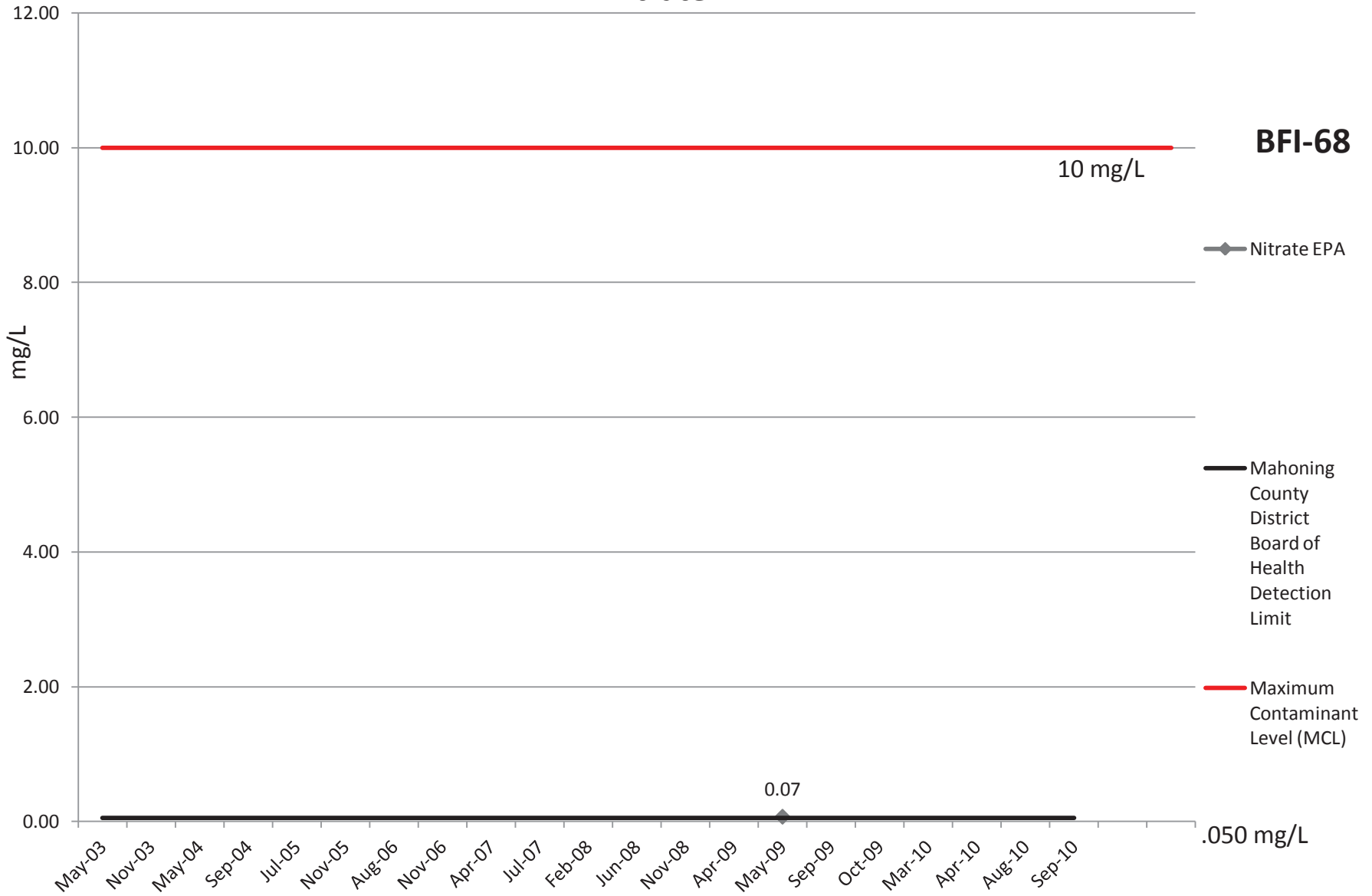
# Potassium



# Sodium

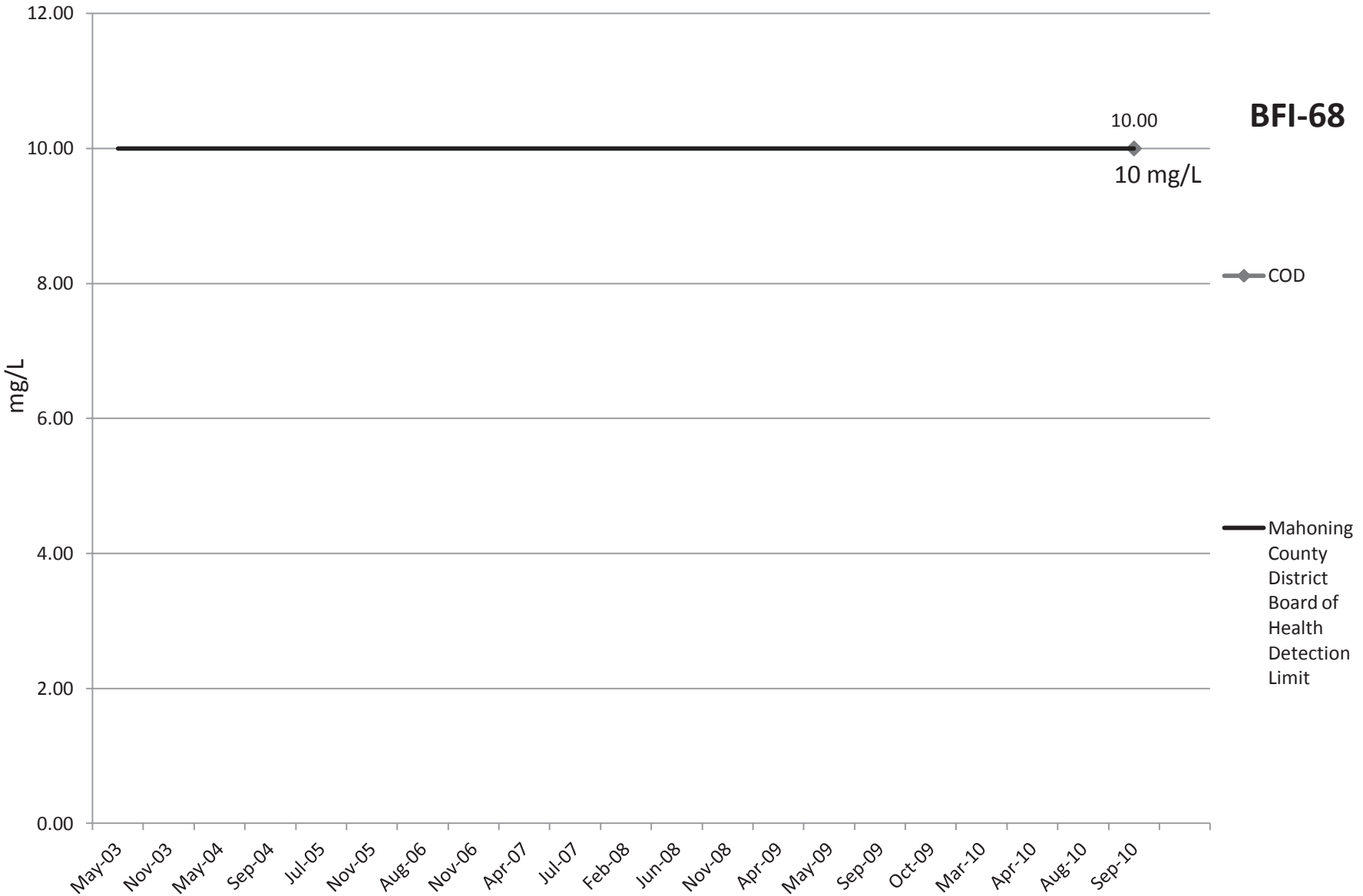


# Nitrate EPA

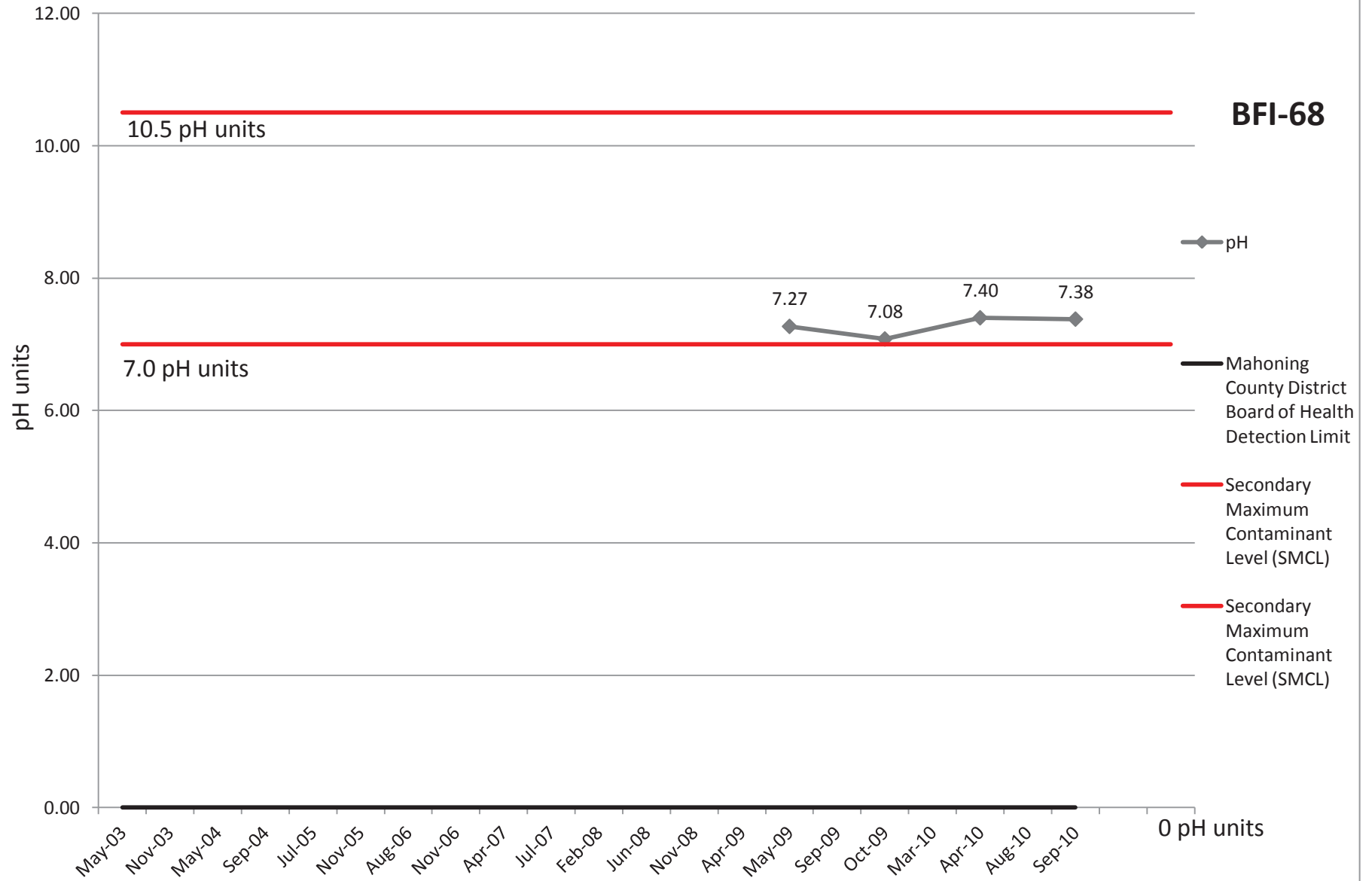




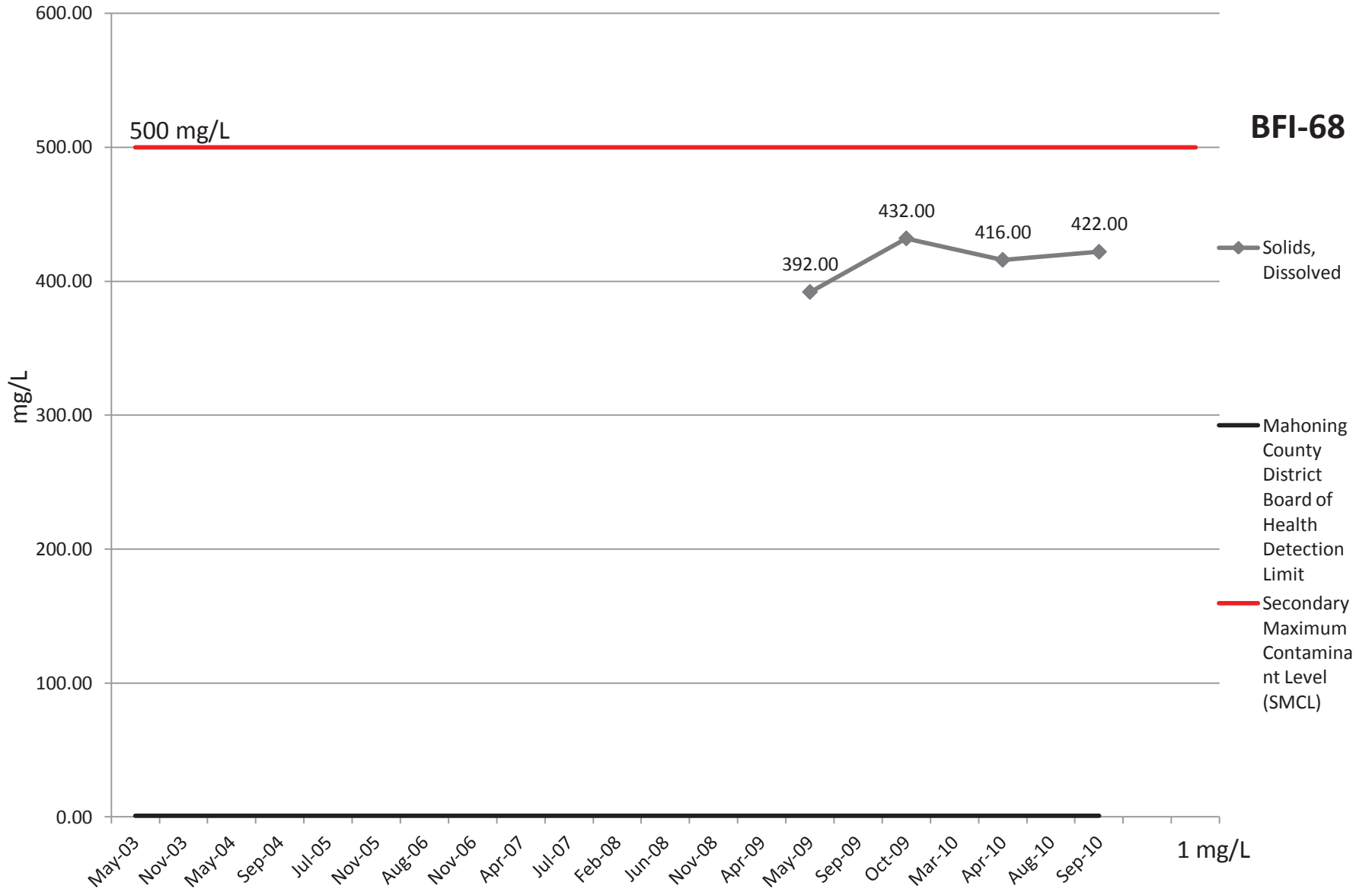
# COD



# pH



# Solids, Dissolved



**BFI-68**

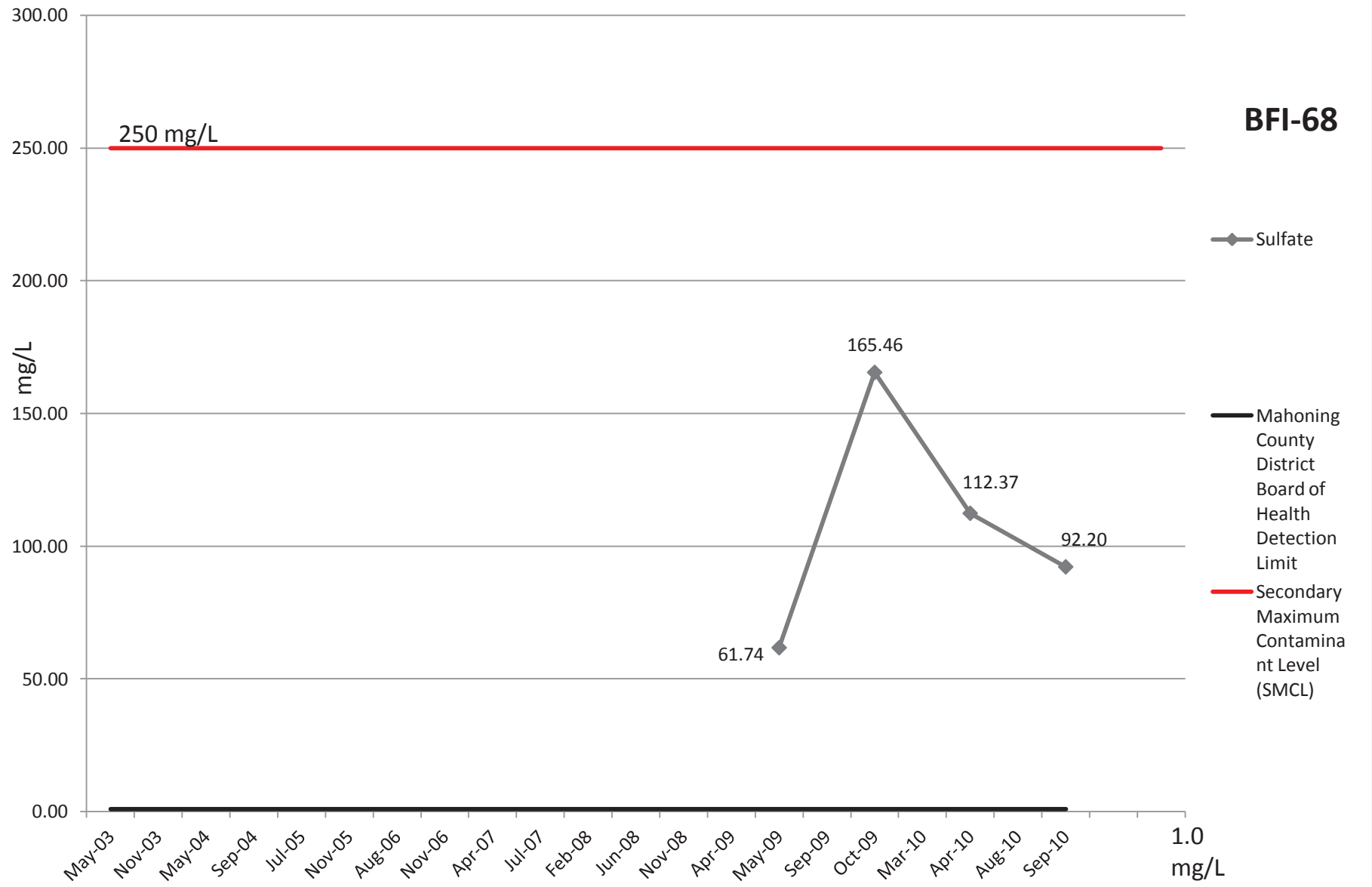
◆ Solids, Dissolved

— Mahoning County District Board of Health Detection Limit  
— Secondary Maximum Contaminant Level (SMCL)

1 mg/L

# Sulfate

**BFI-68**



# Bacteria

positive (1)

**BFI-68**

Positive/Negative

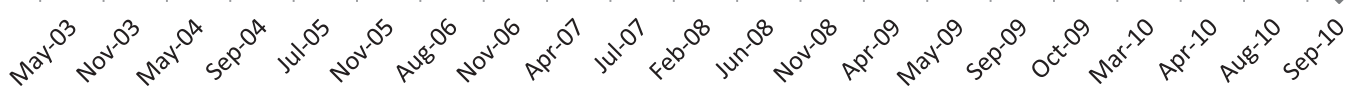
◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

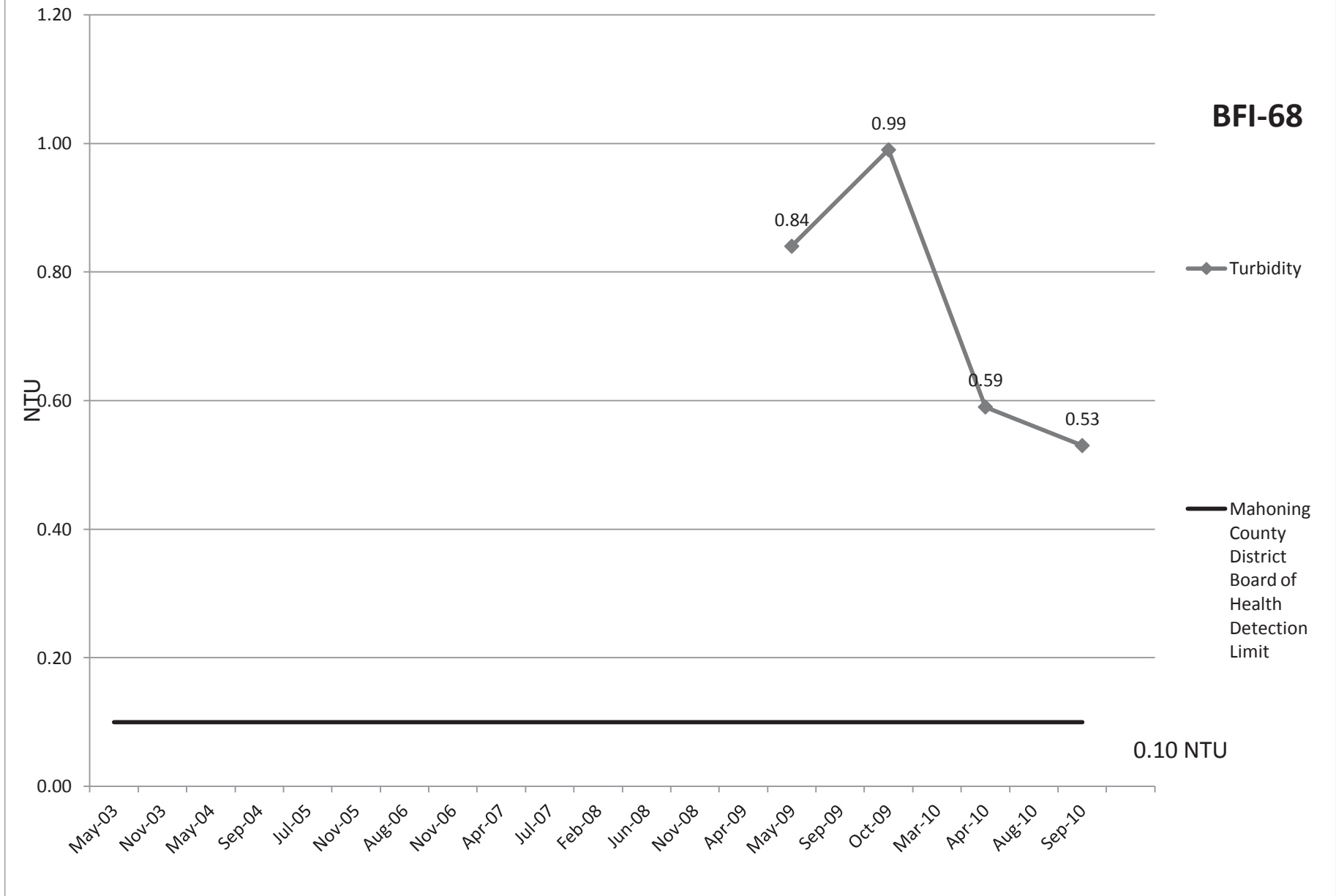
— Maximum  
Contaminant  
Level (MCL)

0.00

negative (0)

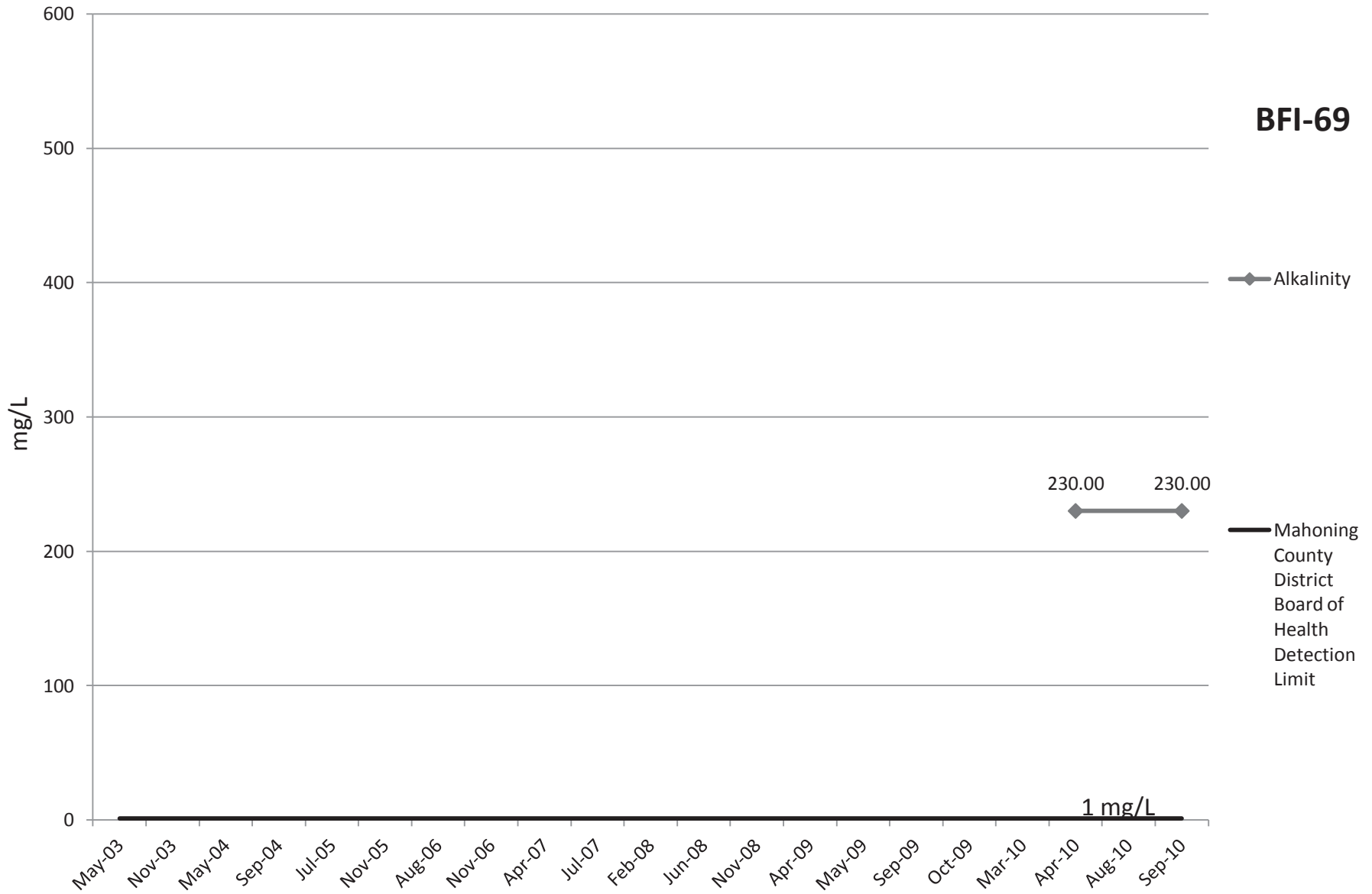


# Turbidity

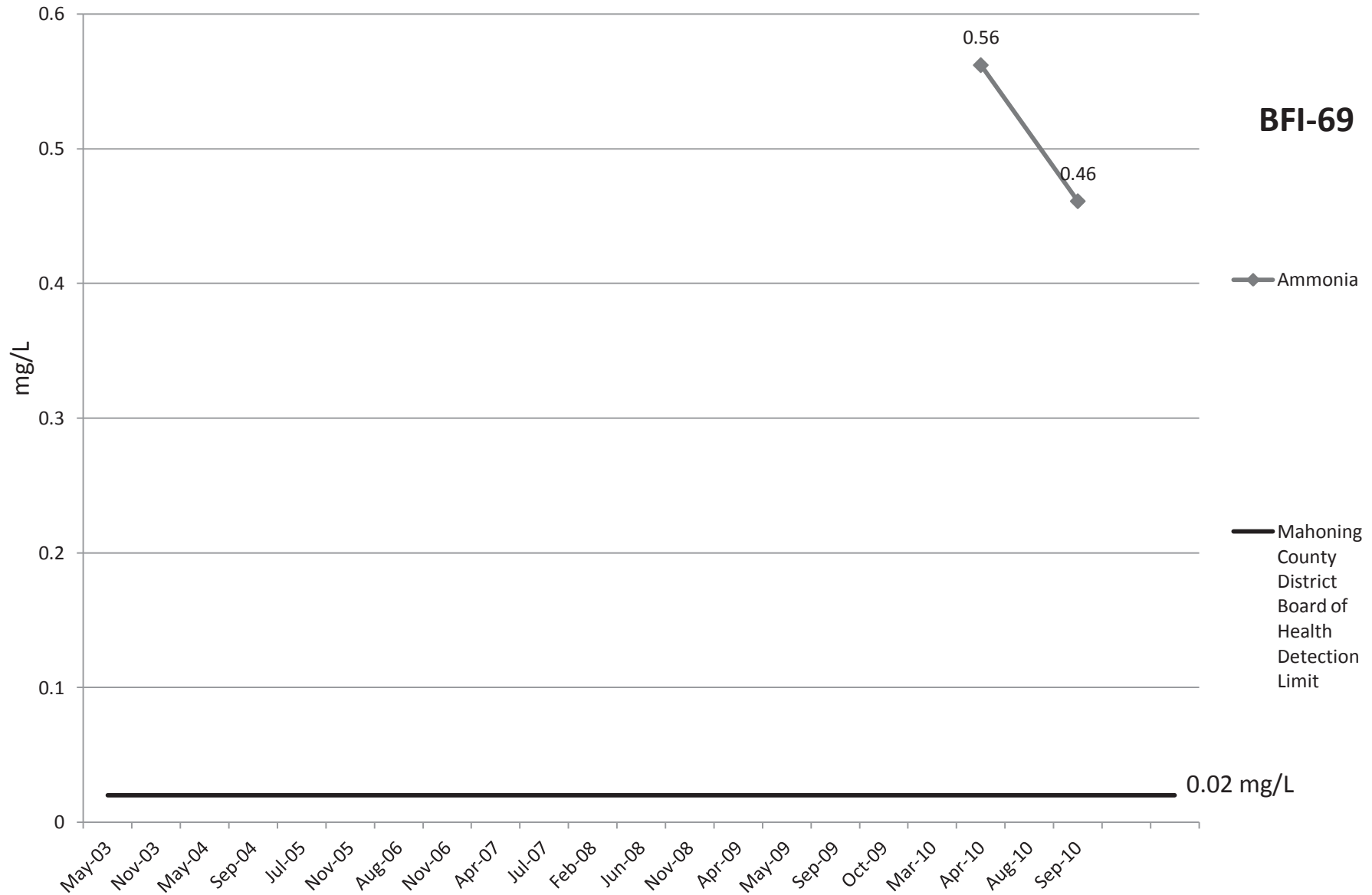


# Alkalinity

**BFI-69**



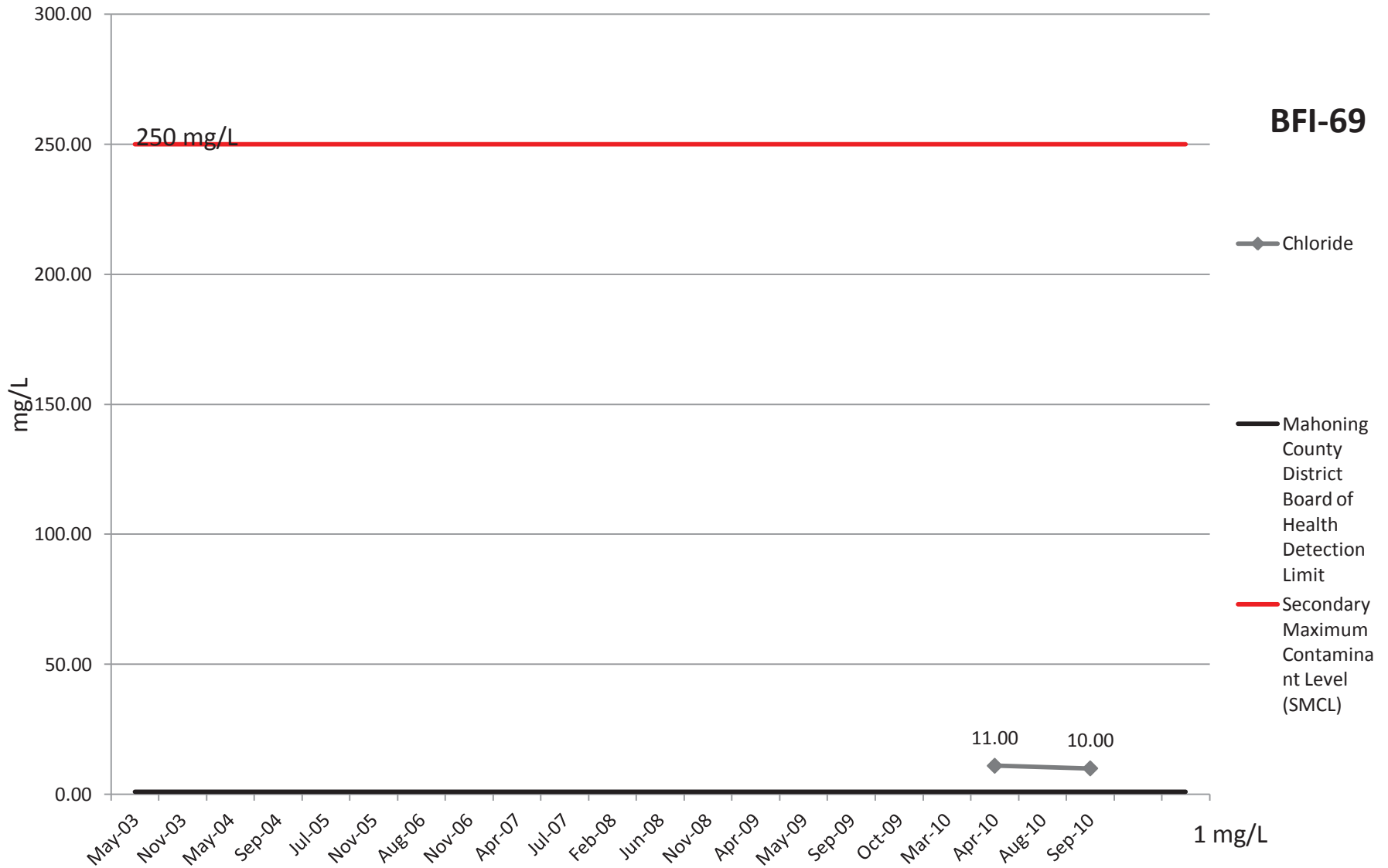
# Ammonia



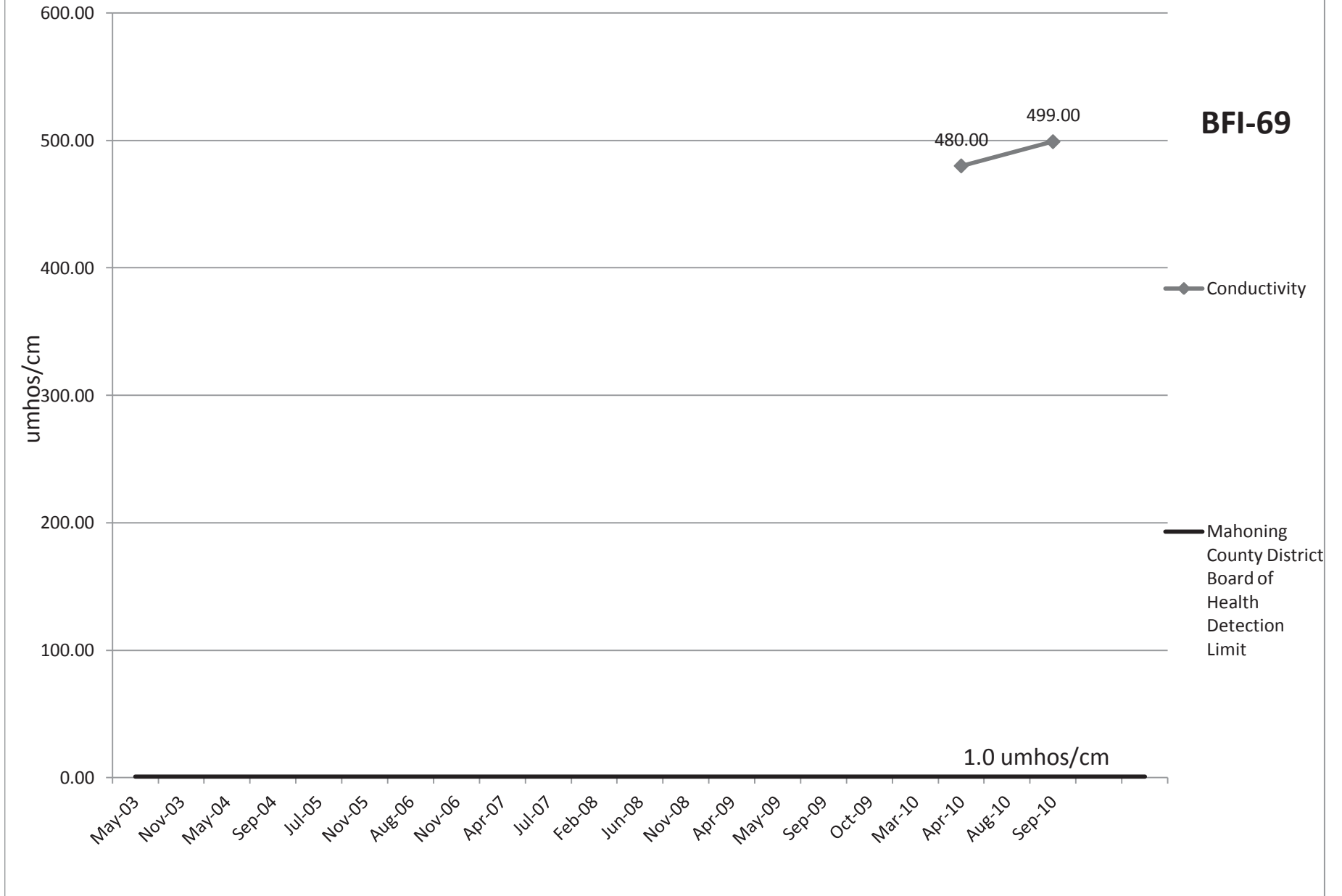


# Chloride

**BFI-69**



# Conductivity



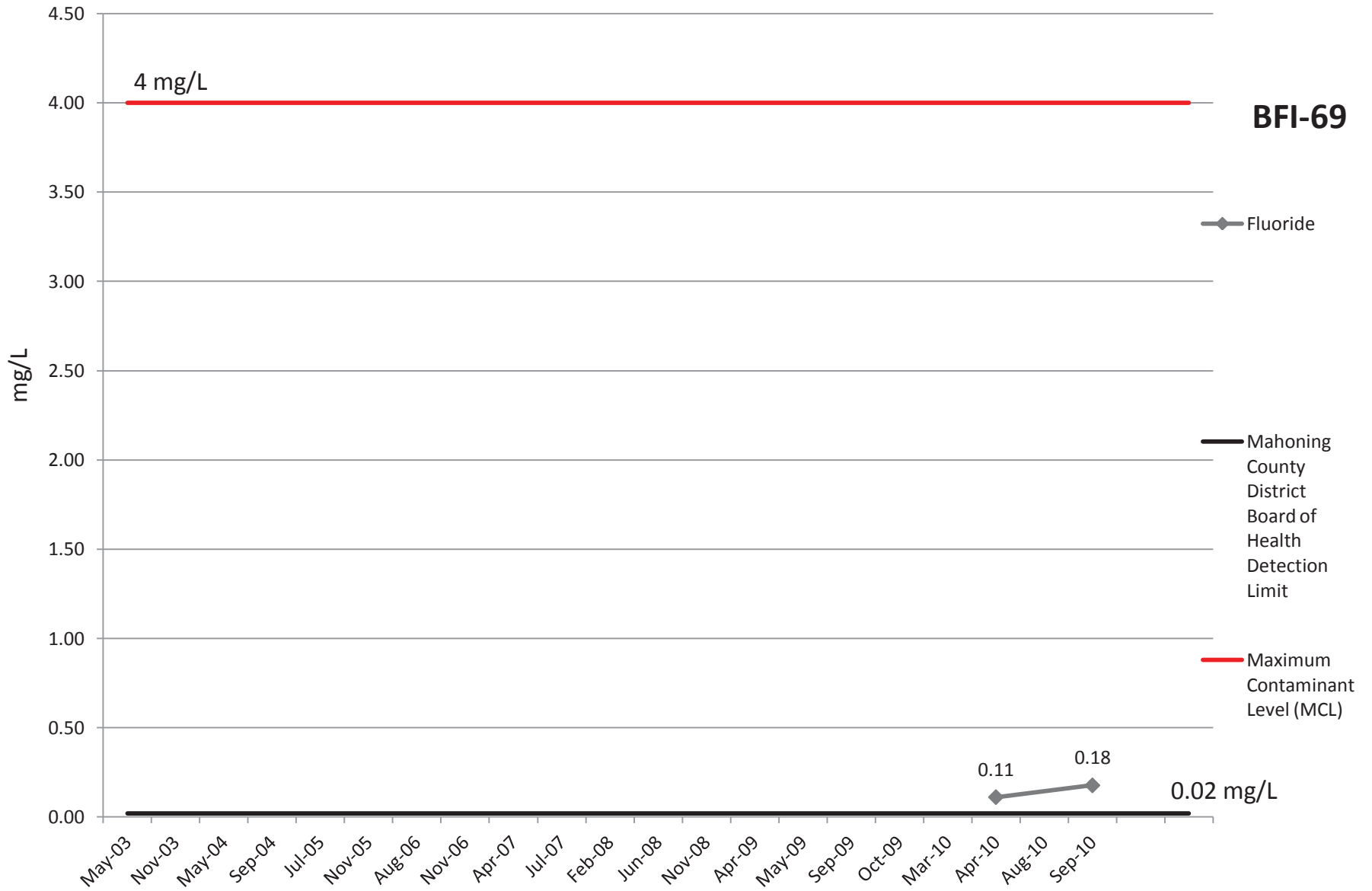
**BFI-69**

◆ Conductivity

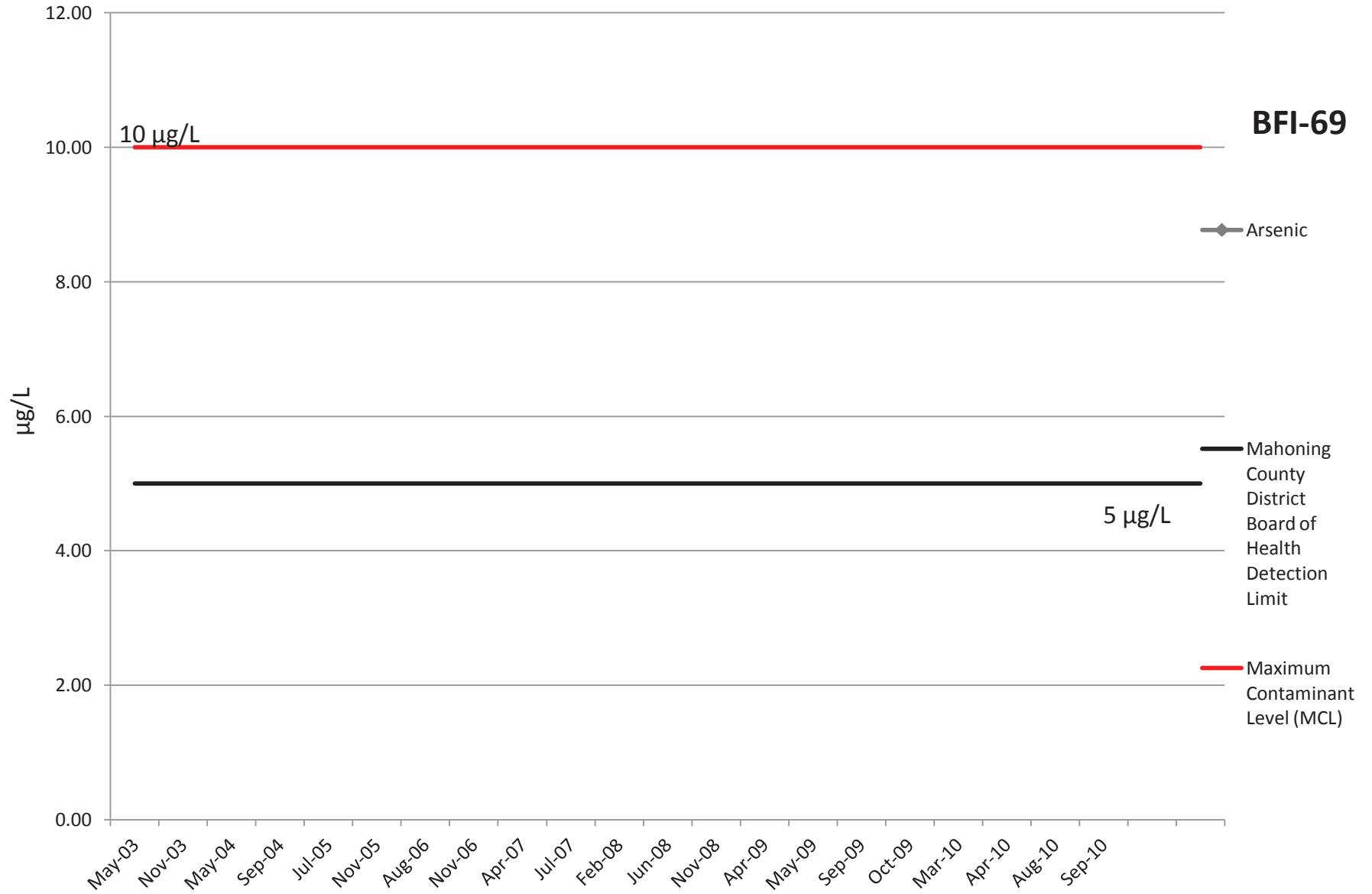
— Mahoning  
County District  
Board of  
Health  
Detection  
Limit

1.0 umhos/cm

# Fluoride

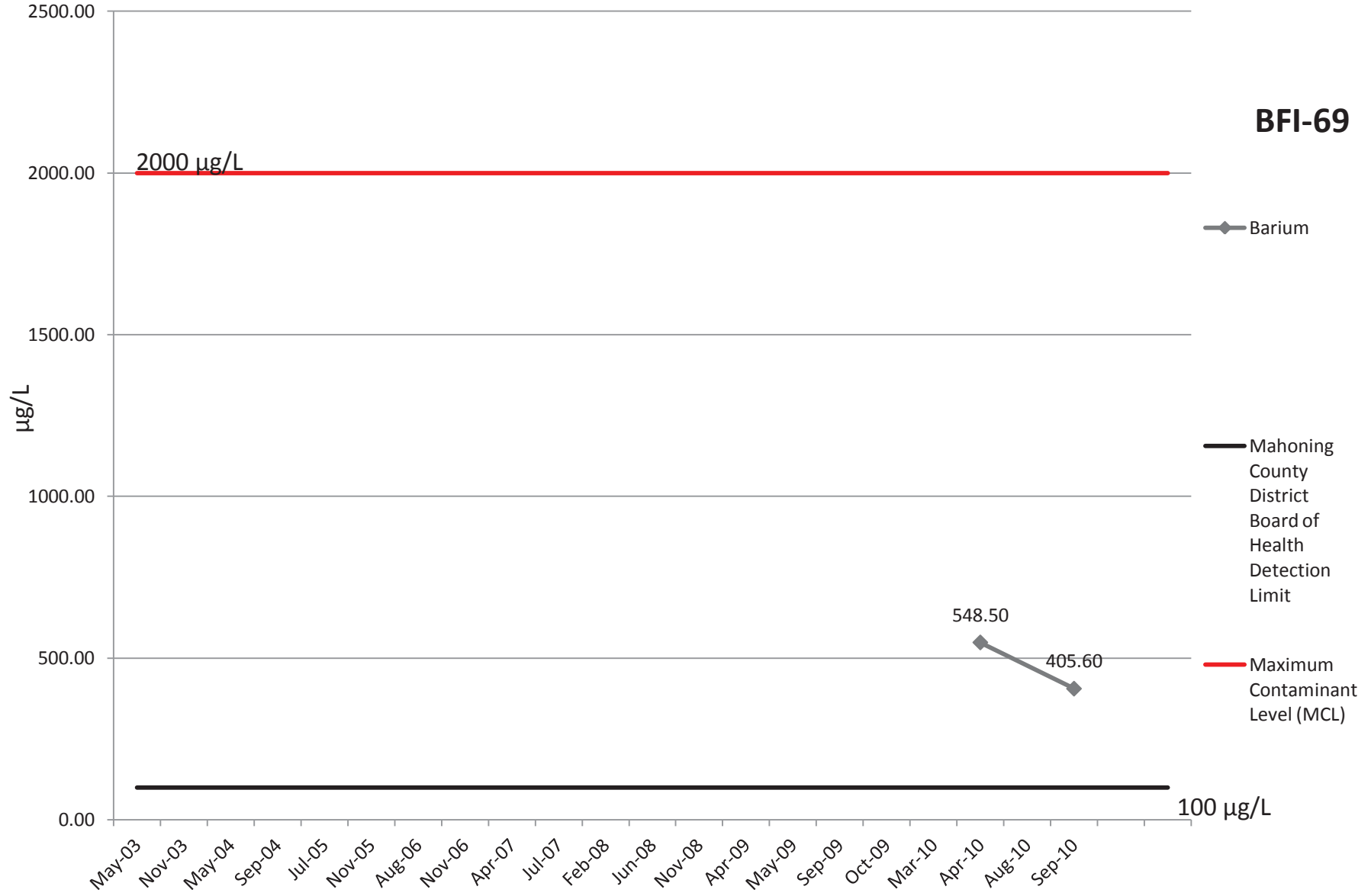


# Arsenic



# Barium

**BFI-69**



# Cadmium

**BFI-69**

10 µg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

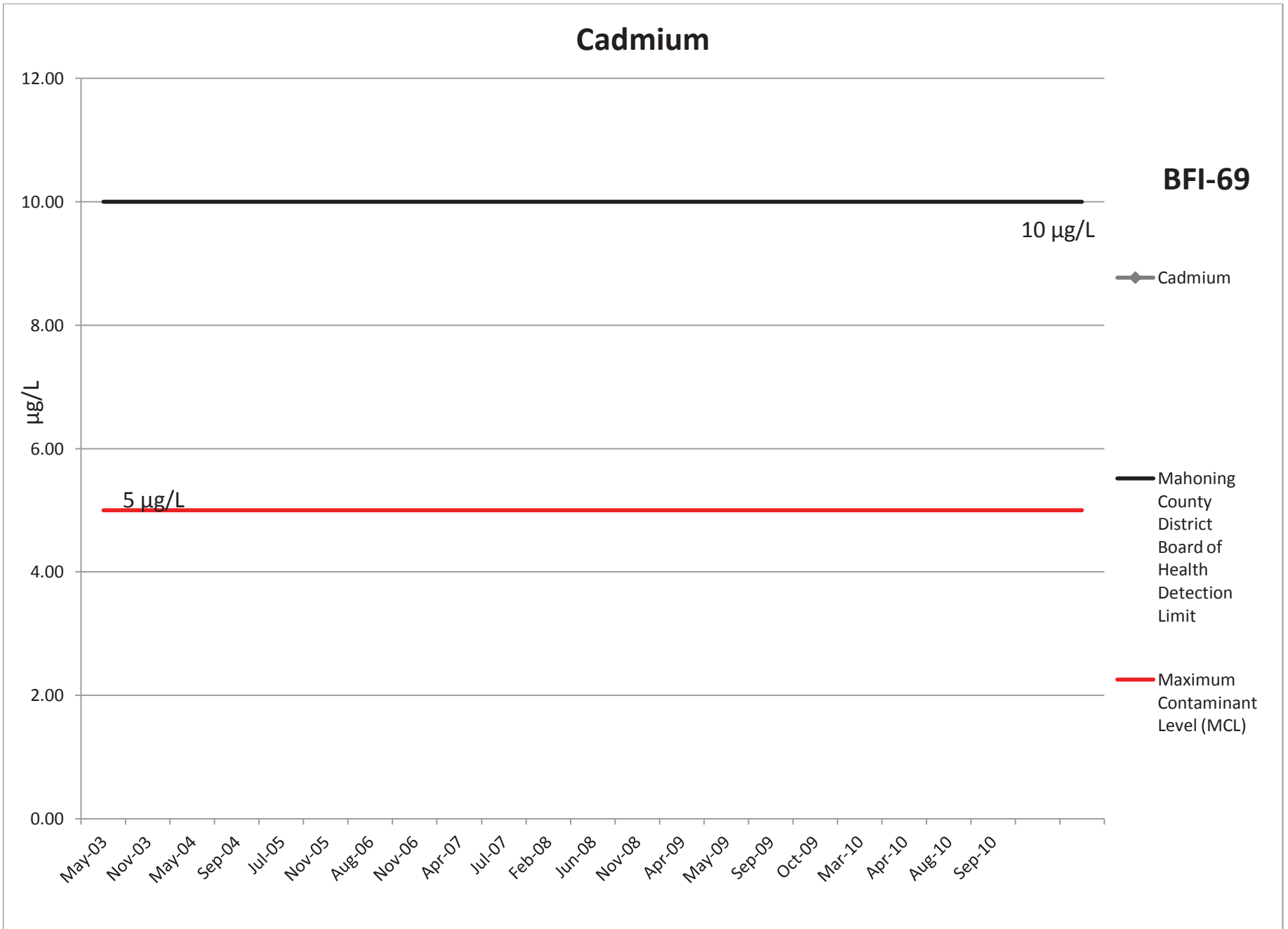
5 µg/L

◆ Cadmium

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

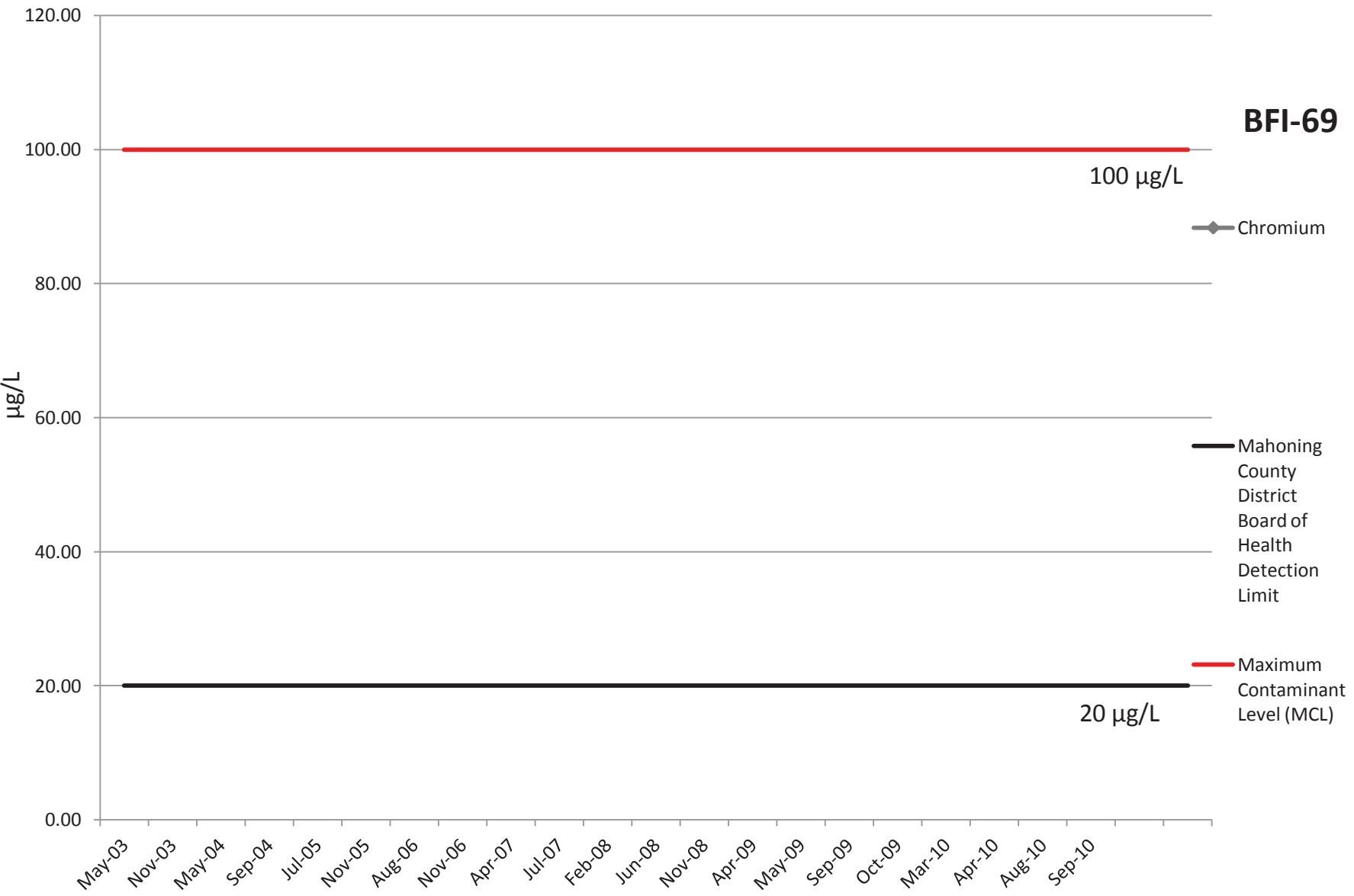
— Maximum  
Contaminant  
Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

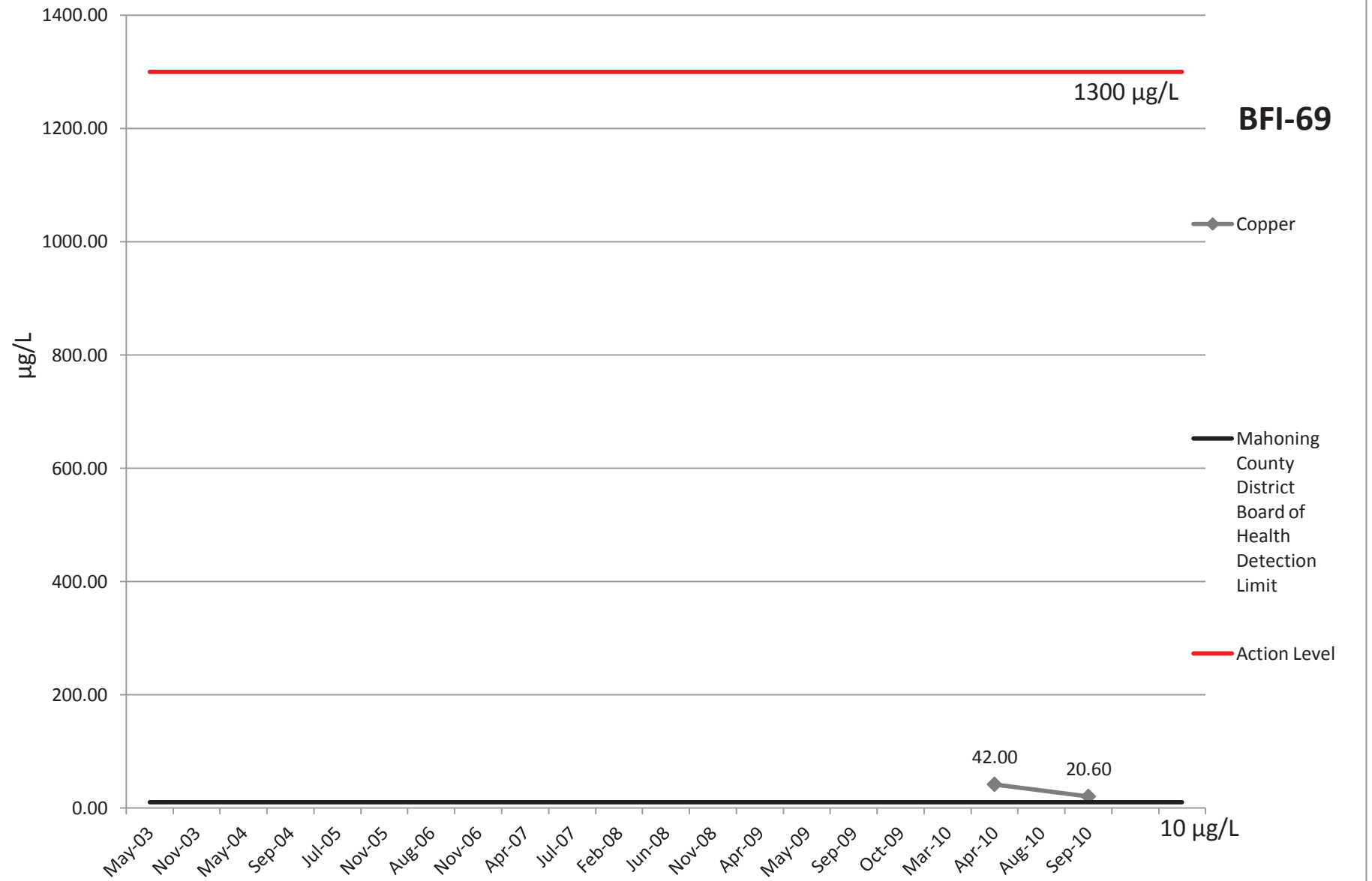


# Chromium

**BFI-69**



# Copper



**BFI-69**

1300 µg/L

◆ Copper

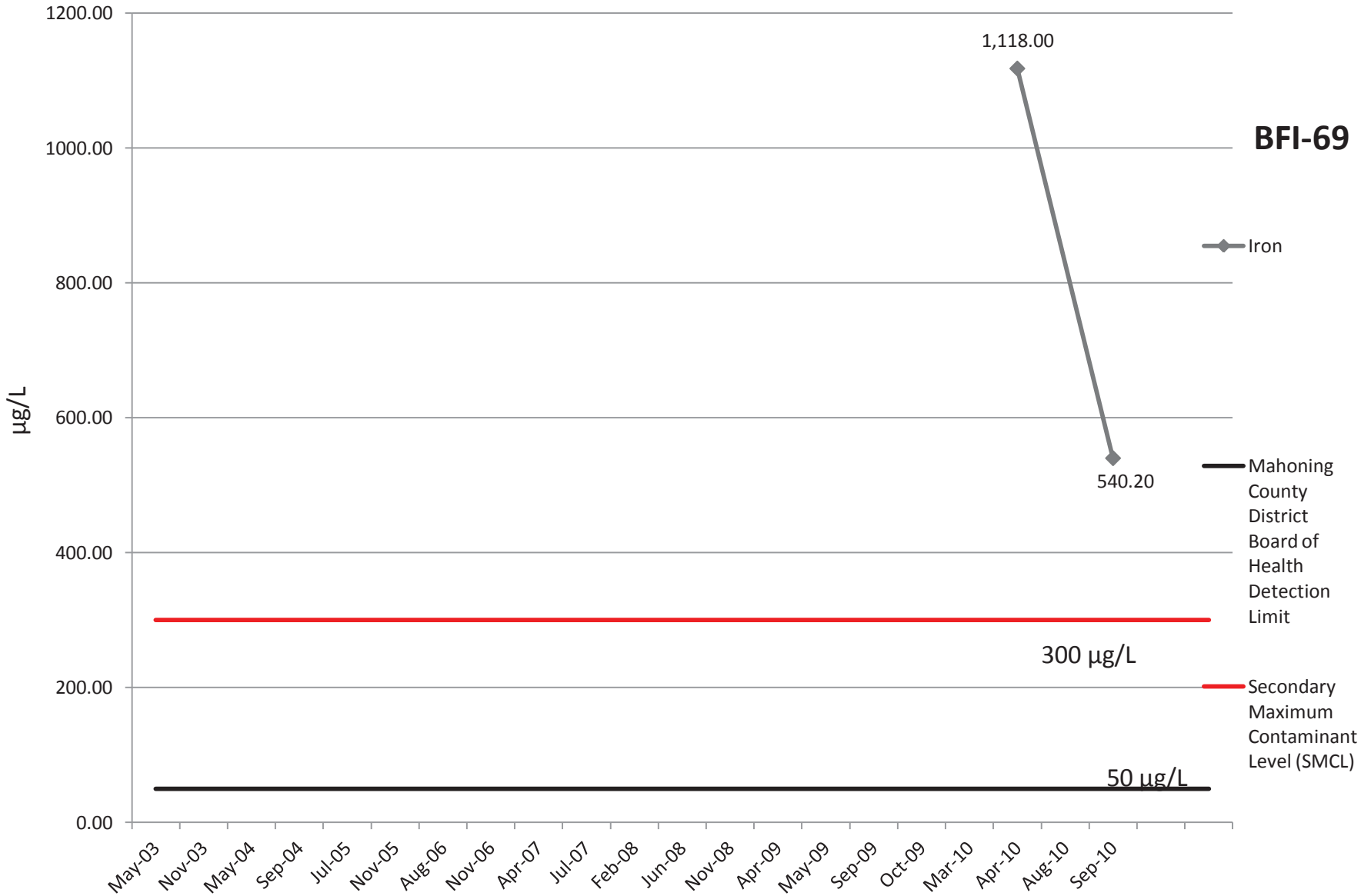
— Mahoning County District Board of Health Detection Limit

— Action Level

10 µg/L



# Iron

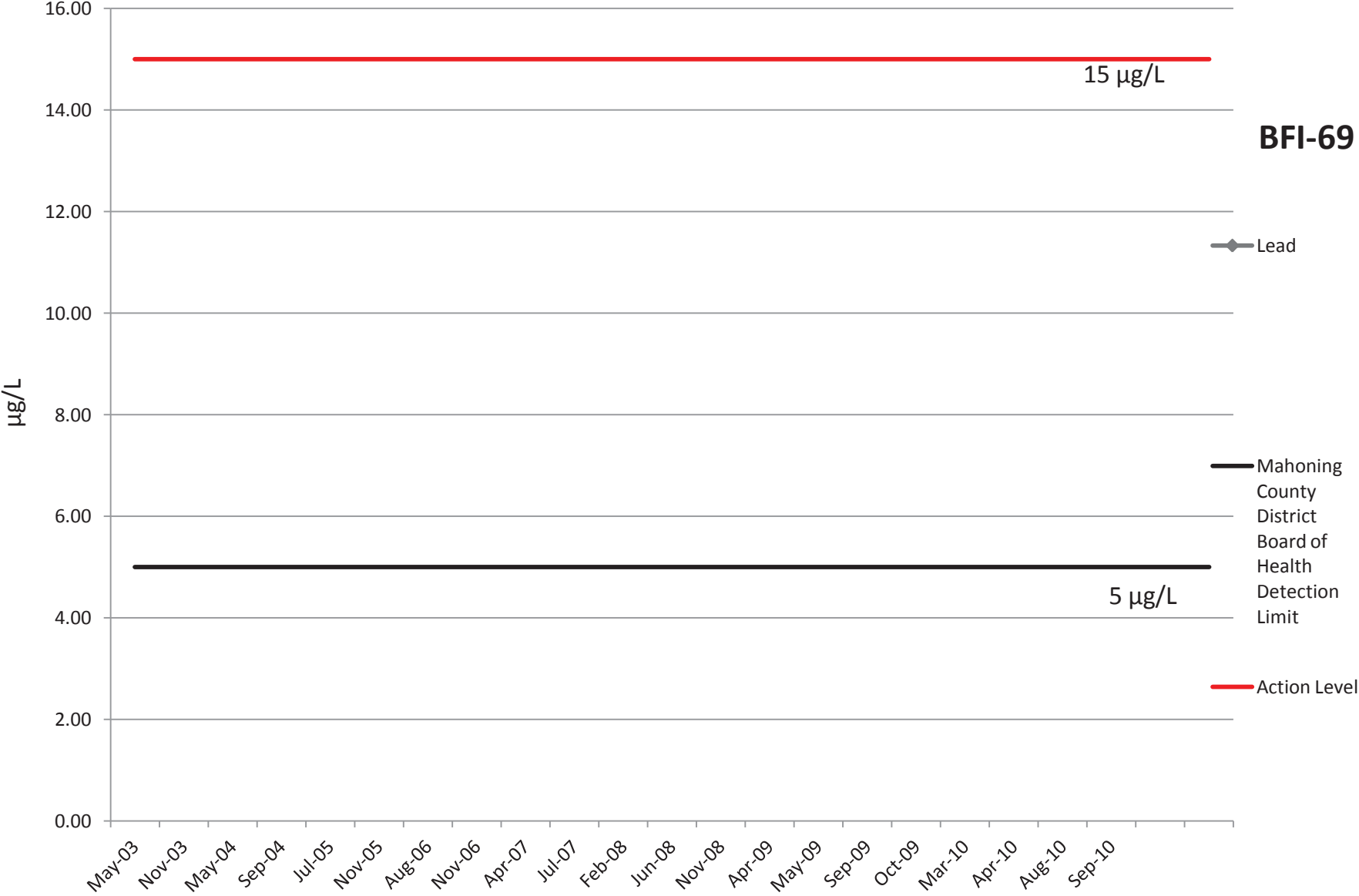


# Lead

**BFI-69**

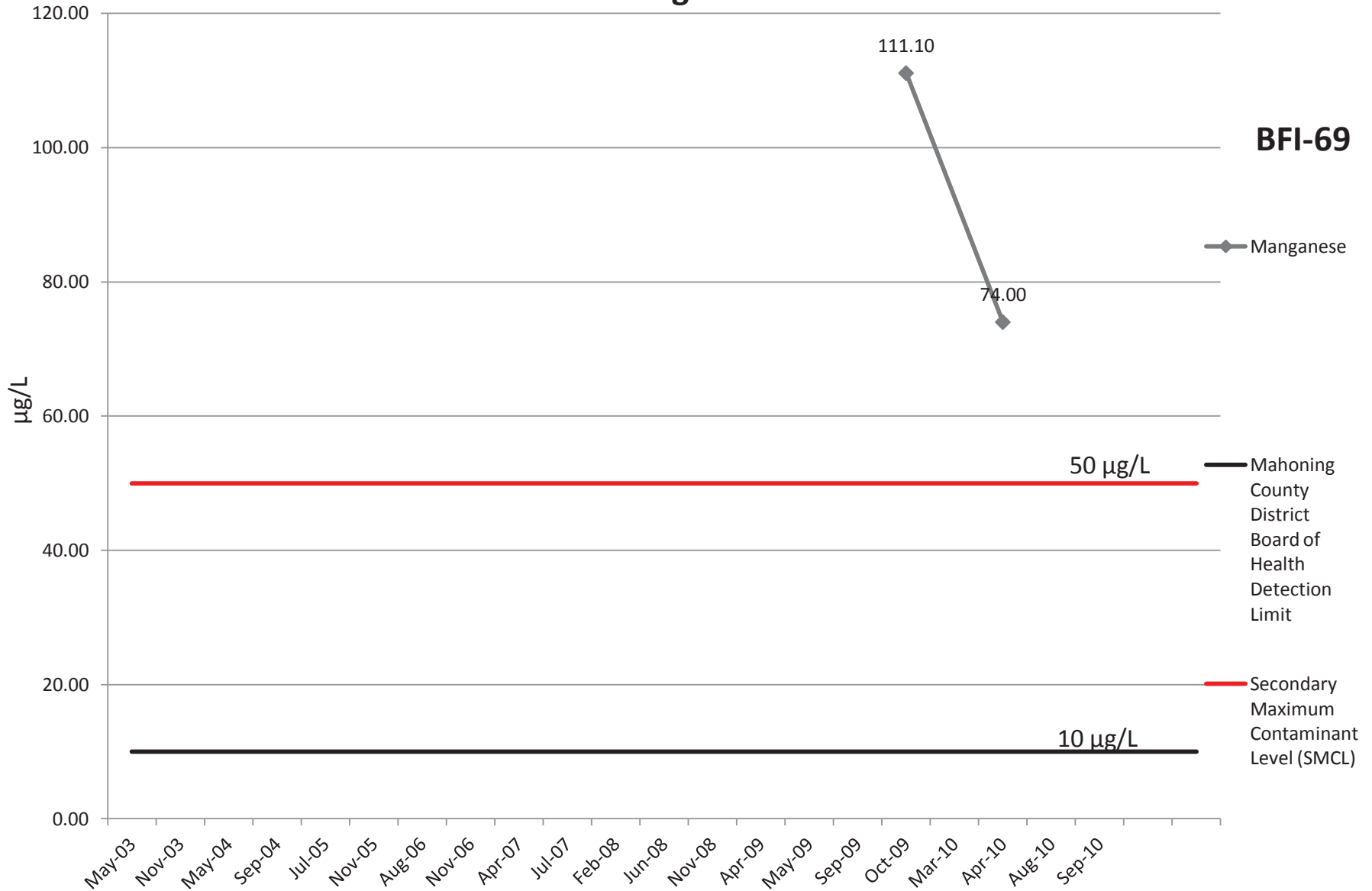
15 µg/L

5 µg/L



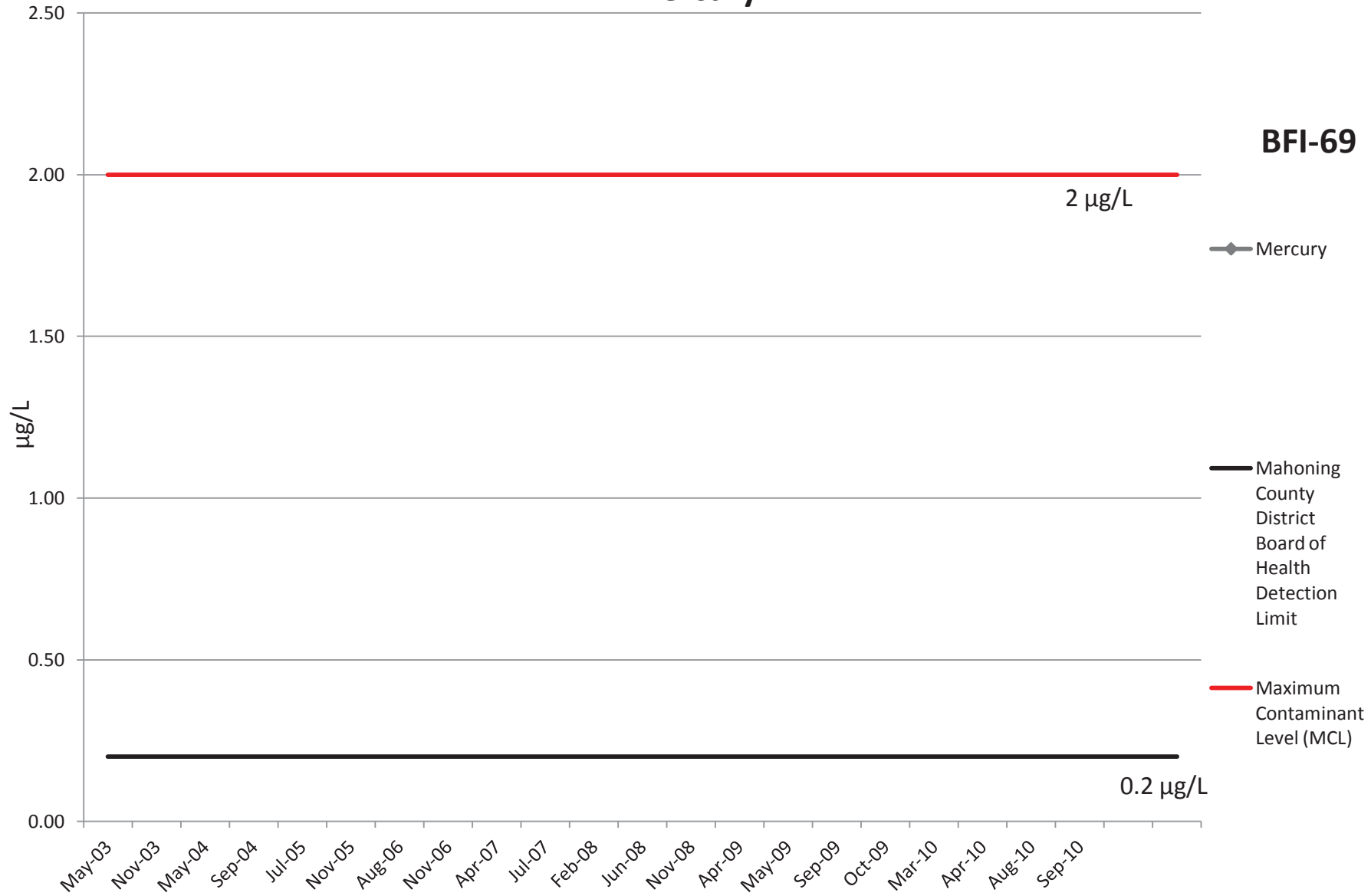
# Manganese

**BFI-69**

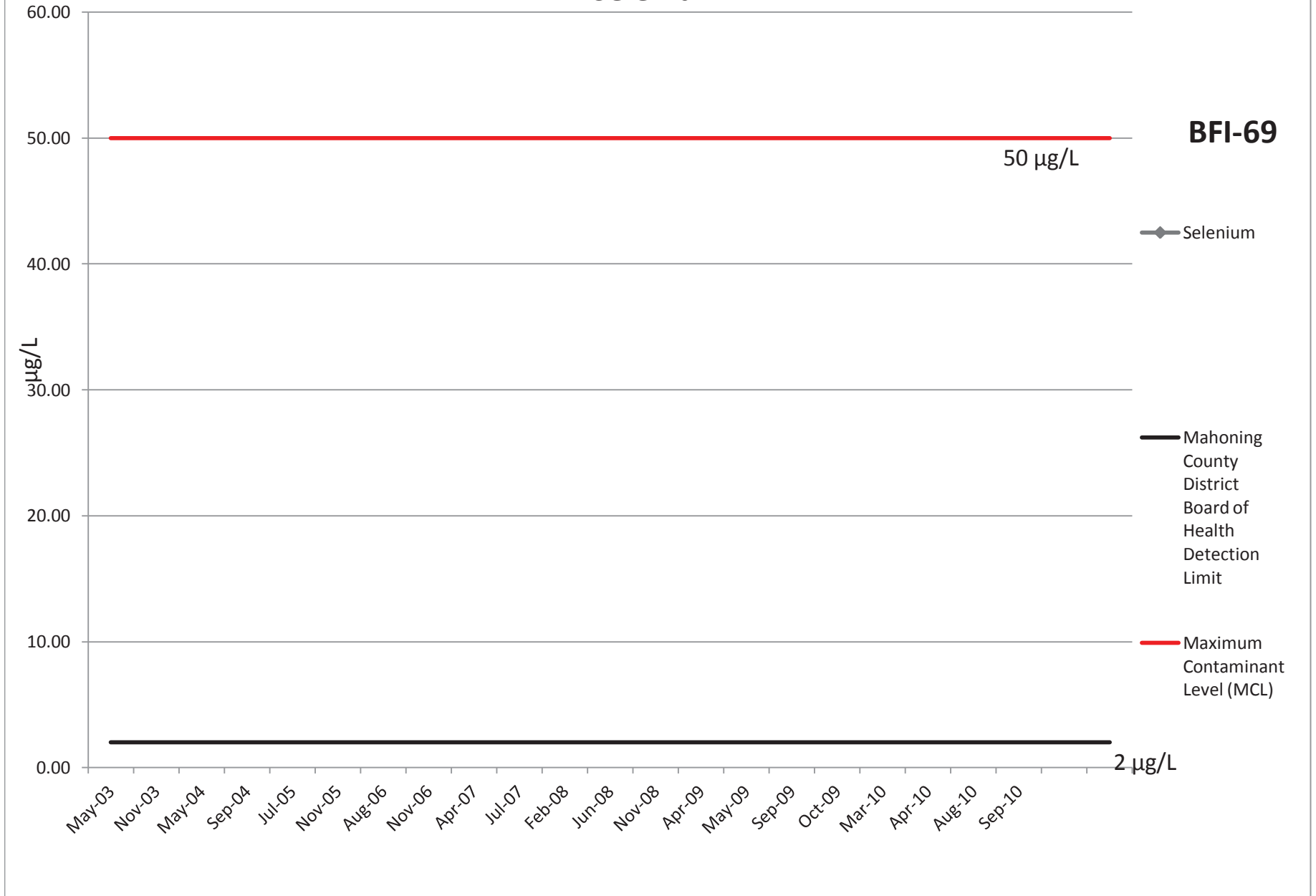


# Mercury

**BFI-69**

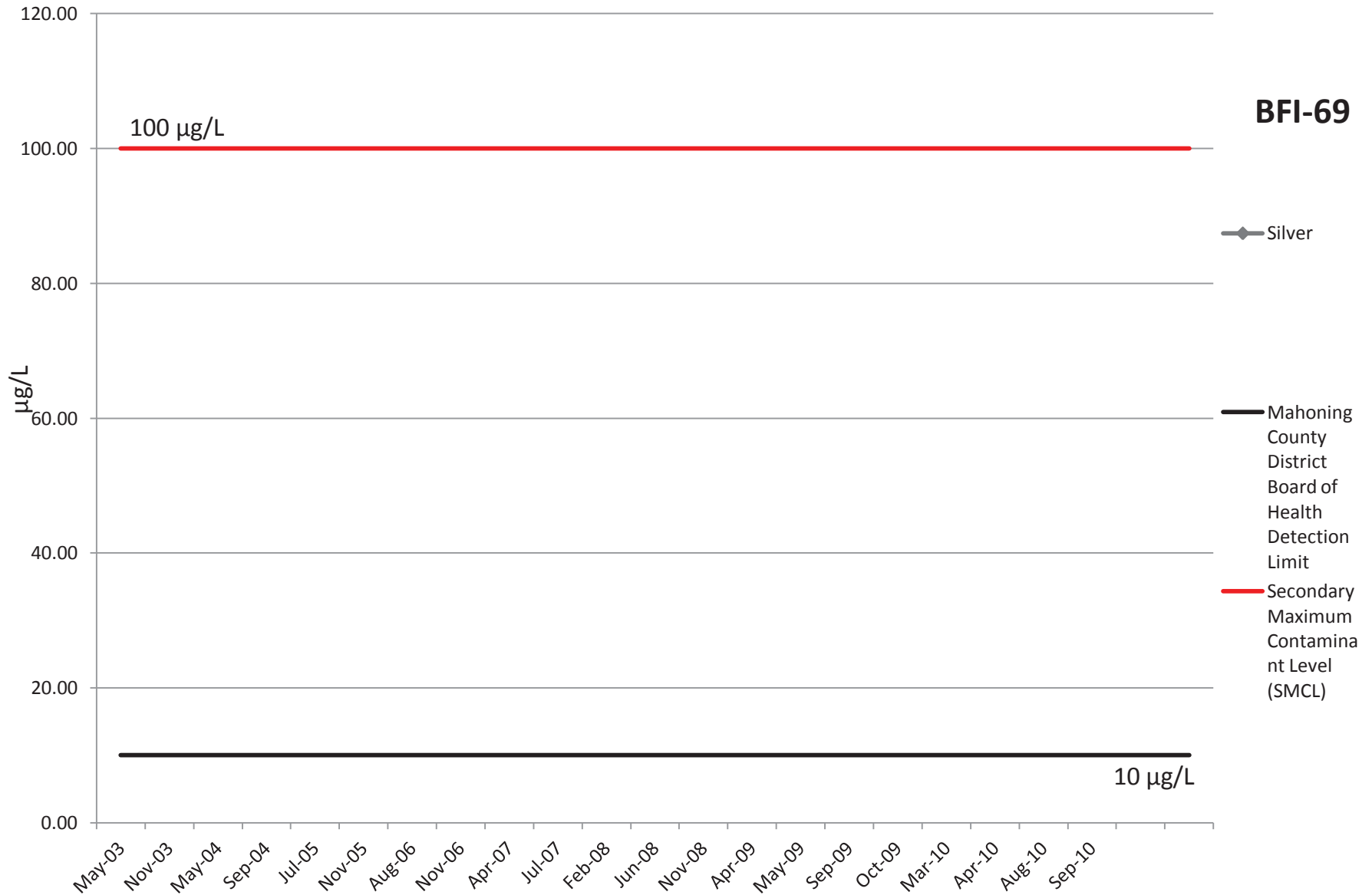


# Selenium

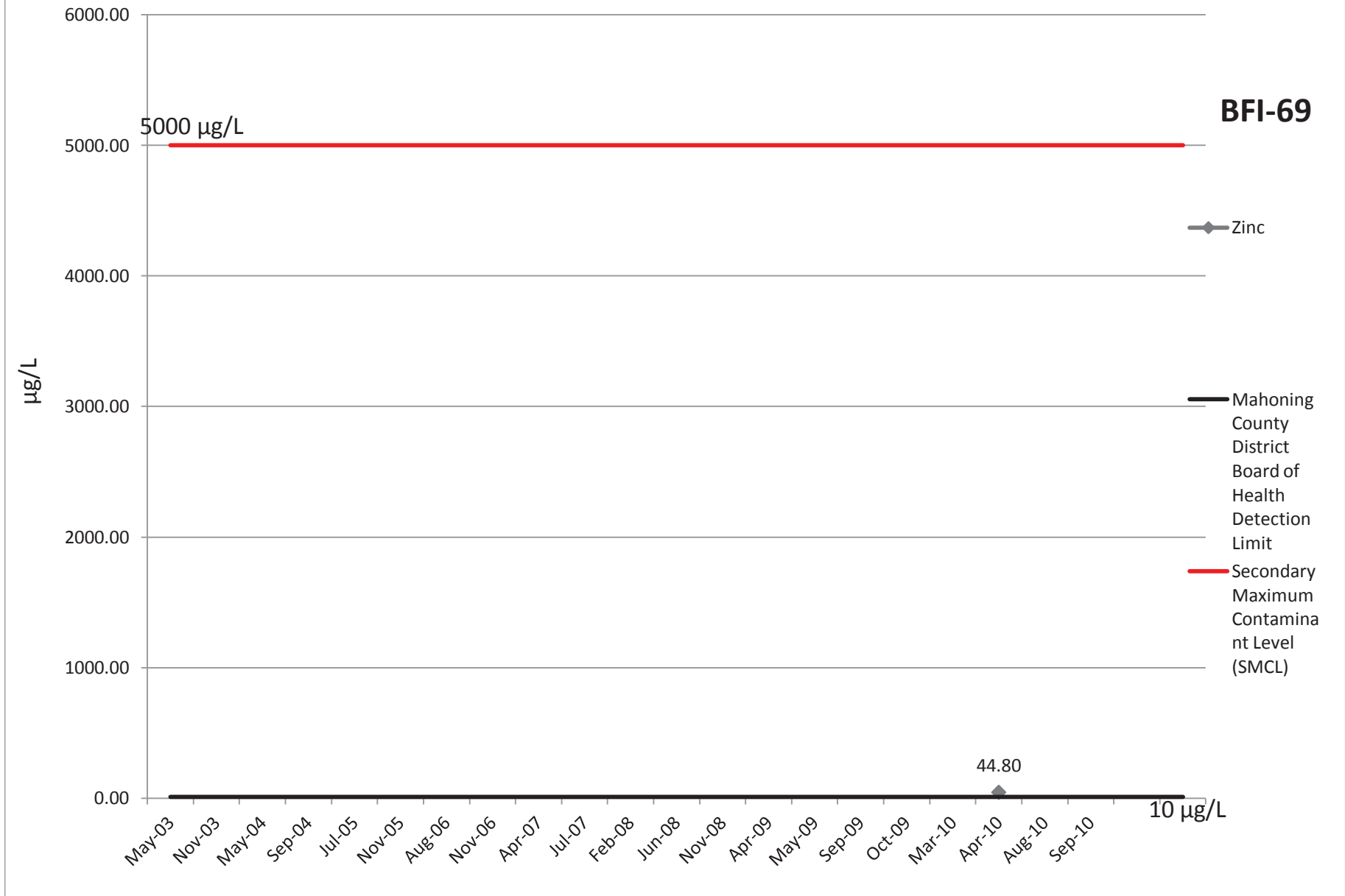


# Silver

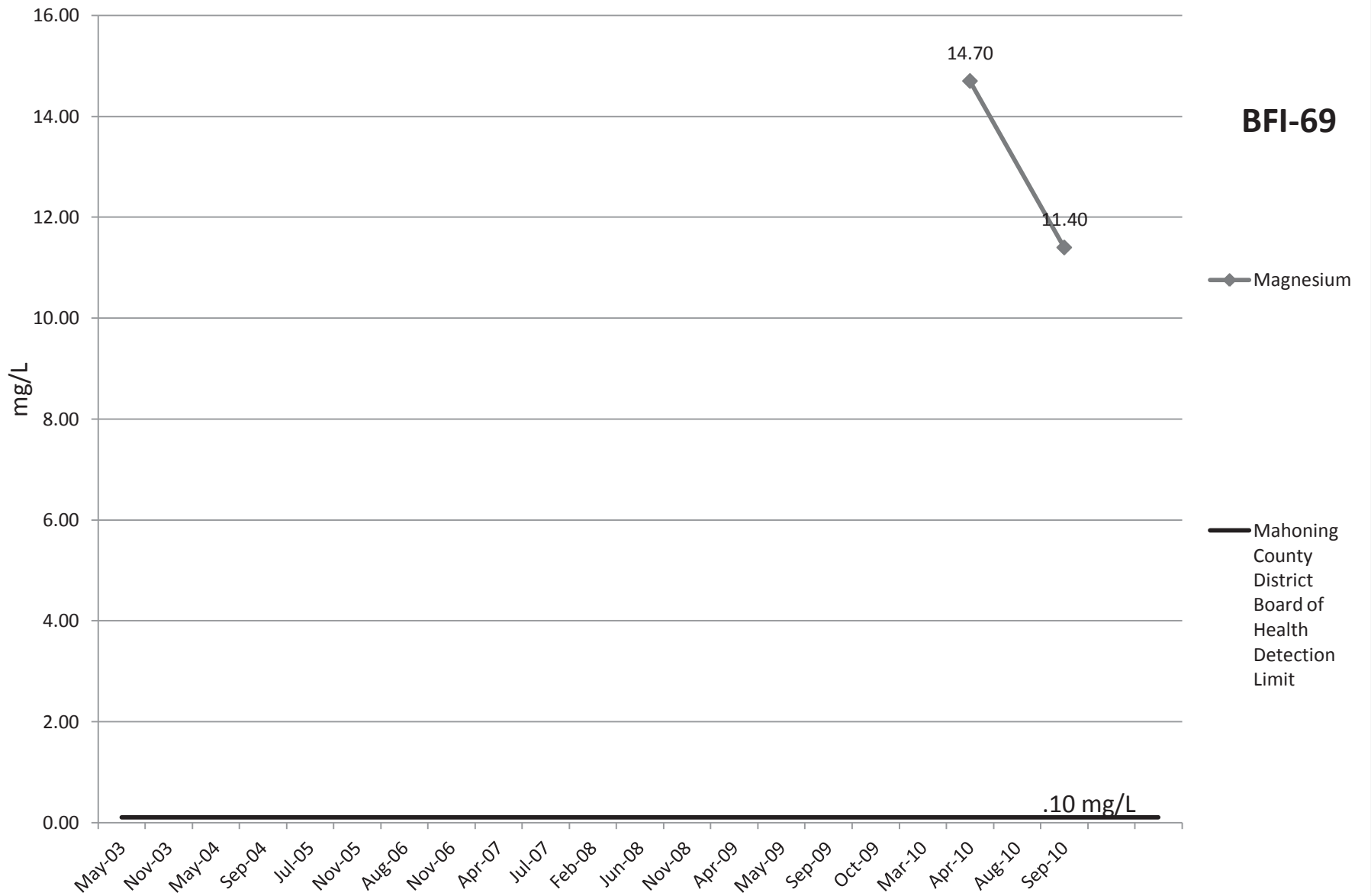
**BFI-69**



# Zinc

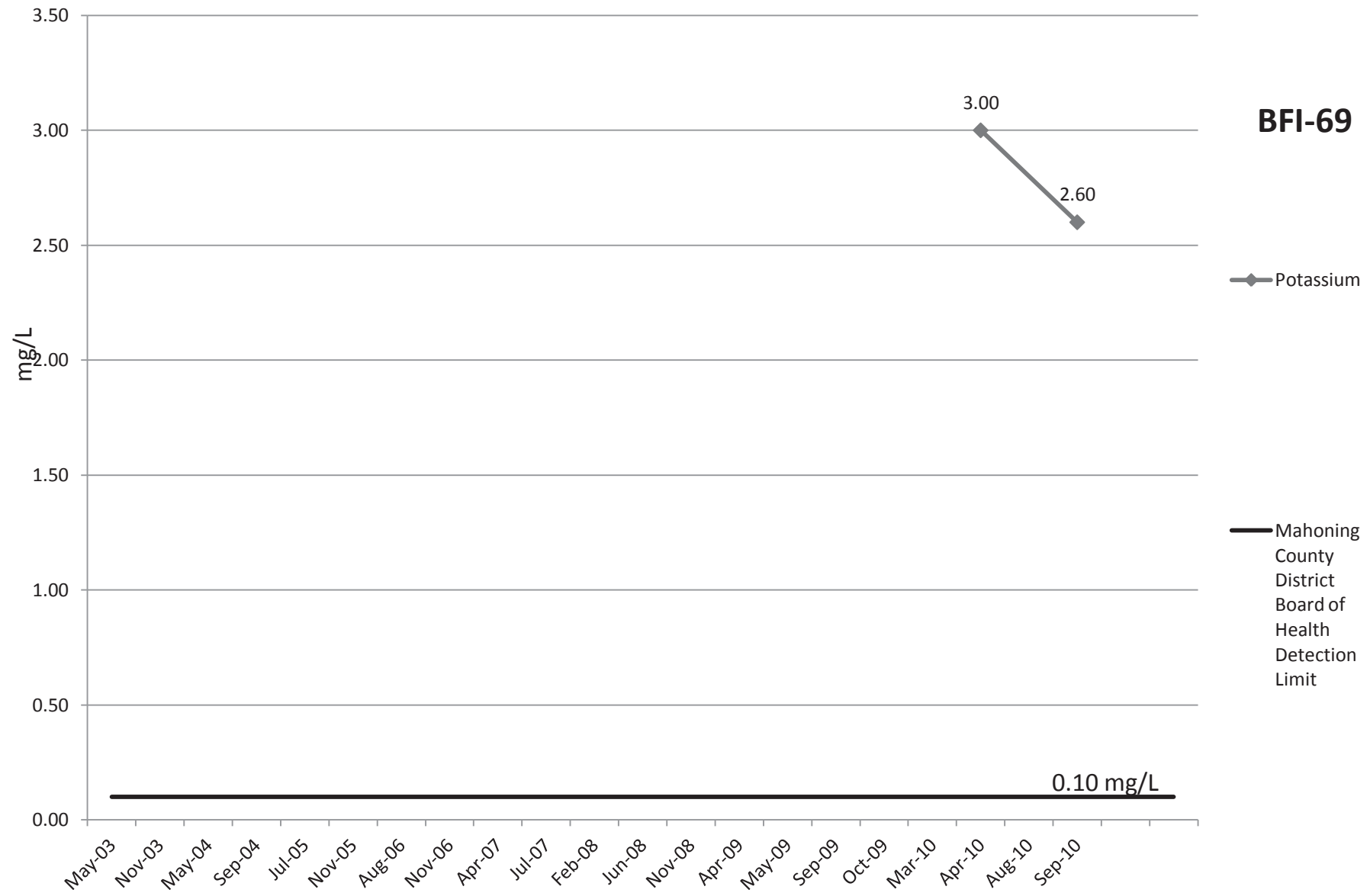


# Magnesium



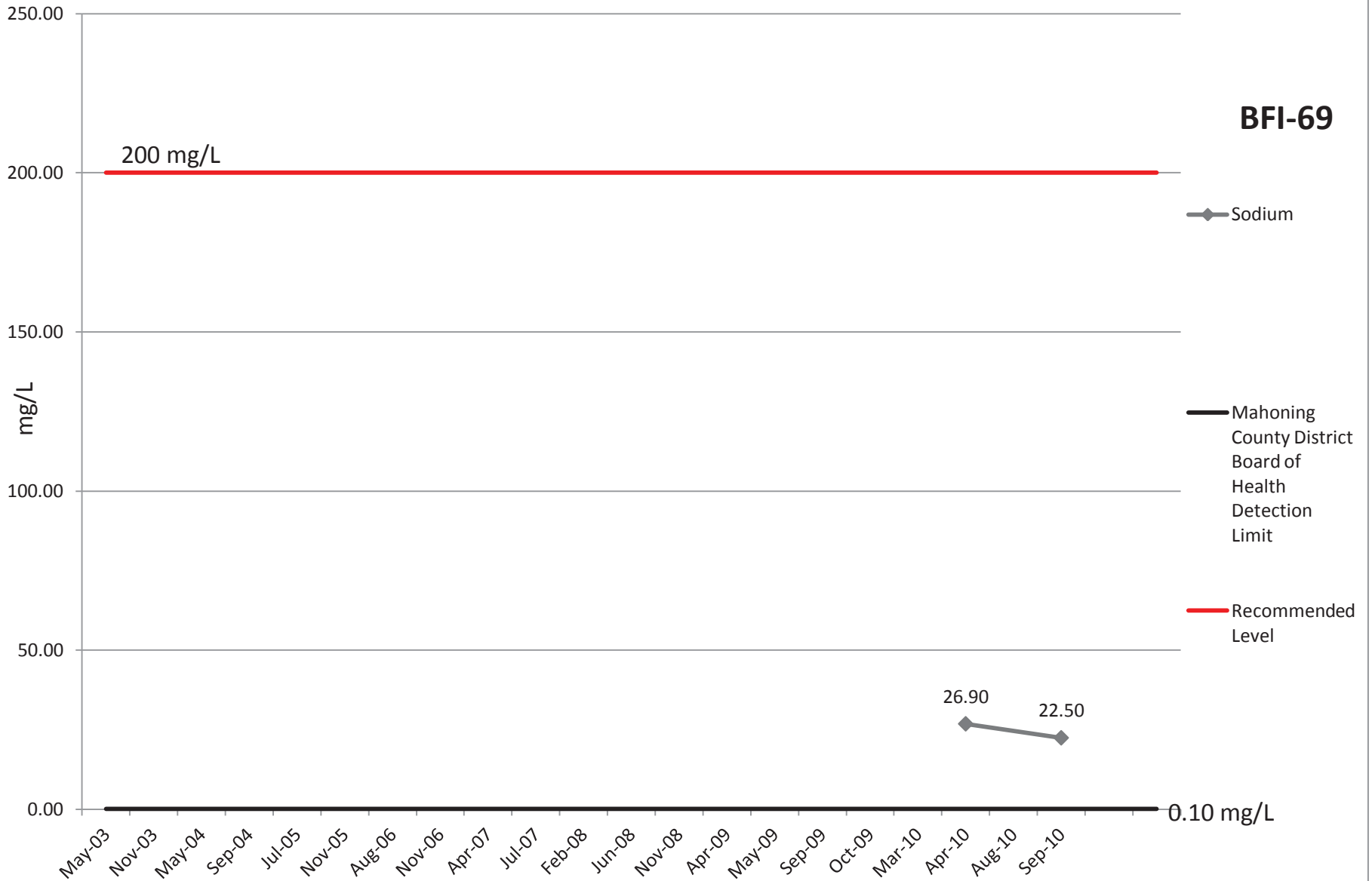


# Potassium

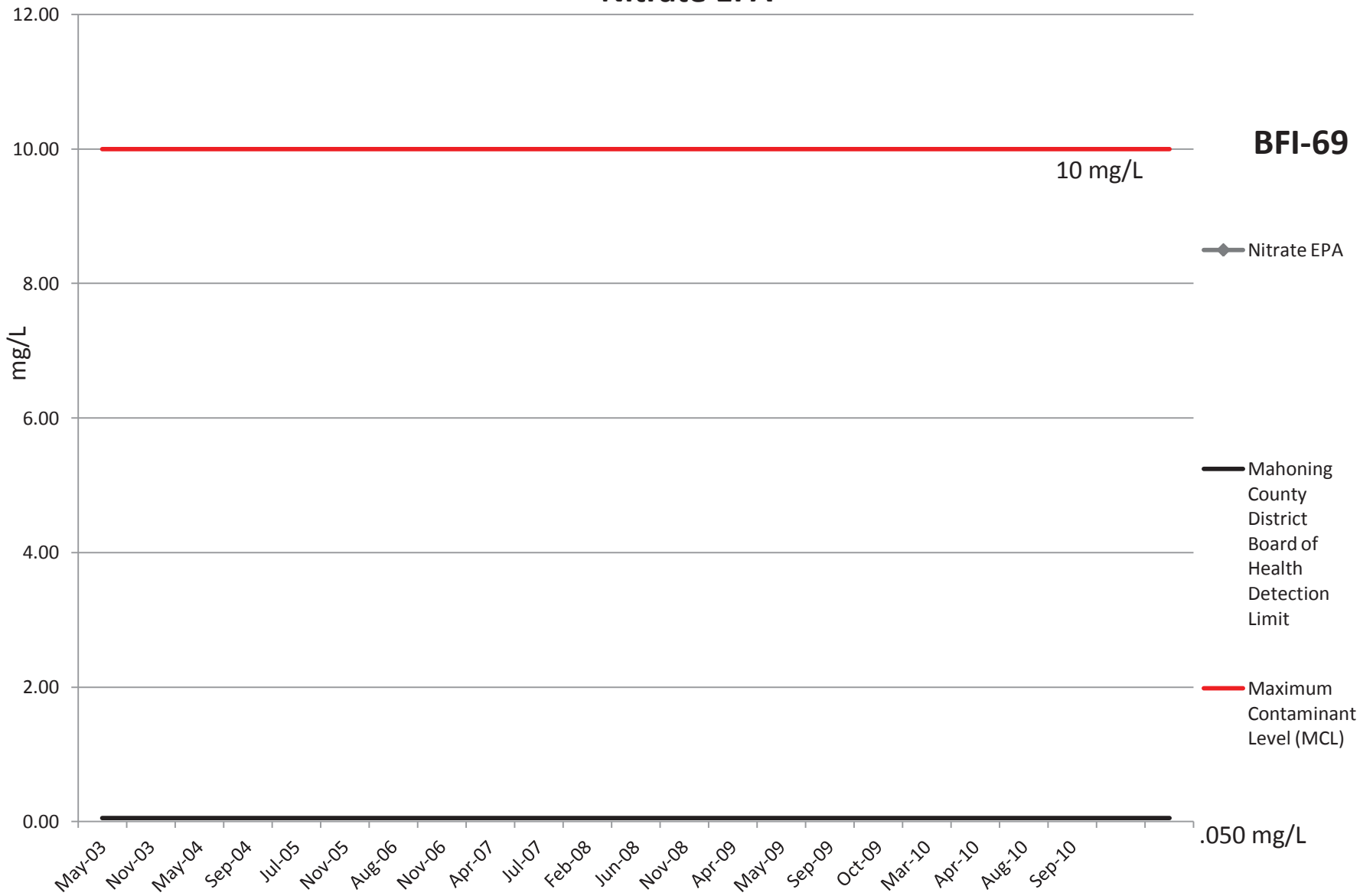


# Sodium

**BFI-69**



# Nitrate EPA



**BFI-69**

10 mg/L

◆ Nitrate EPA

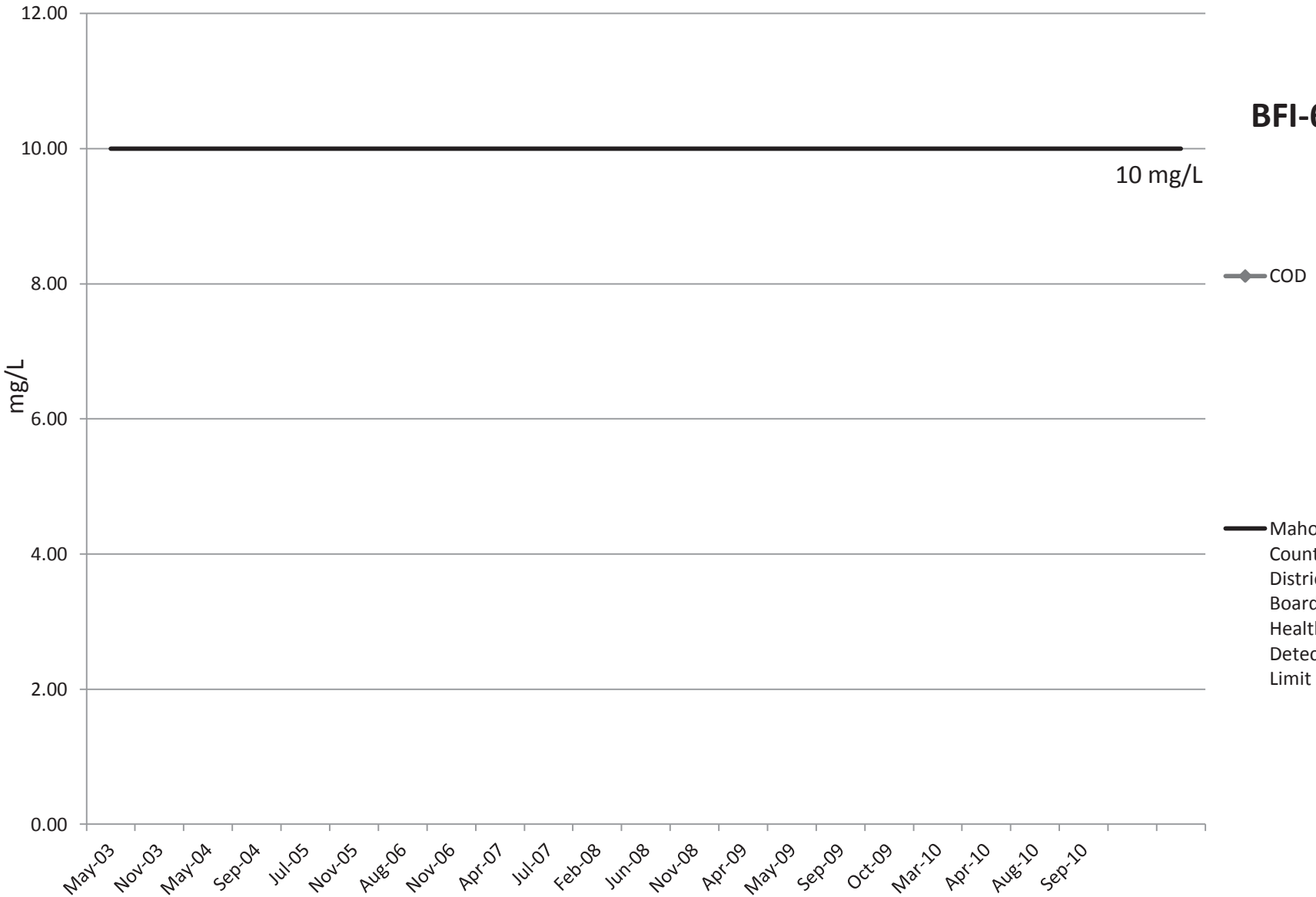
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

.050 mg/L

# COD

**BFI-69**



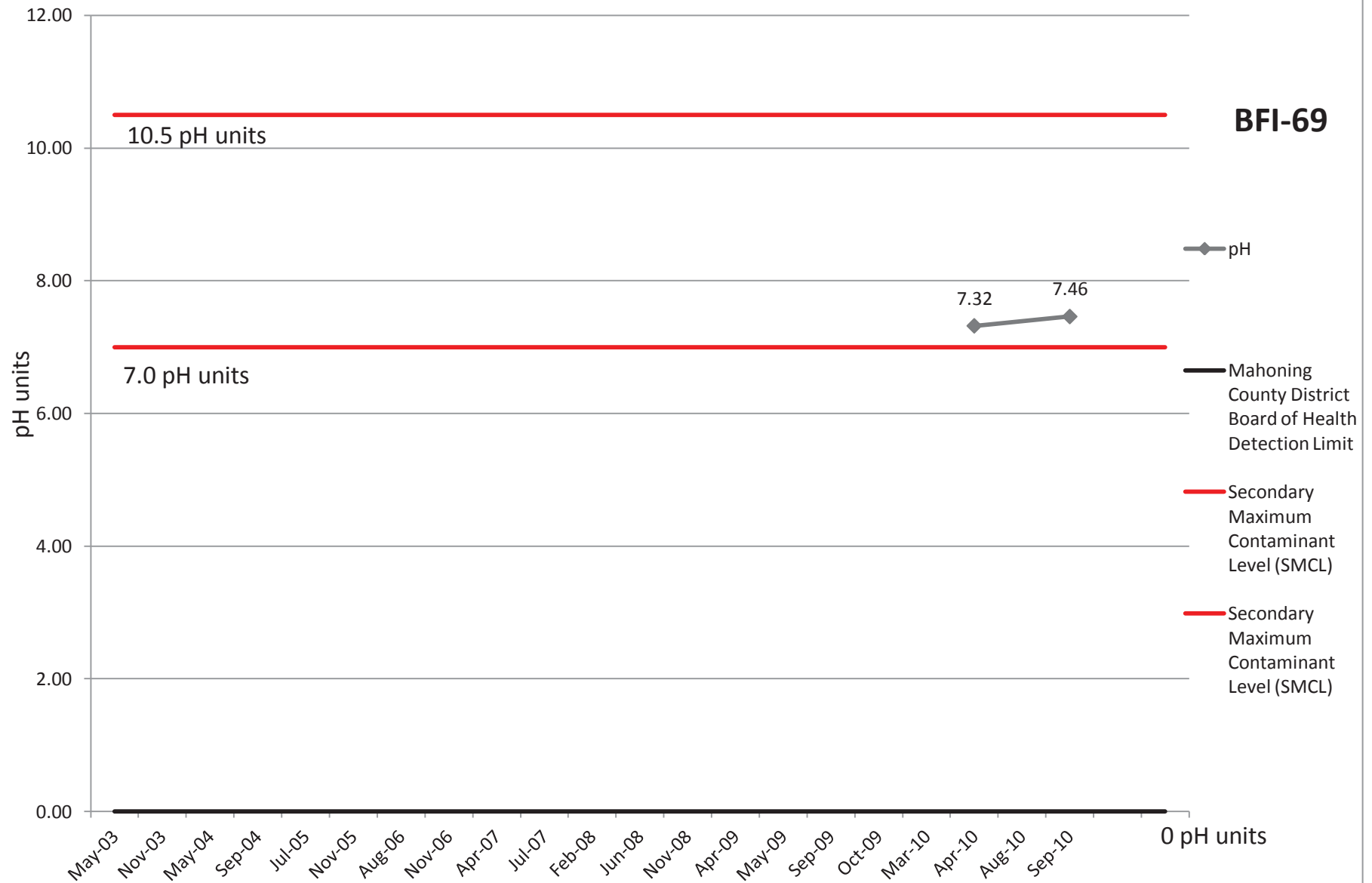
10 mg/L

◆ COD

— Mahoning County District Board of Health Detection Limit

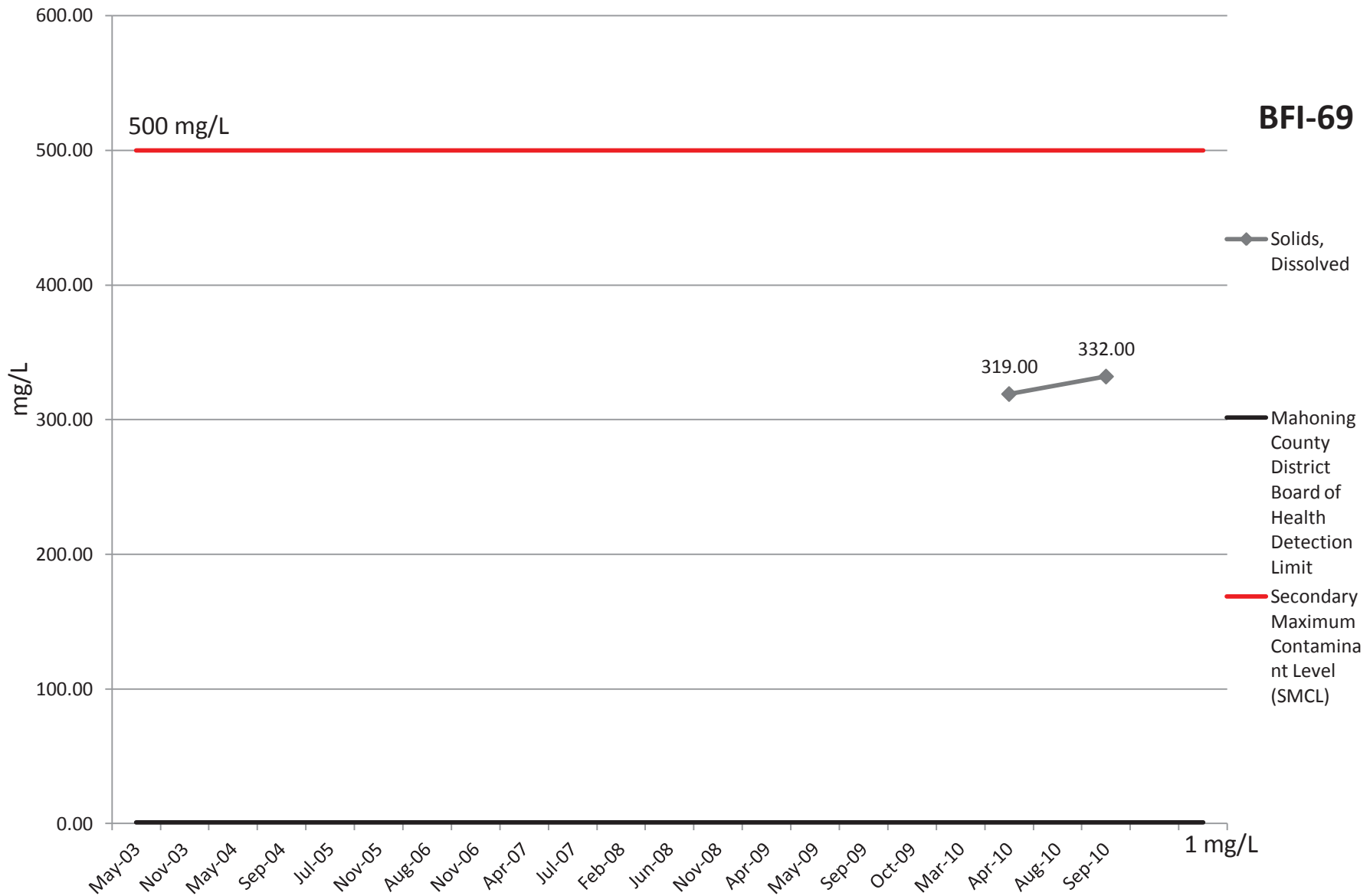
# pH

**BFI-69**



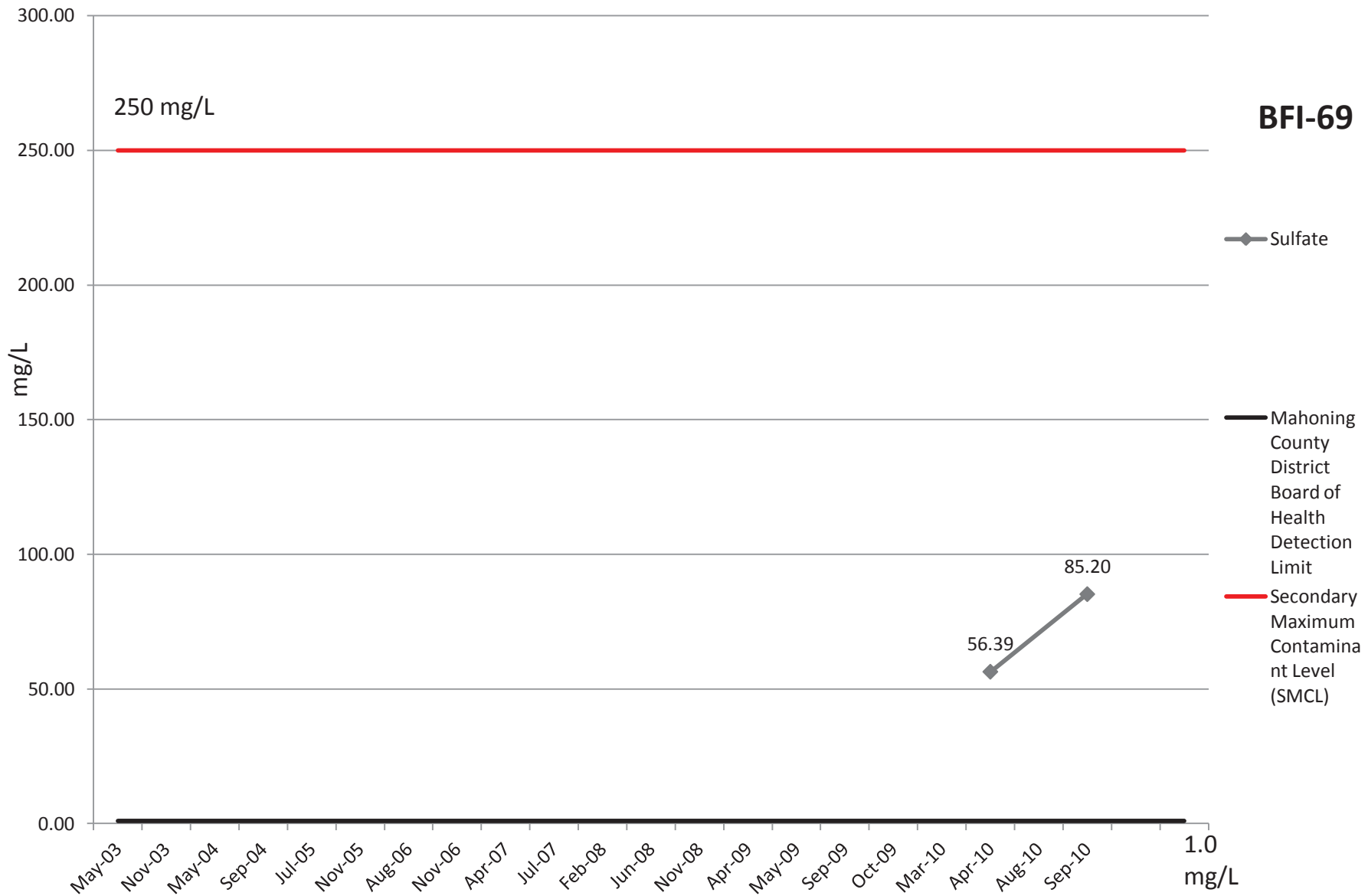
# Solids, Dissolved

**BFI-69**



# Sulfate

**BFI-69**



# Bacteria

**BFI-69**

Positive/Negative

◆ Bacteria

positive (1)

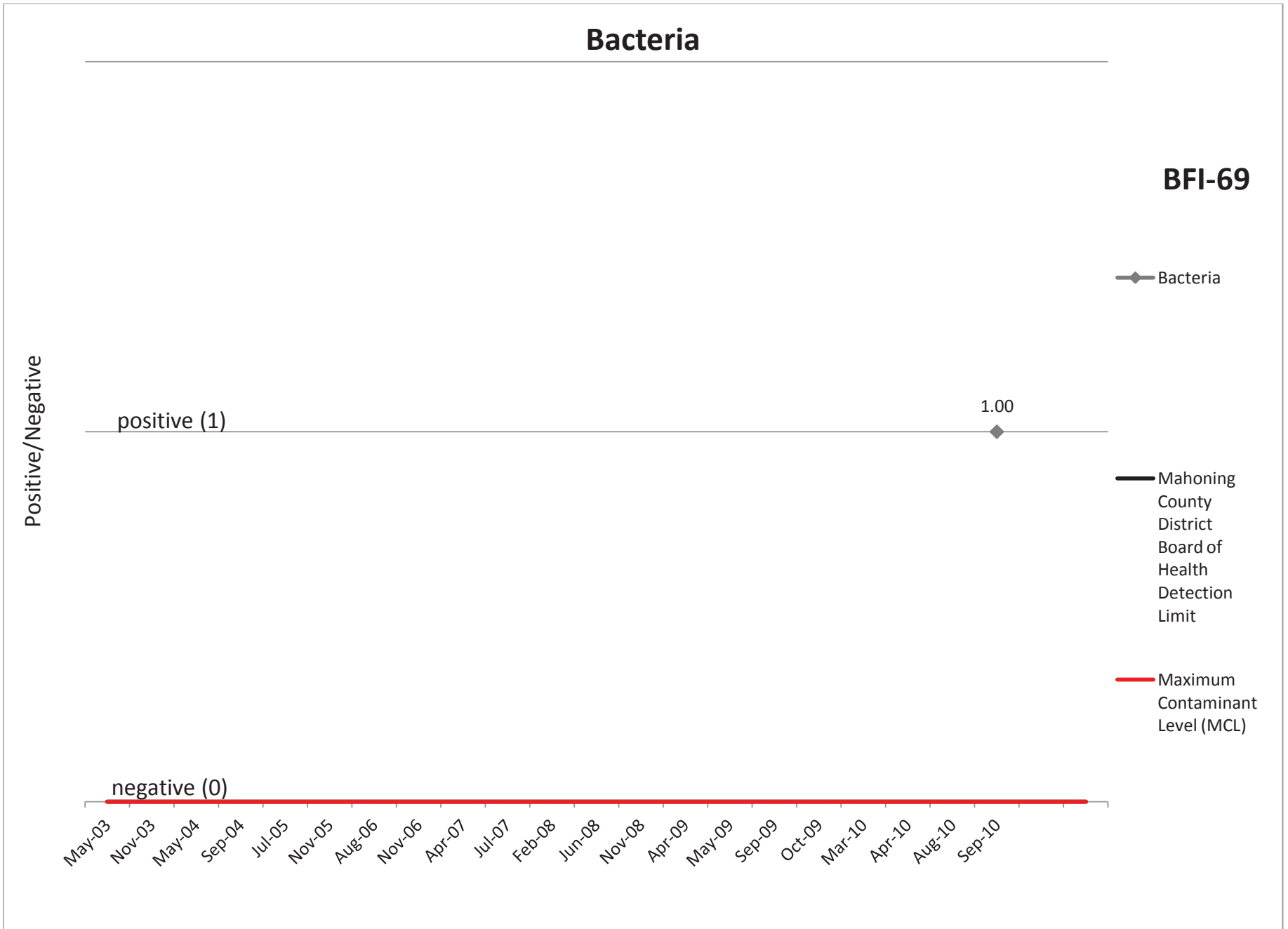
1.00

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

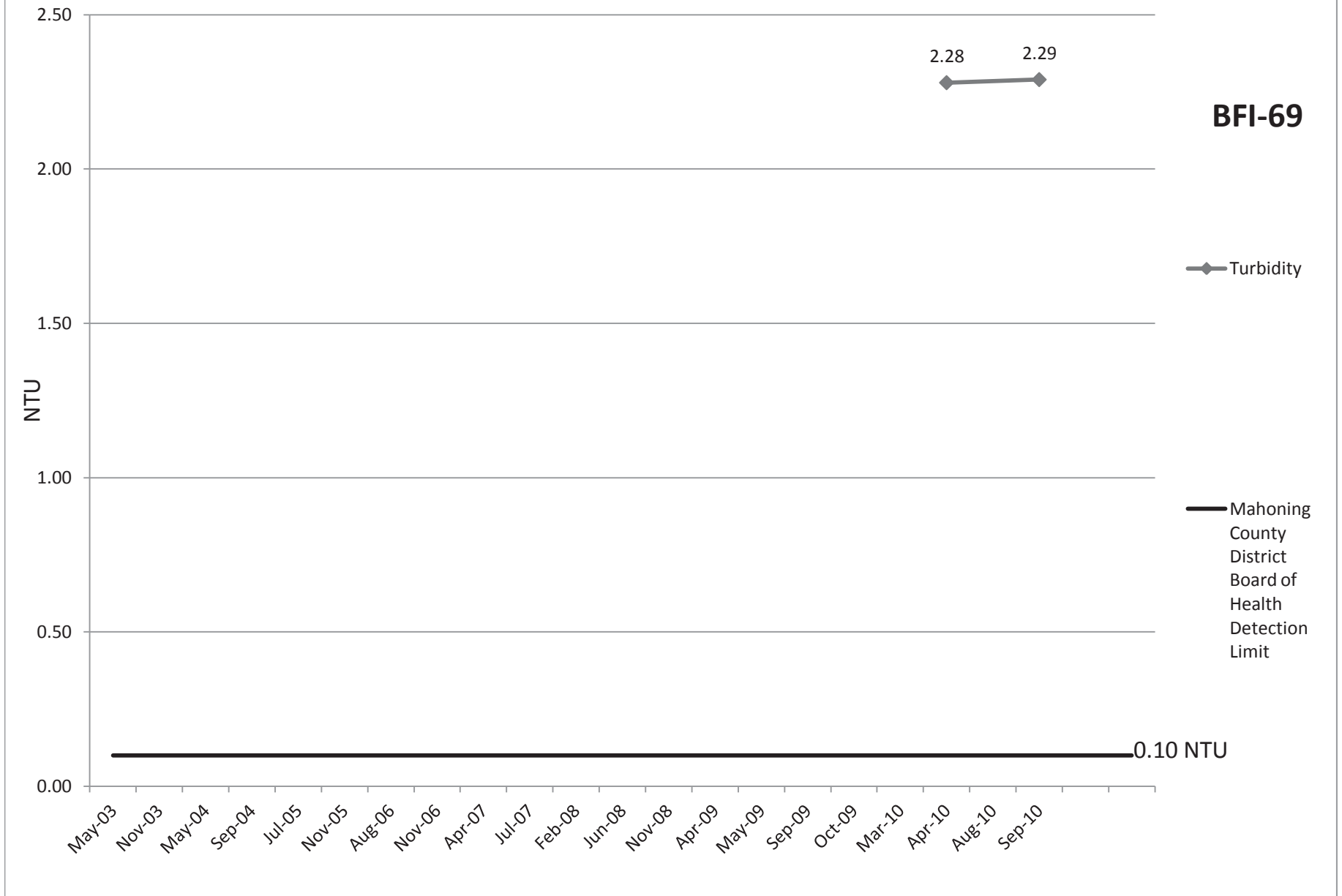
negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10





# Turbidity



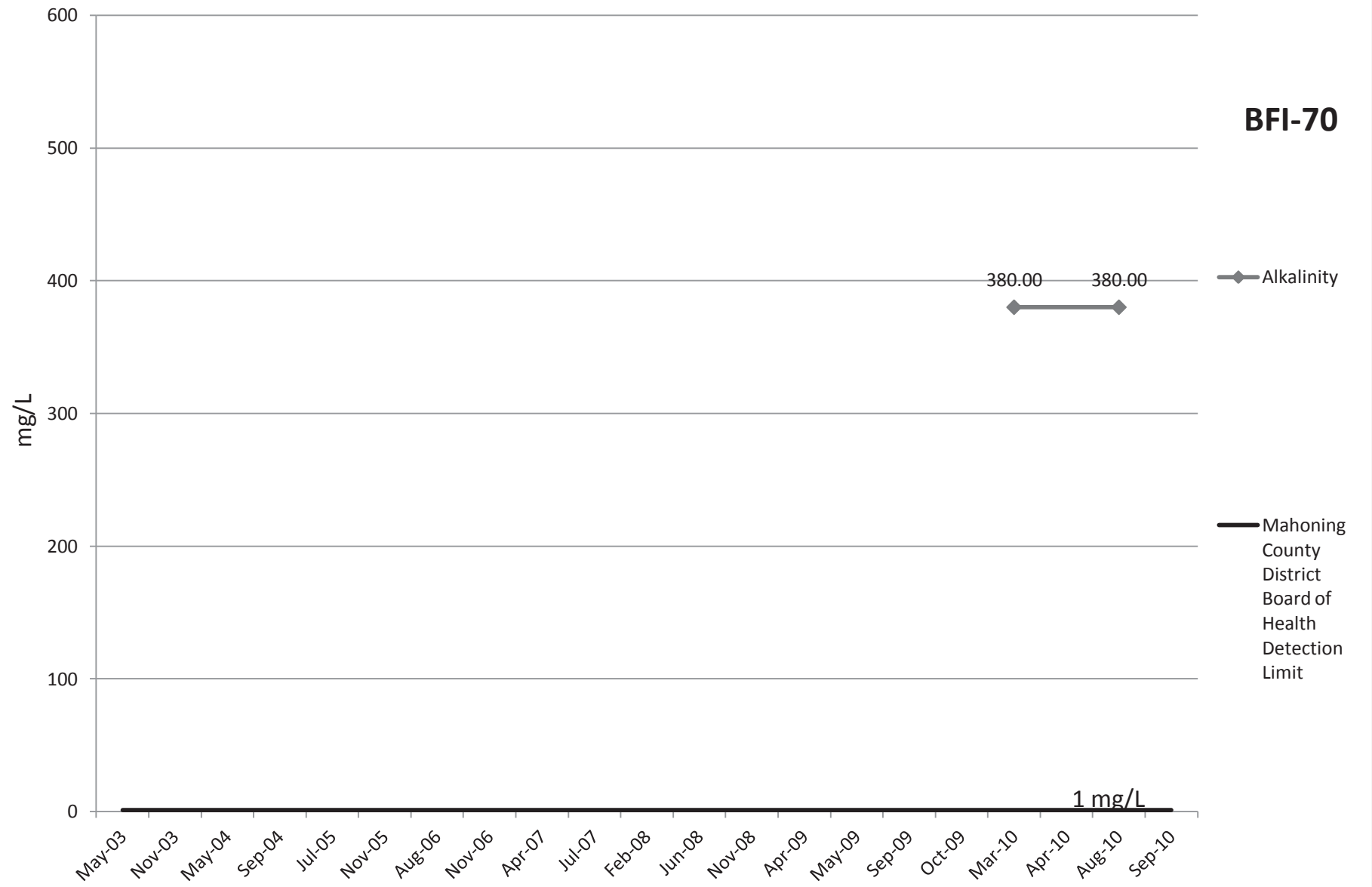
**BFI-69**

◆ Turbidity

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

0.10 NTU

# Alkalinity



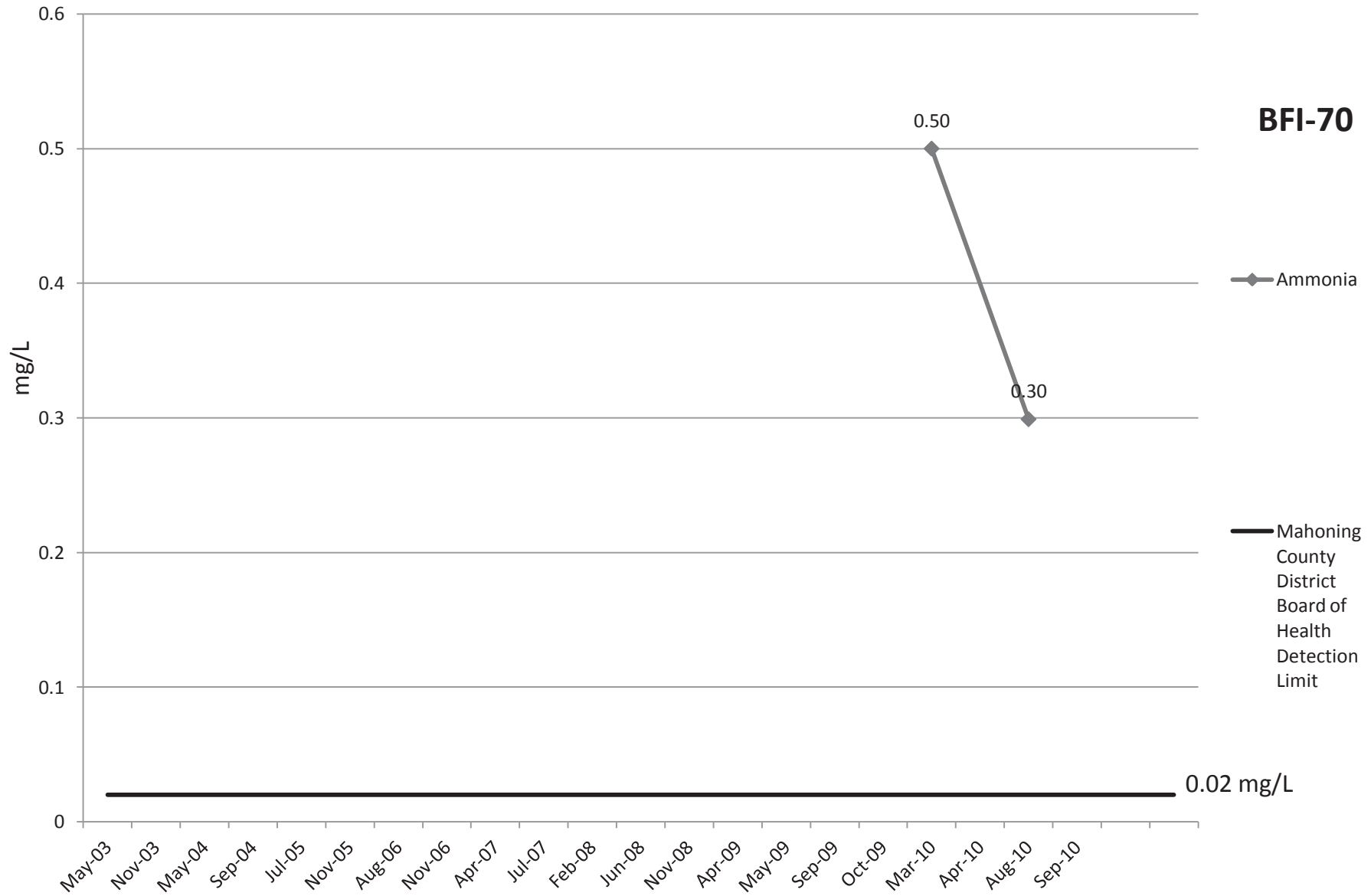
**BFI-70**

◆ Alkalinity

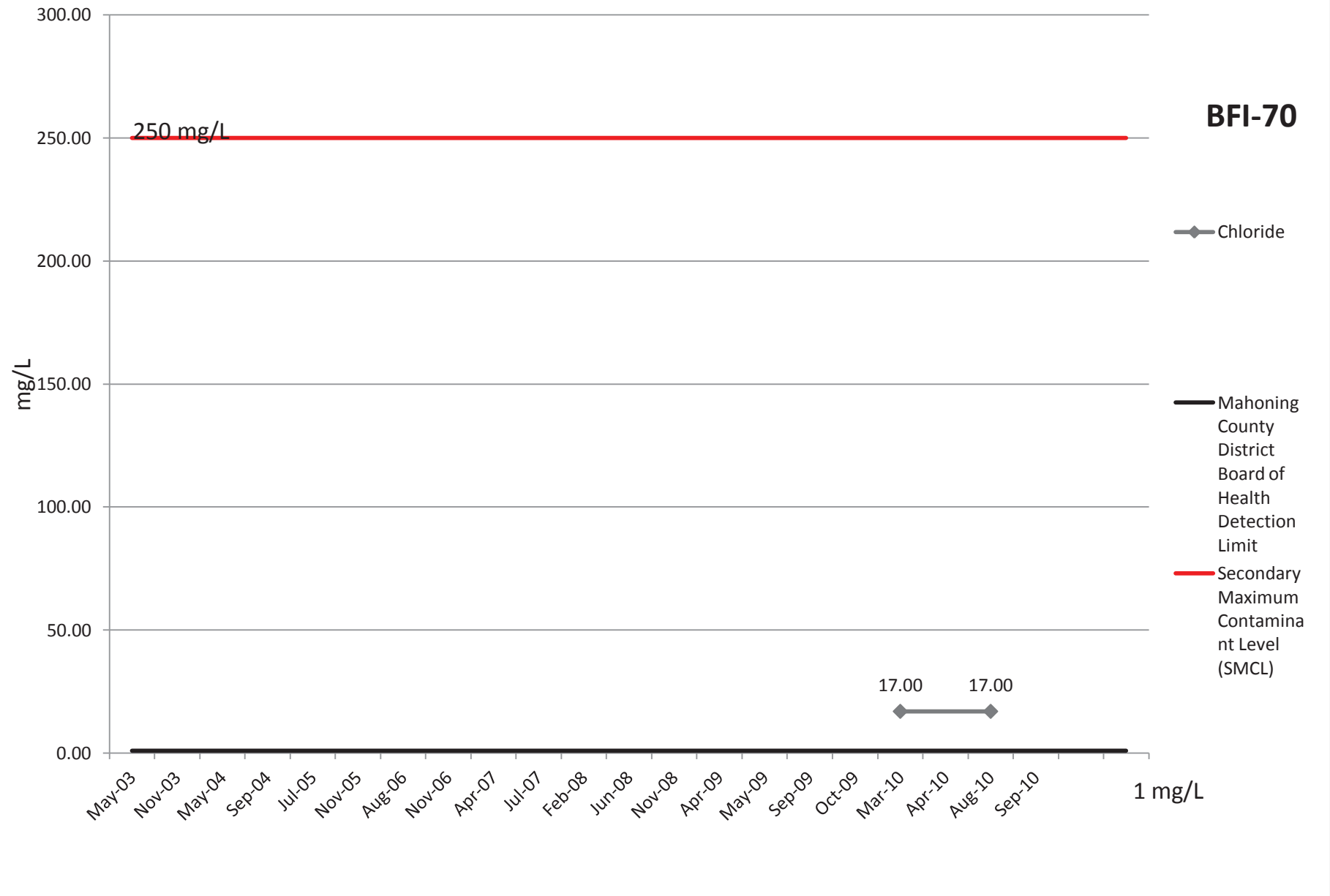
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

1 mg/L

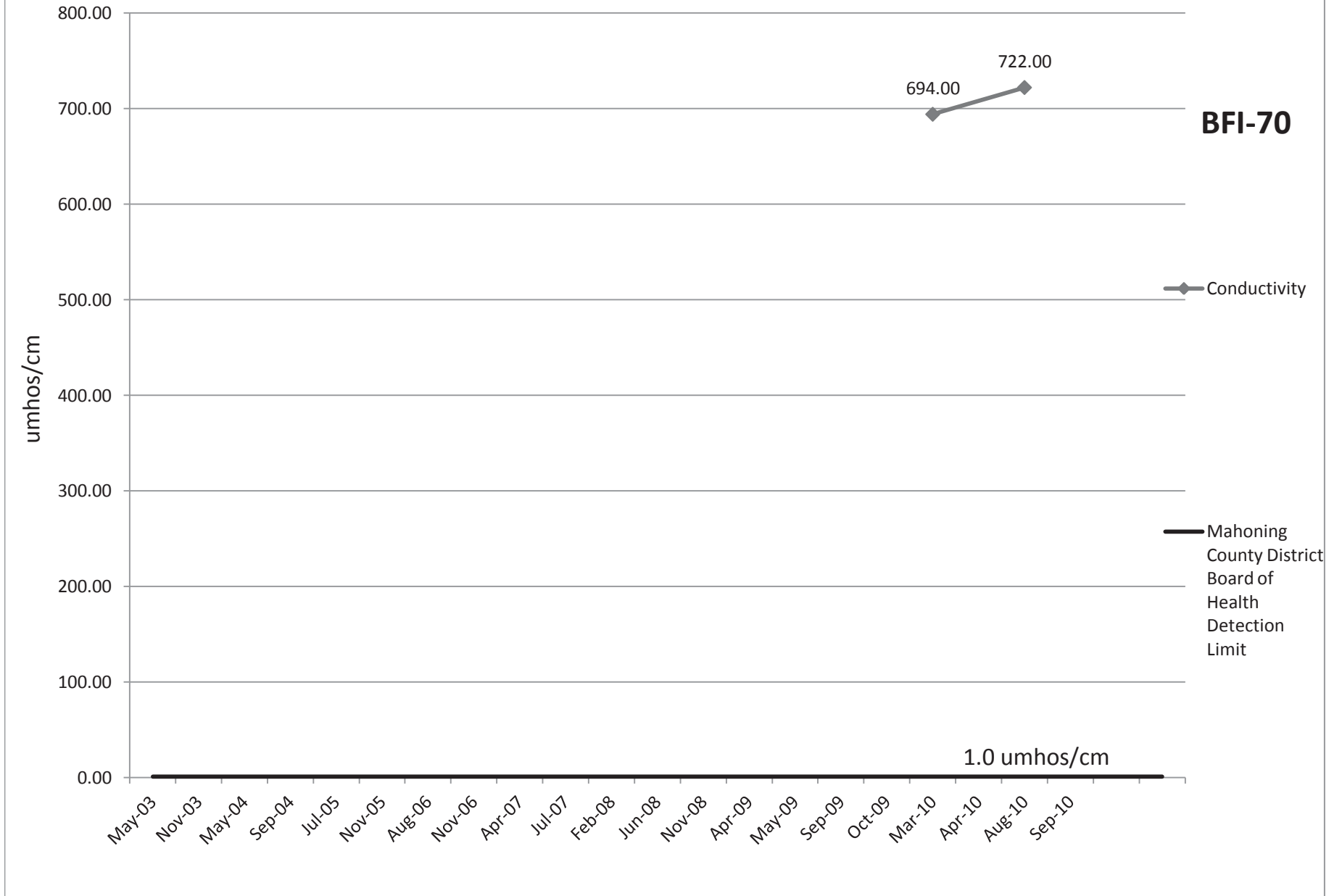
# Ammonia



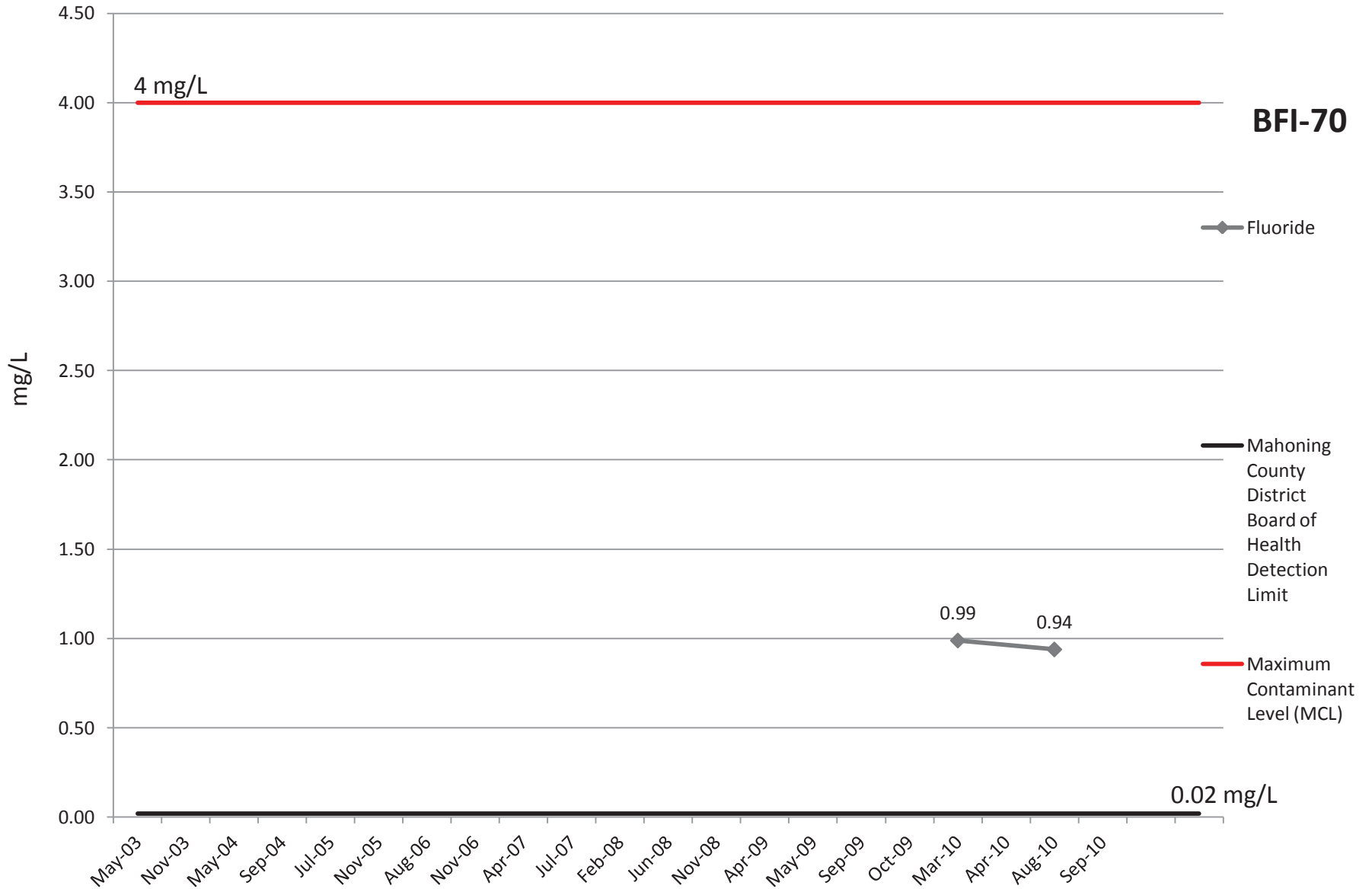
# Chloride



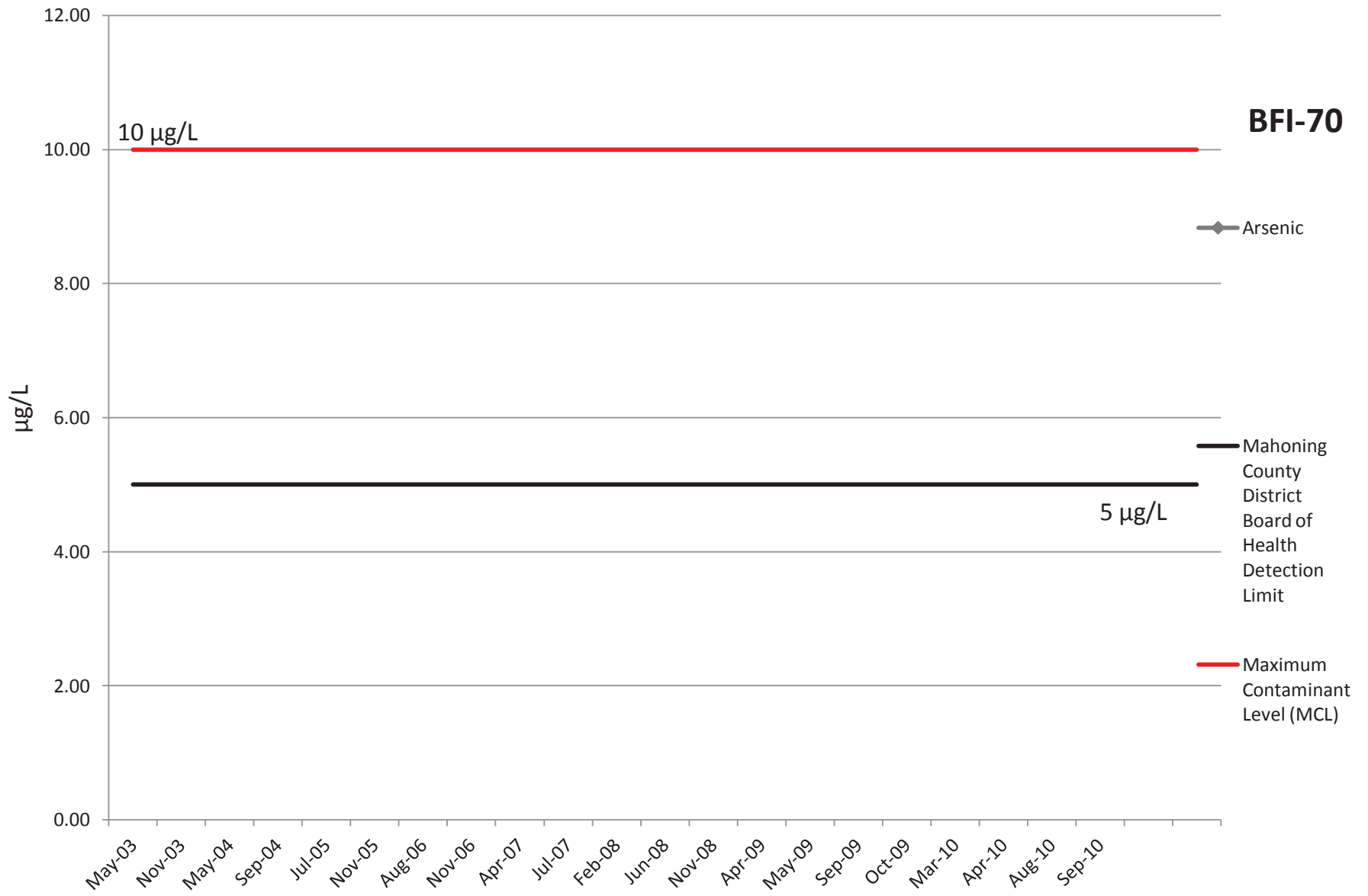
# Conductivity



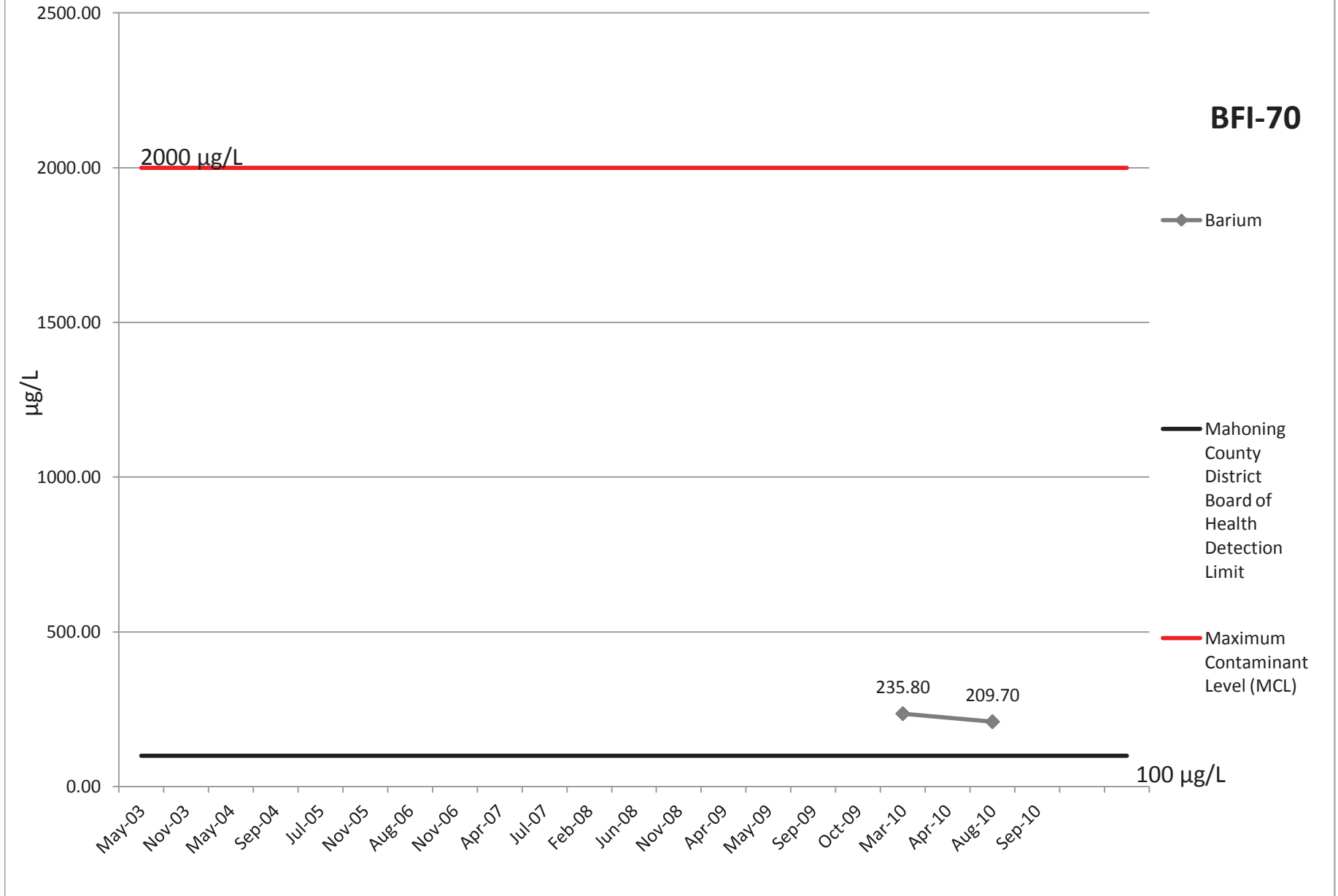
# Fluoride



# Arsenic

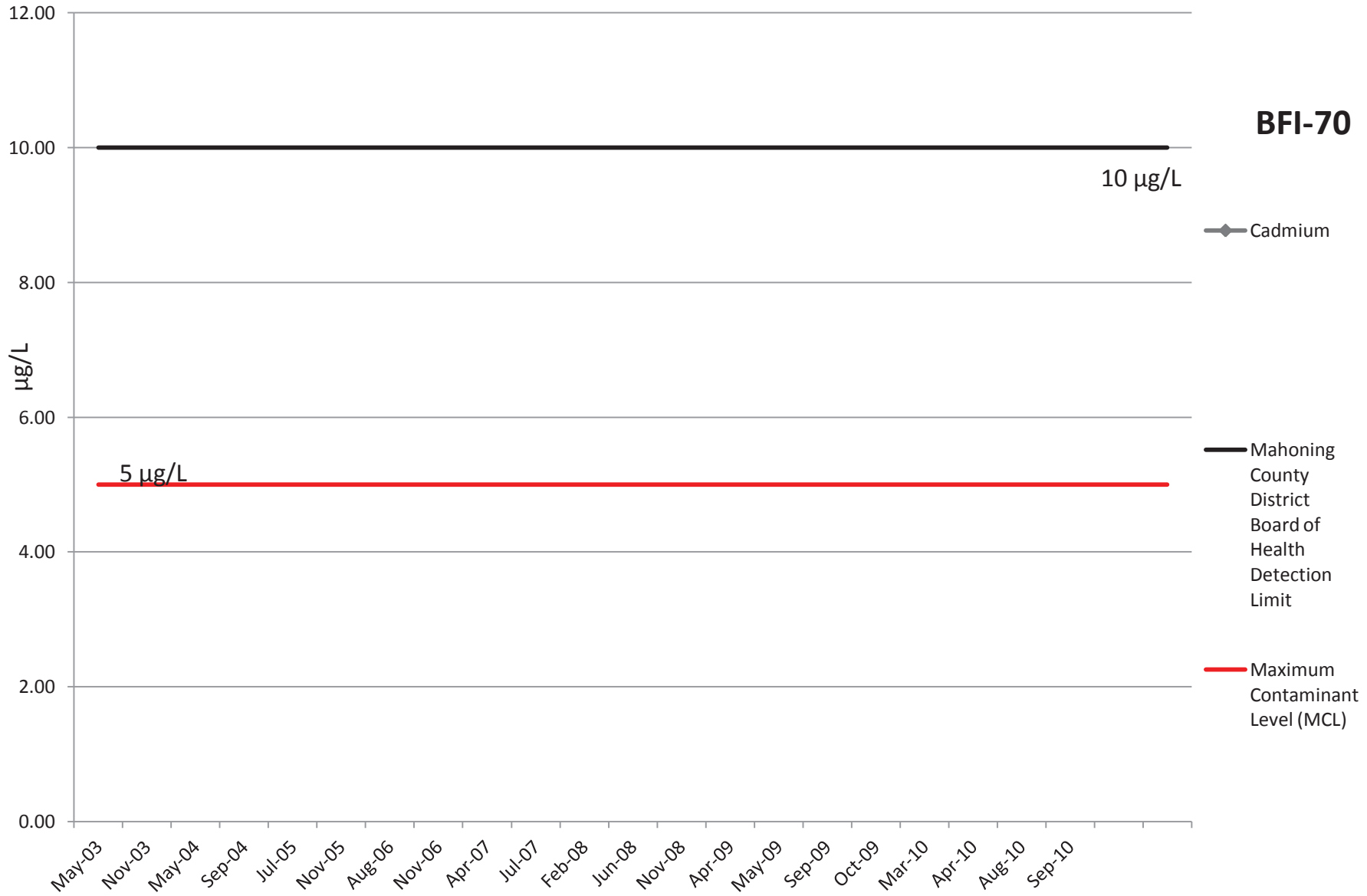


# Barium

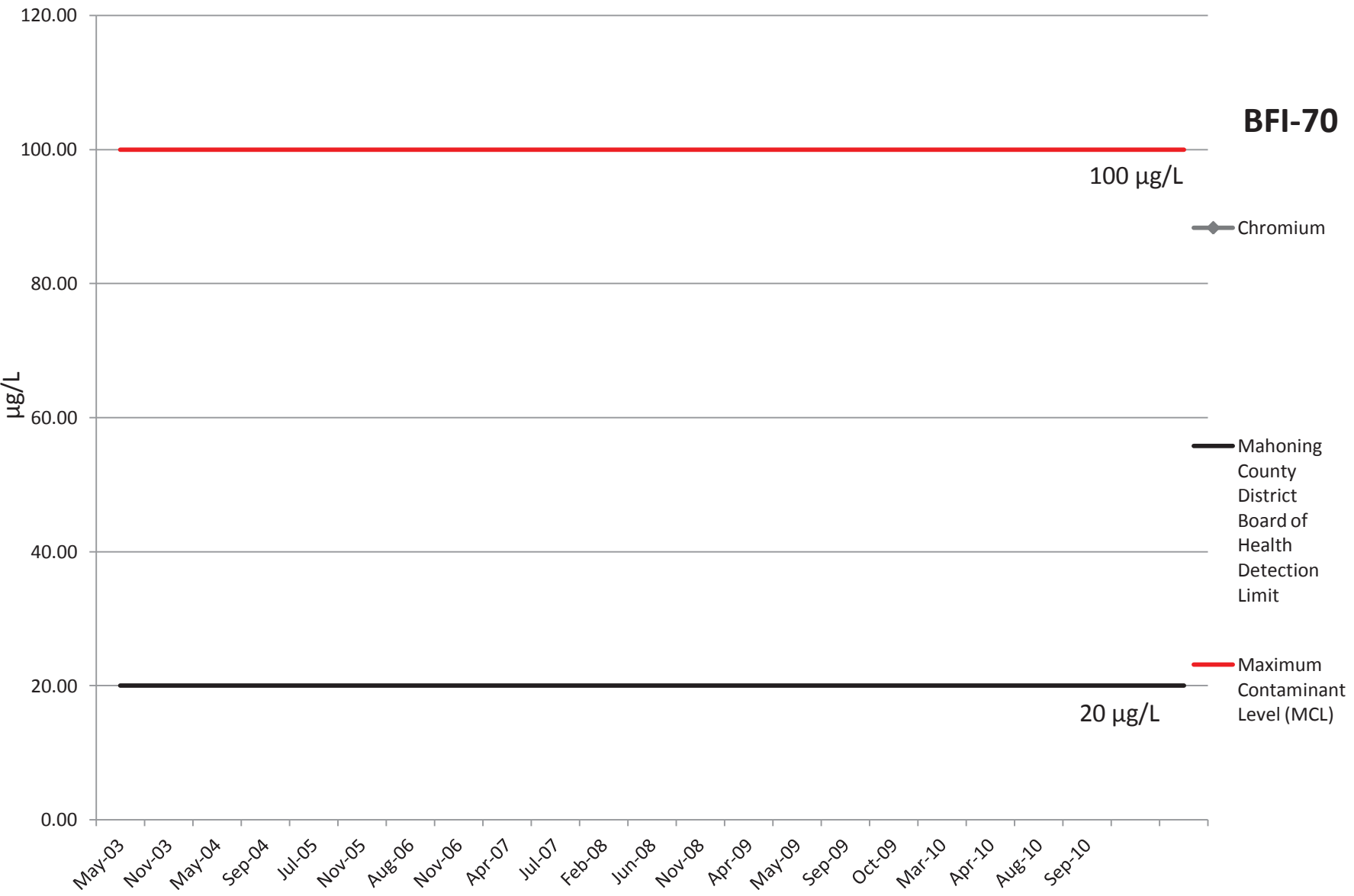




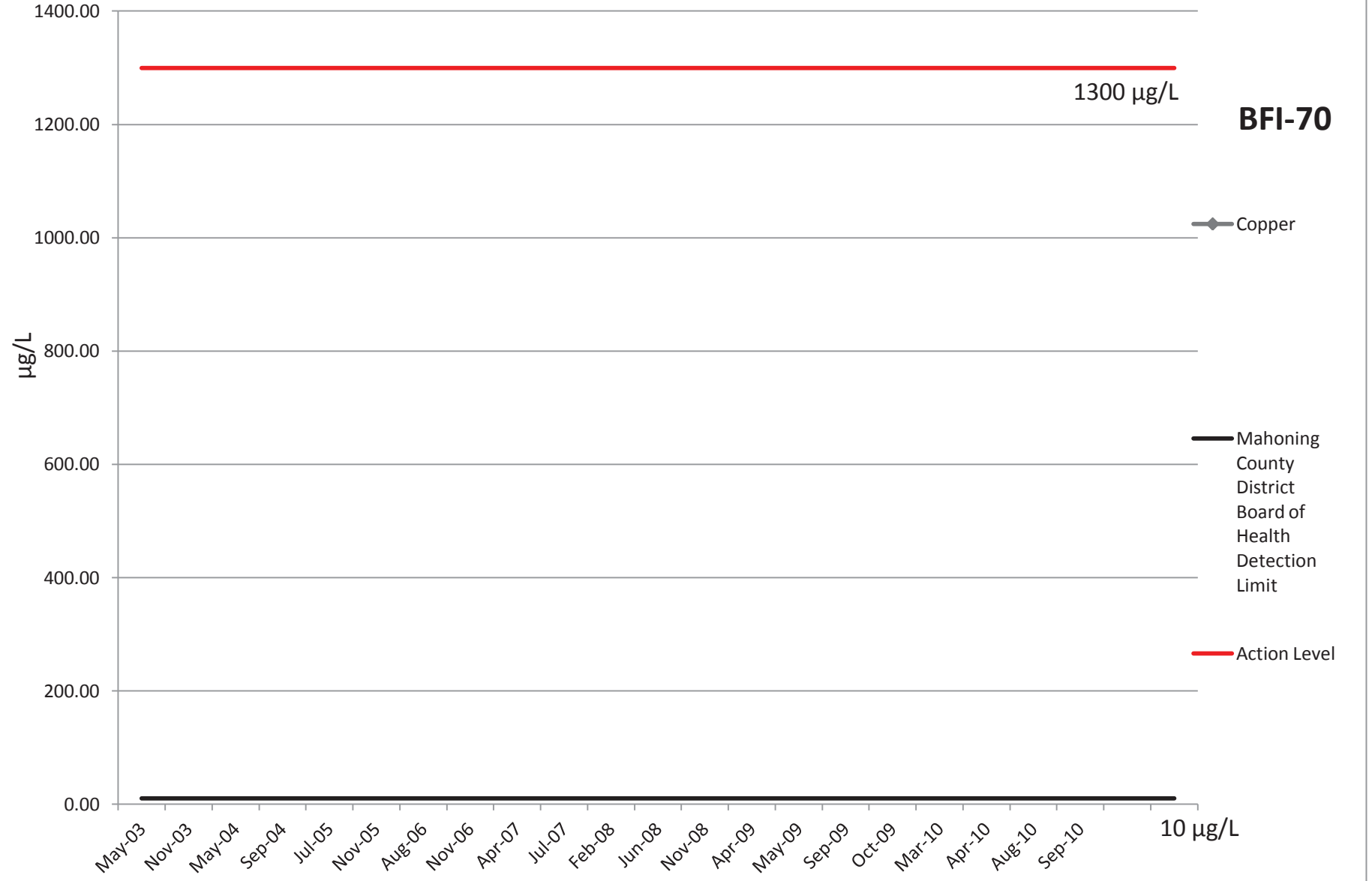
# Cadmium



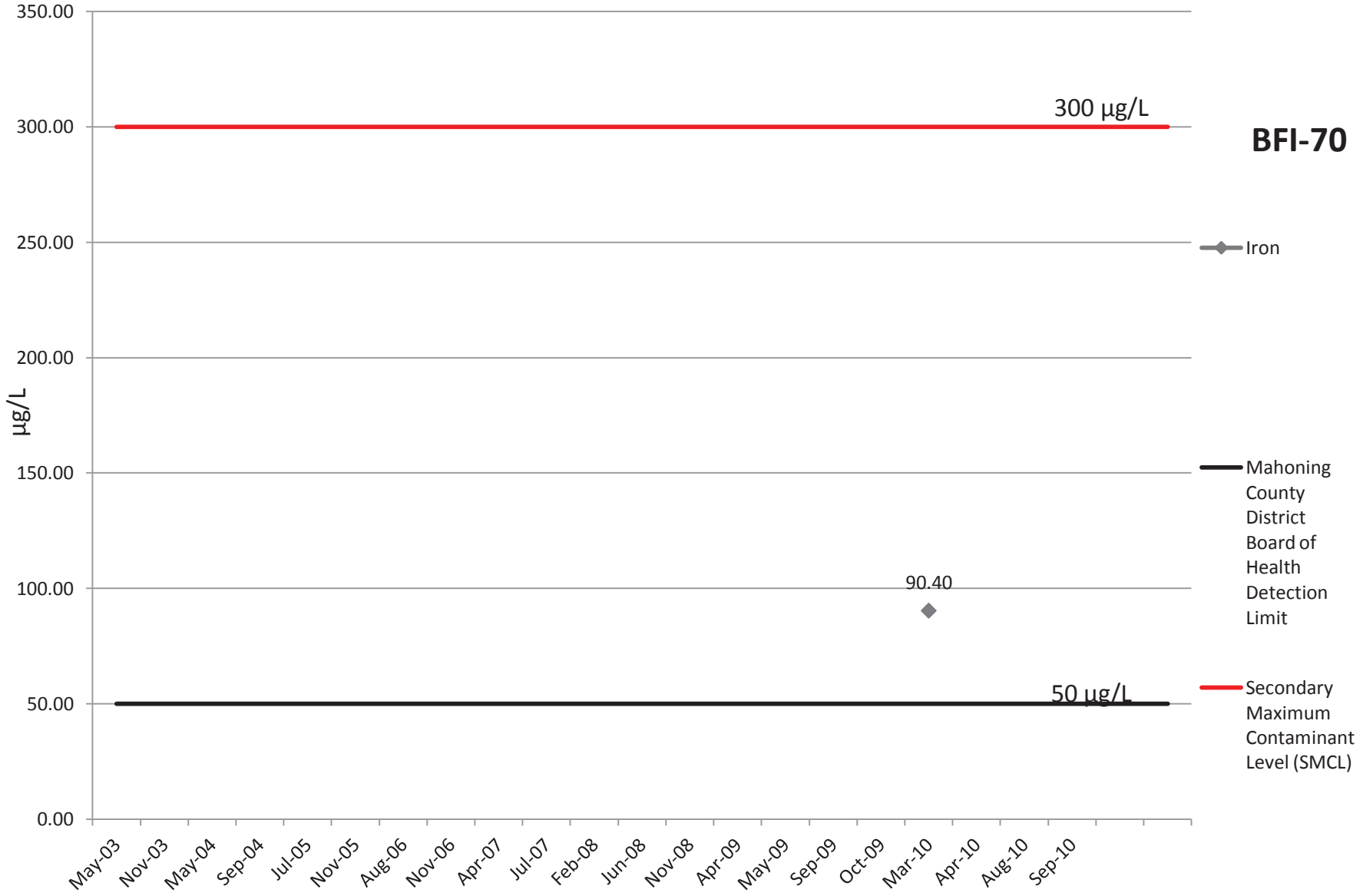
# Chromium



# Copper

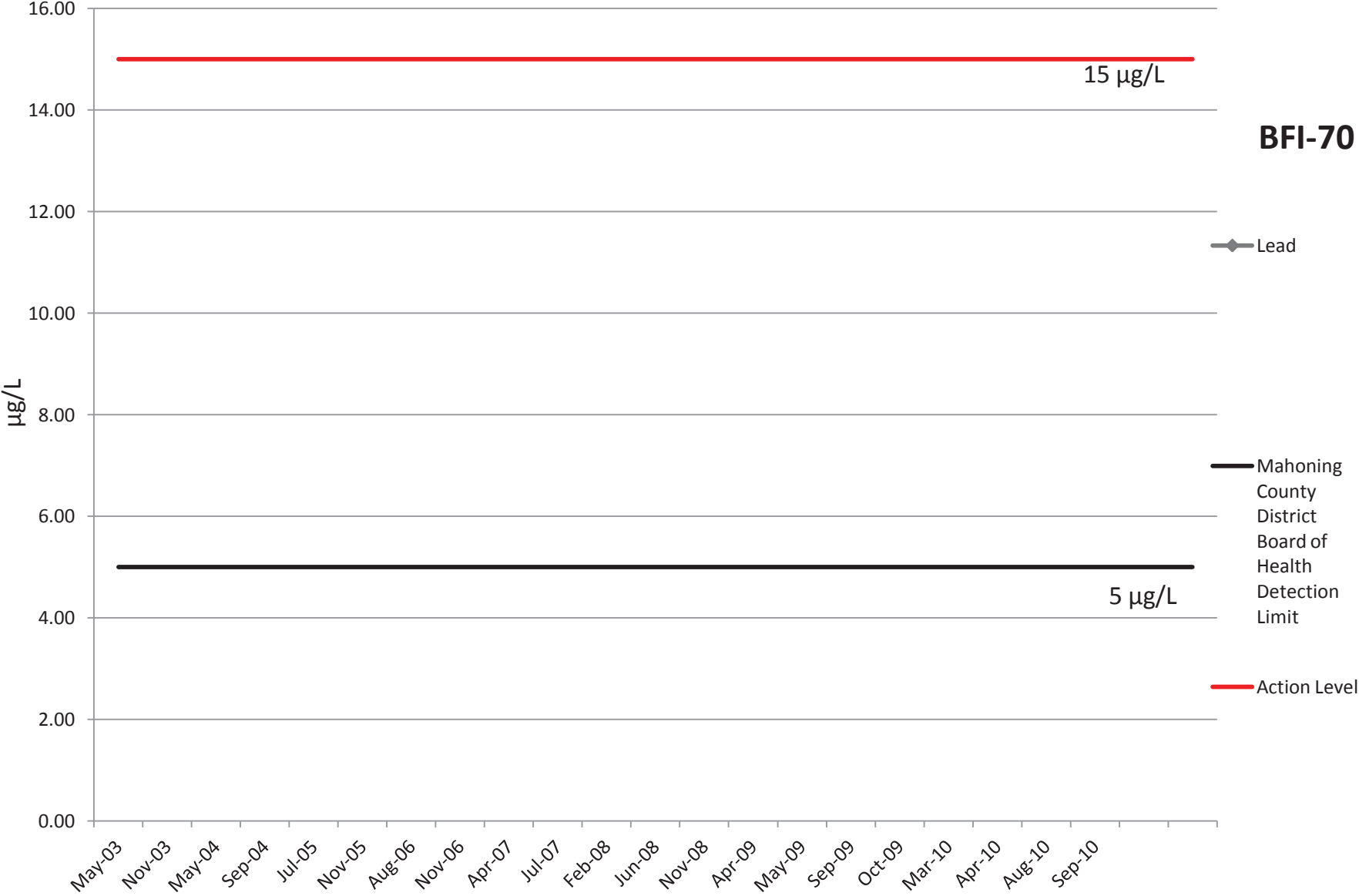


# Iron

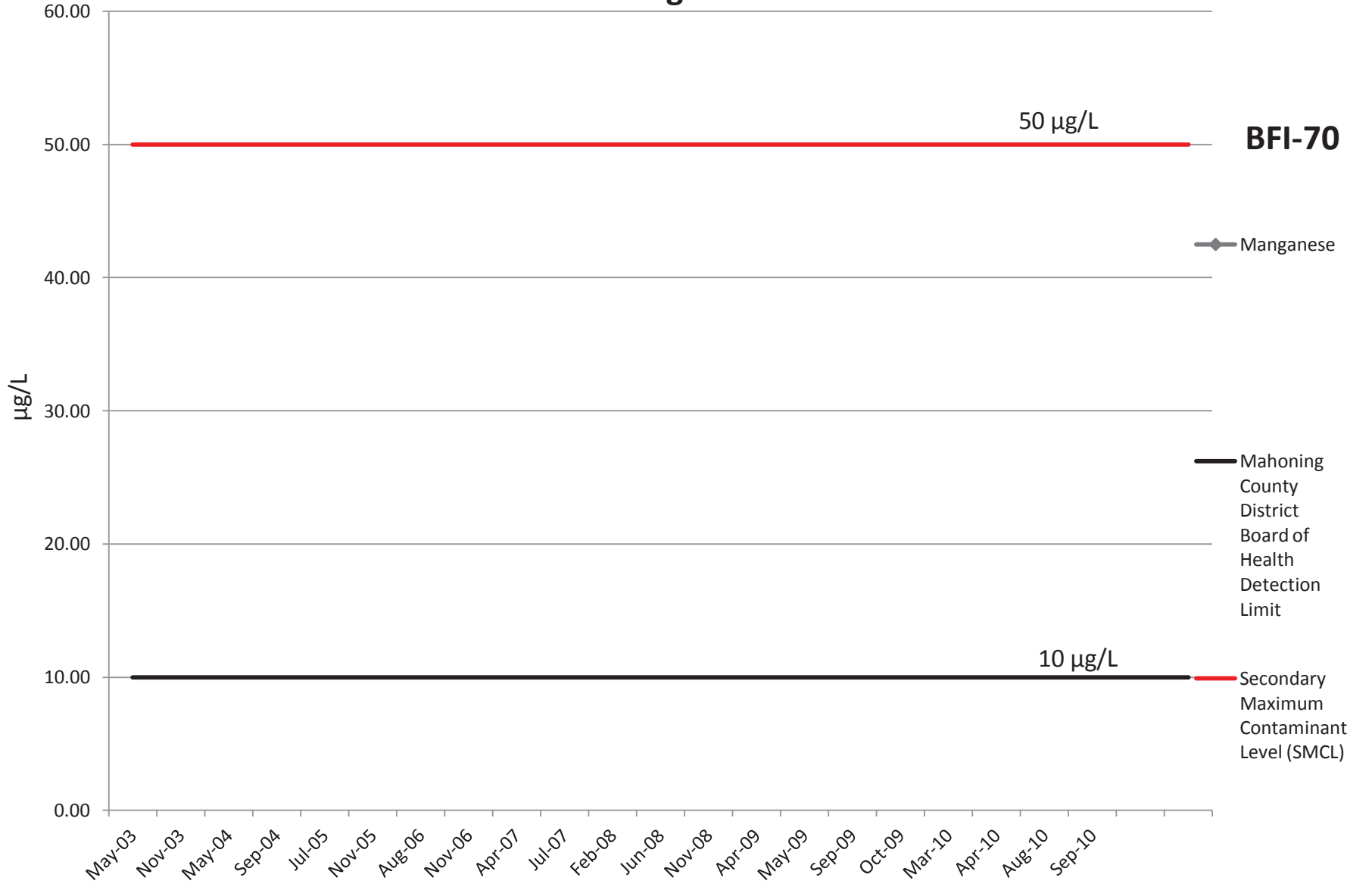


# Lead

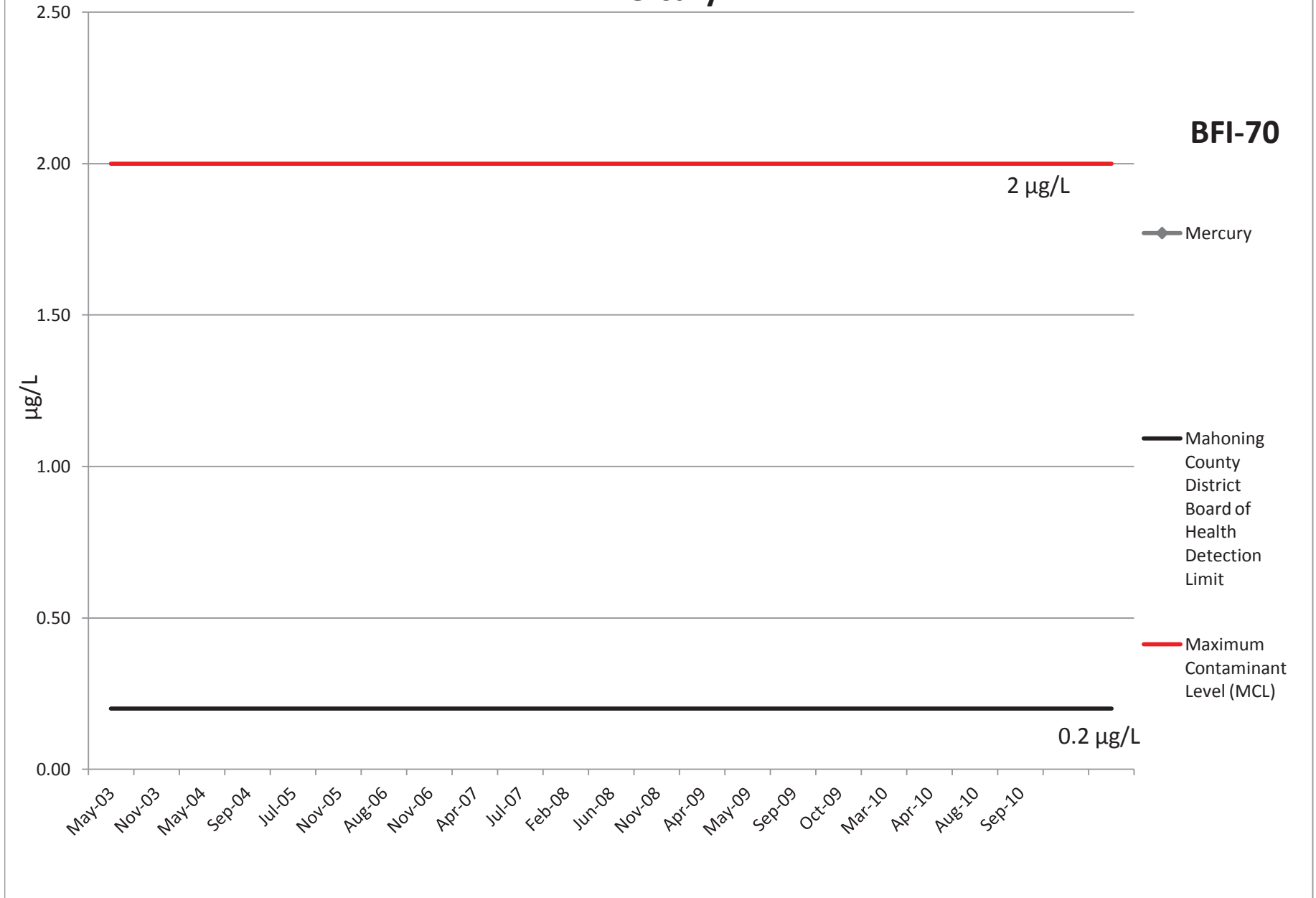
**BFI-70**



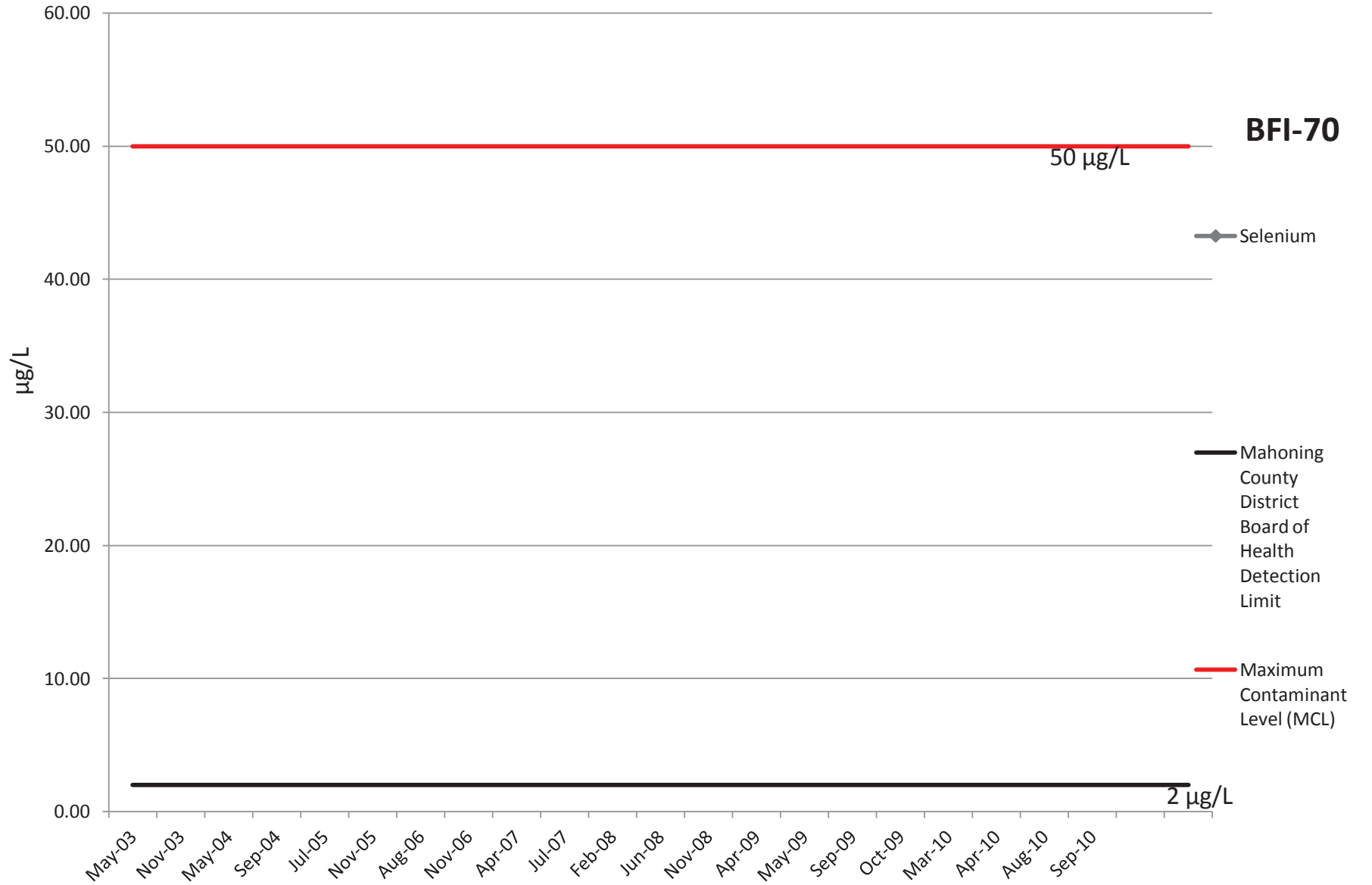
# Manganese



# Mercury



# Selenium



**BFI-70**

50  $\mu\text{g/L}$

◆ Selenium

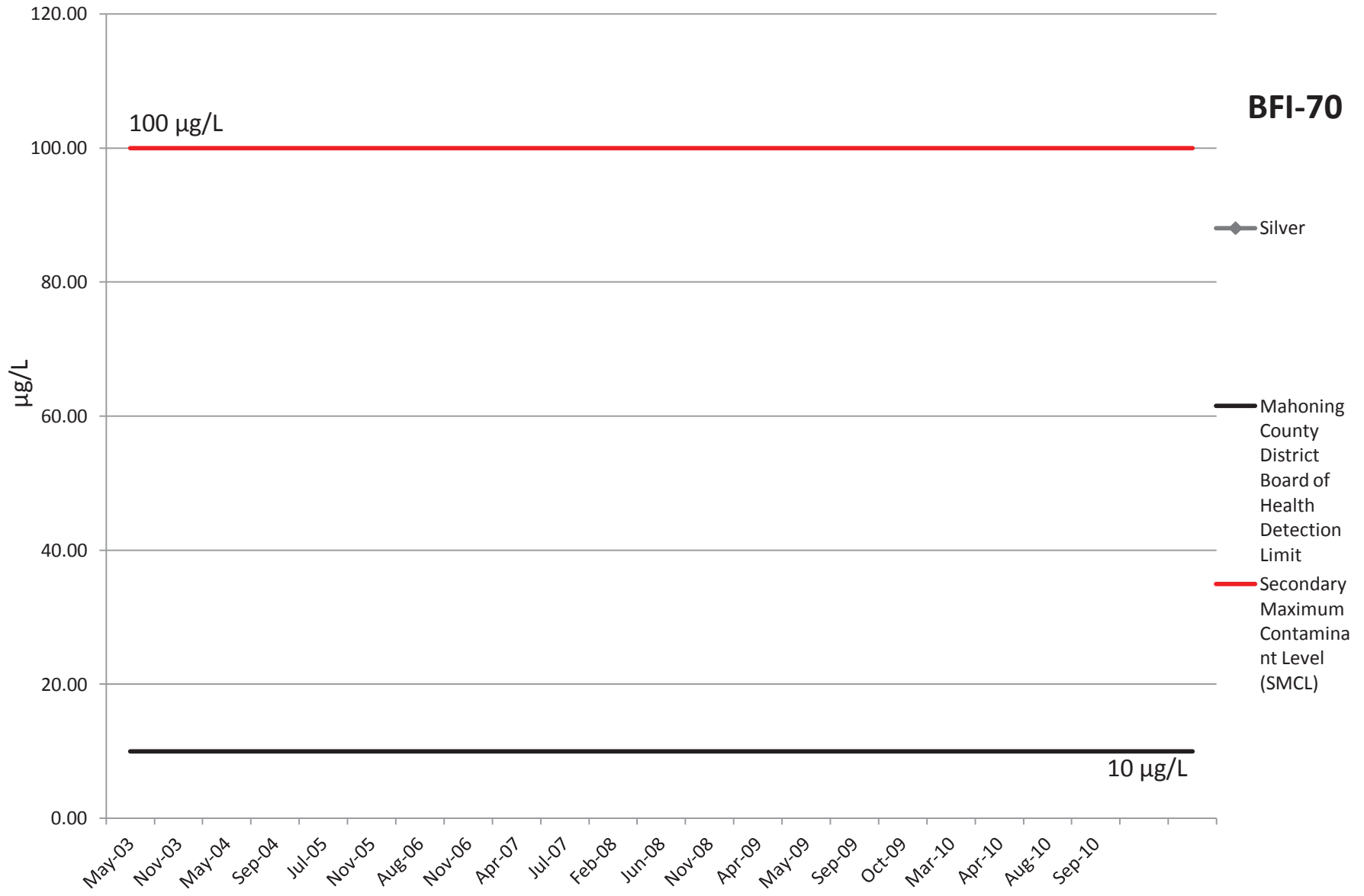
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

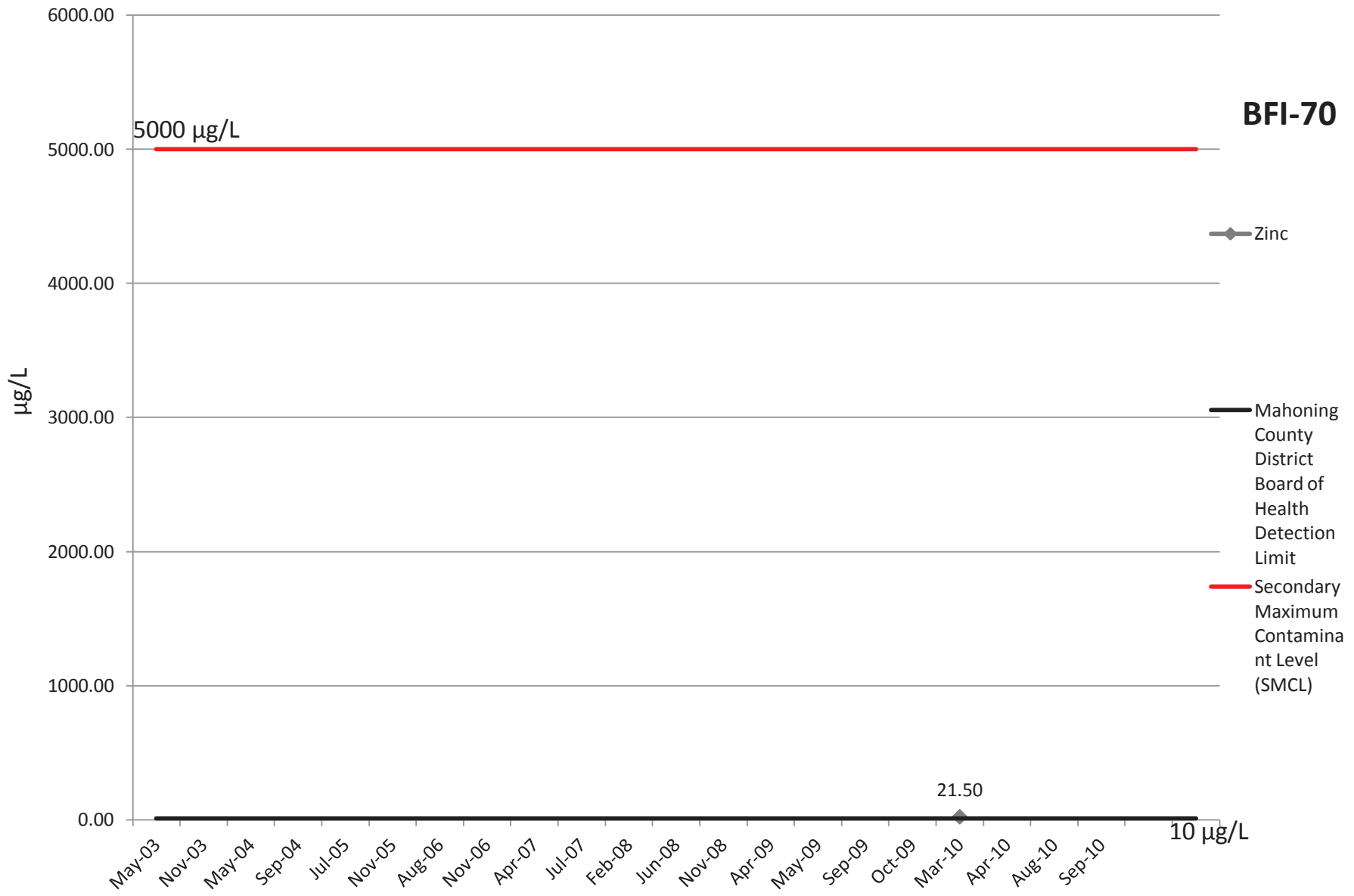
2  $\mu\text{g/L}$



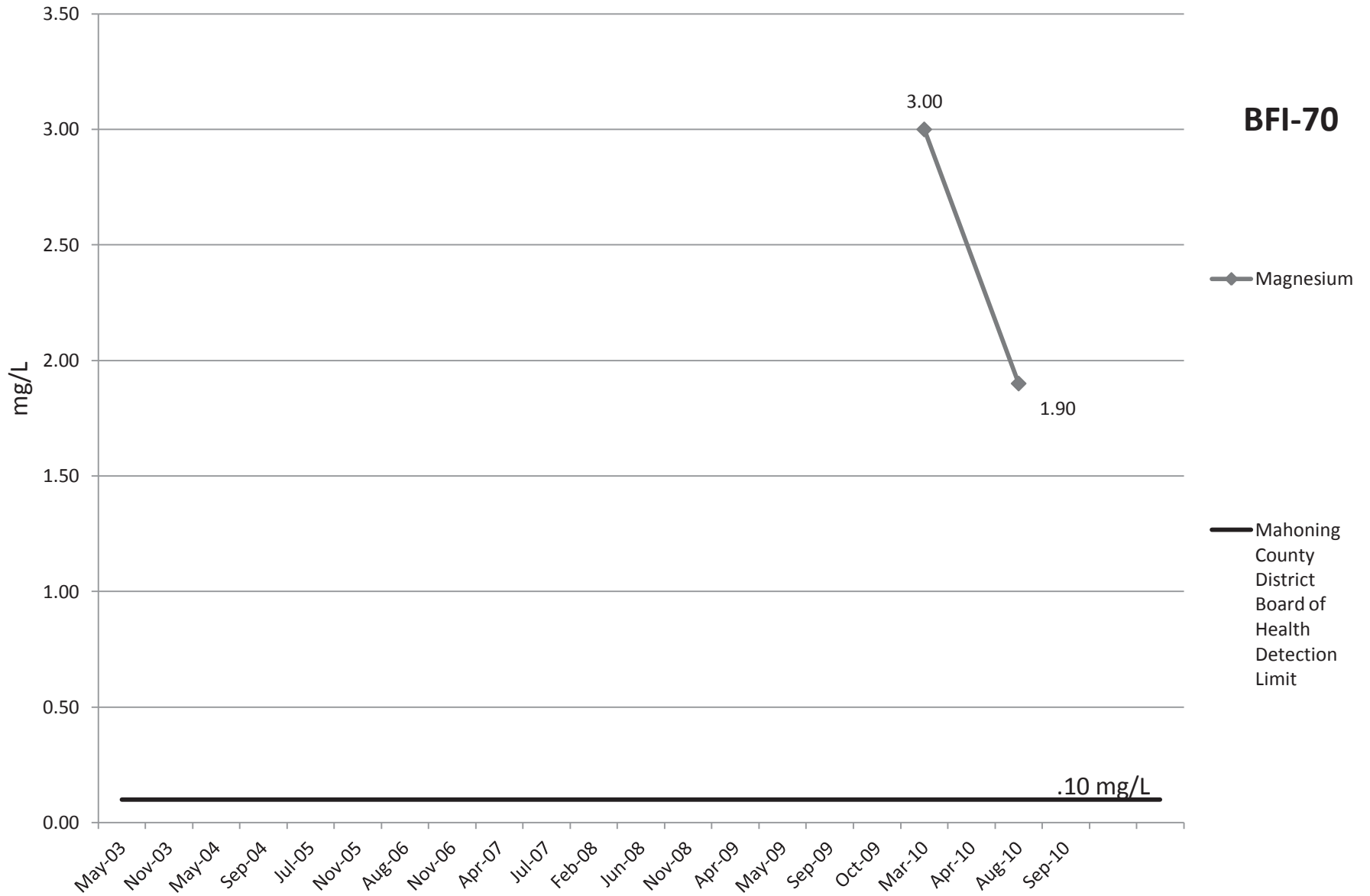
# Silver



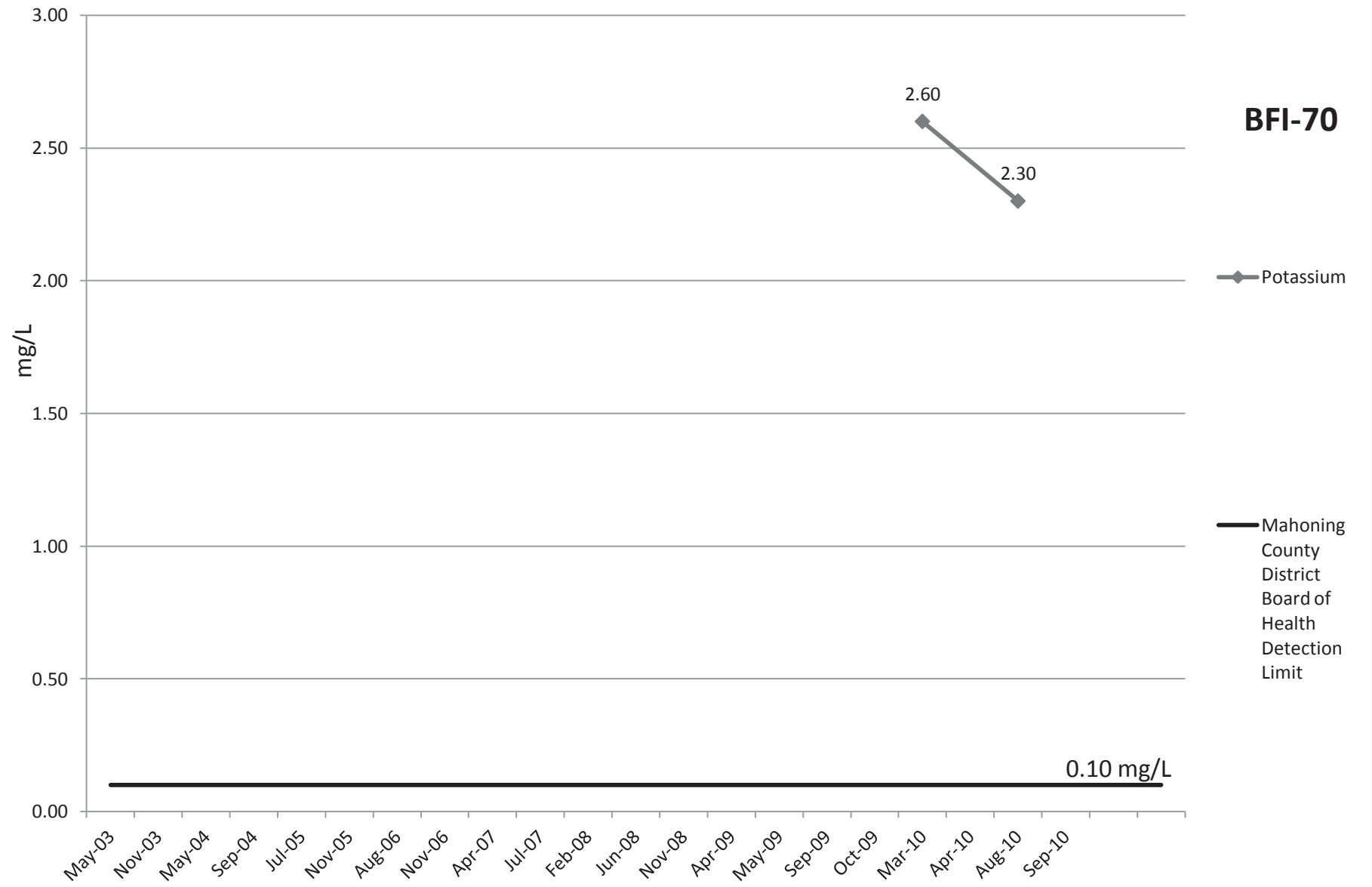
# Zinc



# Magnesium

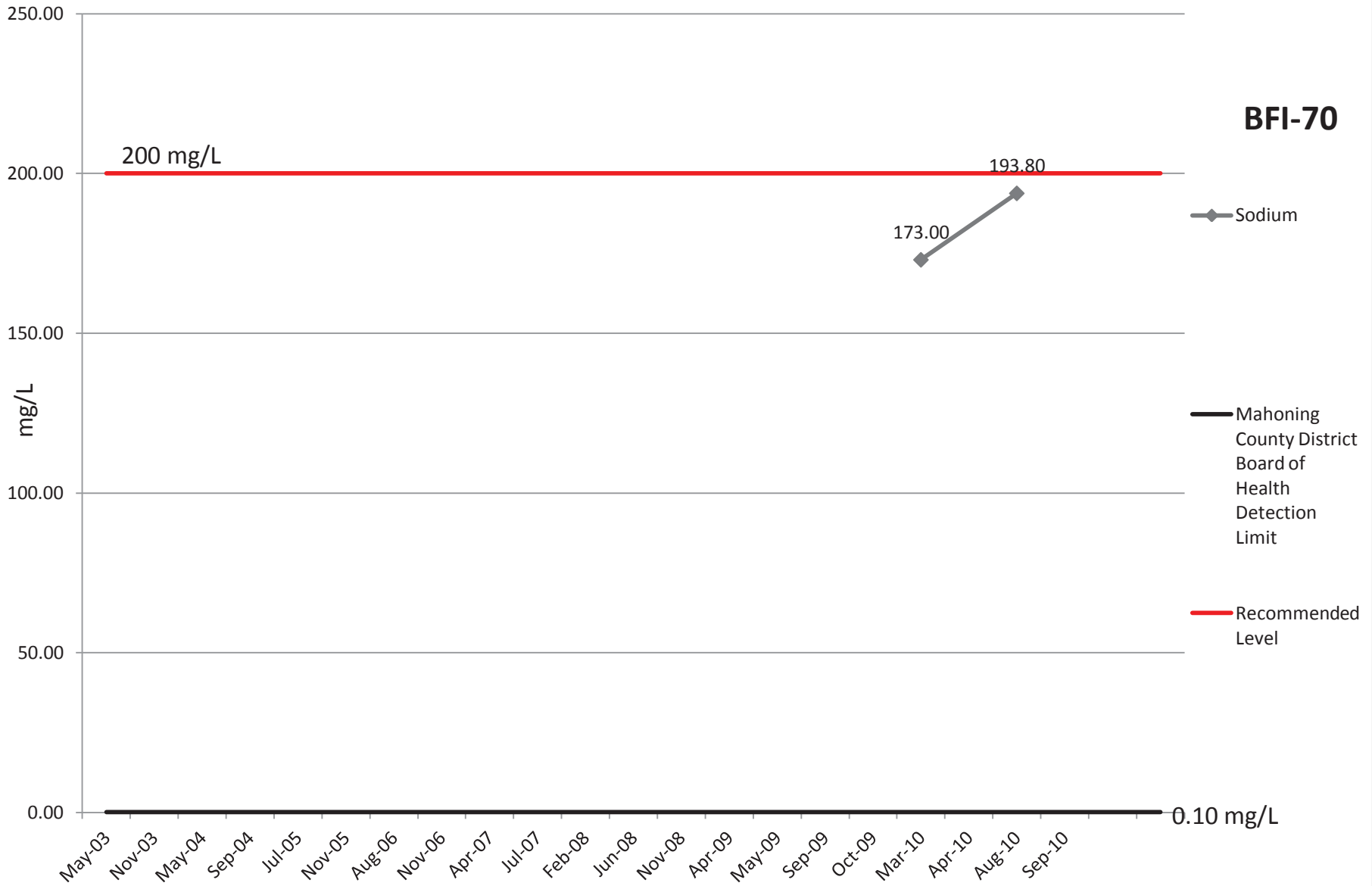


# Potassium

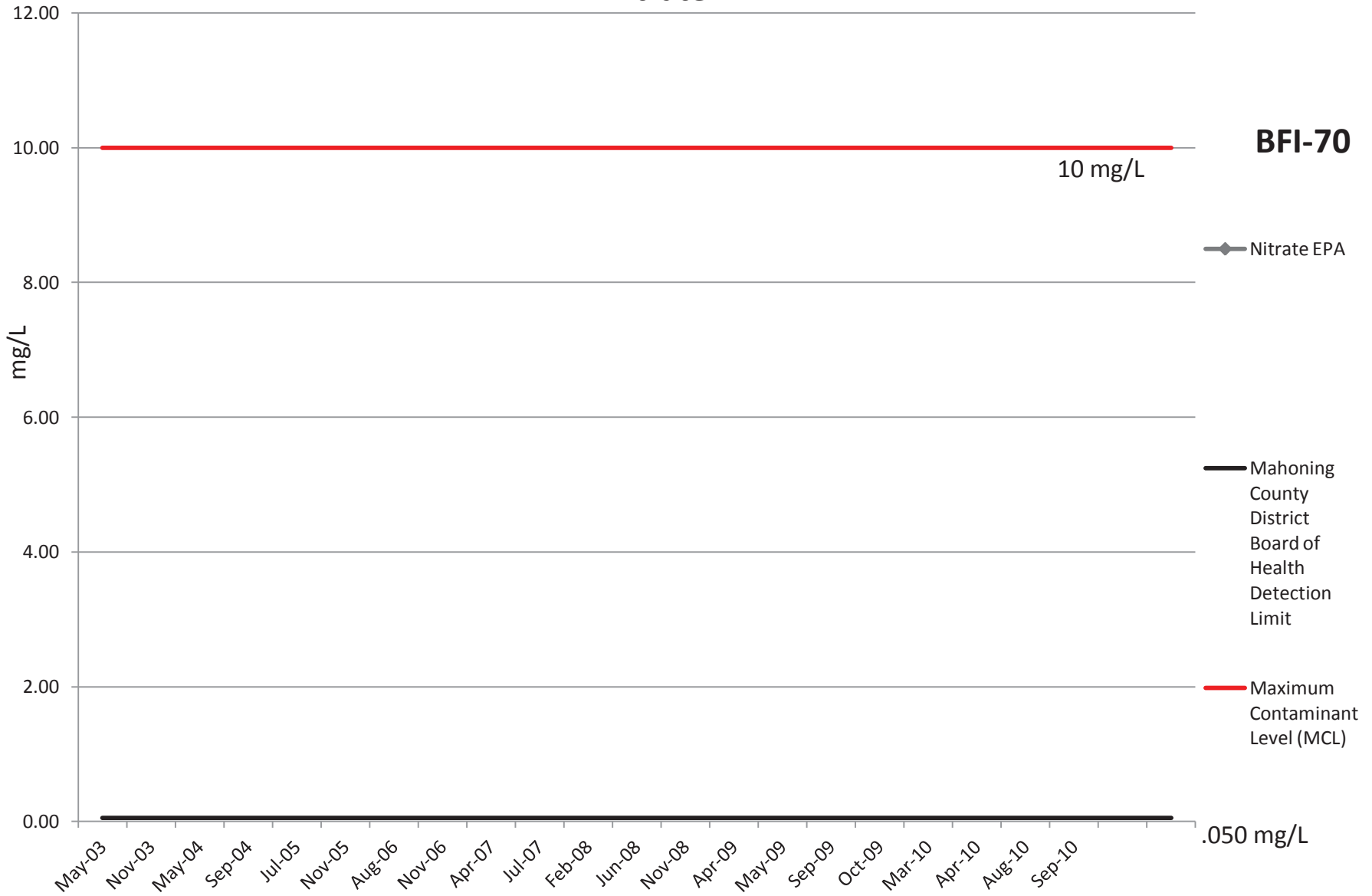


# Sodium

**BFI-70**



# Nitrate EPA



# COD

**BFI-70**

10 mg/L

—◆— COD

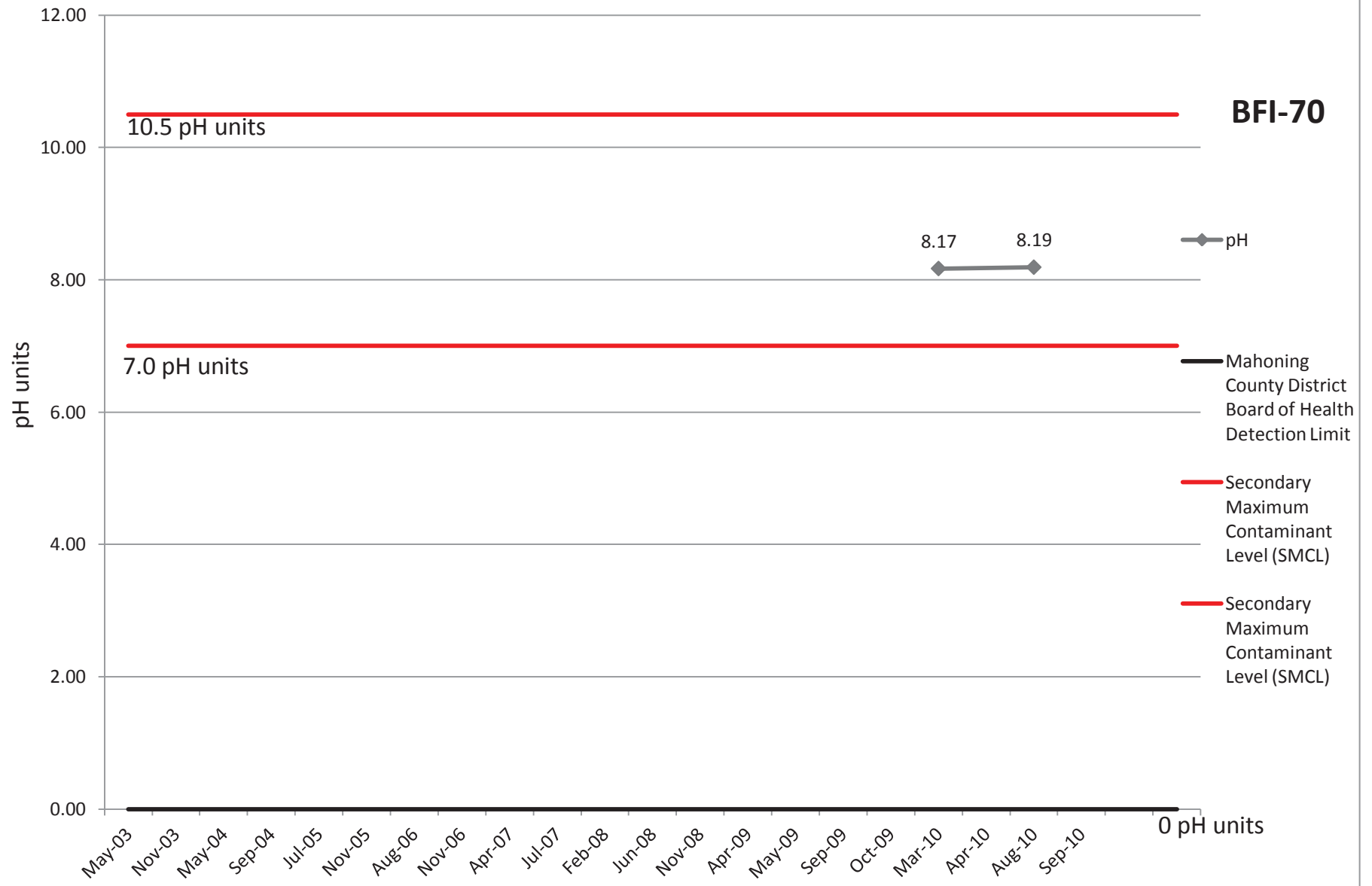
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit



mg/L

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

# pH



**BFI-70**

10.5 pH units

7.0 pH units

—◆— pH

— Mahoning  
County District  
Board of Health  
Detection Limit

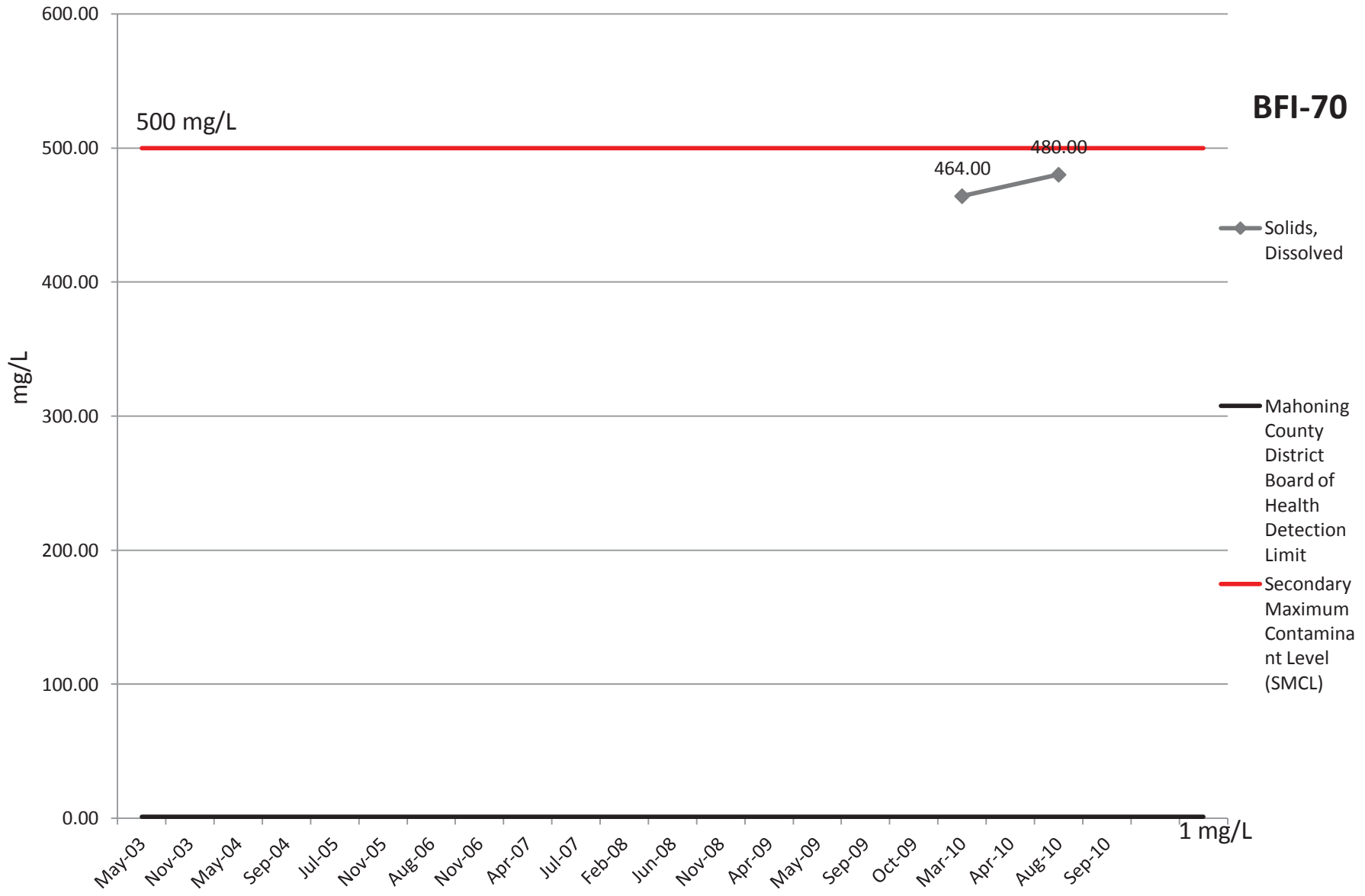
— Secondary  
Maximum  
Contaminant  
Level (SMCL)

— Secondary  
Maximum  
Contaminant  
Level (SMCL)

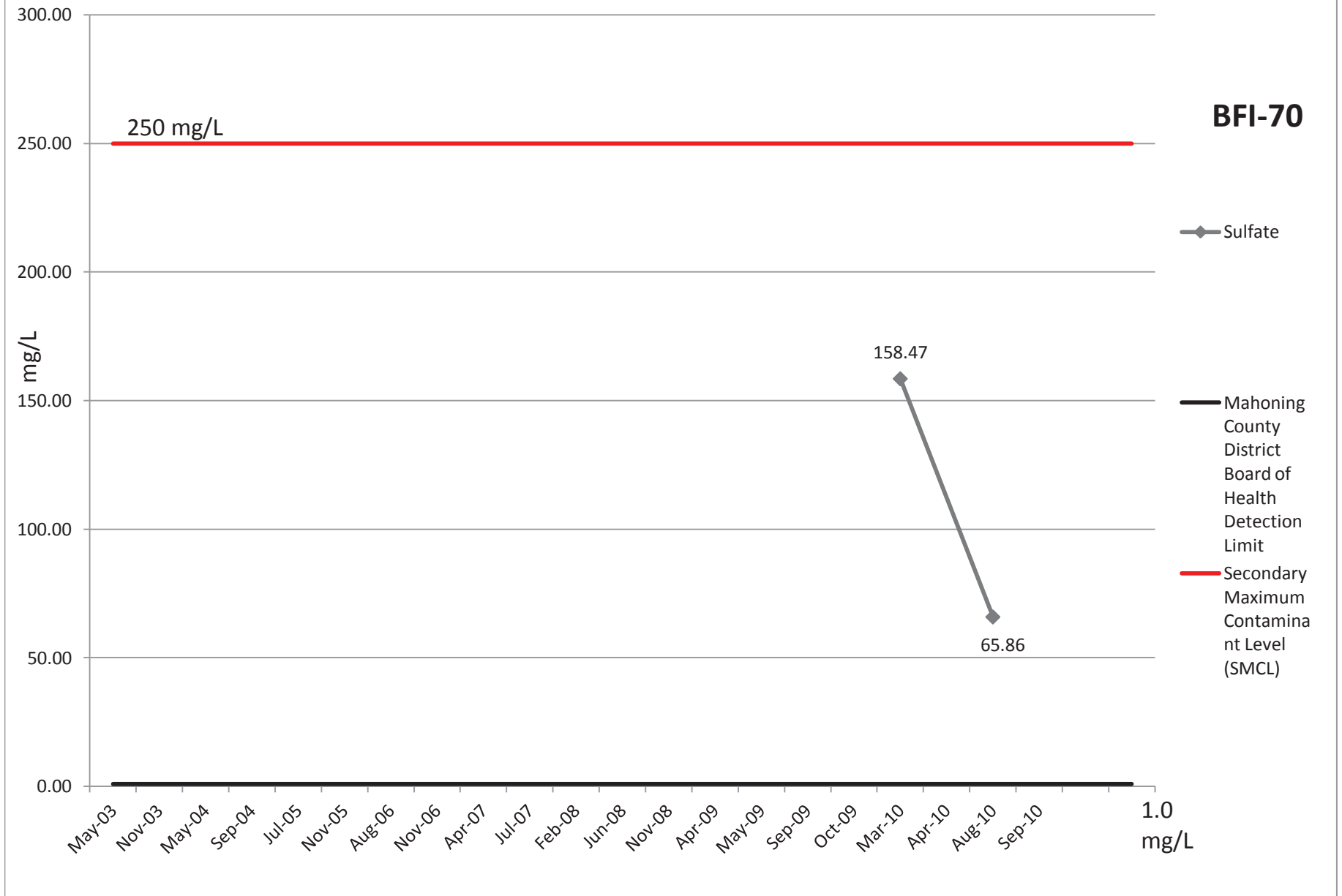
0 pH units



# Solids, Dissolved



# Sulfate



# Bacteria

positive (1)

**BFI-70**

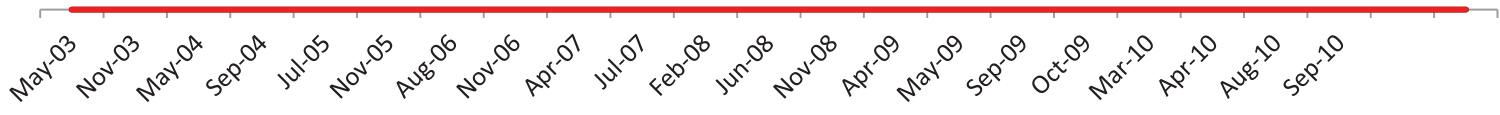
Positive/Negative

◆ Bacteria

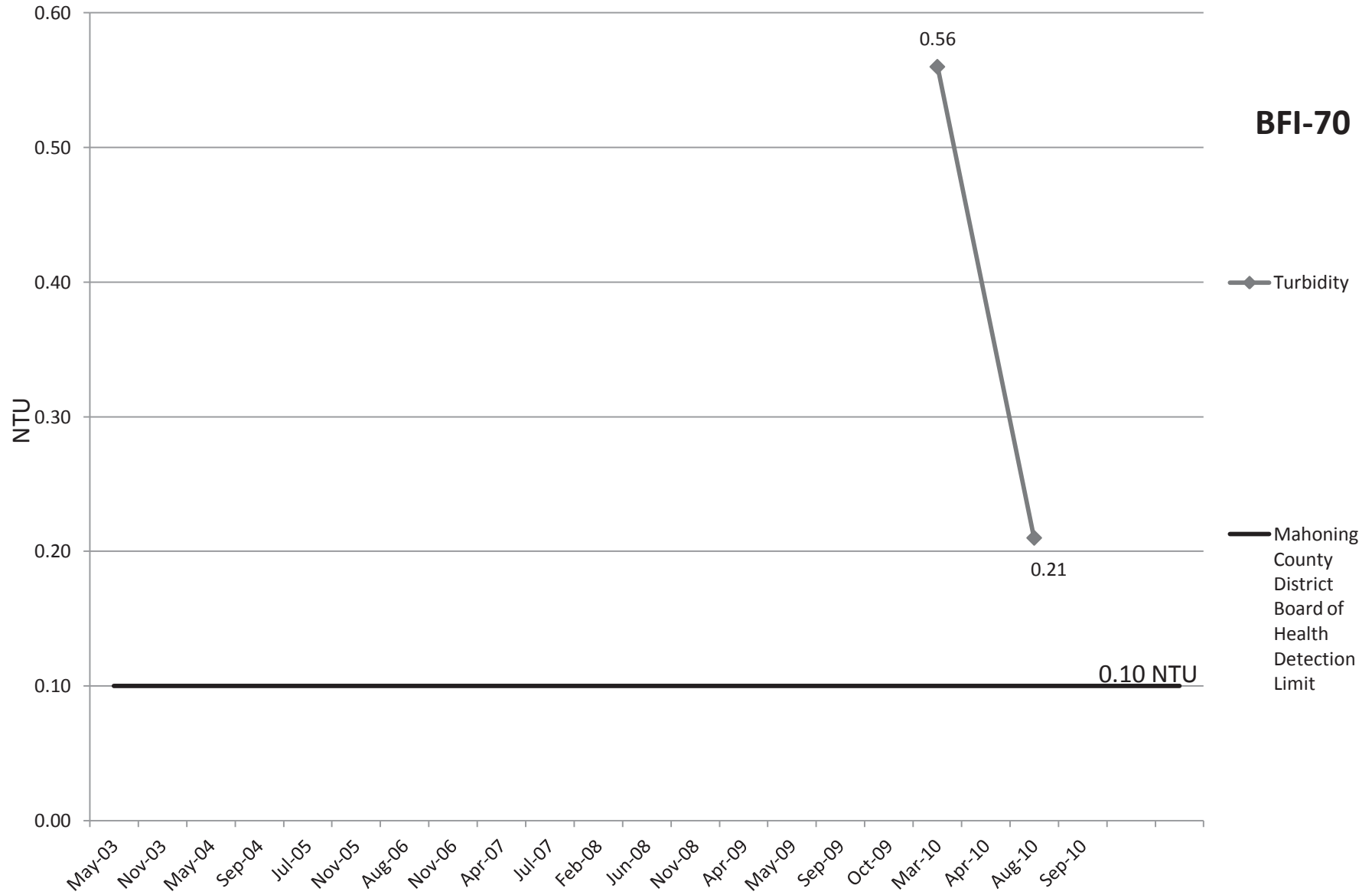
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

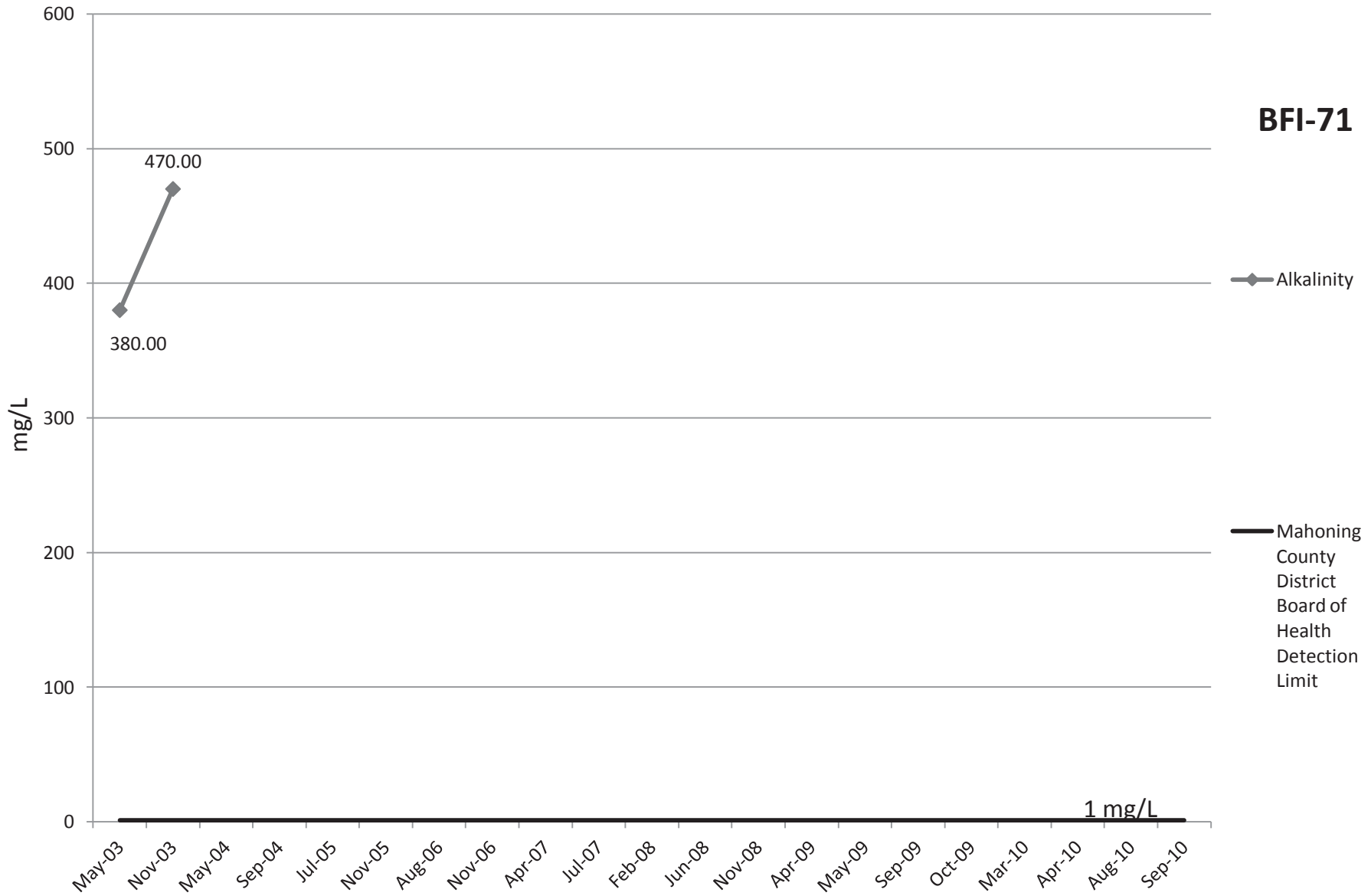
negative (0)



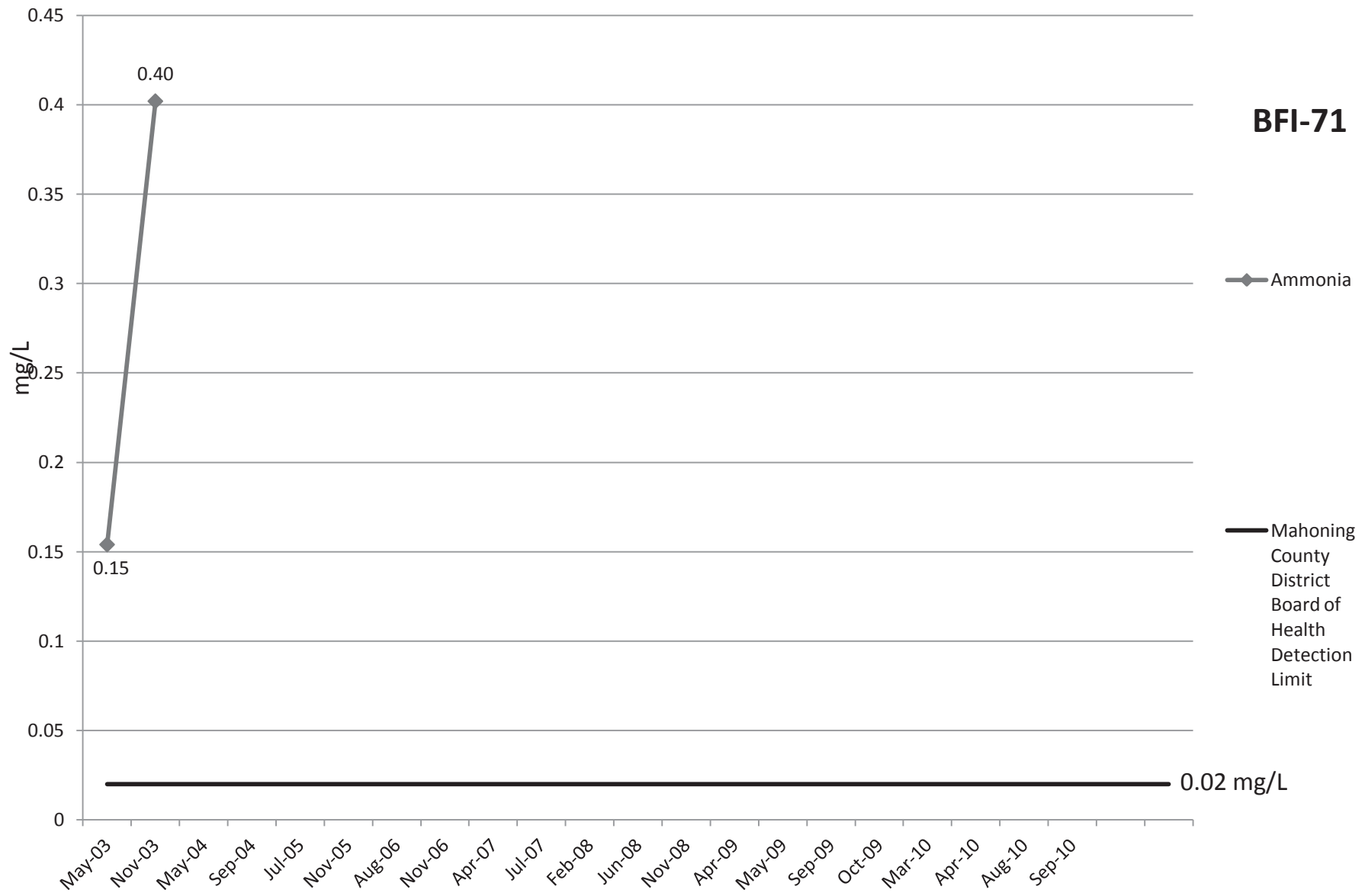
# Turbidity



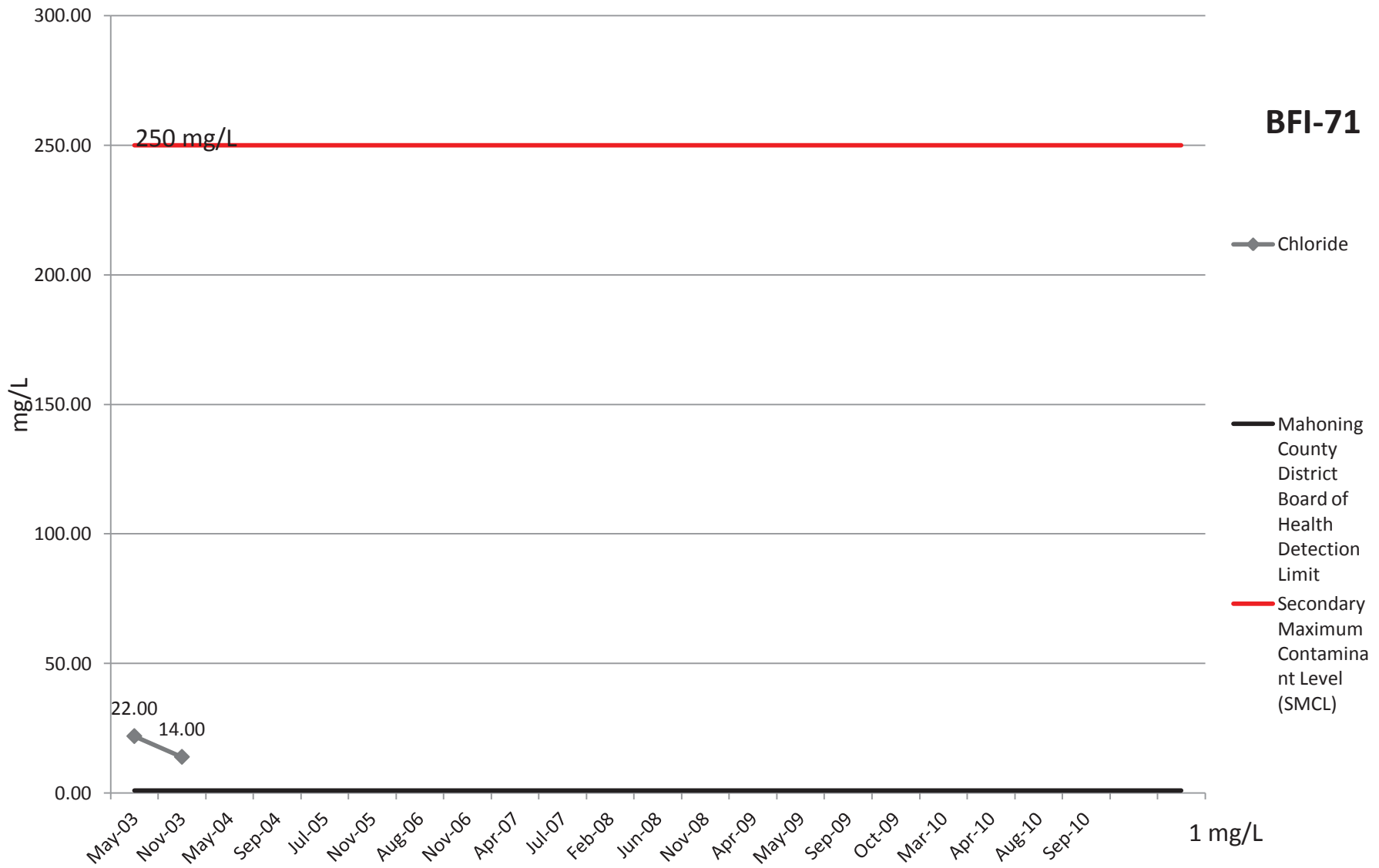
# Alkalinity



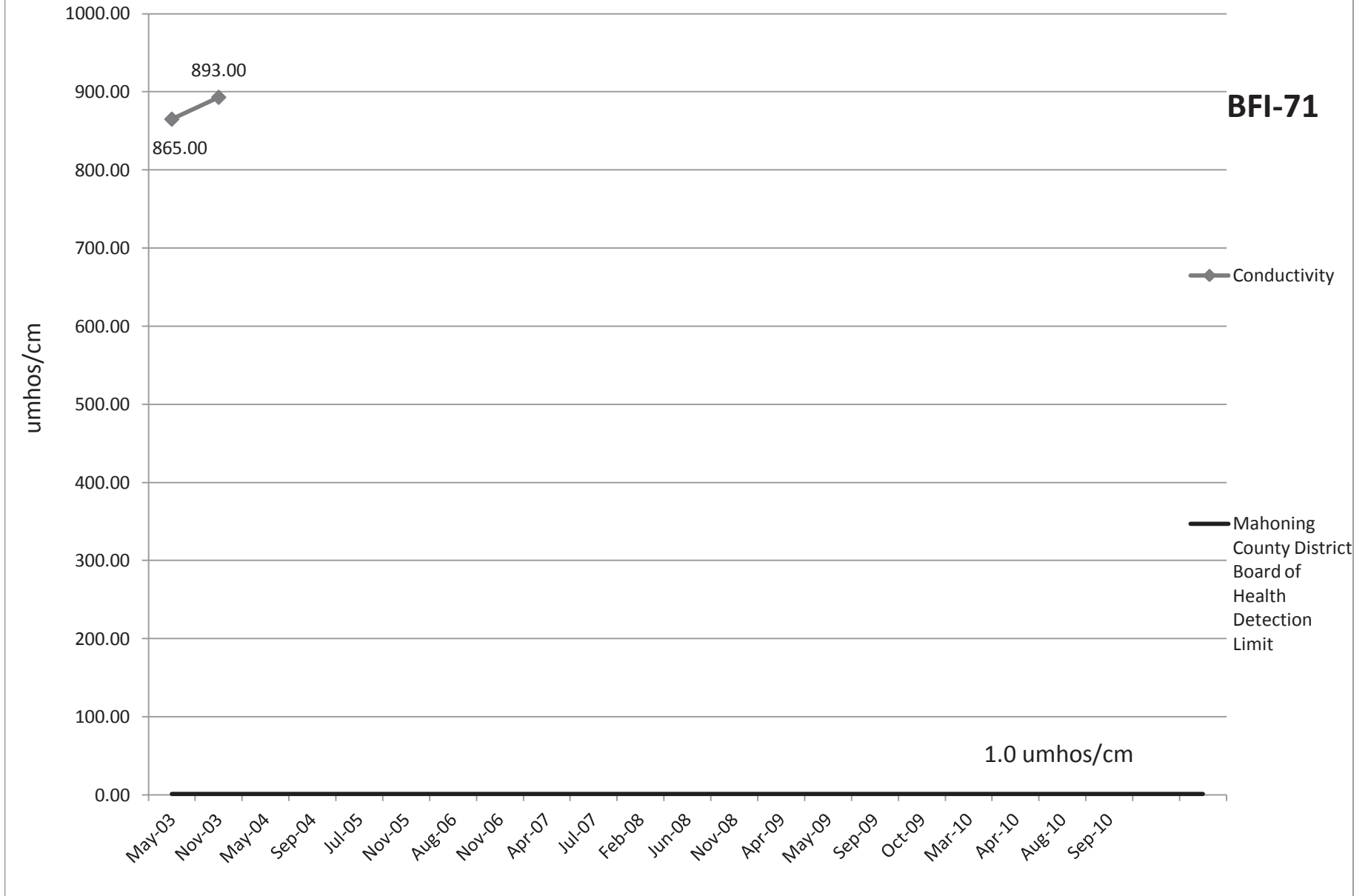
# Ammonia



# Chloride

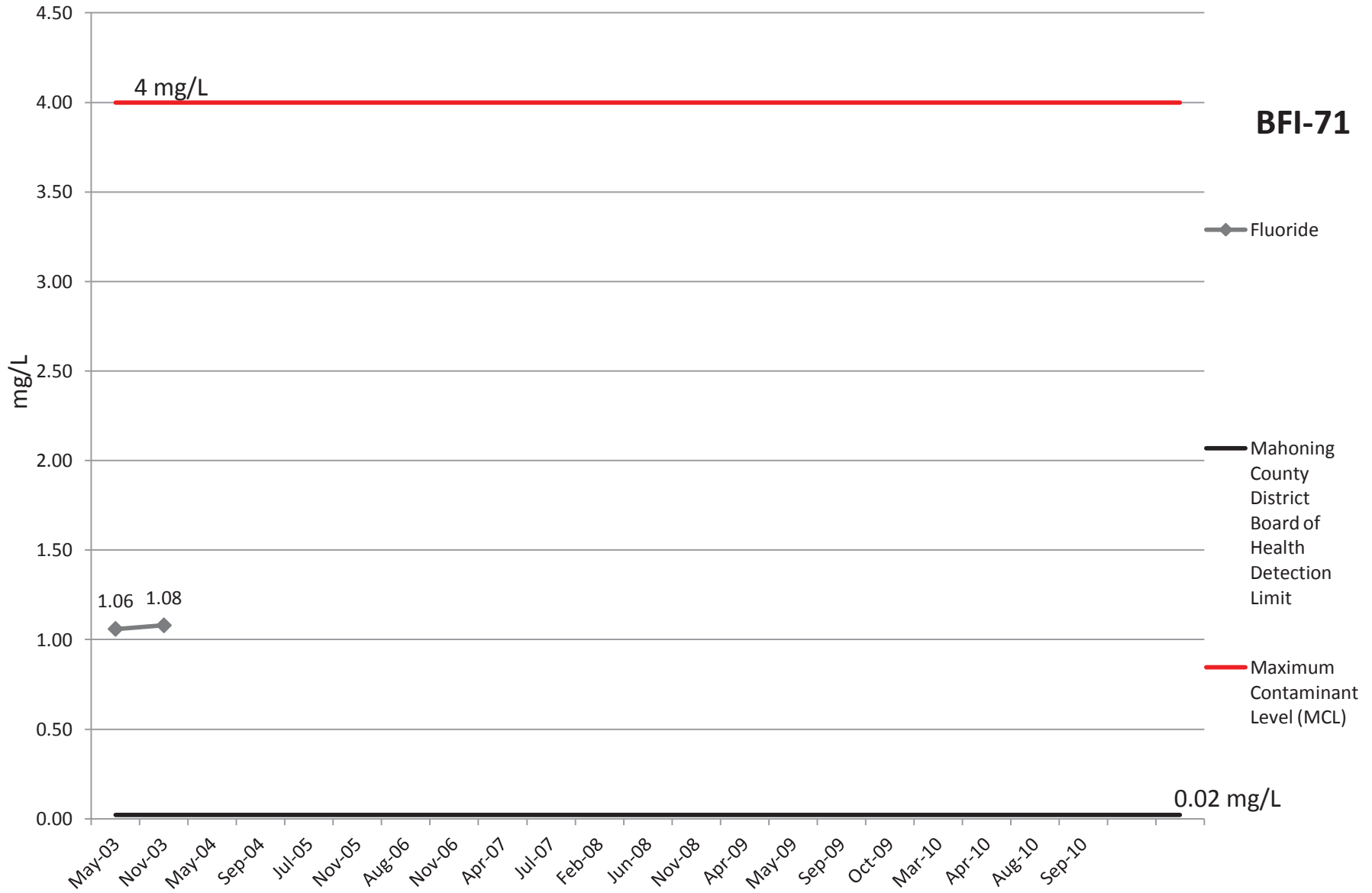


# Conductivity

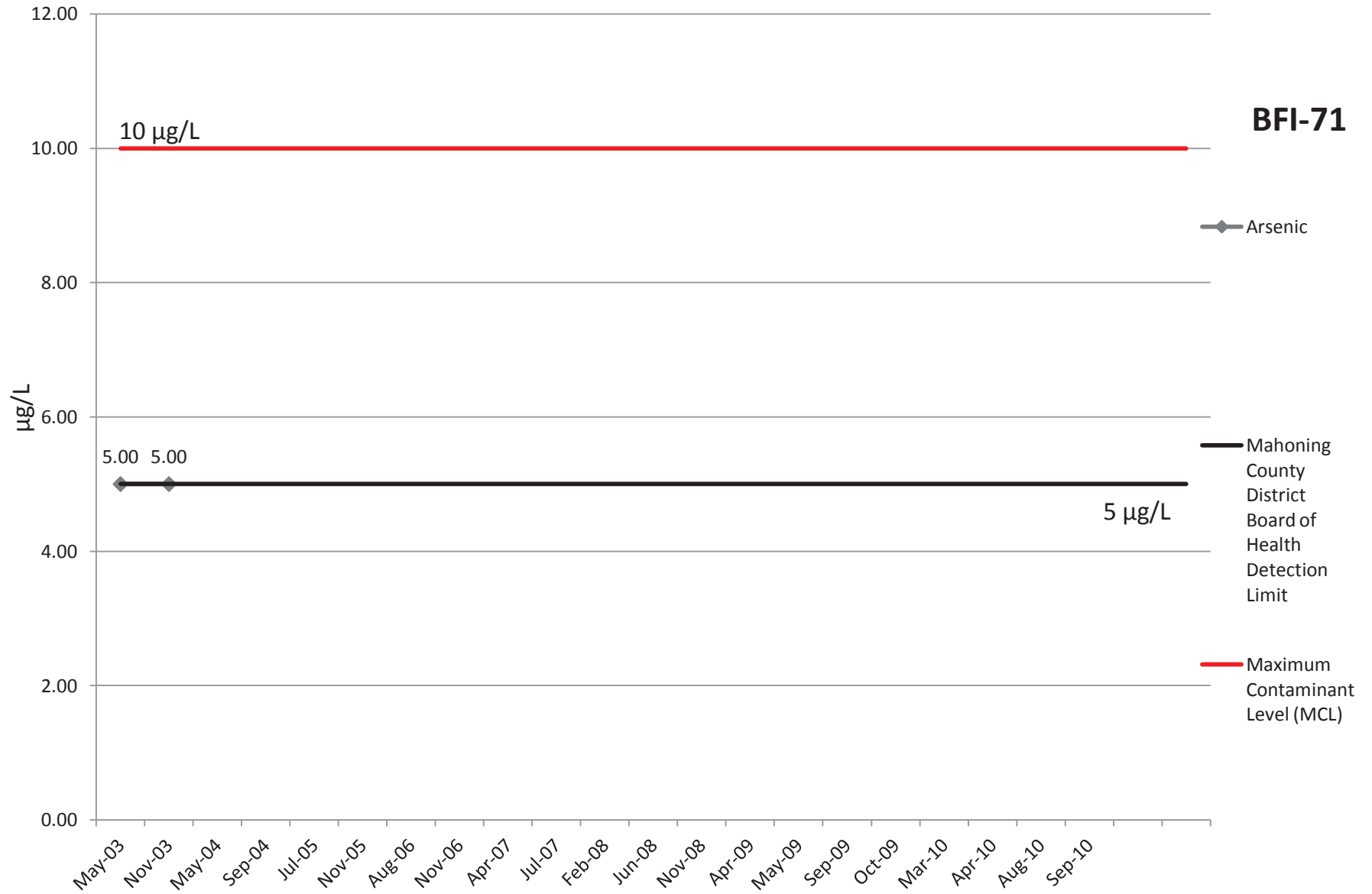




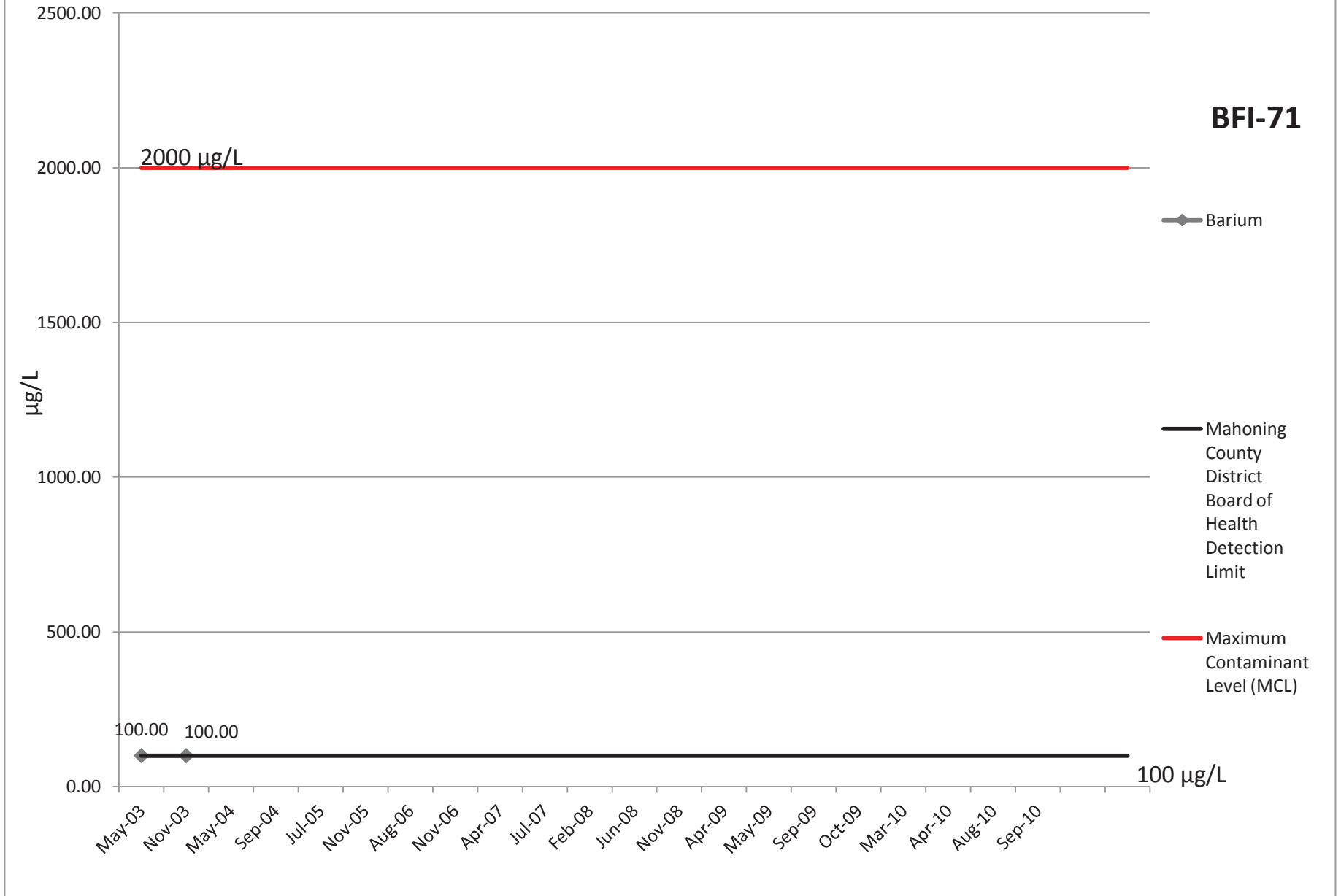
# Fluoride



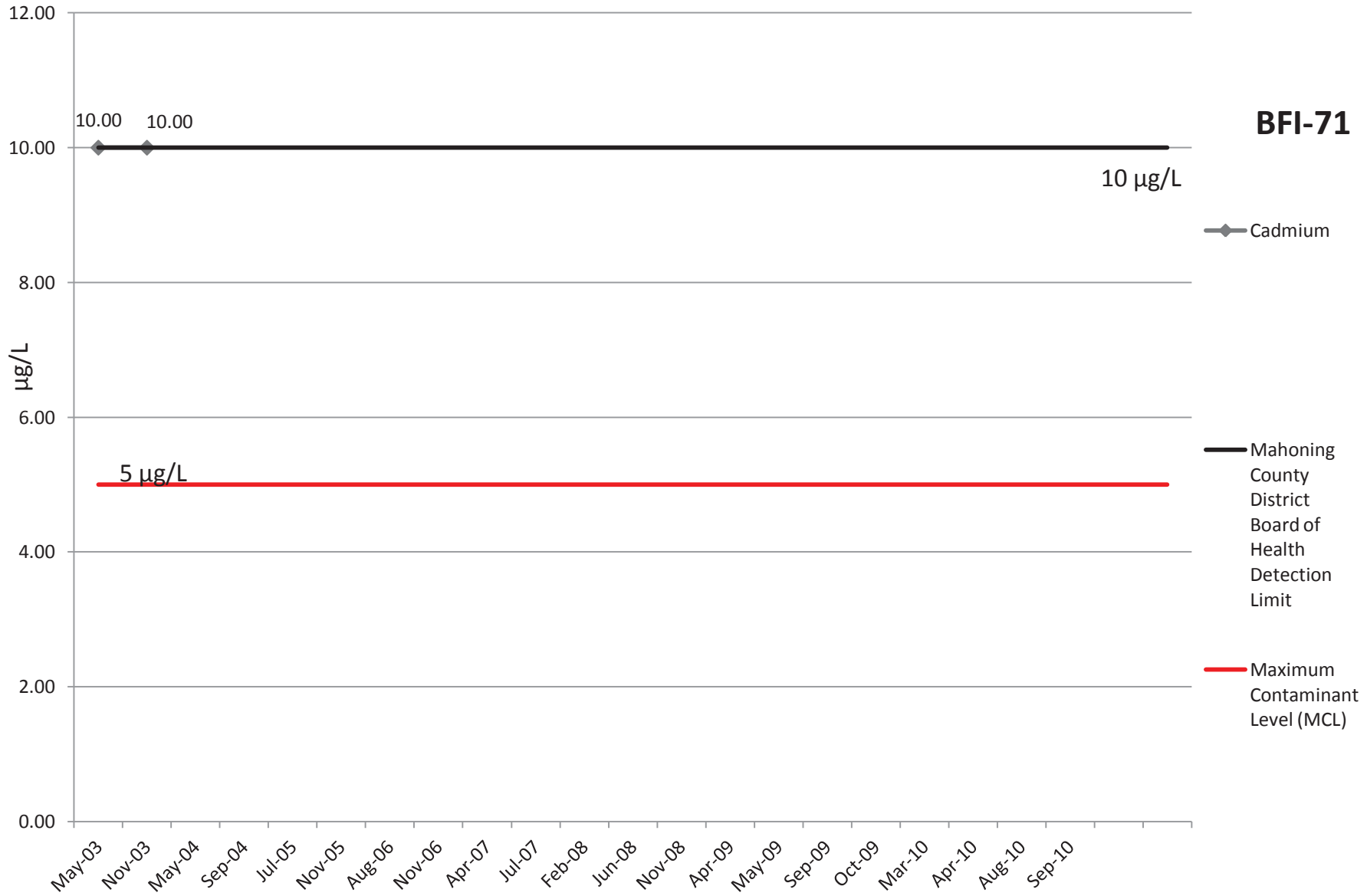
# Arsenic



# Barium



# Cadmium



**BFI-71**

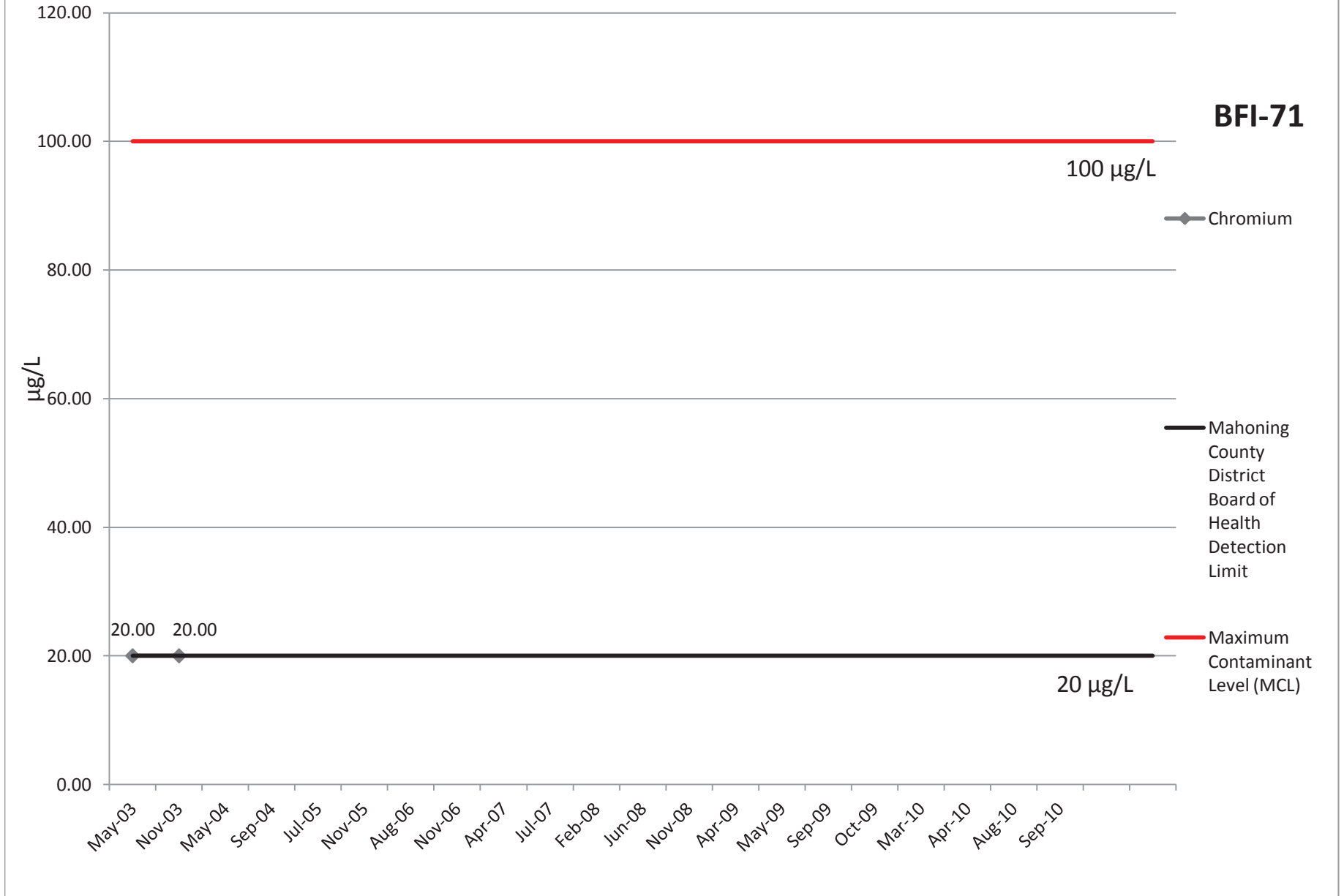
10 µg/L

◆ Cadmium

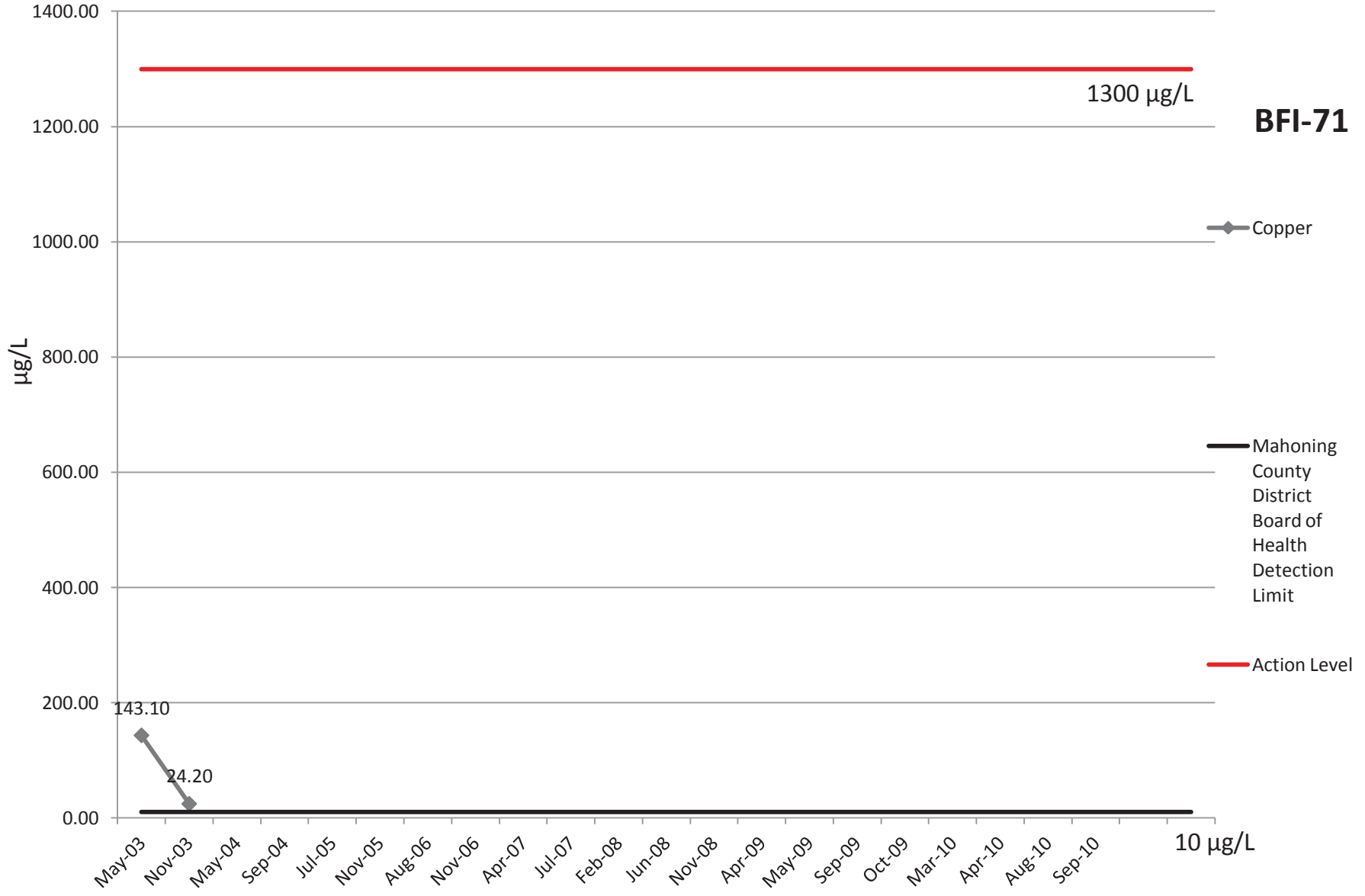
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

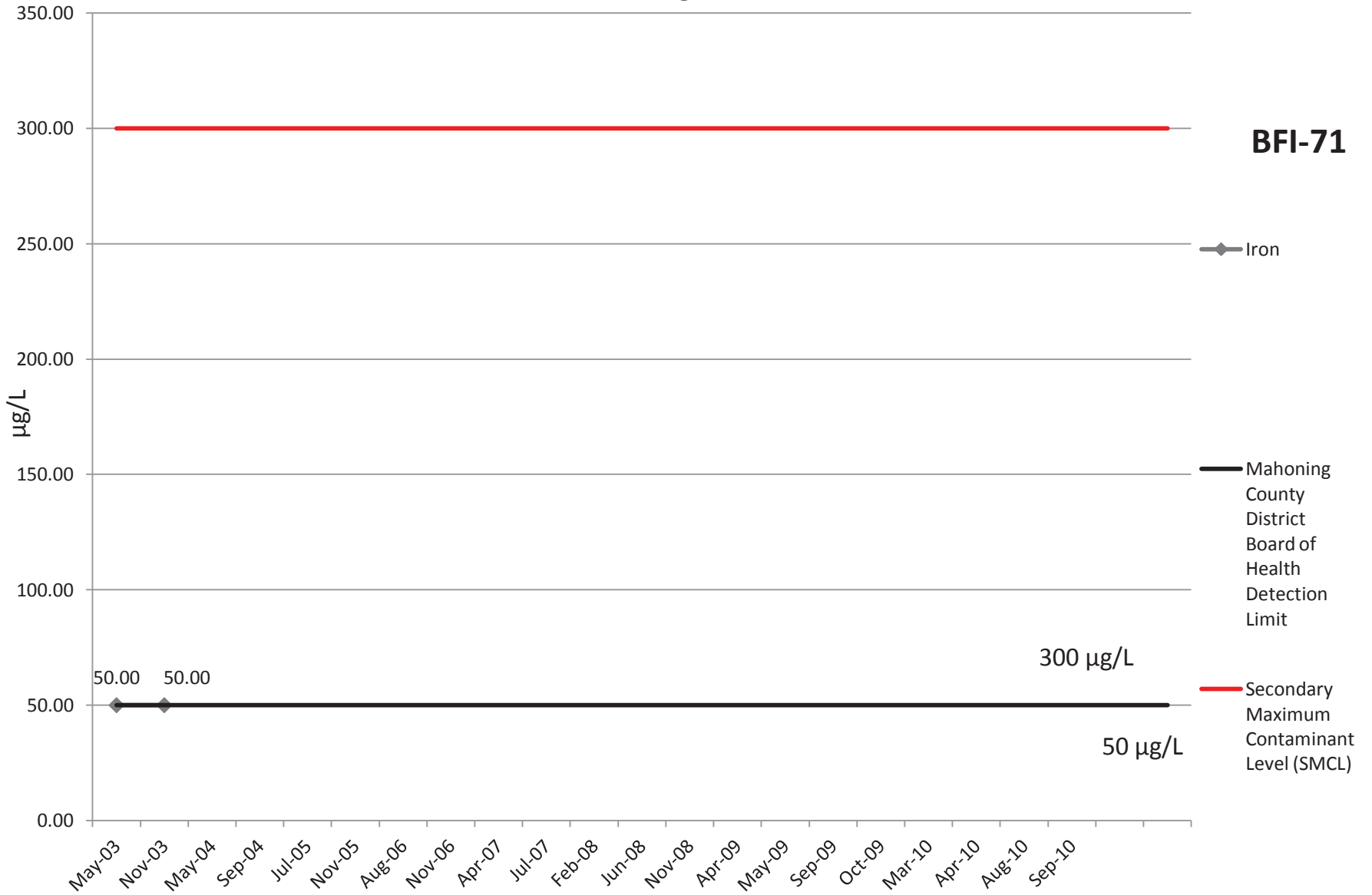
# Chromium



# Copper



# Iron



**BFI-71**

Iron

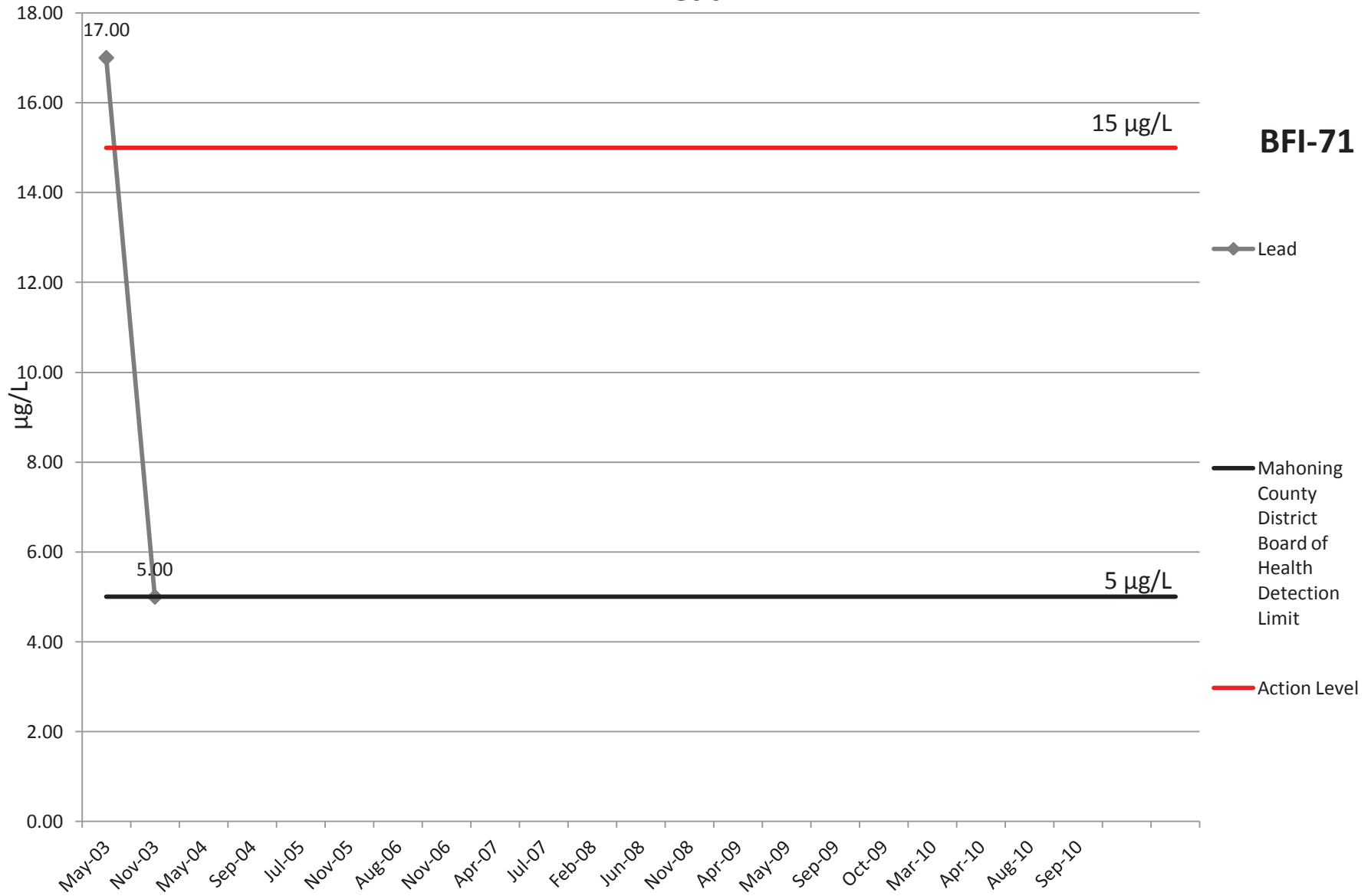
Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

Secondary  
Maximum  
Contaminant  
Level (SMCL)

300 µg/L

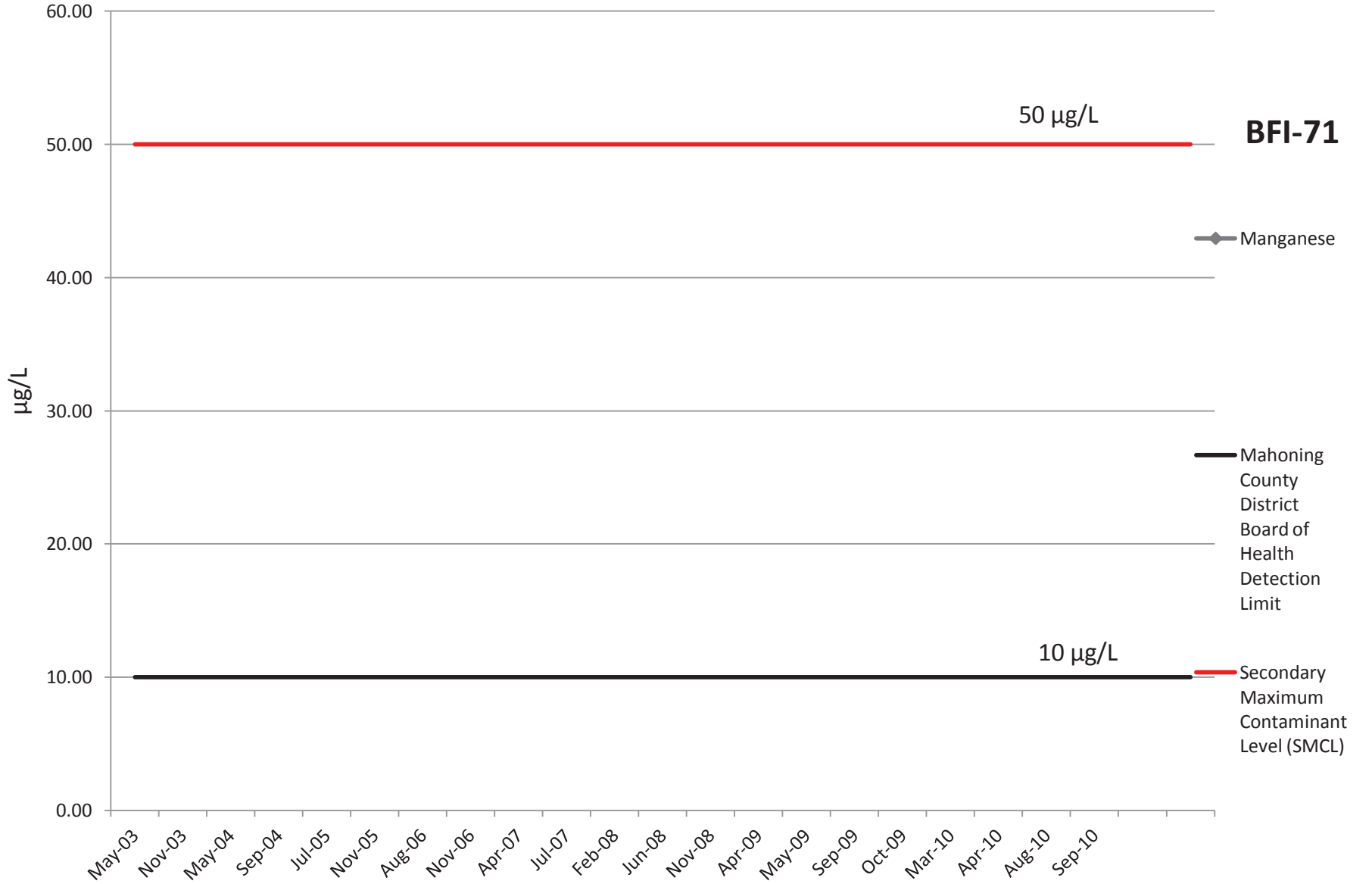
50 µg/L

# Lead



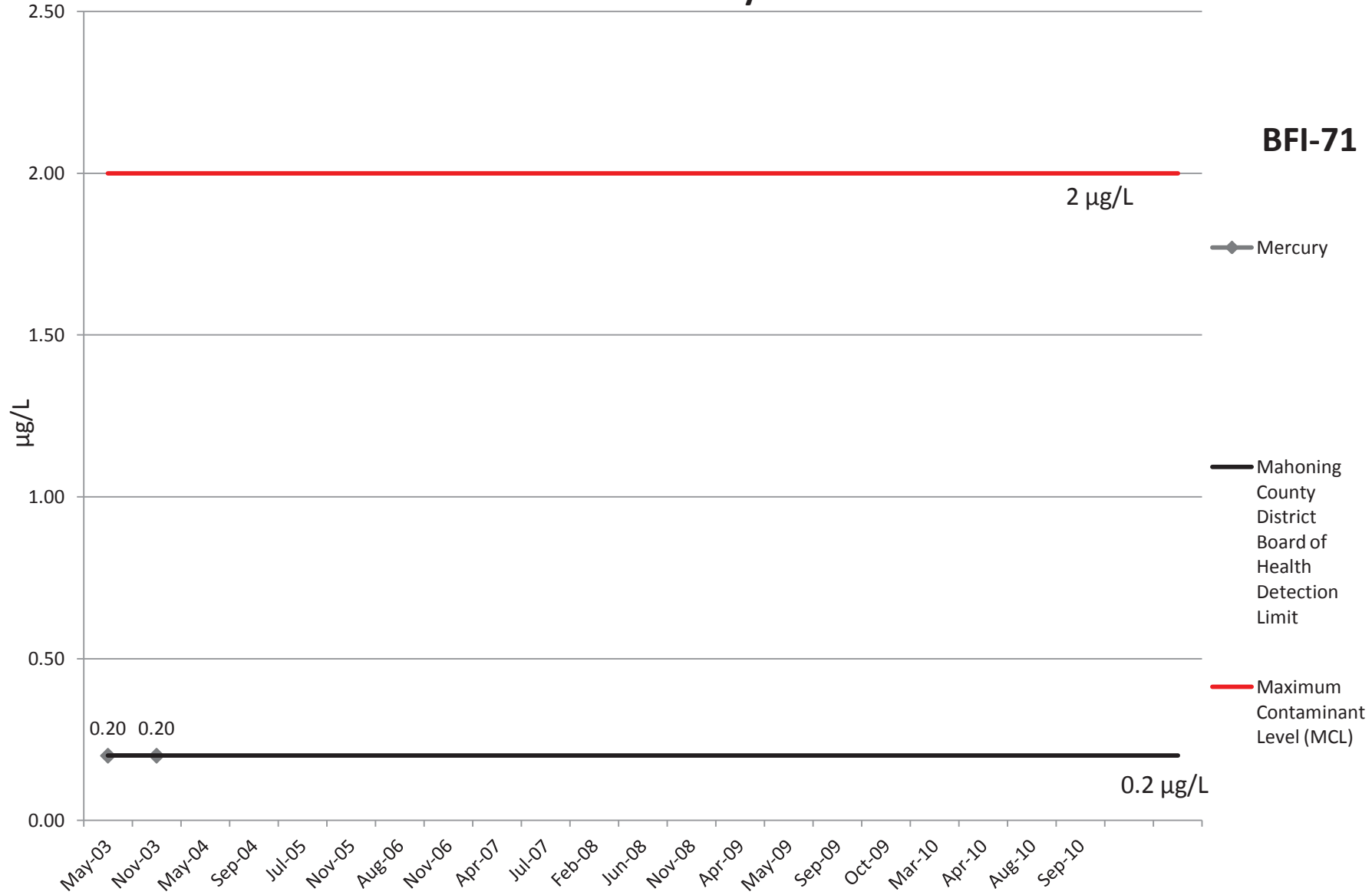


# Manganese

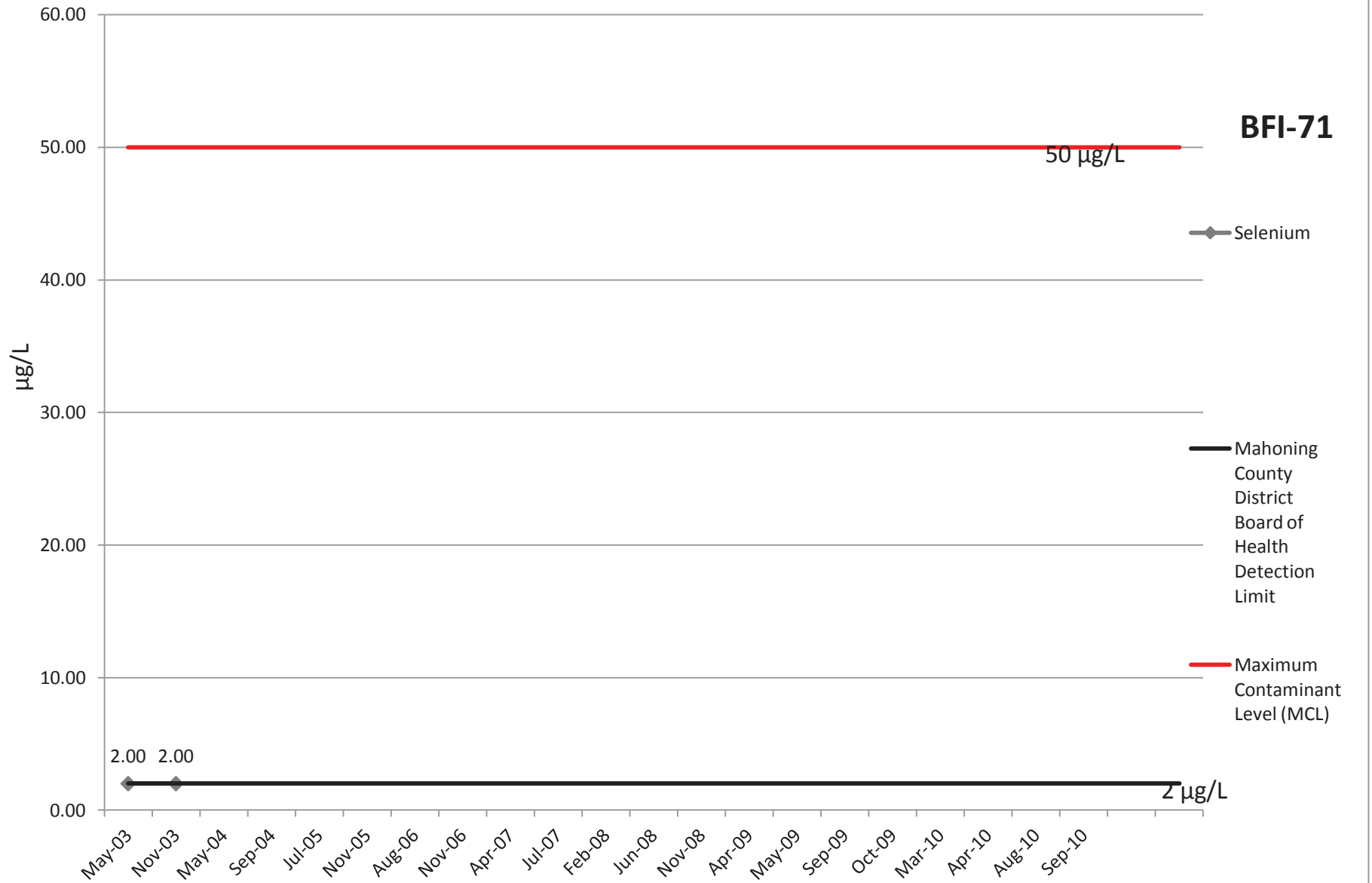


# Mercury

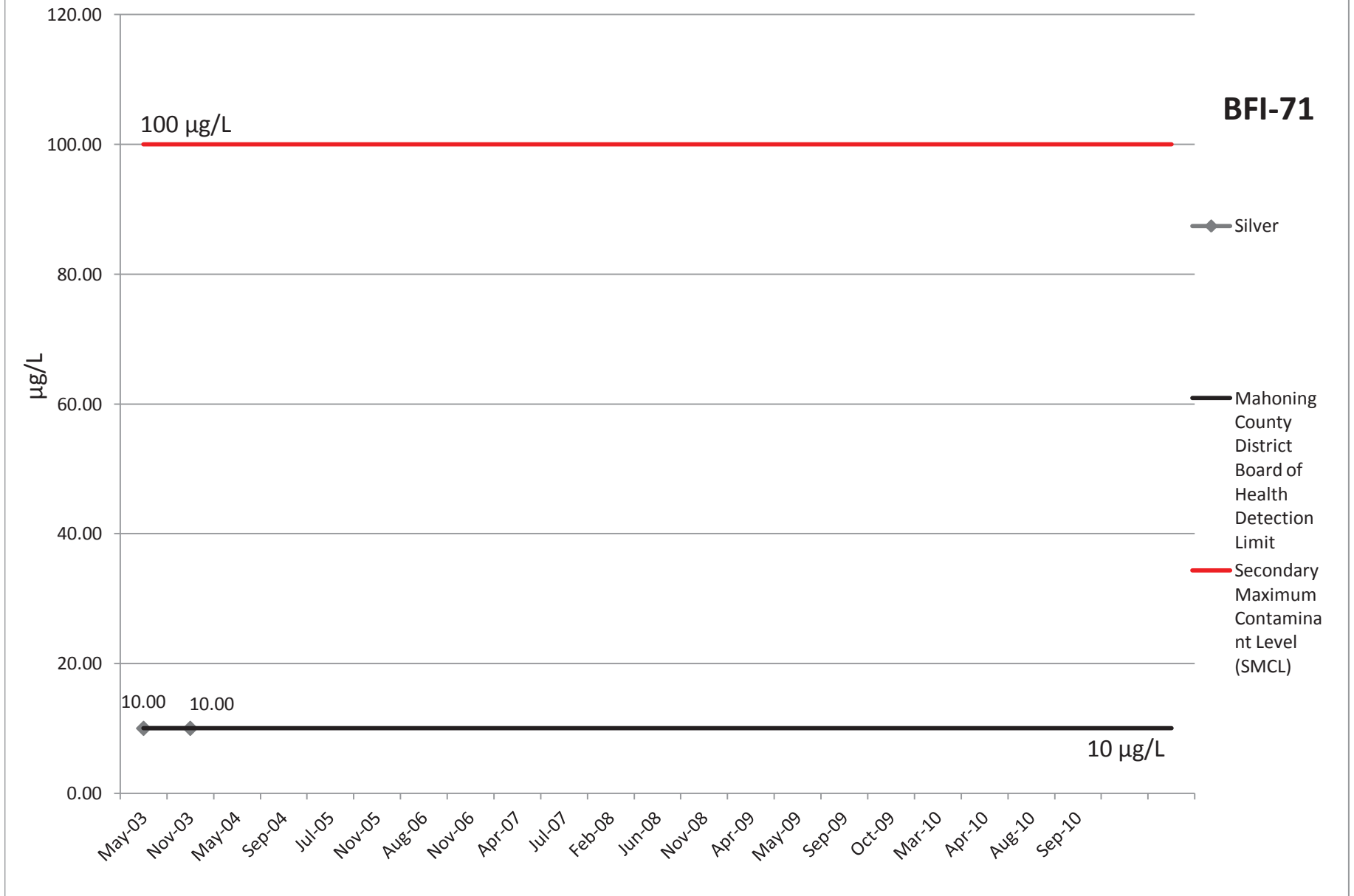
**BFI-71**



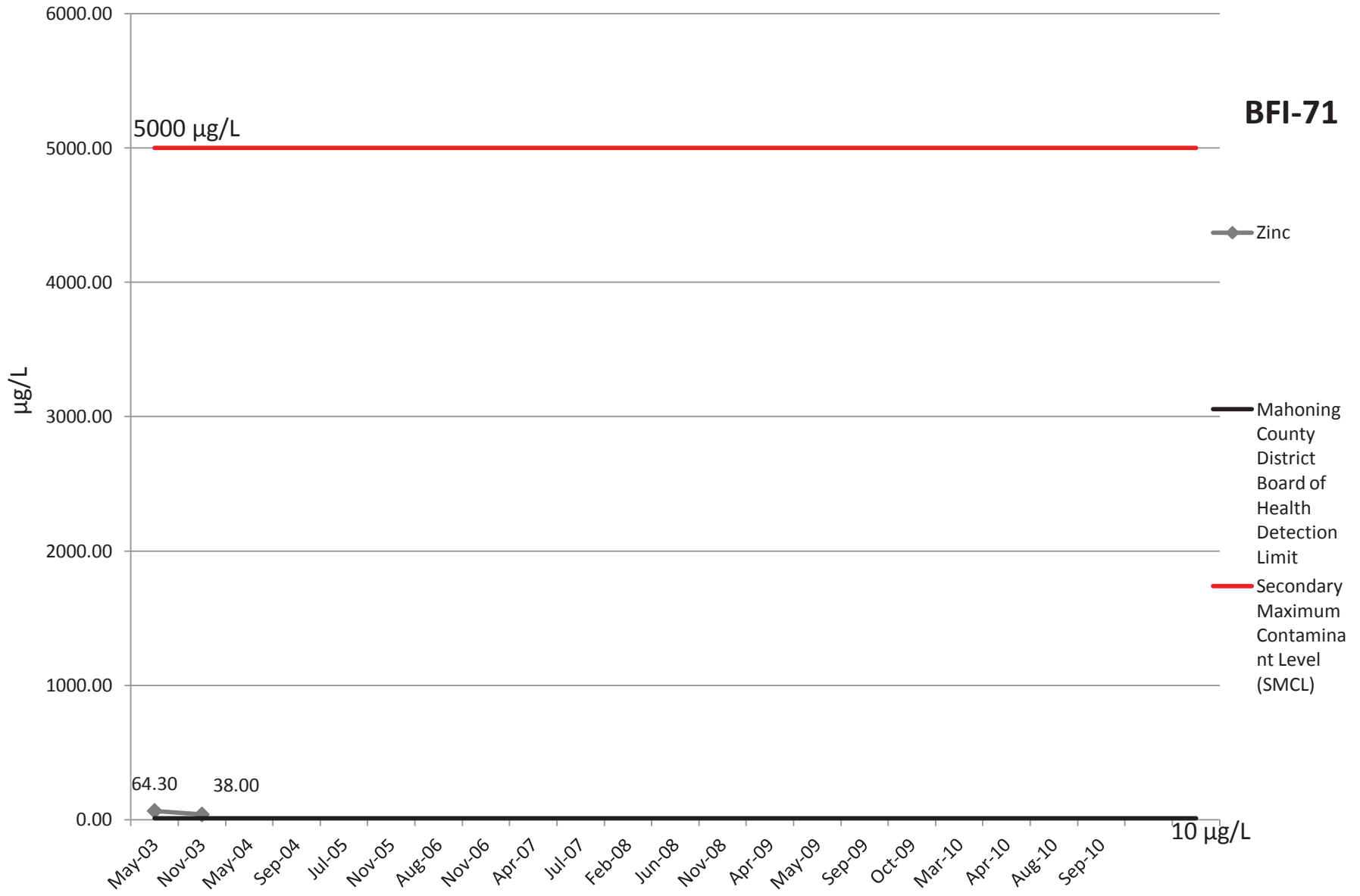
# Selenium



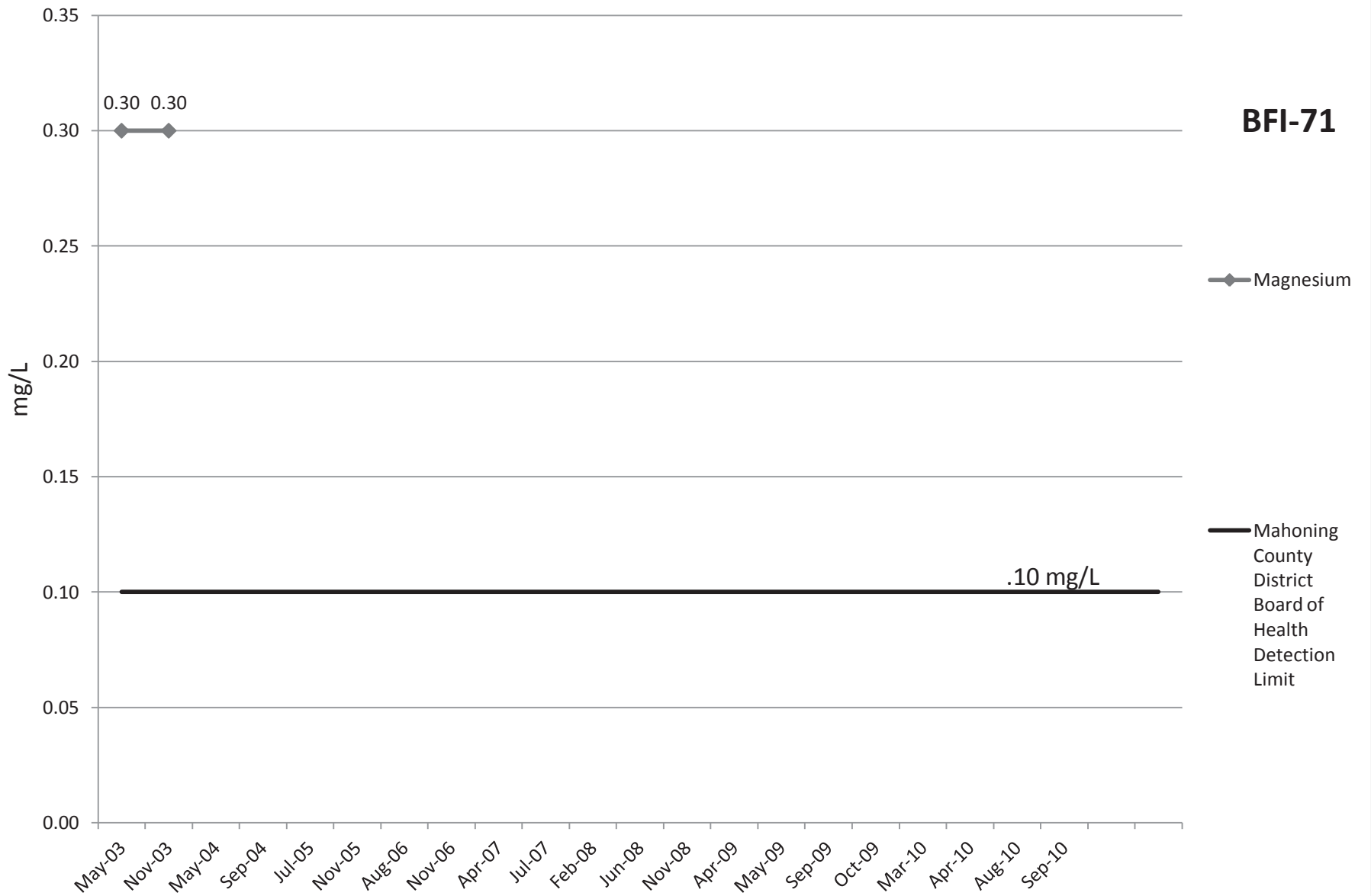
# Silver



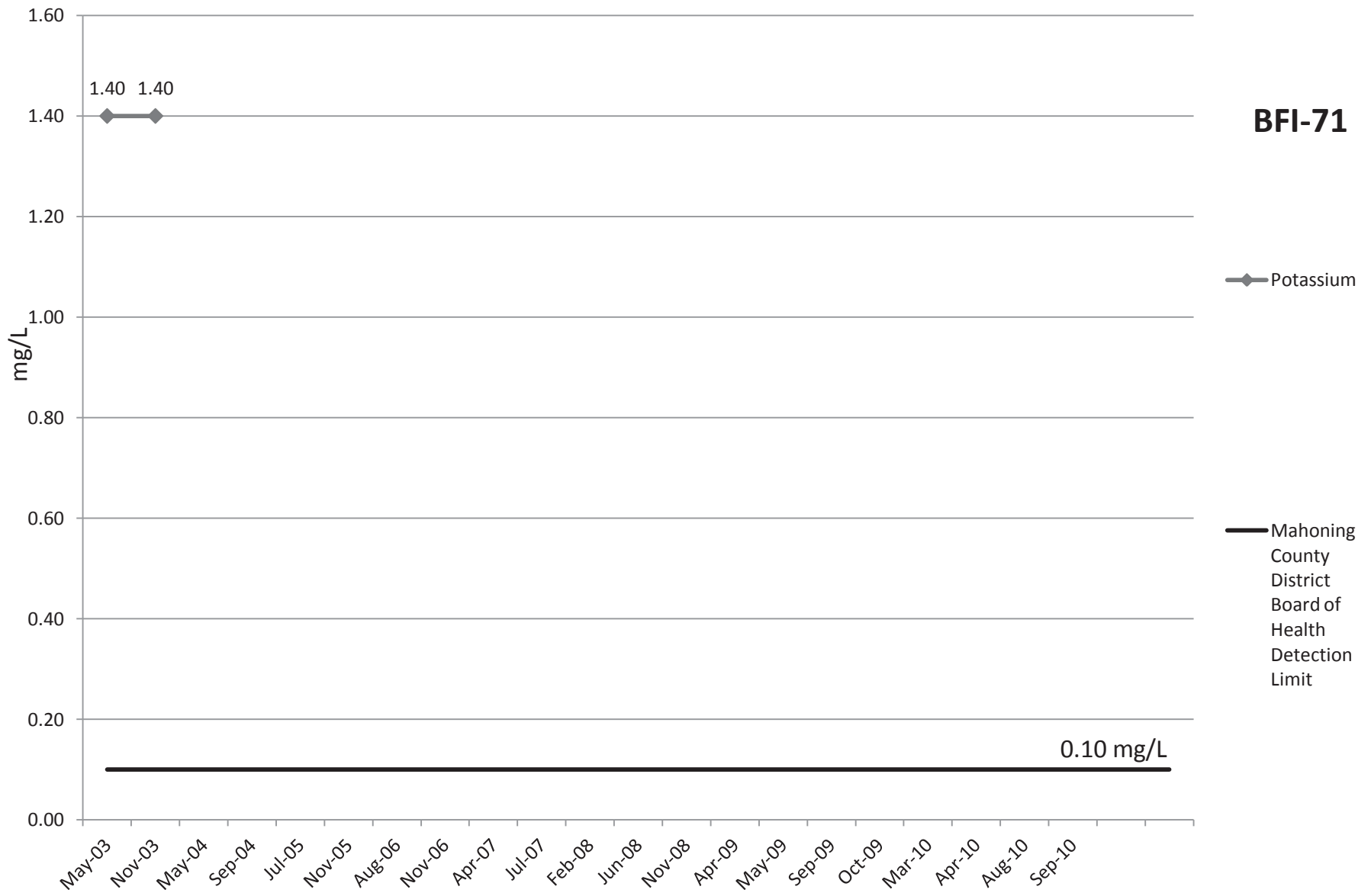
# Zinc



# Magnesium

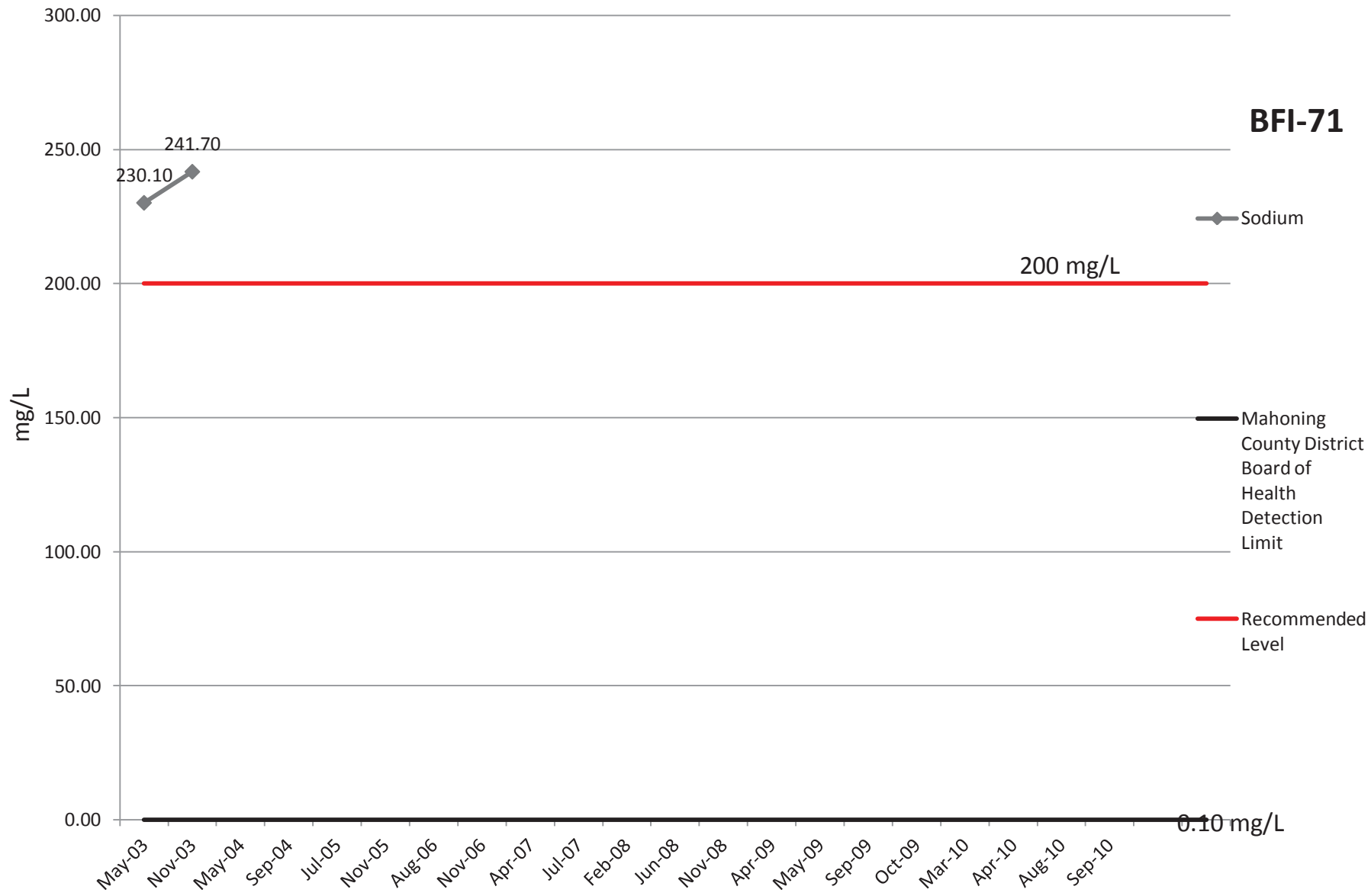


# Potassium



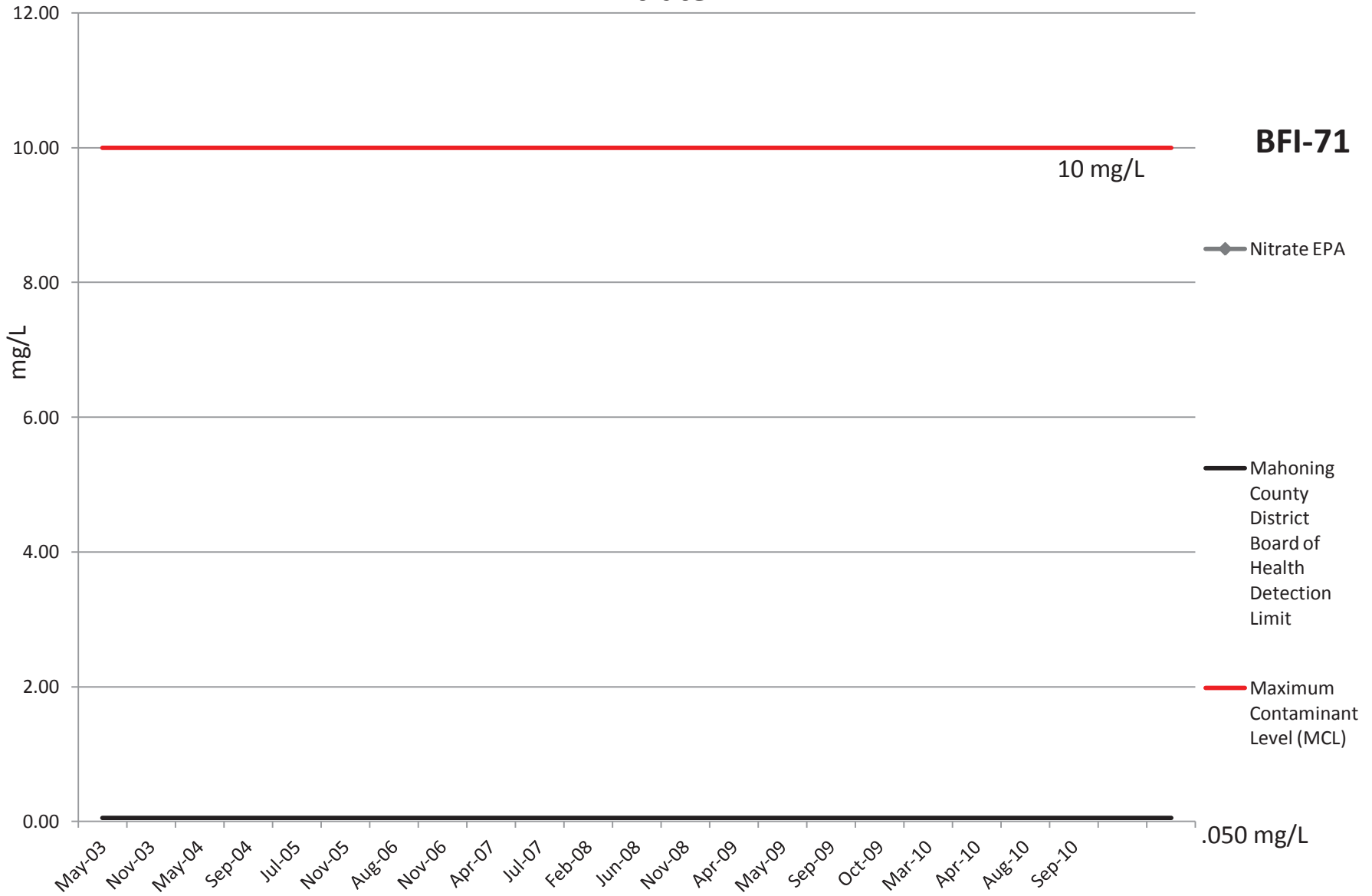
# Sodium

**BFI-71**

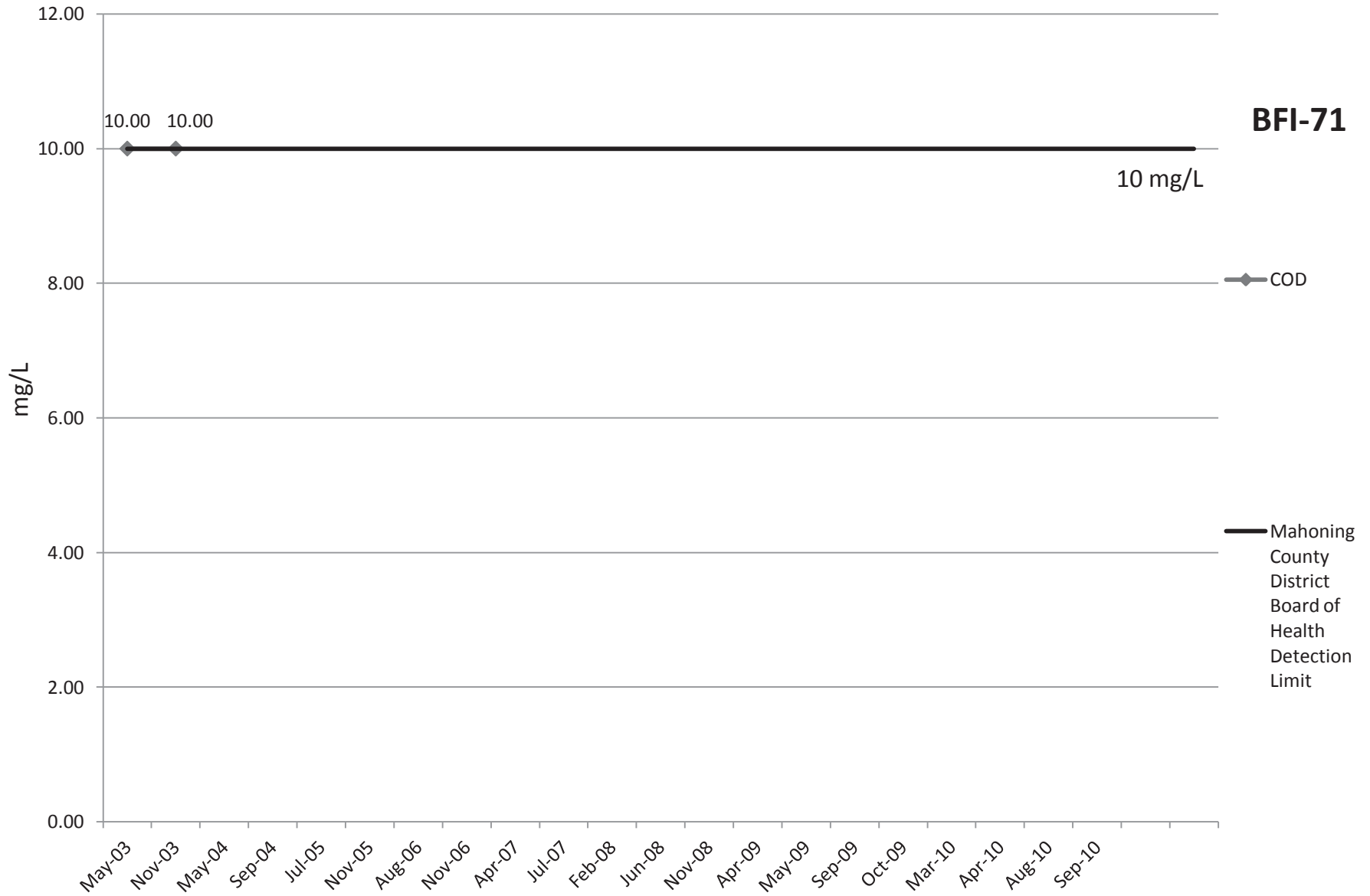




# Nitrate EPA



# COD



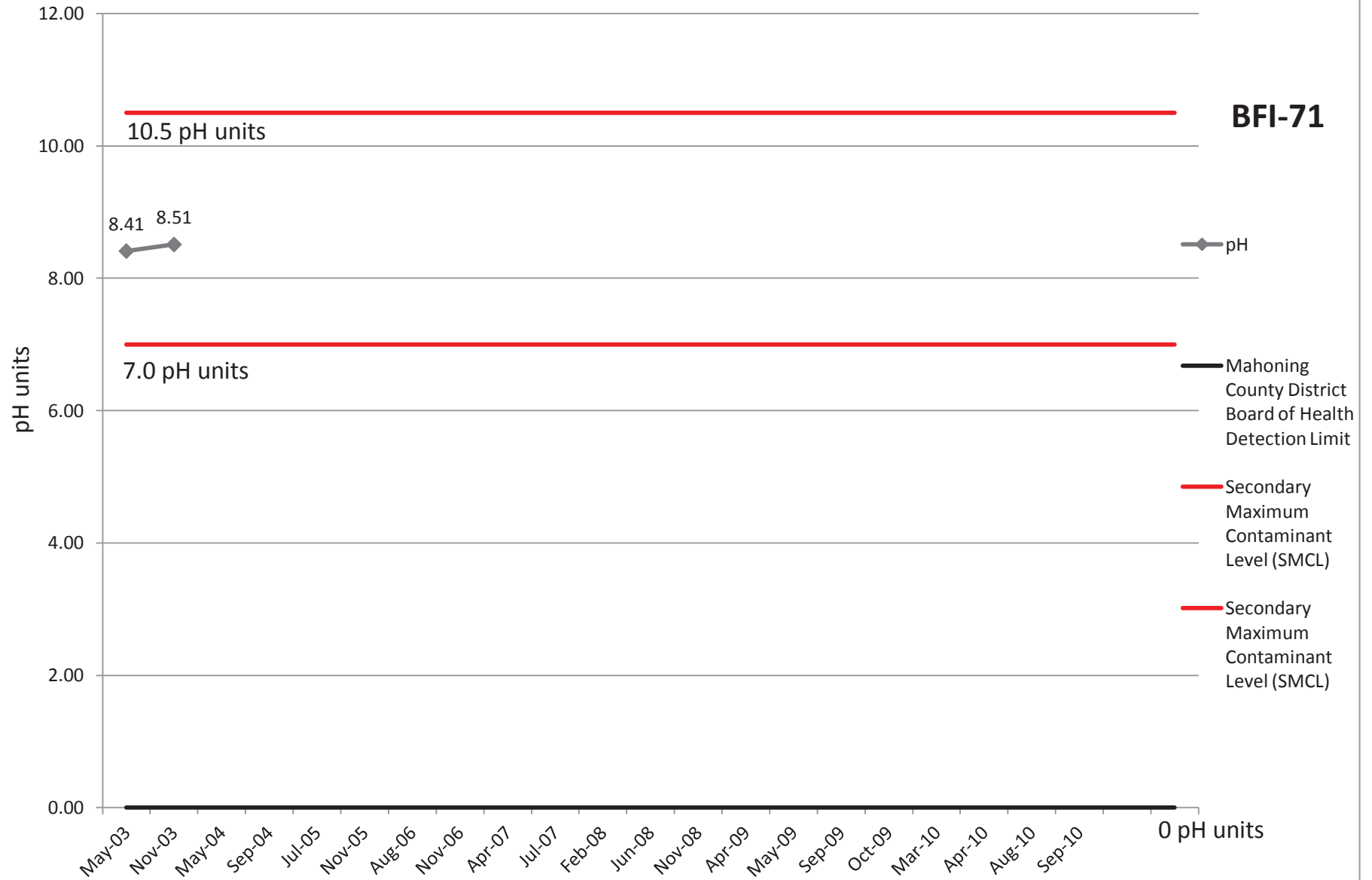
**BFI-71**

10 mg/L

—◆— COD

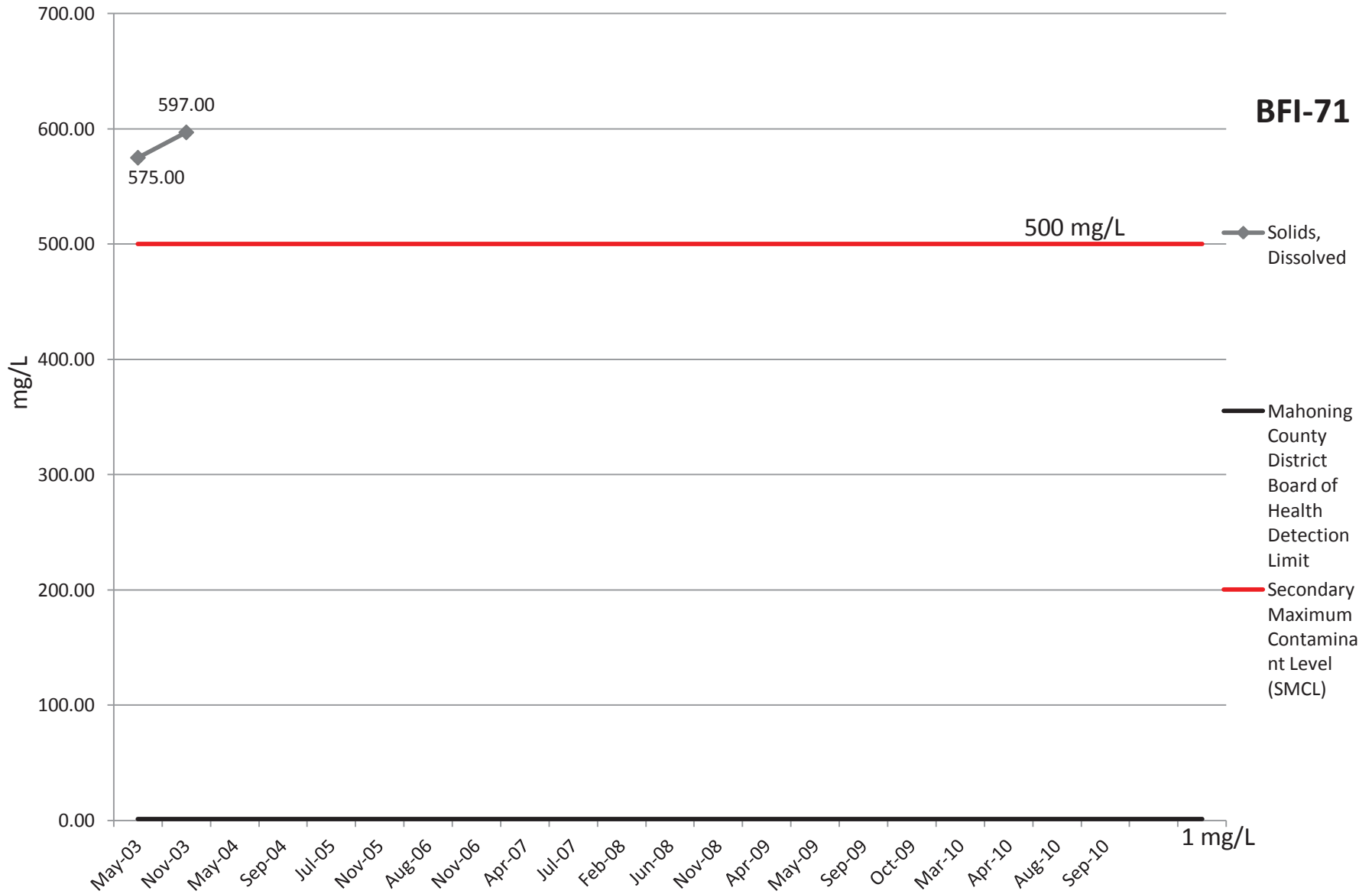
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

# pH

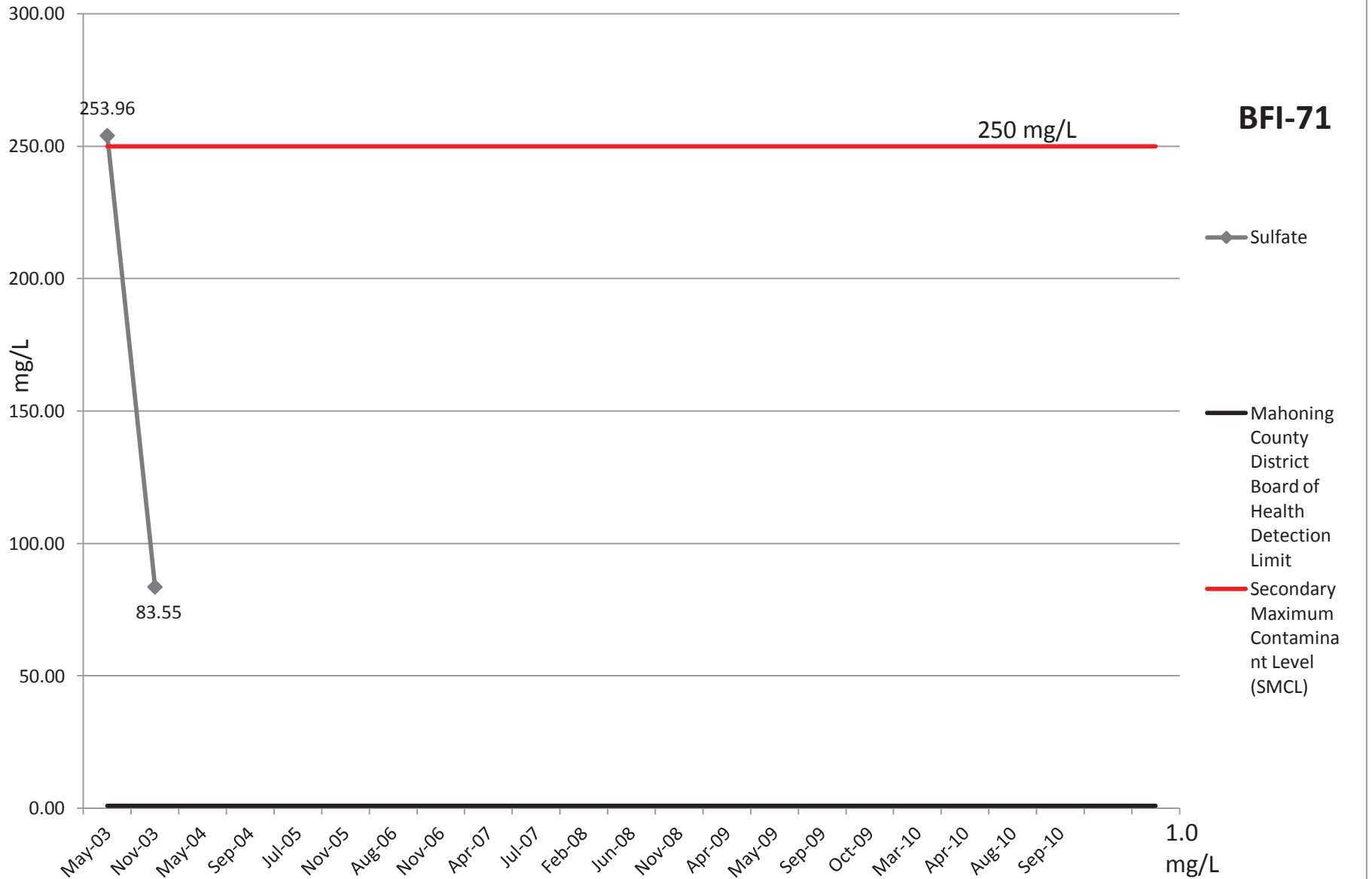


# Solids, Dissolved

**BFI-71**



# Sulfate



# Bacteria

positive (1)

**BFI-71**

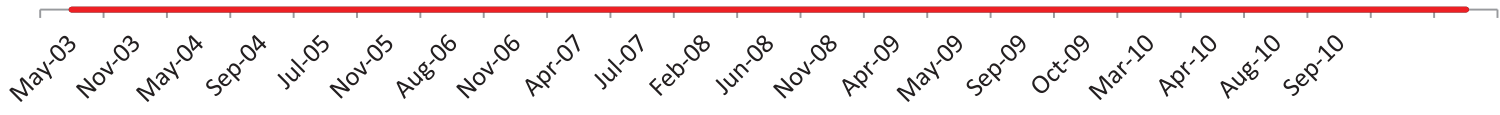
Positive/Negative

◆ Bacteria

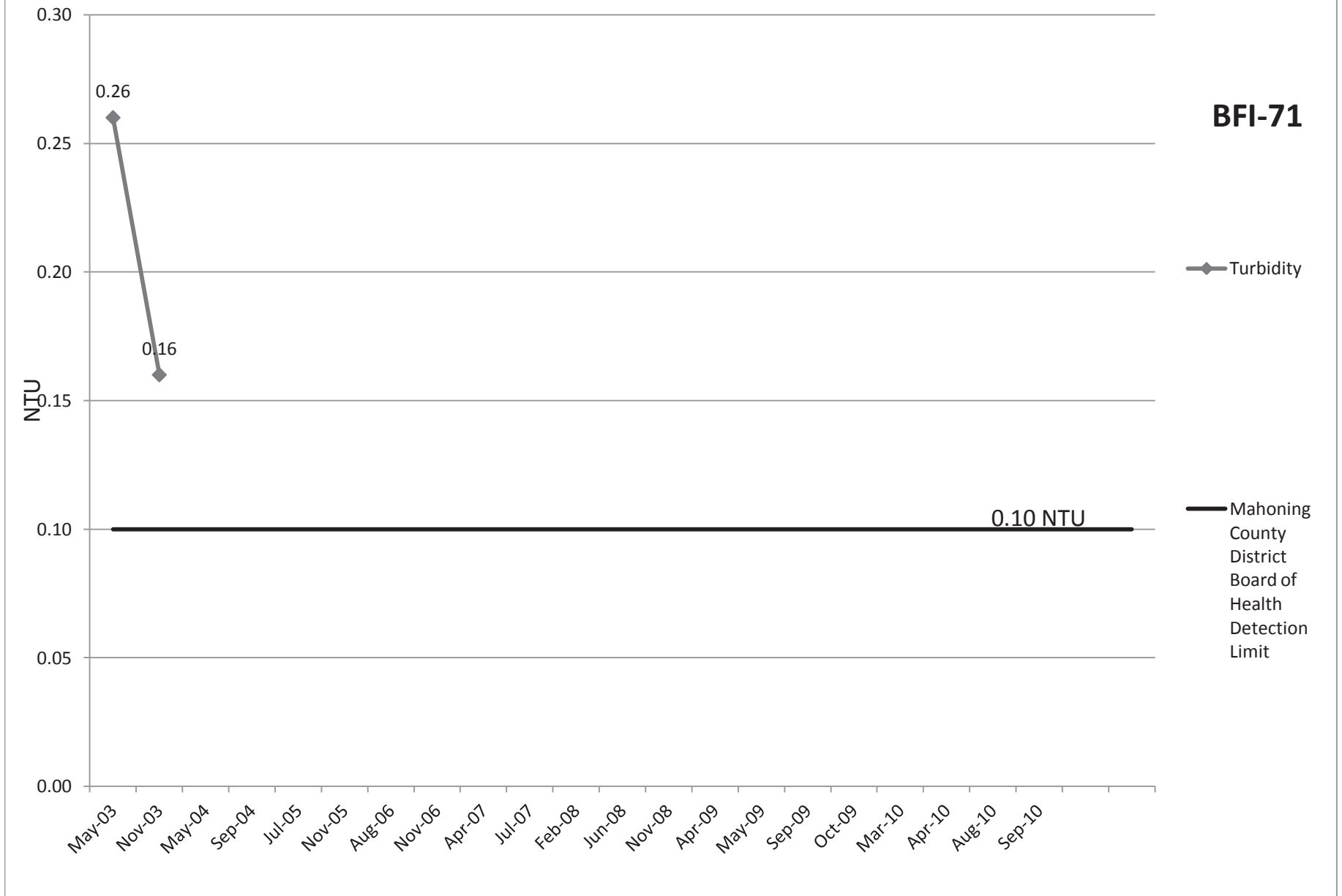
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

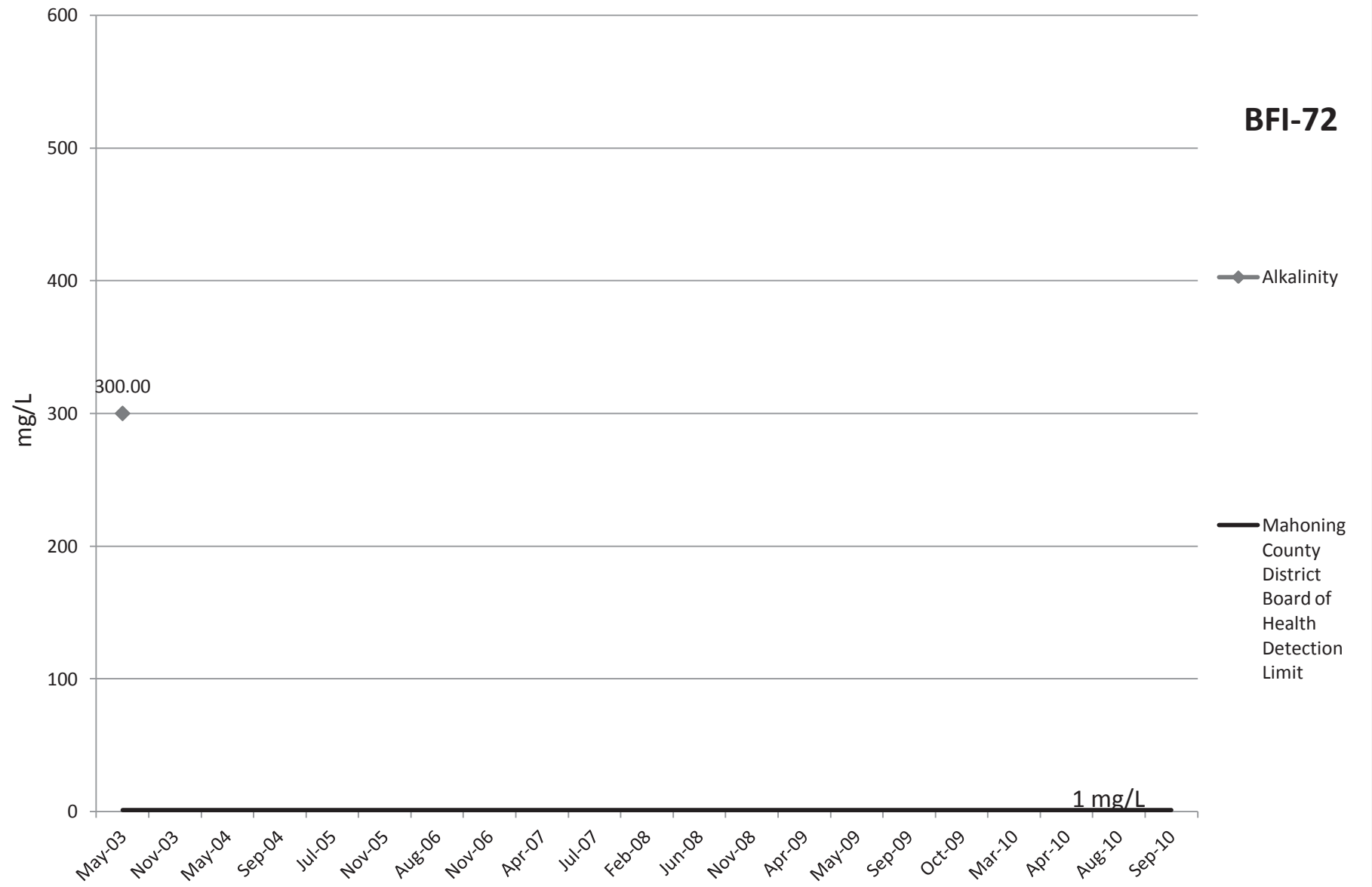
negative (0)



# Turbidity

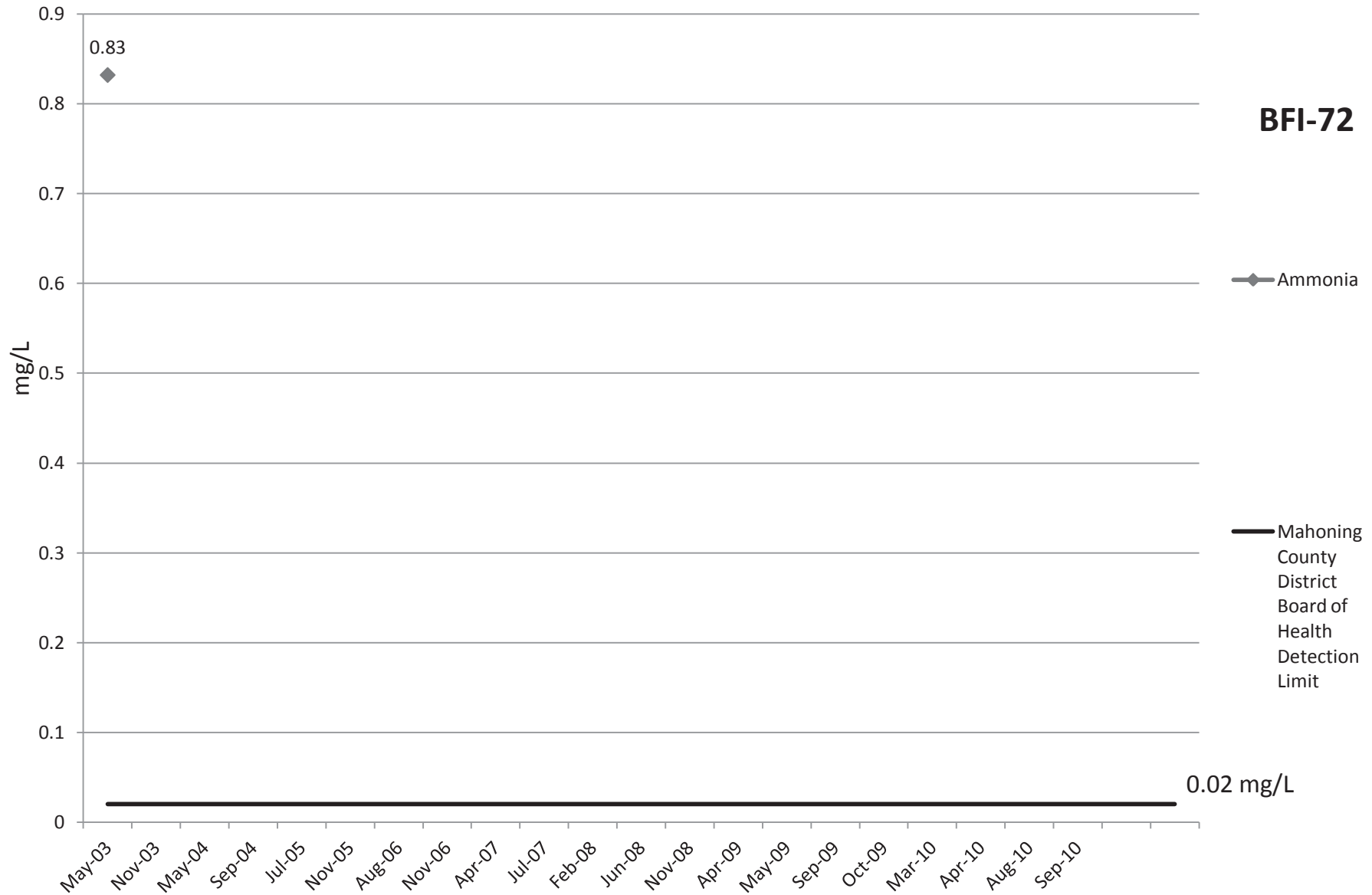


# Alkalinity

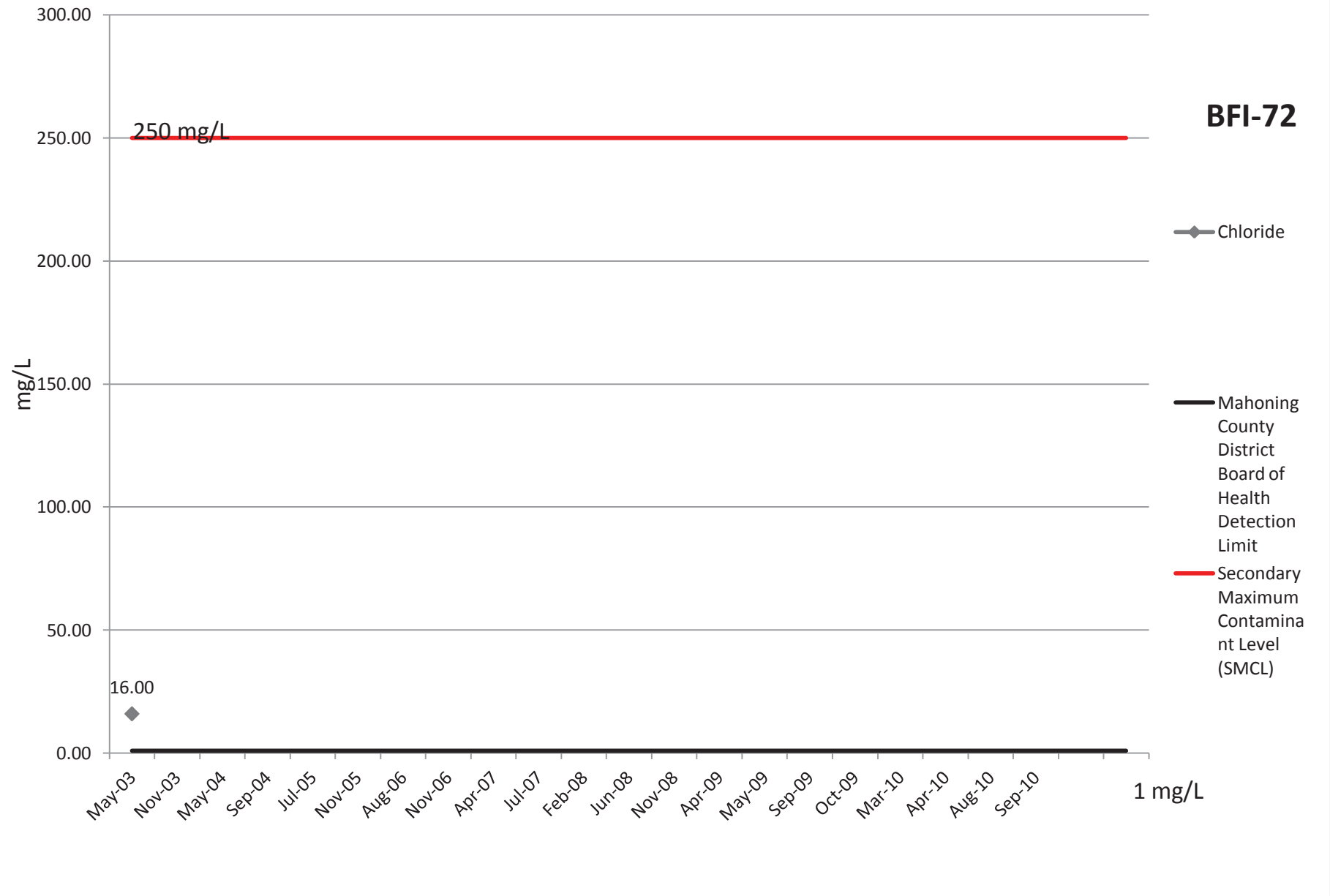




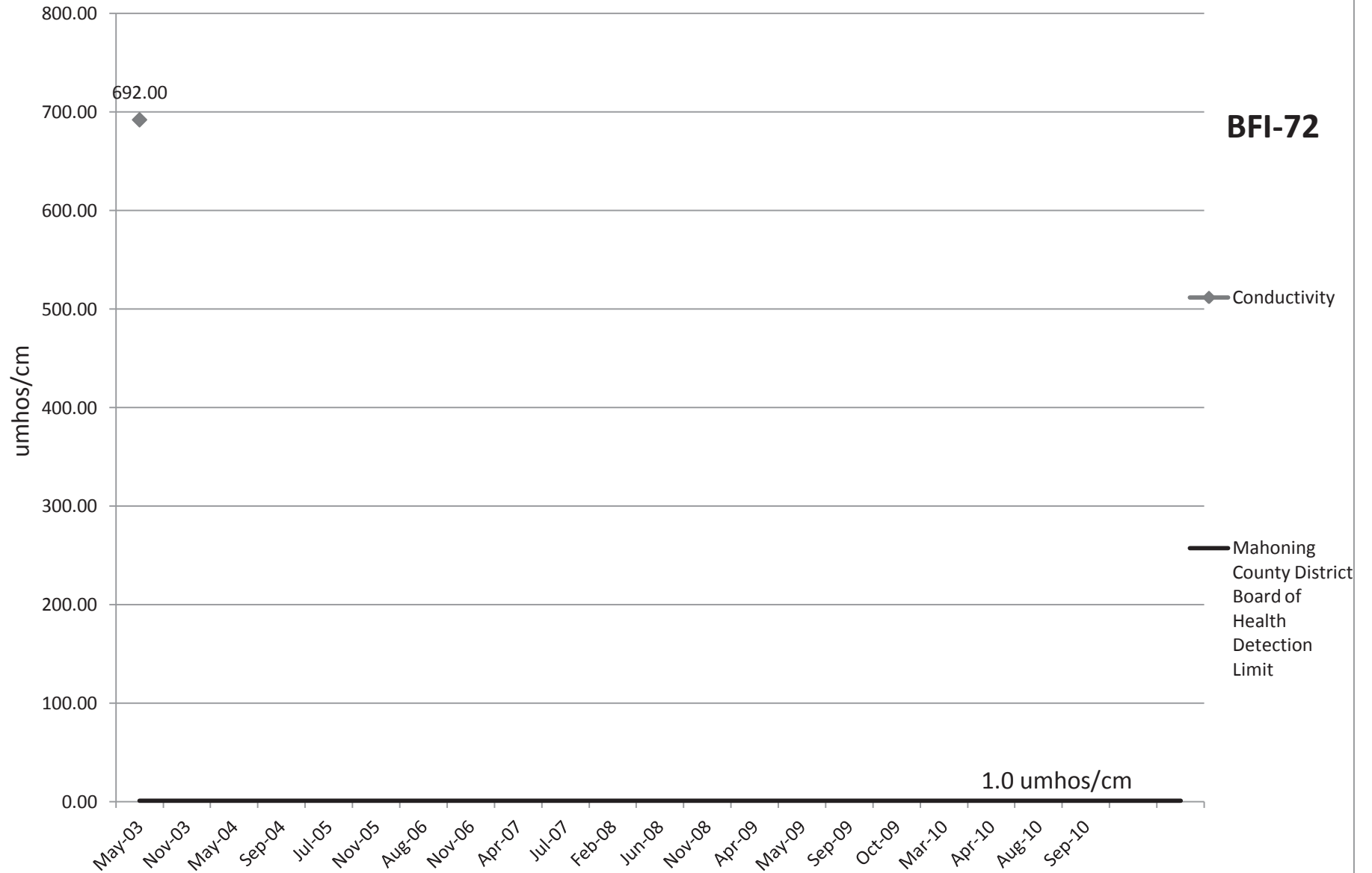
# Ammonia



# Chloride



# Conductivity



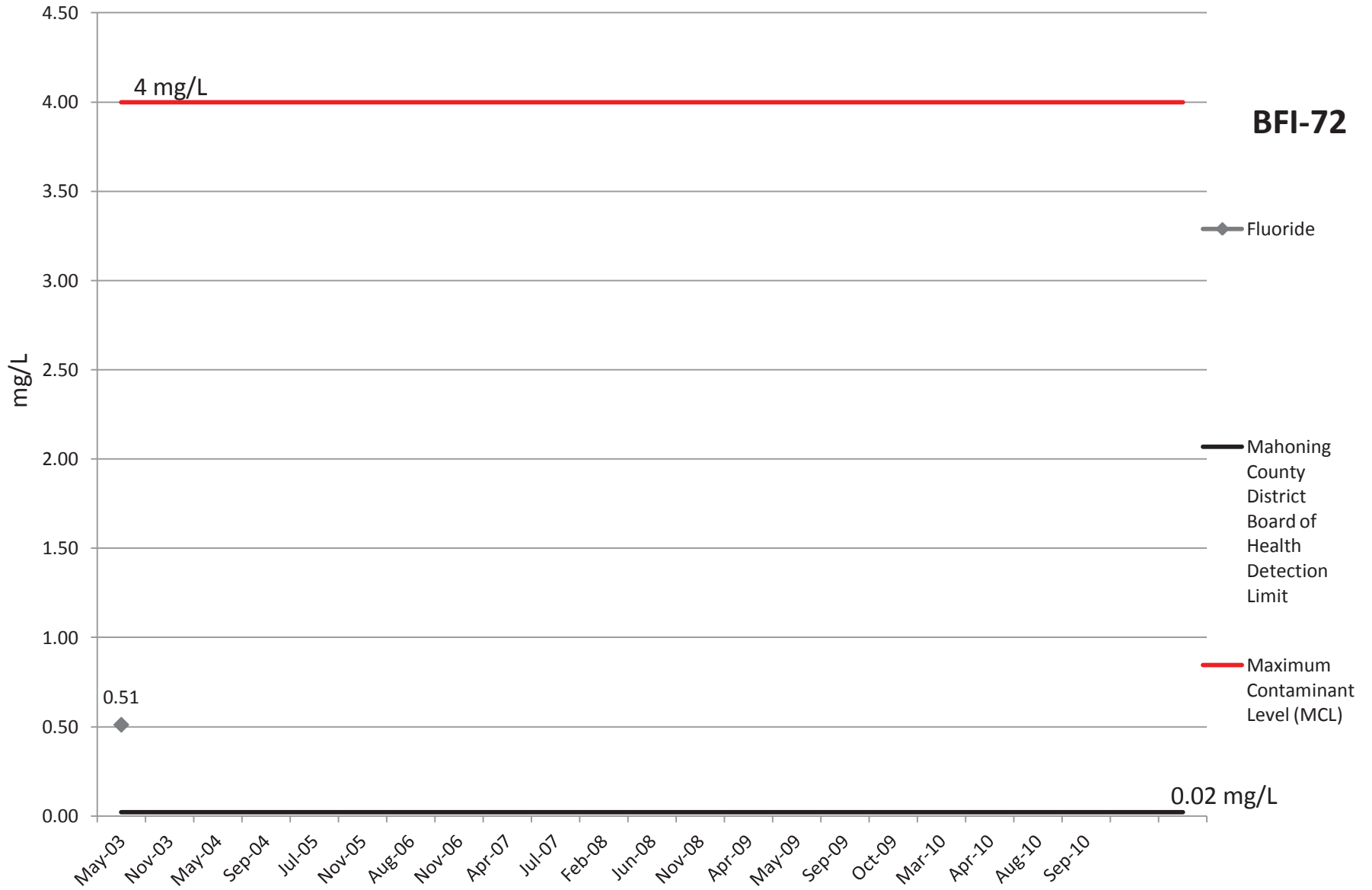
**BFI-72**

—◆— Conductivity

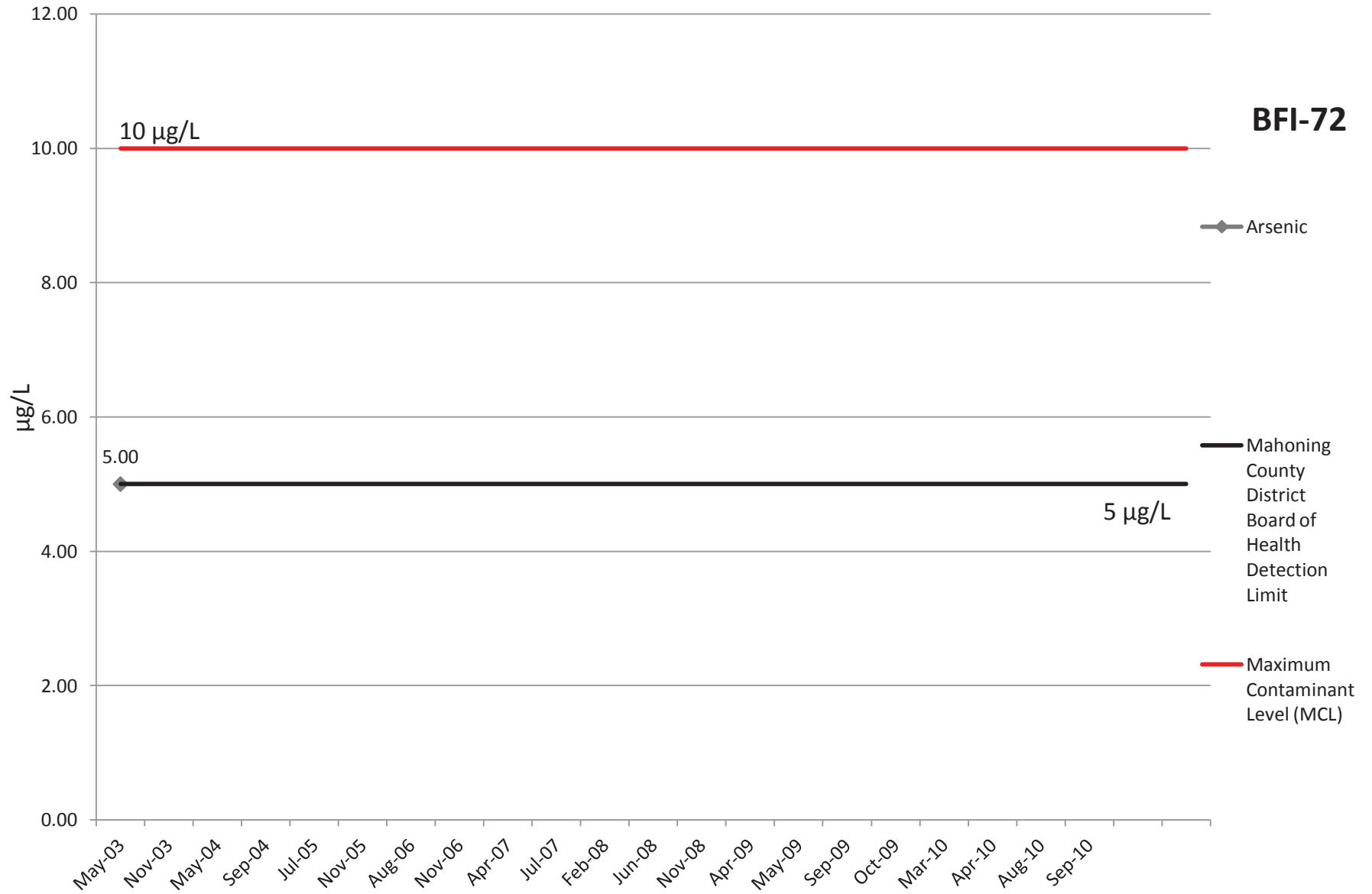
— Mahoning  
County District  
Board of  
Health  
Detection  
Limit

1.0 umhos/cm

# Fluoride



# Arsenic



**BFI-72**

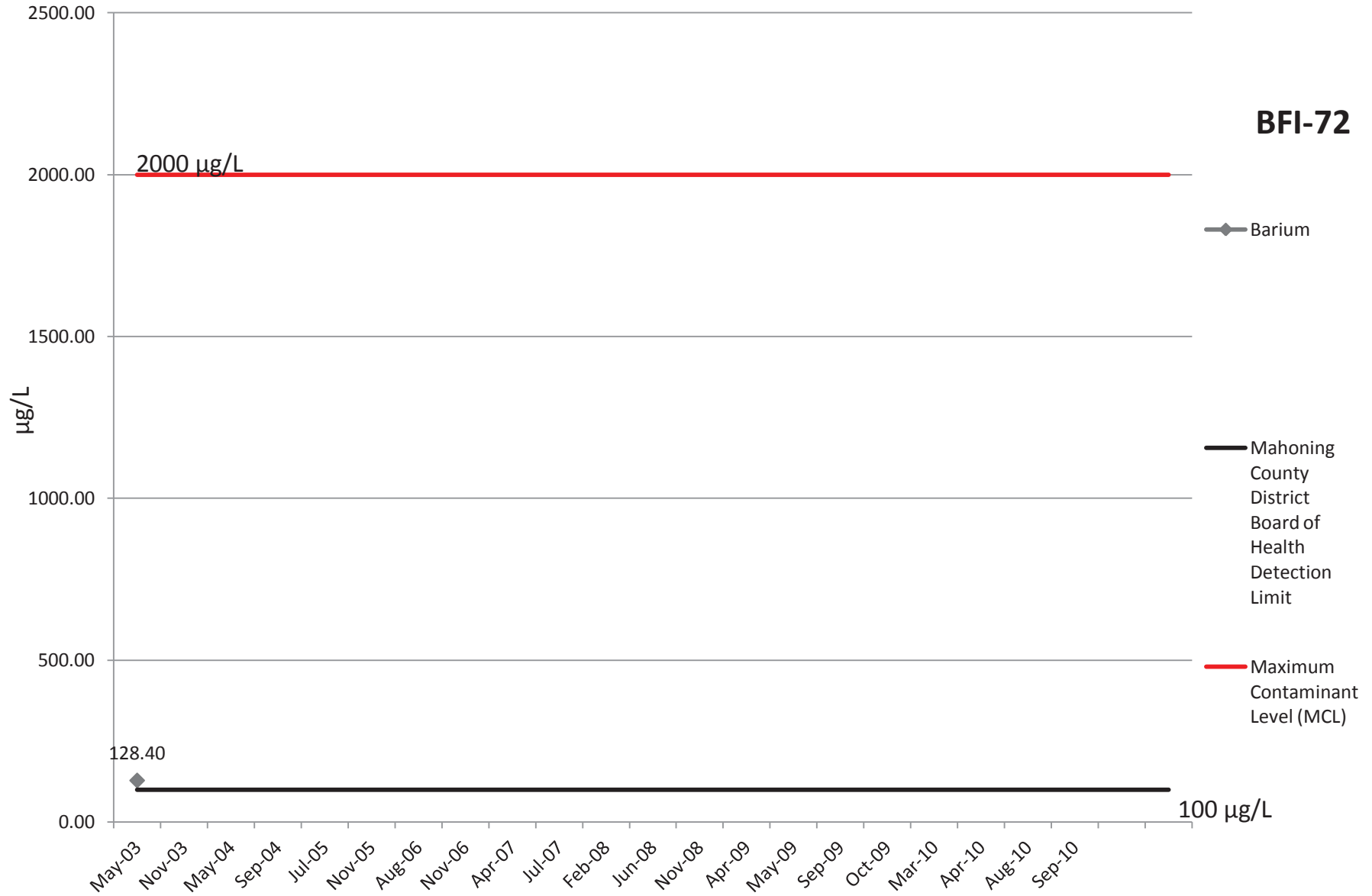
◆ Arsenic

— Mahoning County District Board of Health Detection Limit

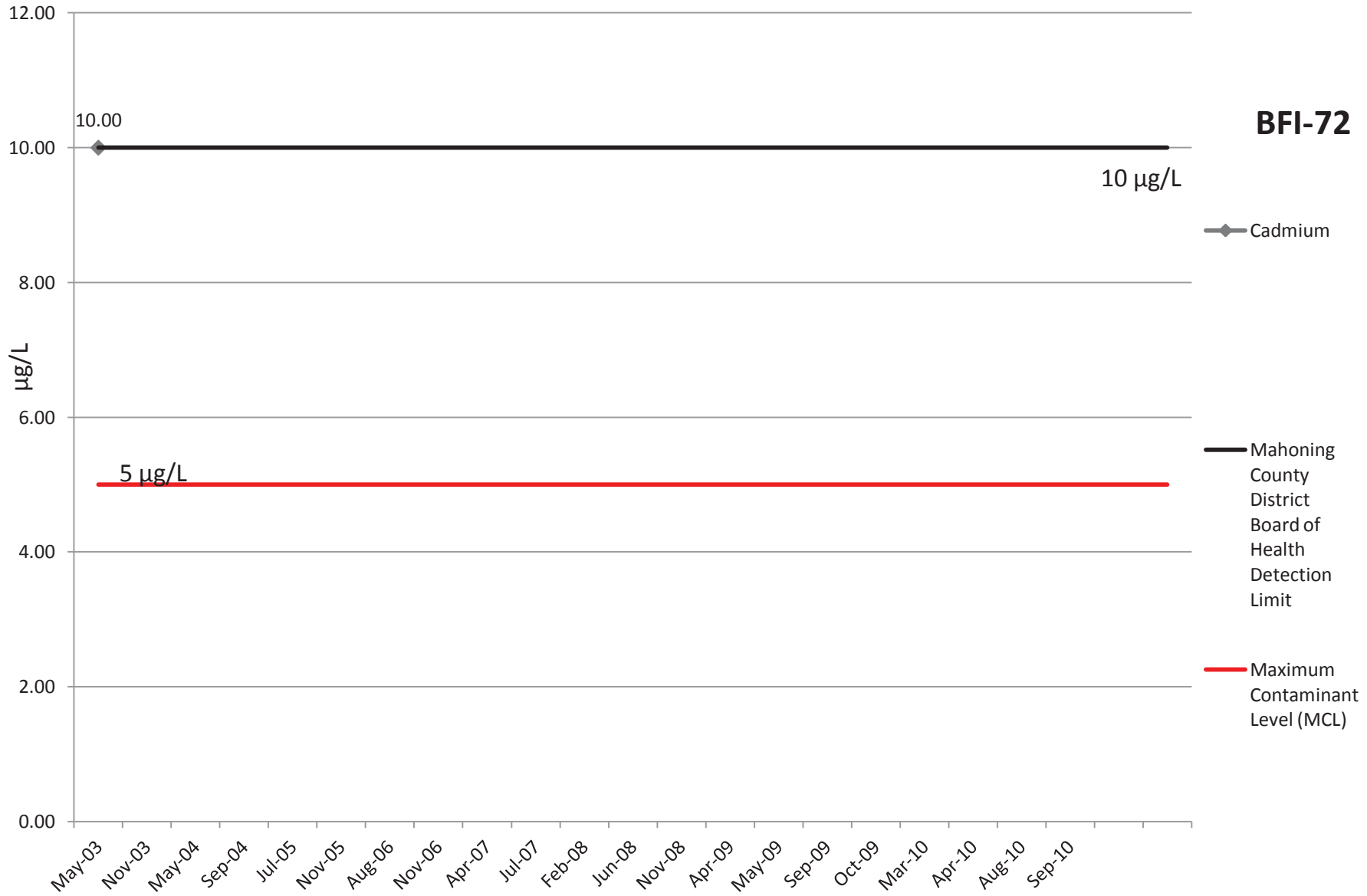
— Maximum Contaminant Level (MCL)

# Barium

**BFI-72**



# Cadmium



**BFI-72**

10 µg/L

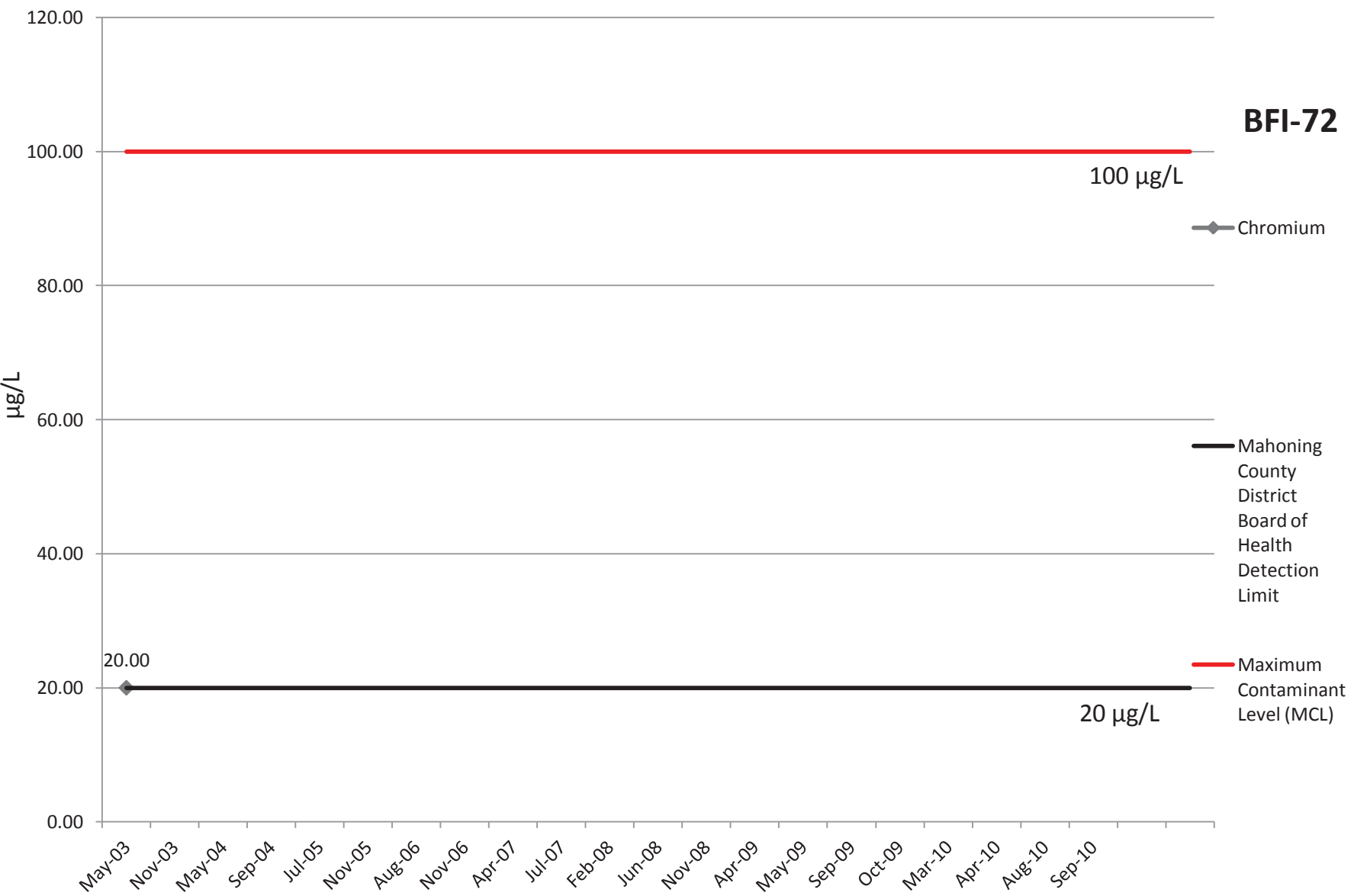
◆ Cadmium

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

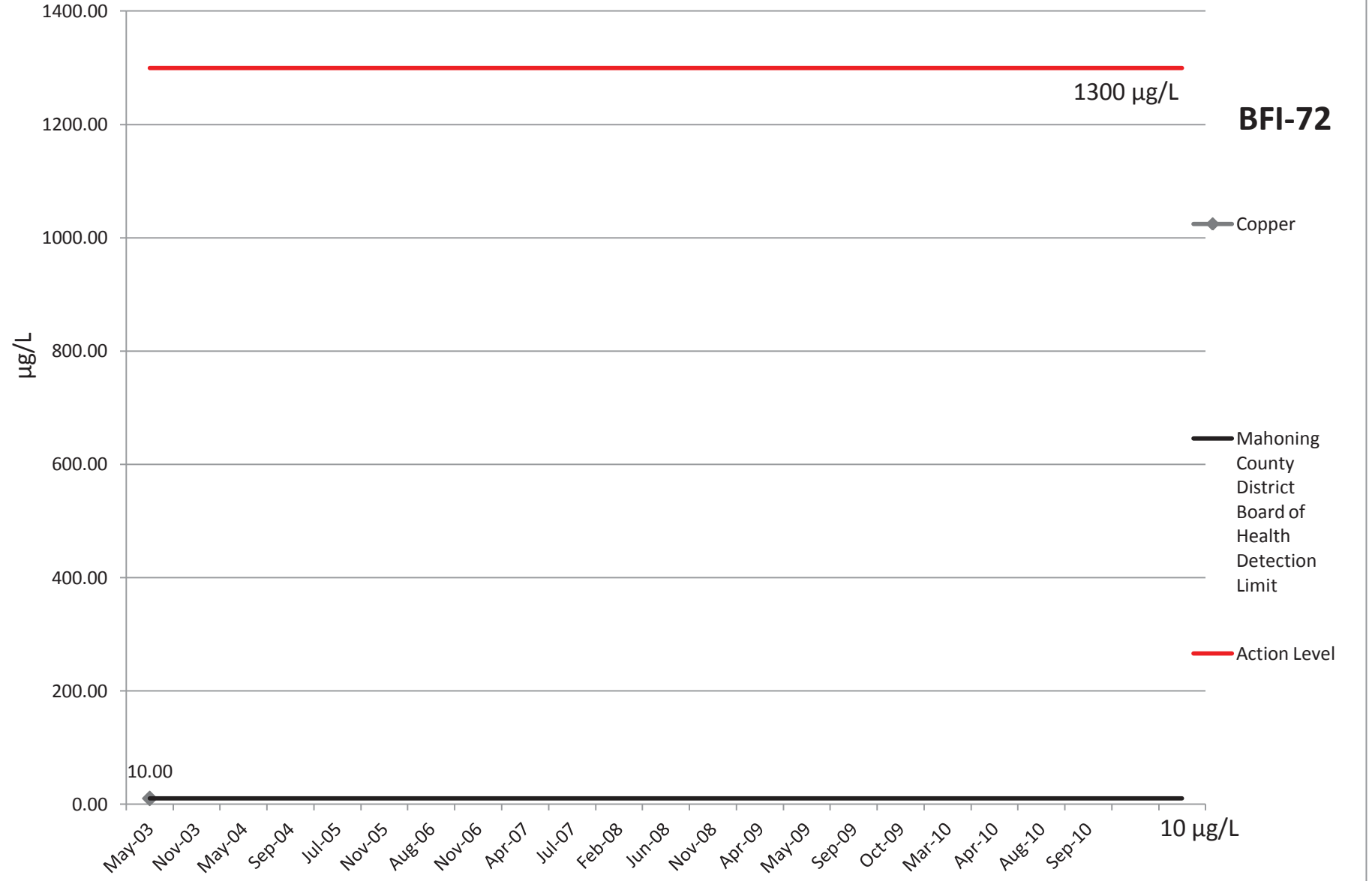
# Chromium

**BFI-72**





# Copper



1300 µg/L

**BFI-72**

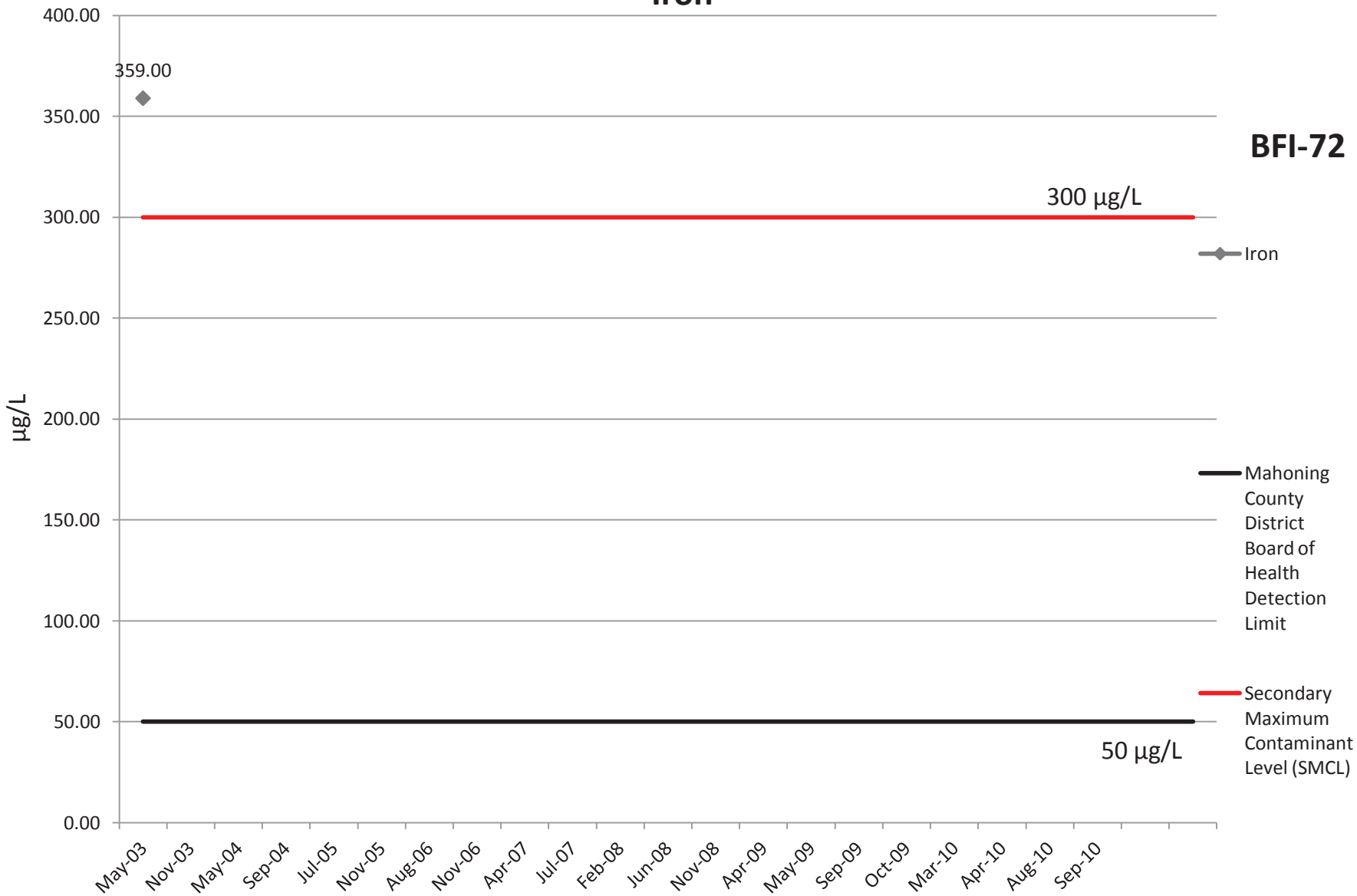
◆ Copper

— Mahoning County District Board of Health Detection Limit

— Action Level

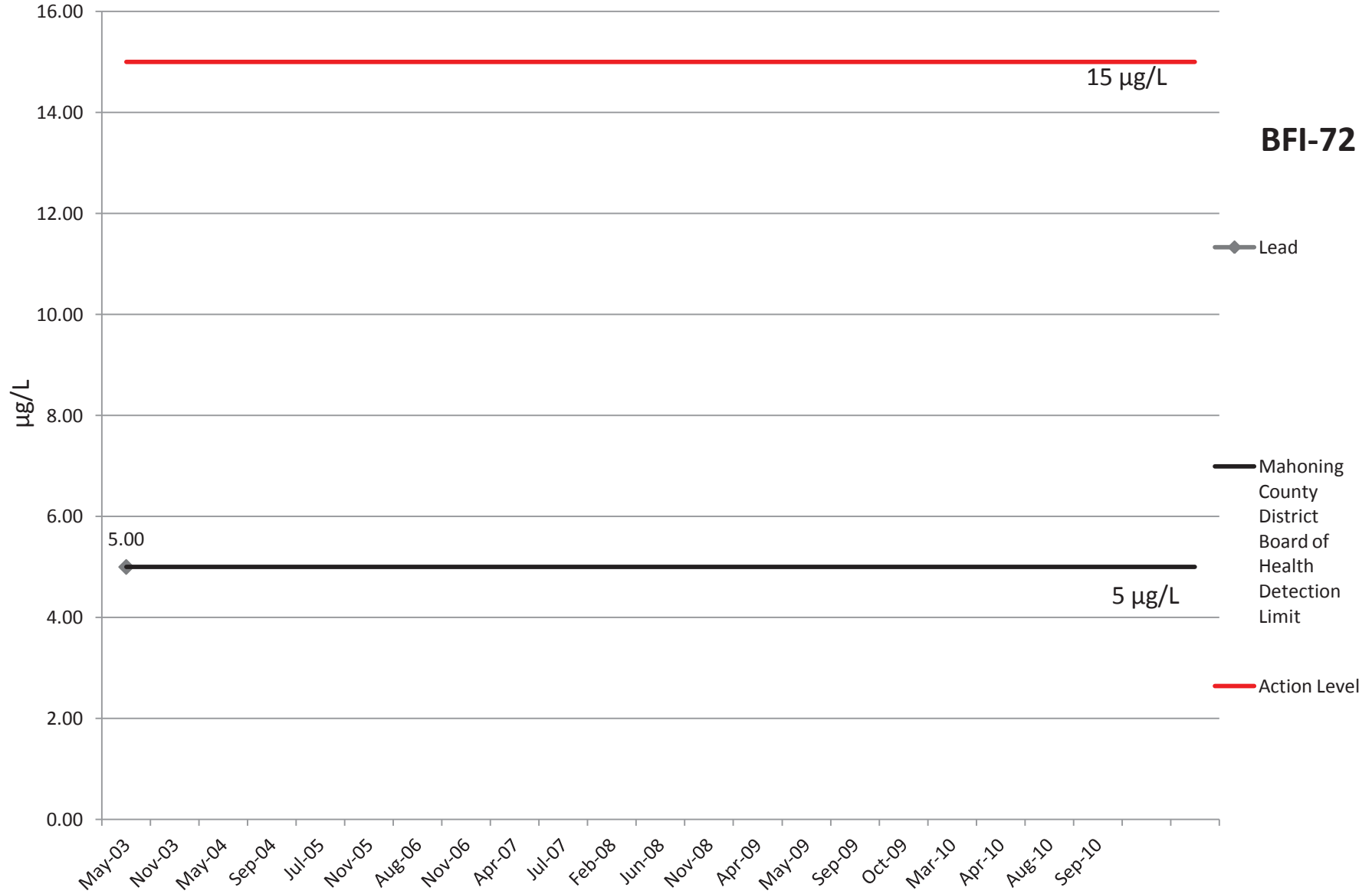
10 µg/L

# Iron

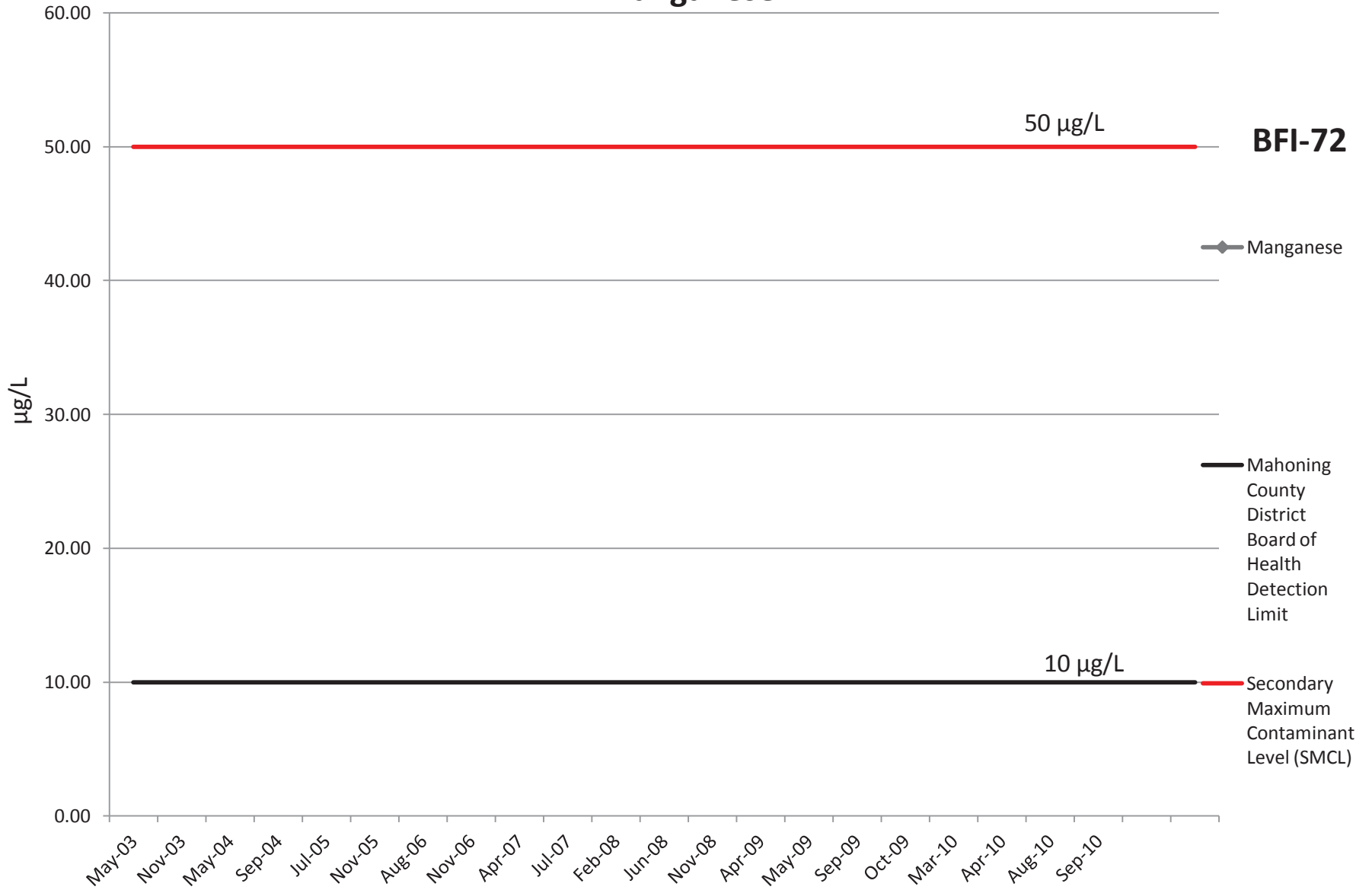


# Lead

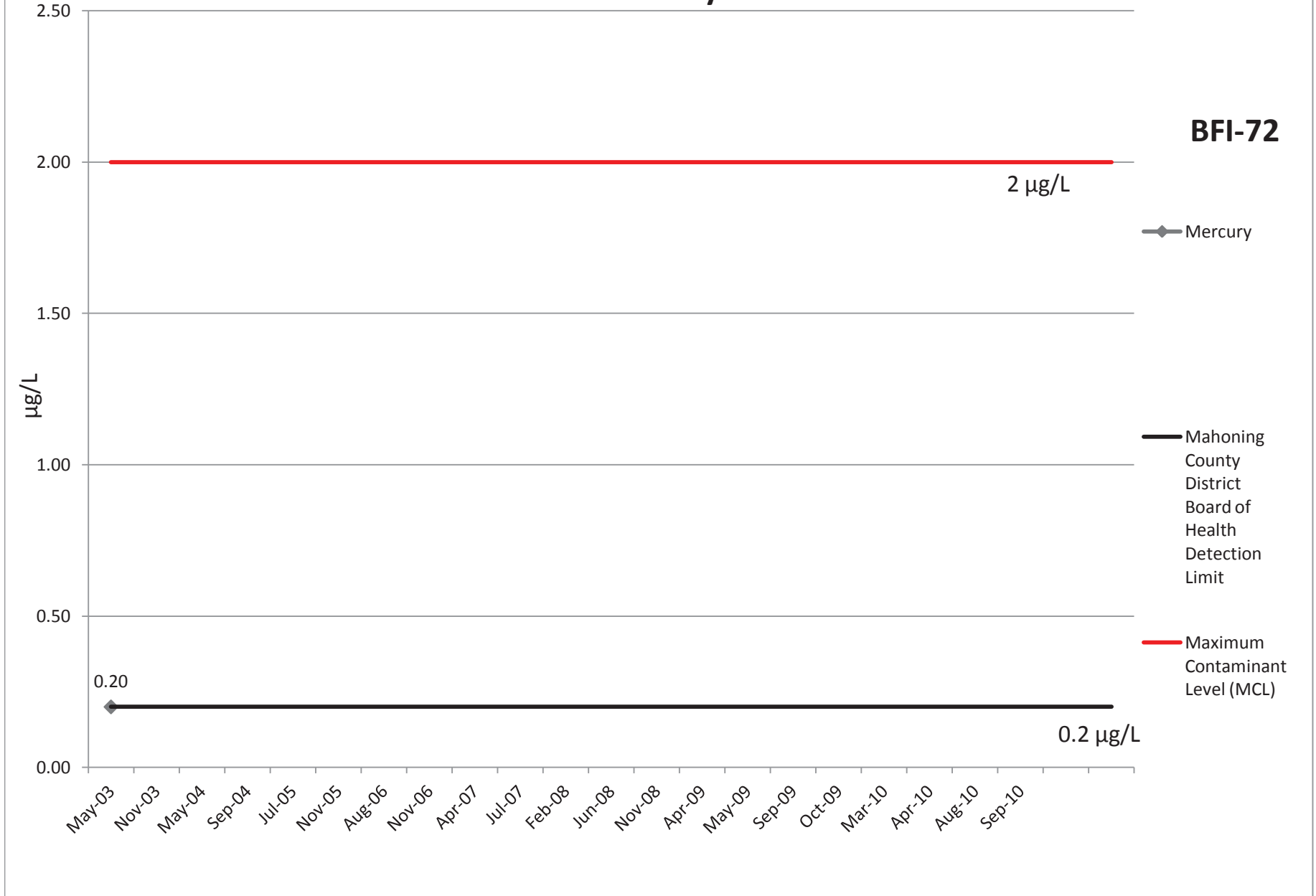
**BFI-72**



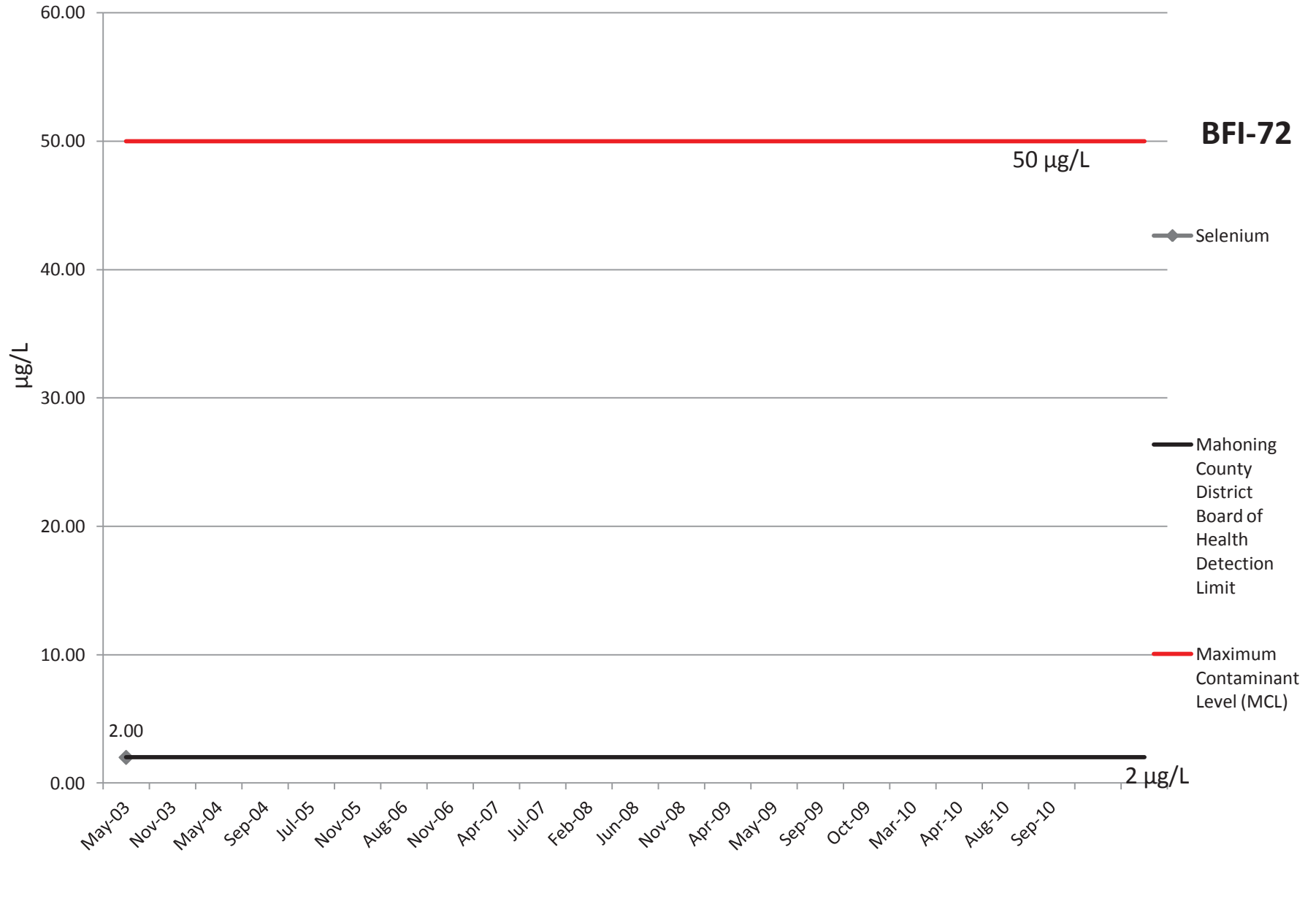
# Manganese



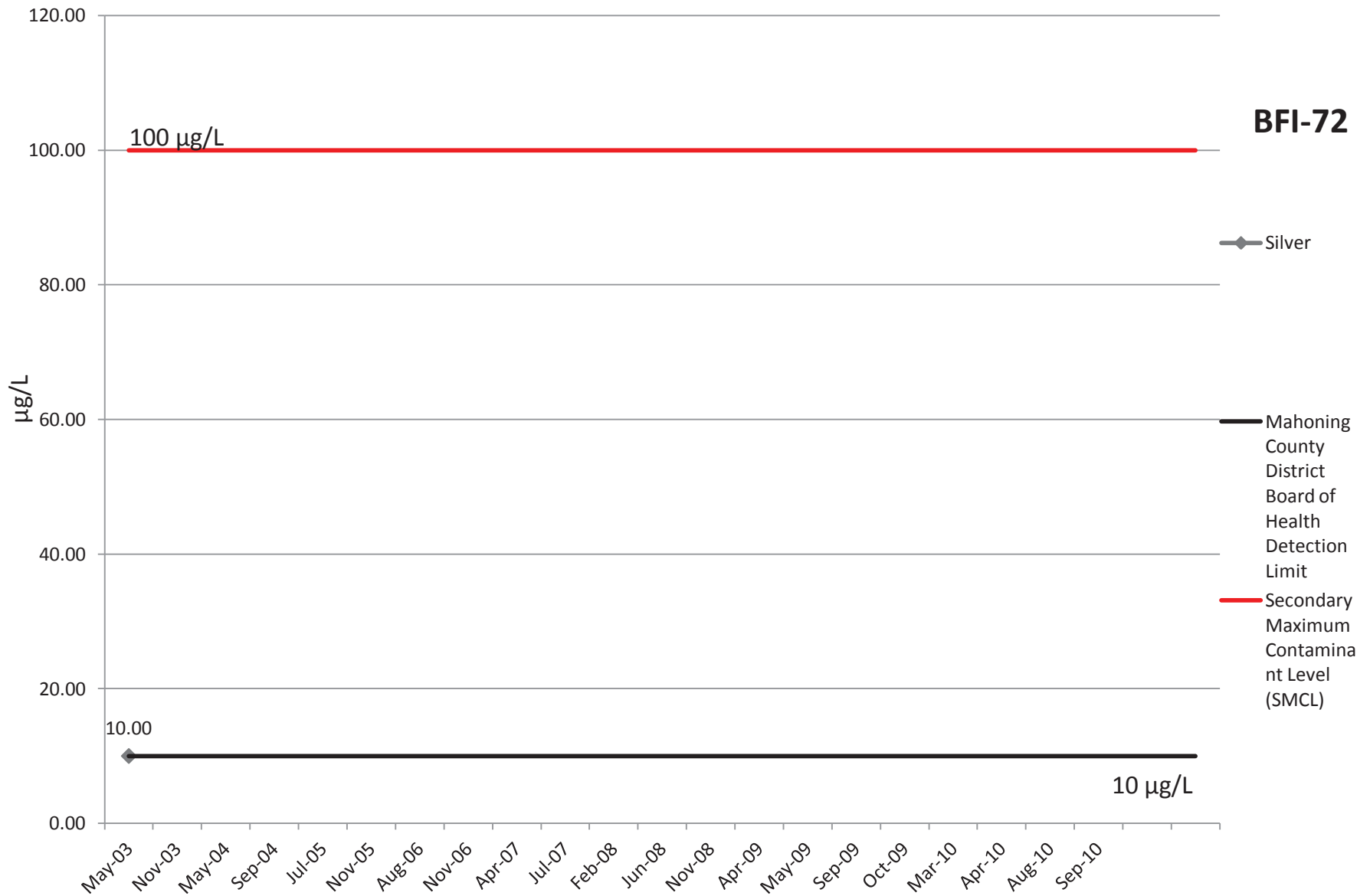
# Mercury



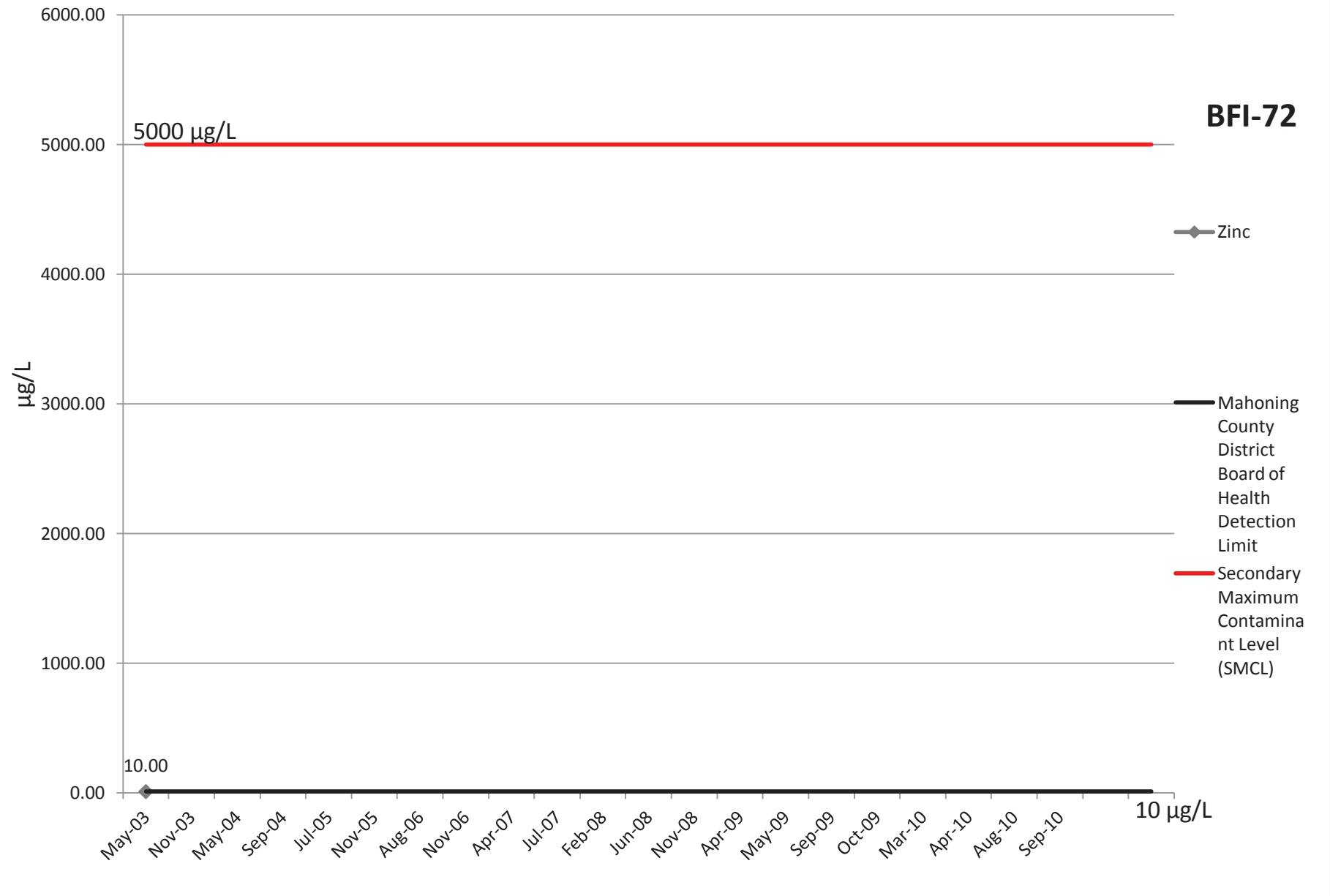
# Selenium



# Silver

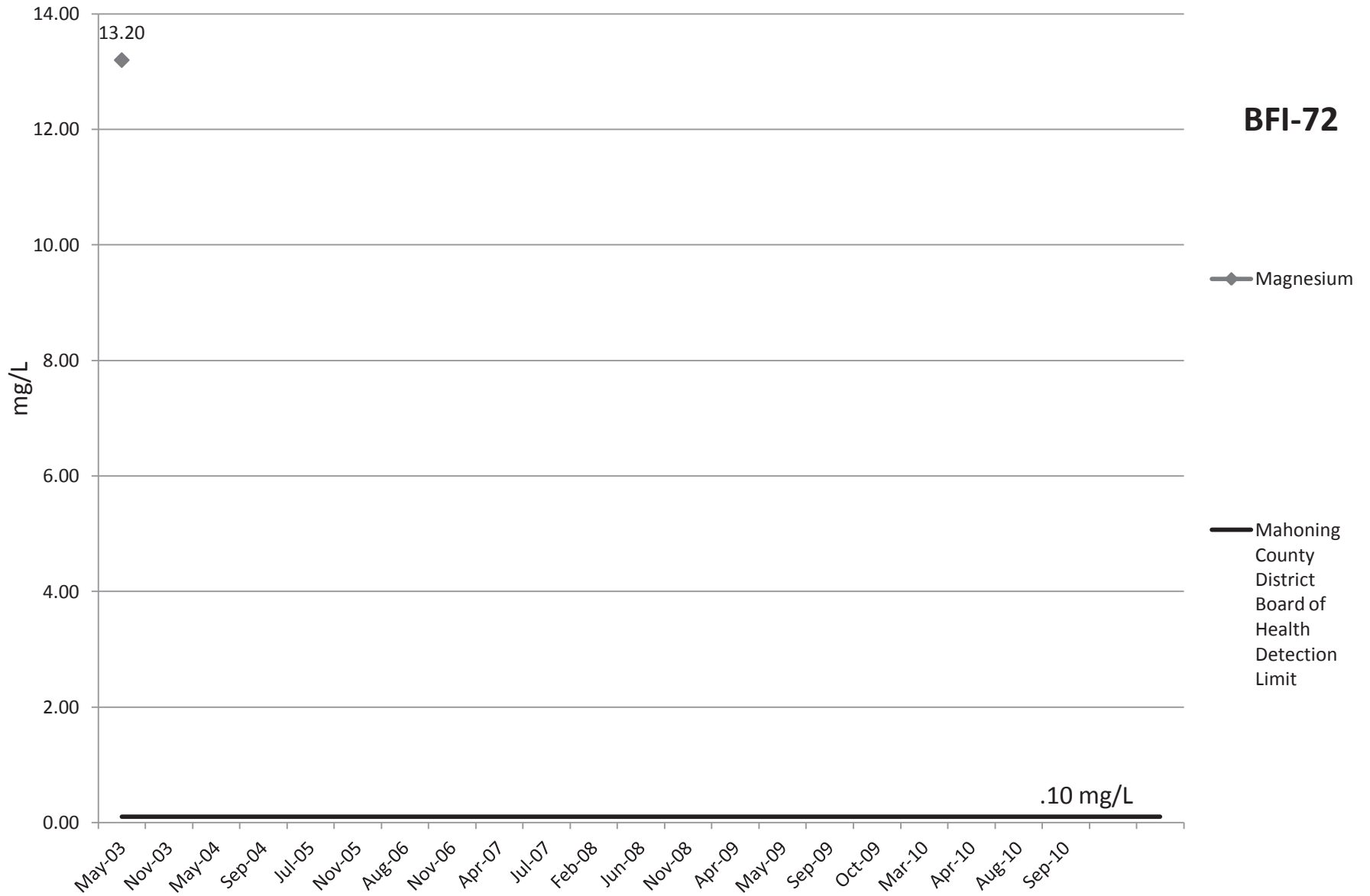


# Zinc

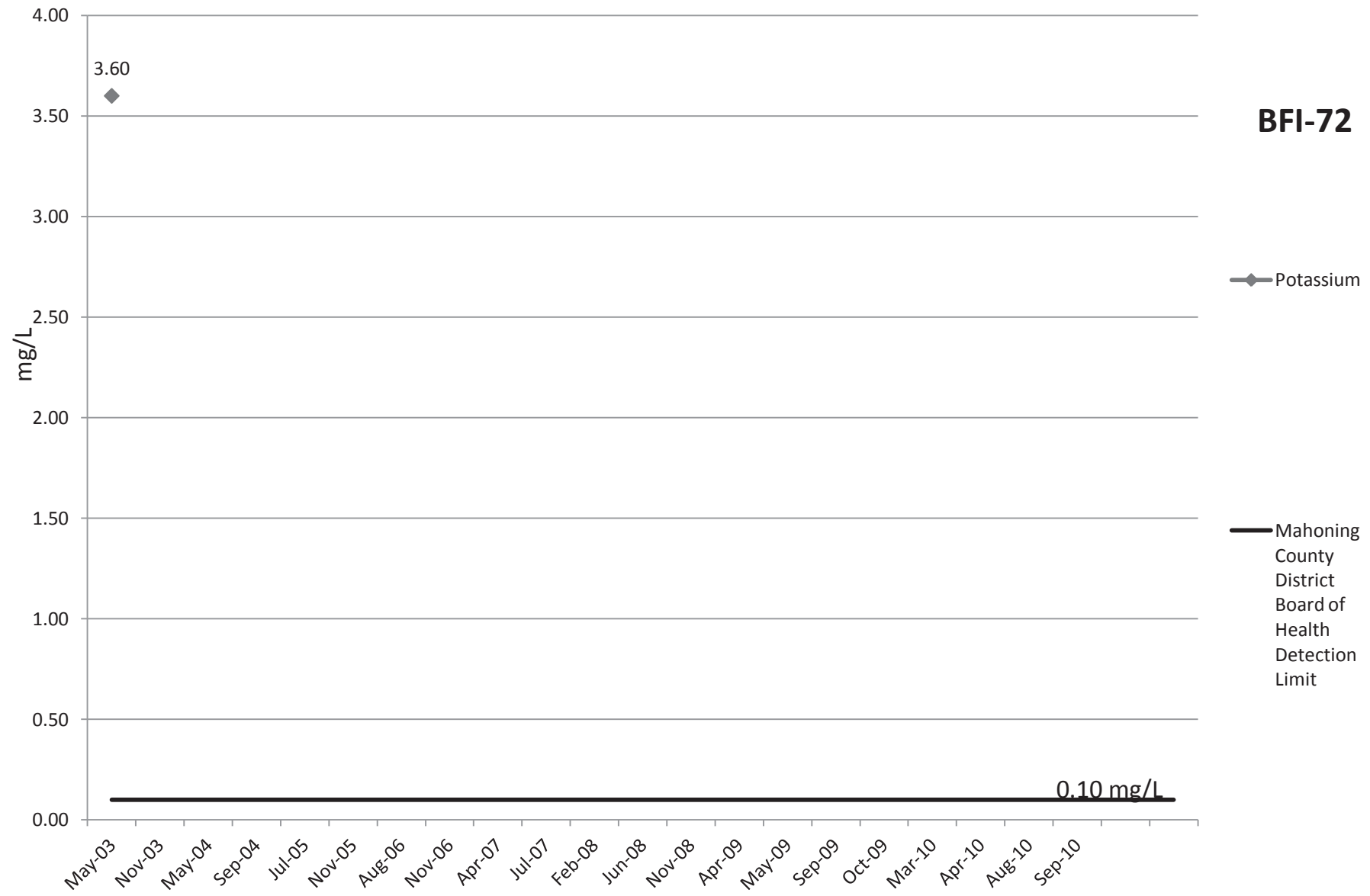




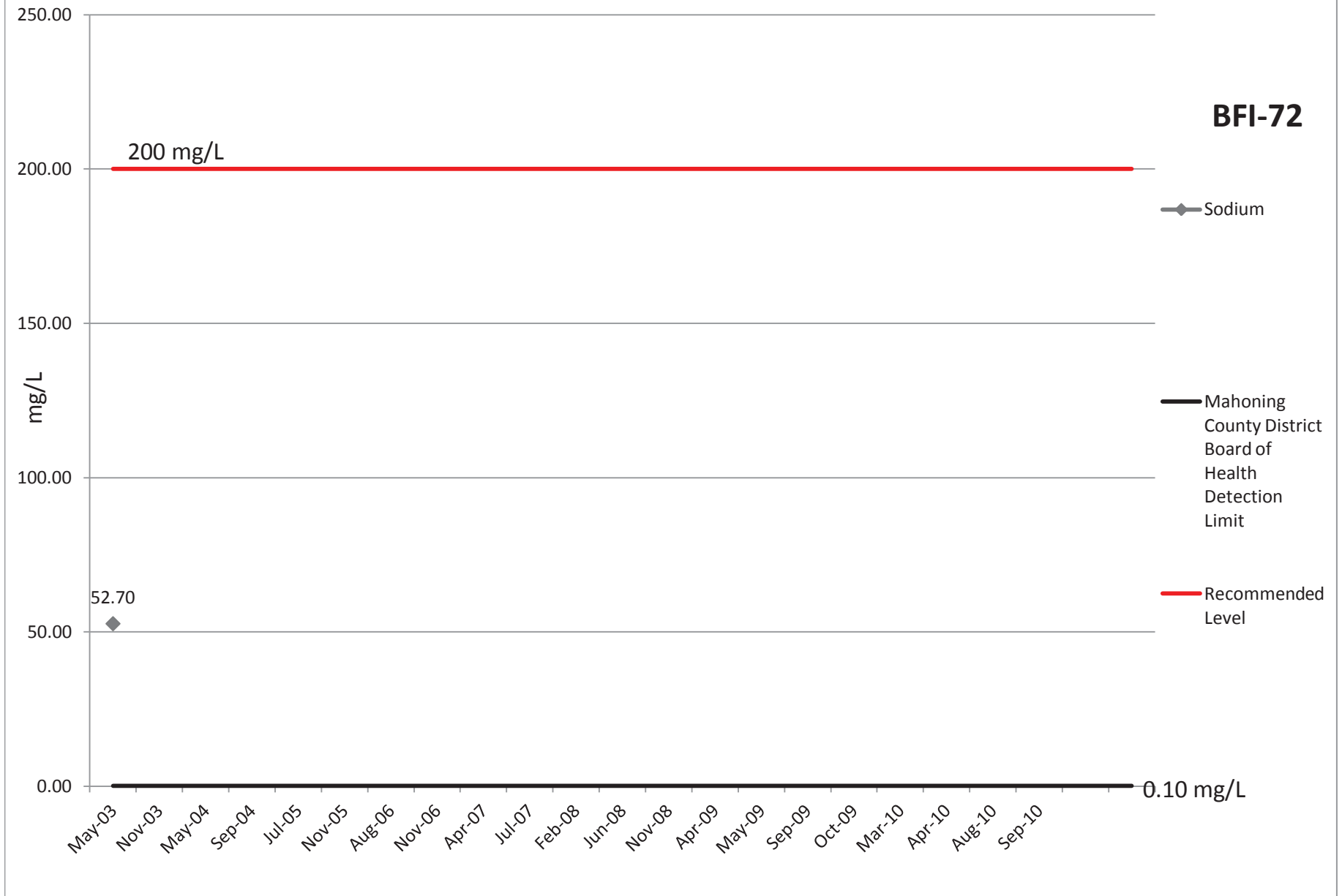
# Magnesium



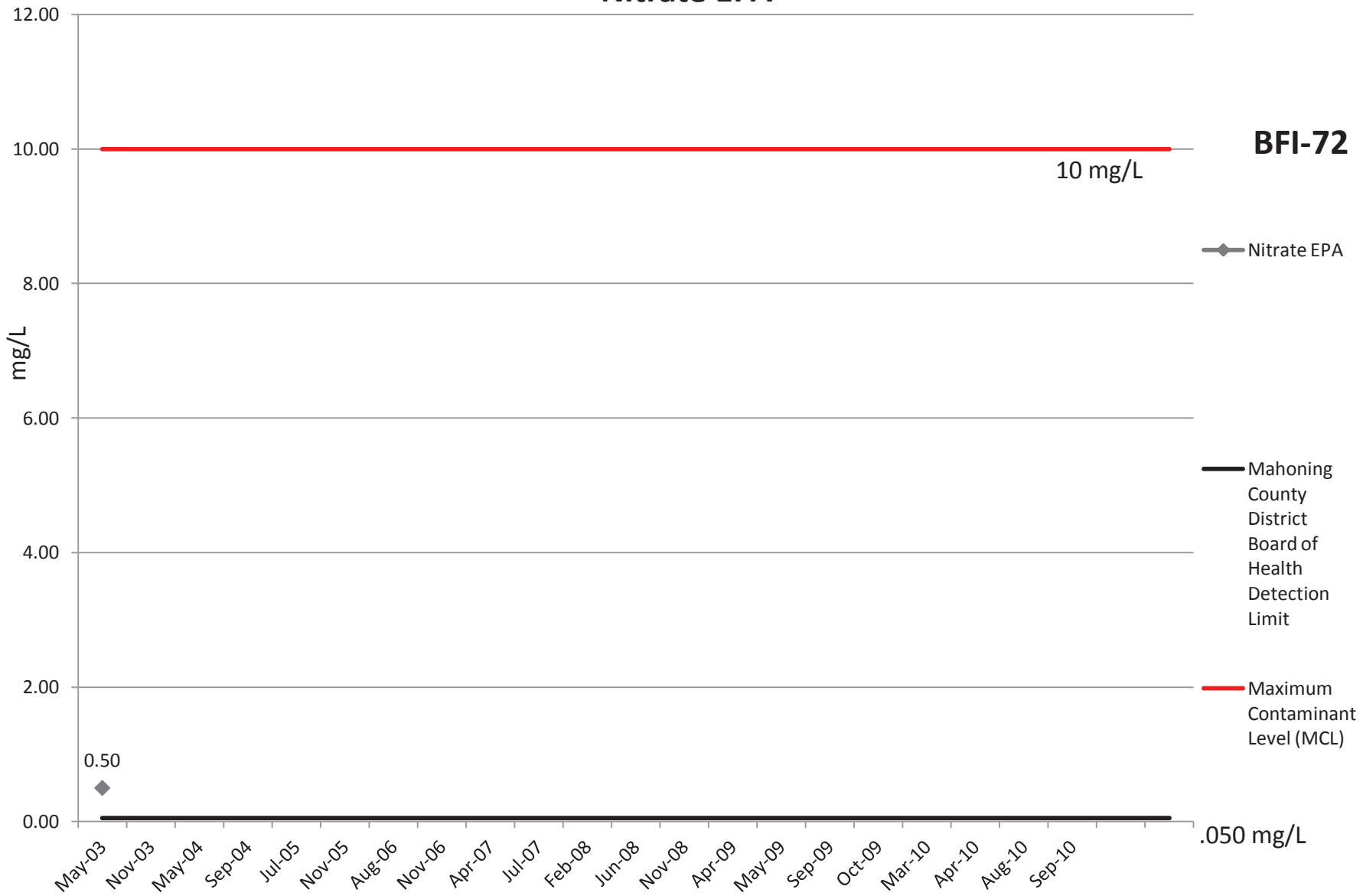
# Potassium



# Sodium



# Nitrate EPA



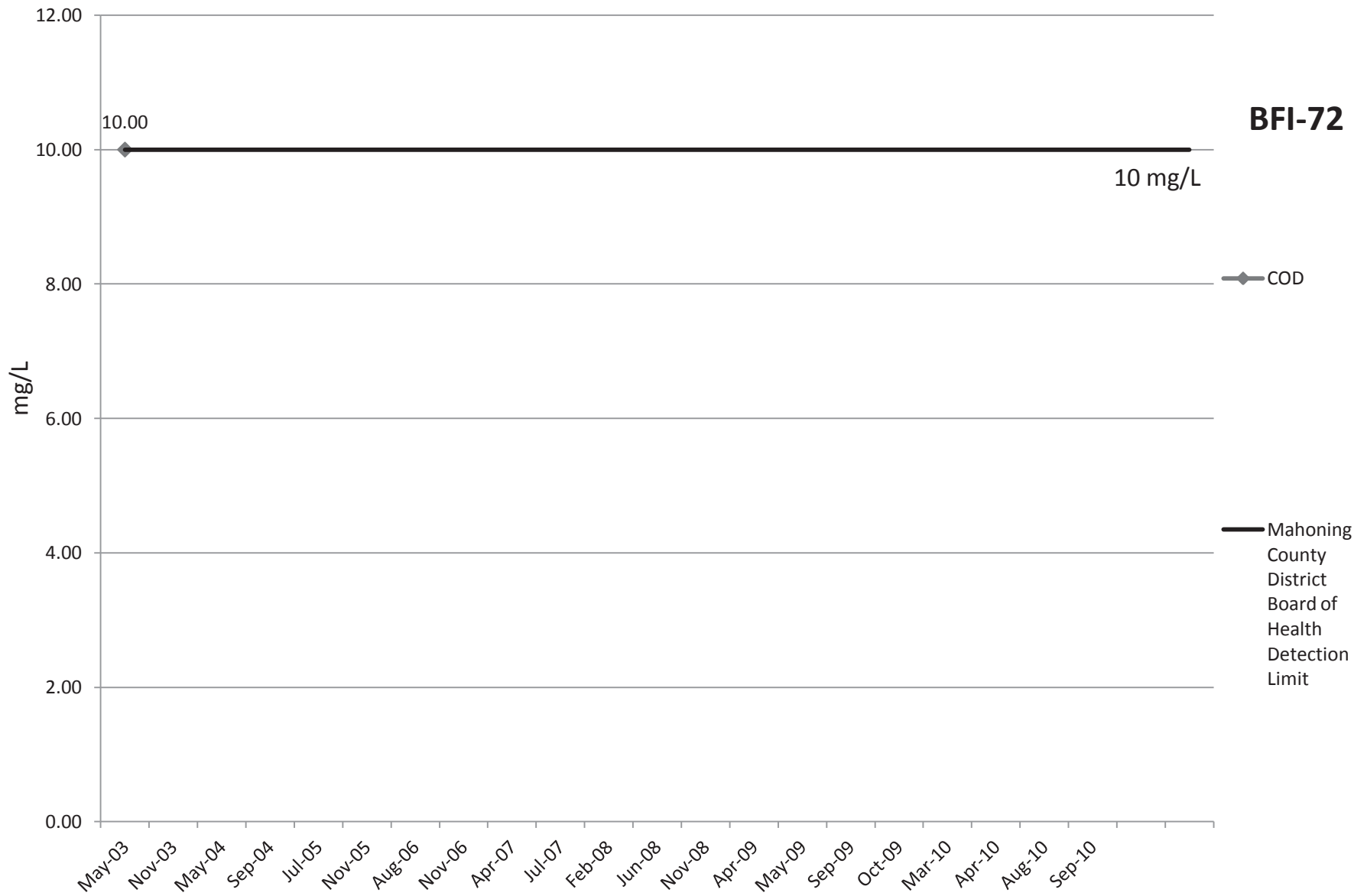
**BFI-72**

◆ Nitrate EPA

— Mahoning County District Board of Health Detection Limit

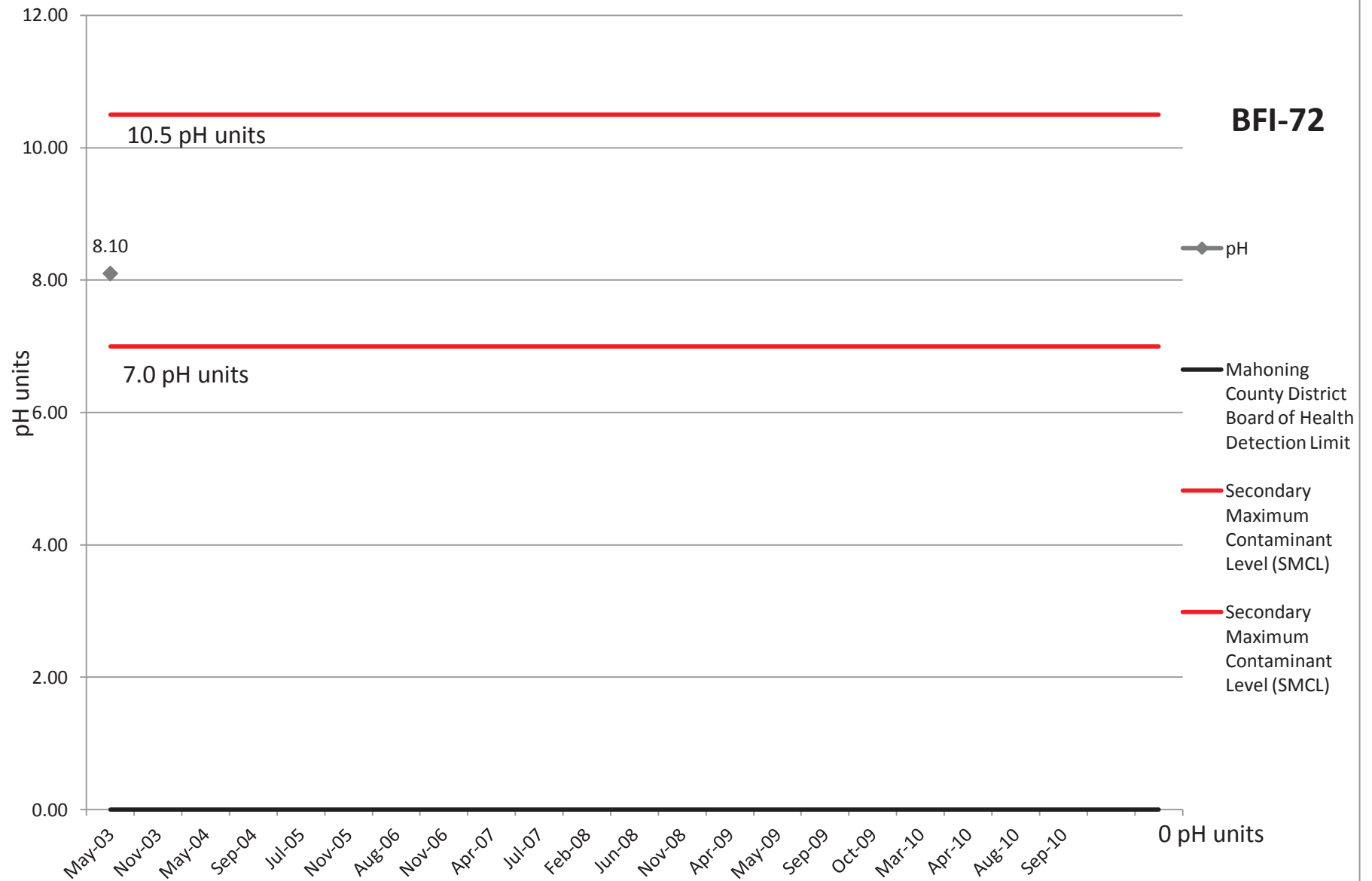
— Maximum Contaminant Level (MCL)

# COD

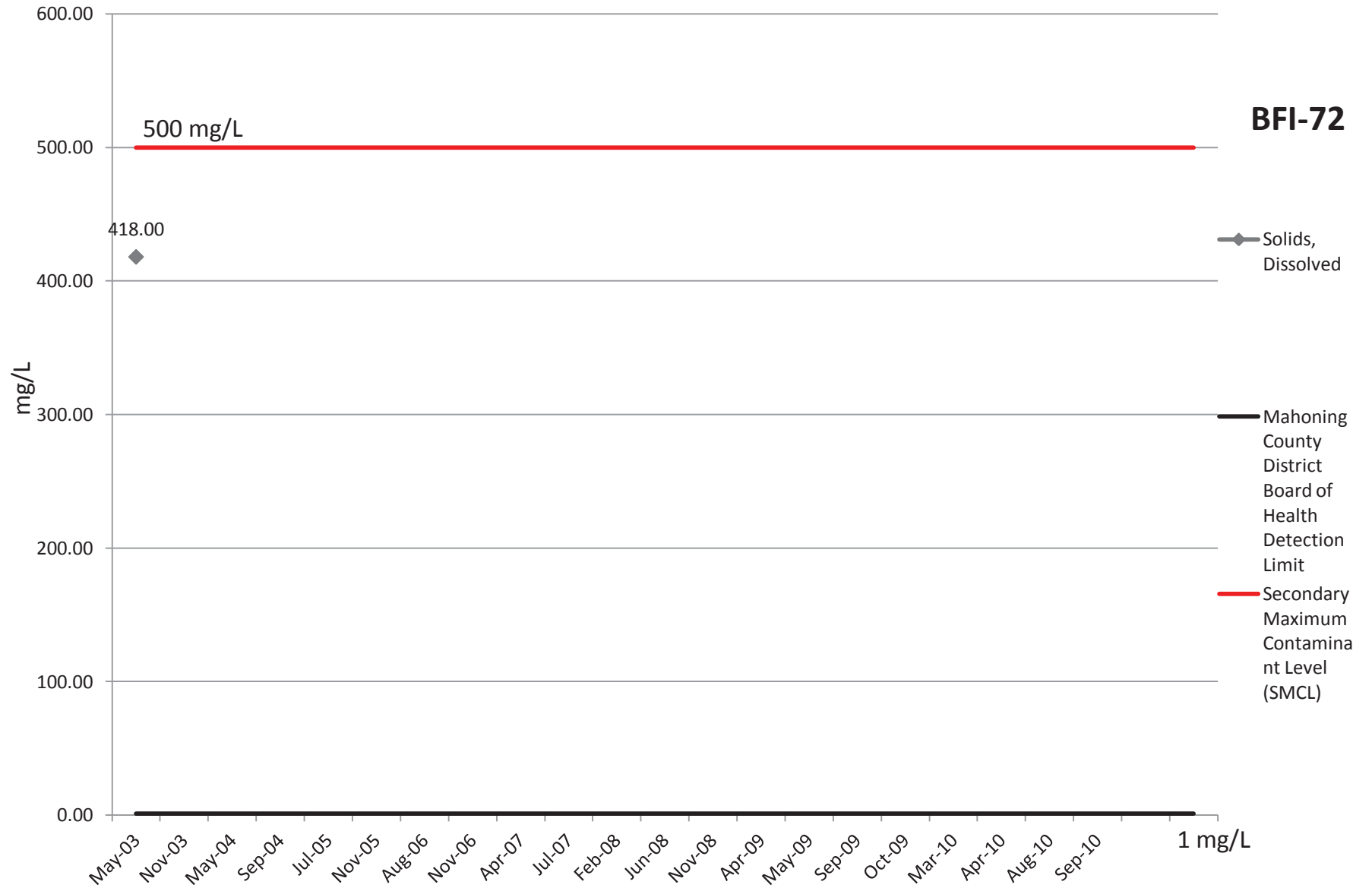


# pH

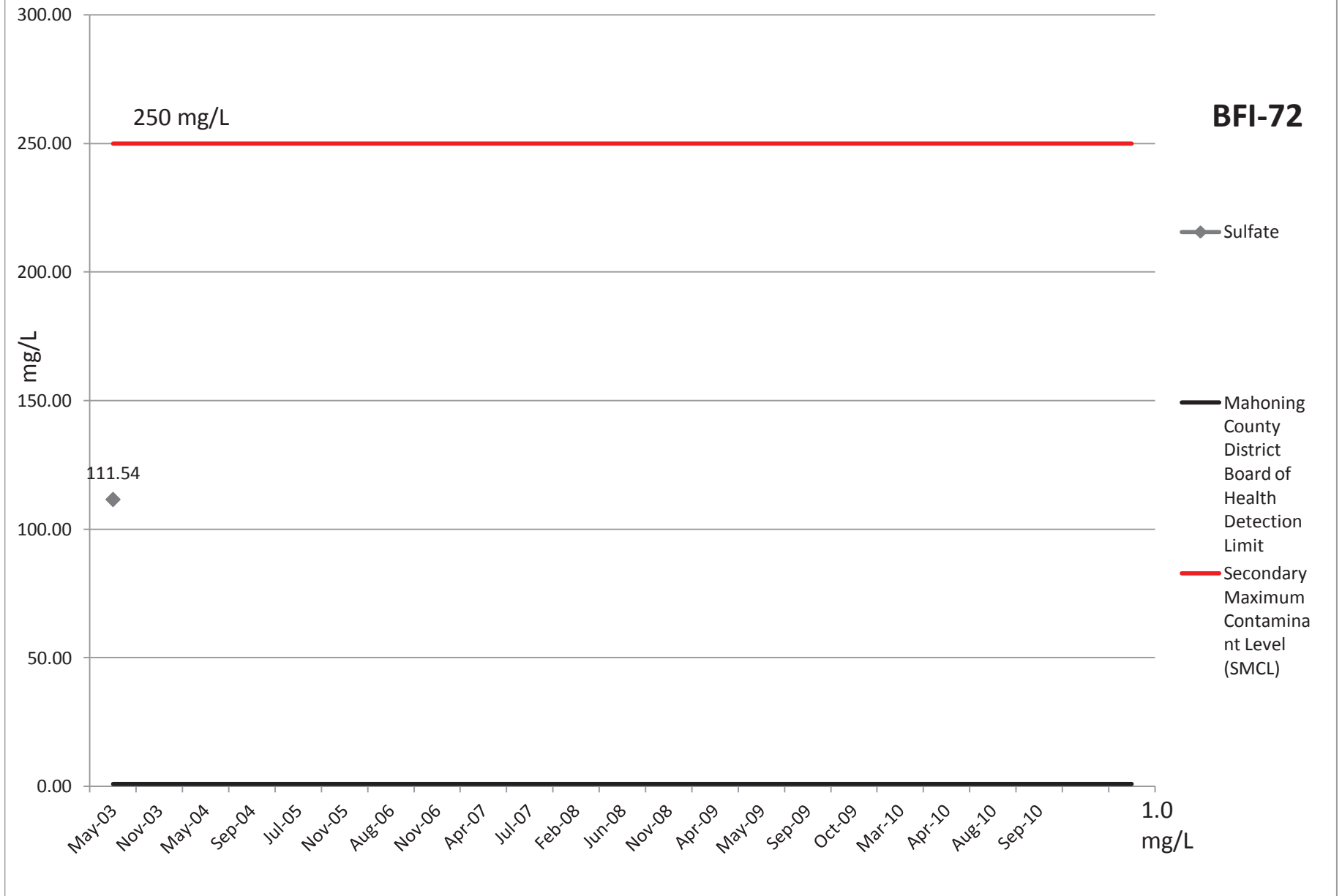
**BFI-72**



# Solids, Dissolved



# Sulfate





# Bacteria

**BFI-72**

Positive/Negative

1.00

positive (1)

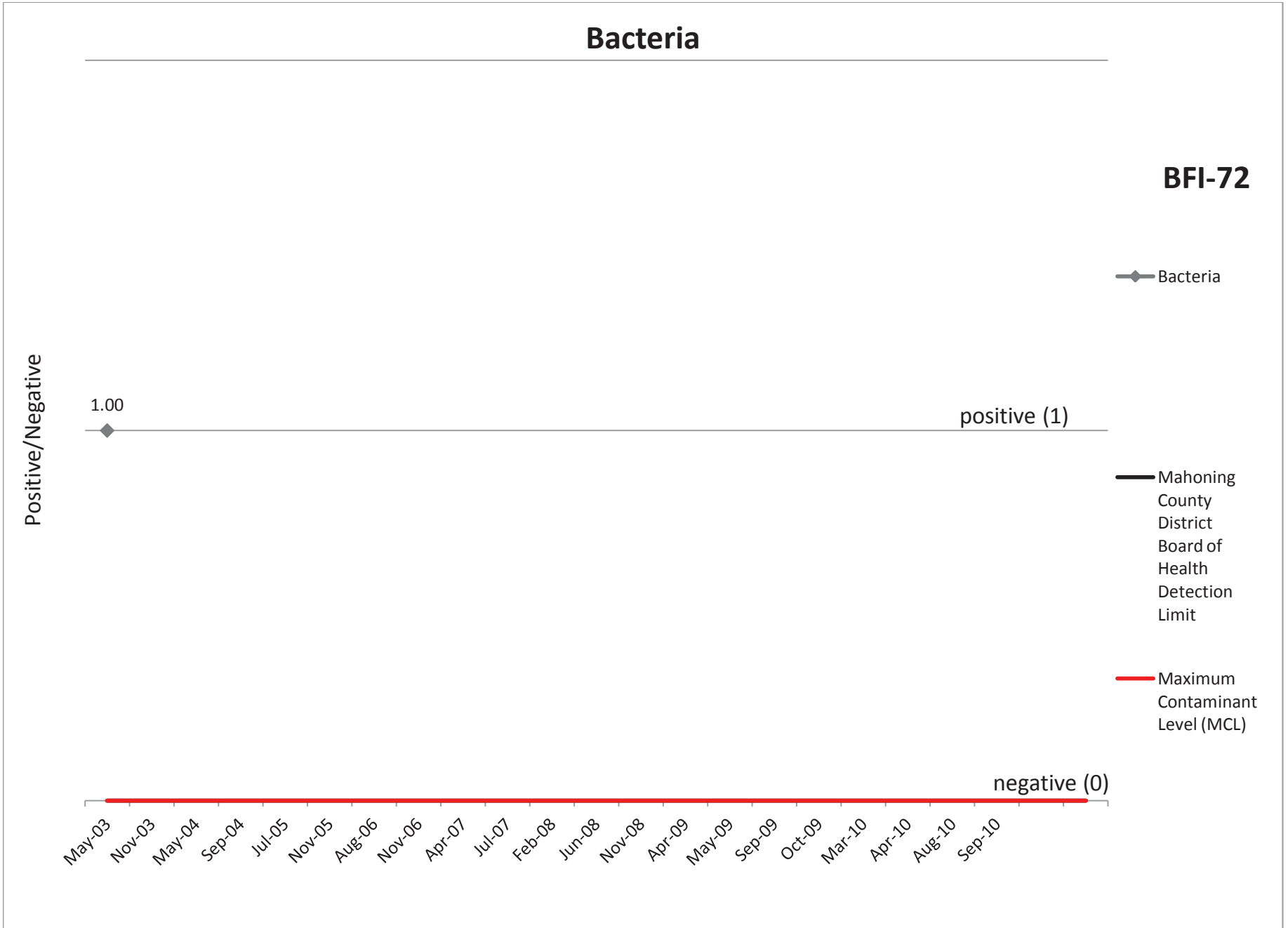
negative (0)

◆ Bacteria

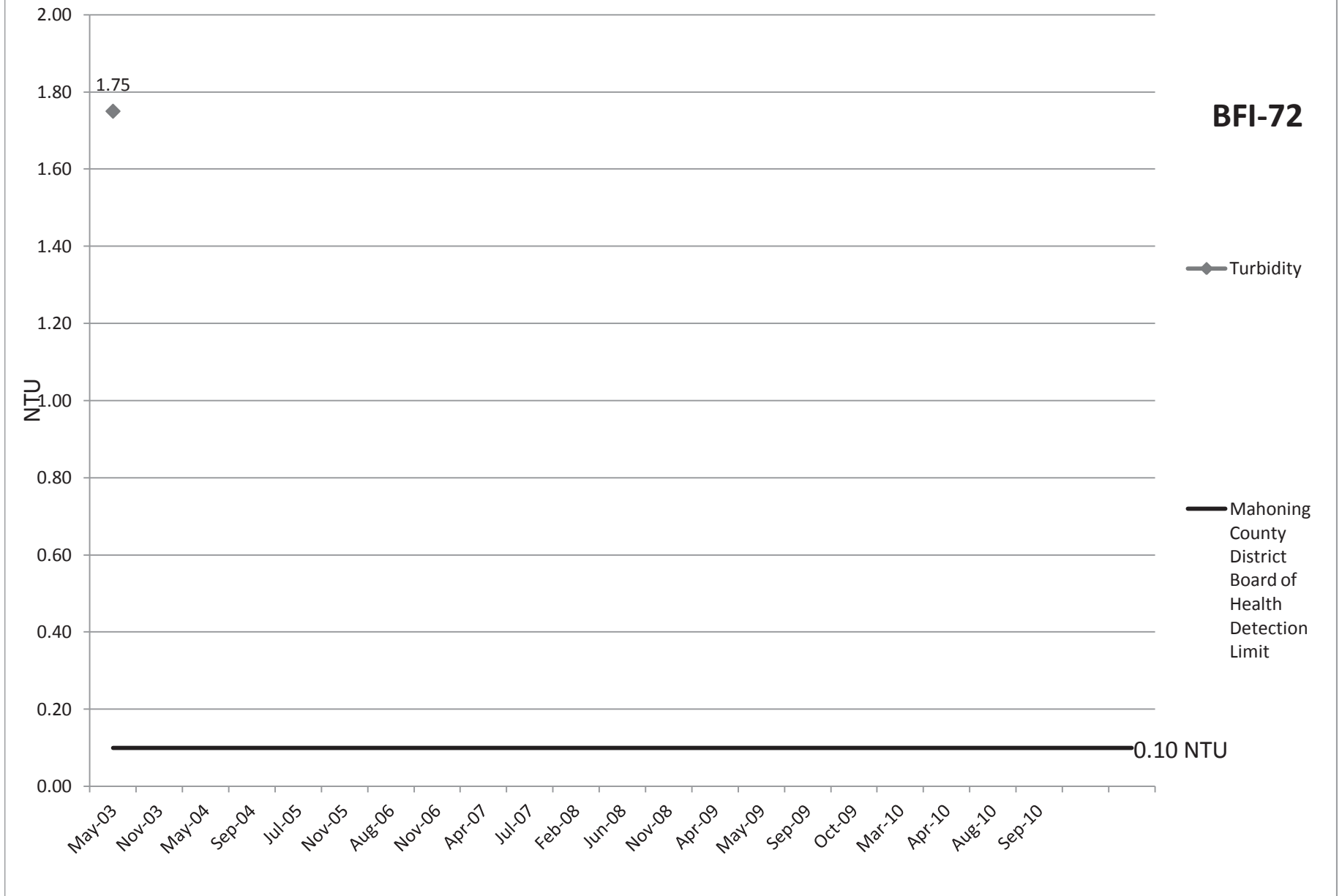
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

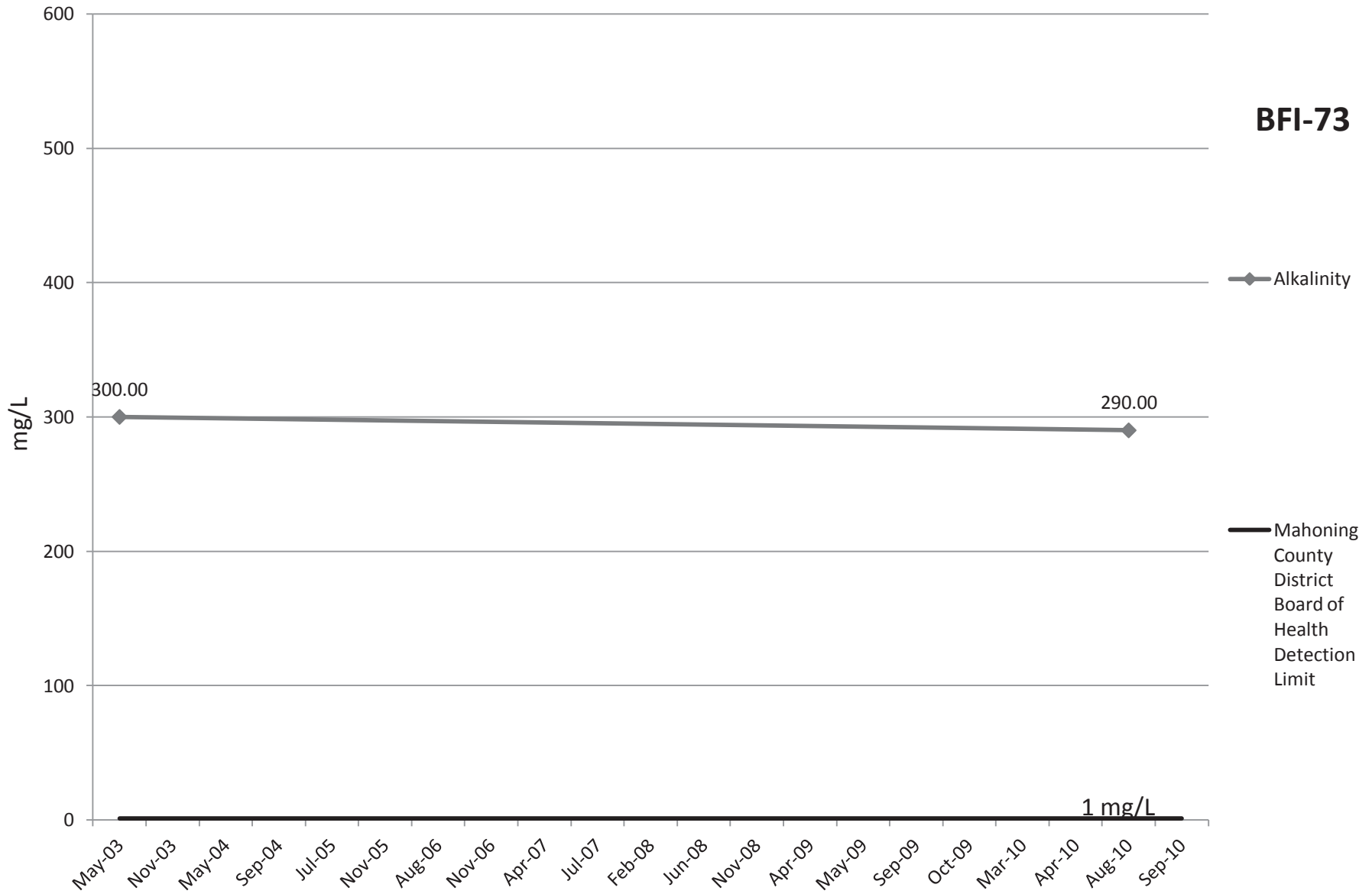


# Turbidity

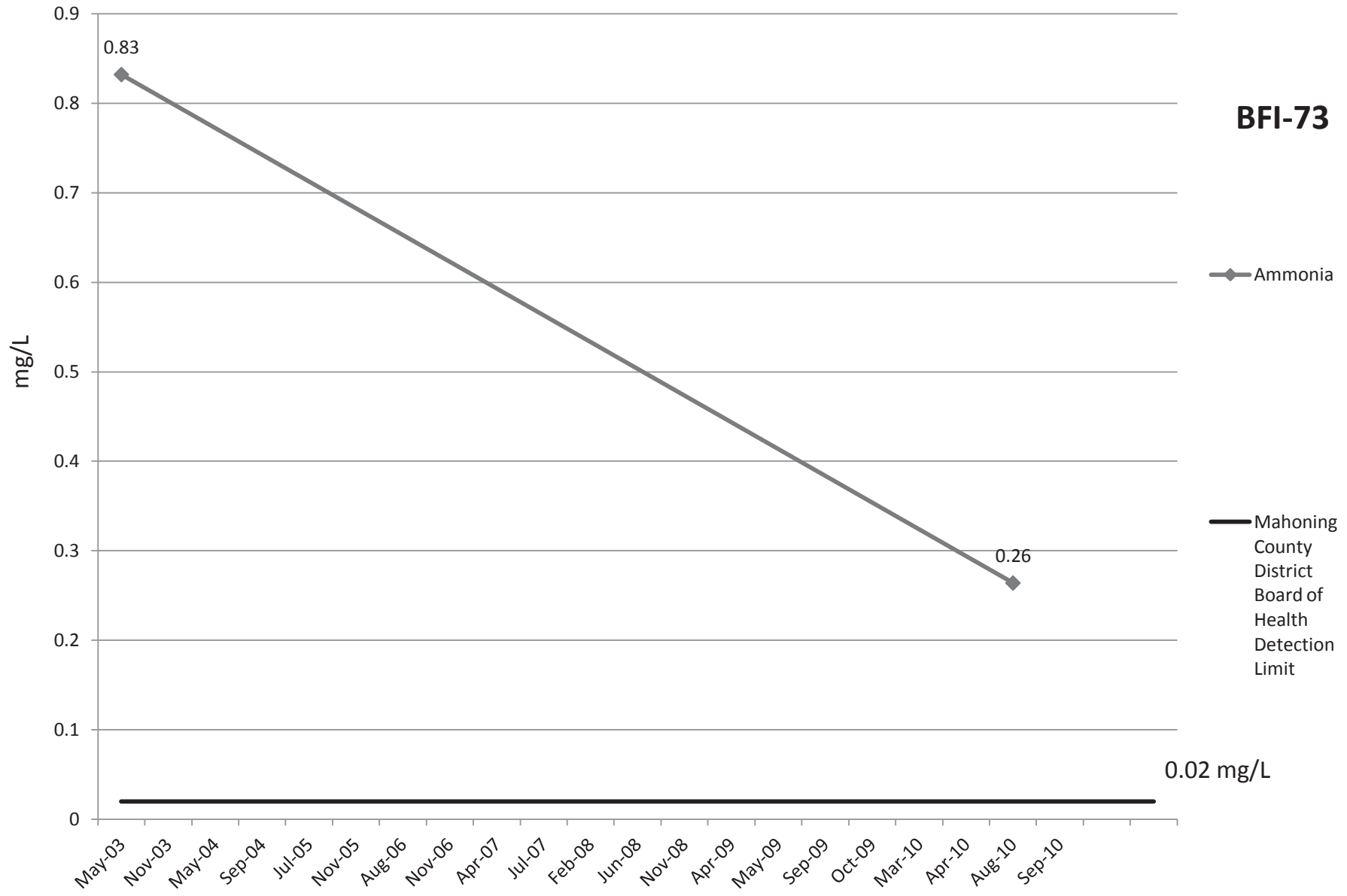


# Alkalinity

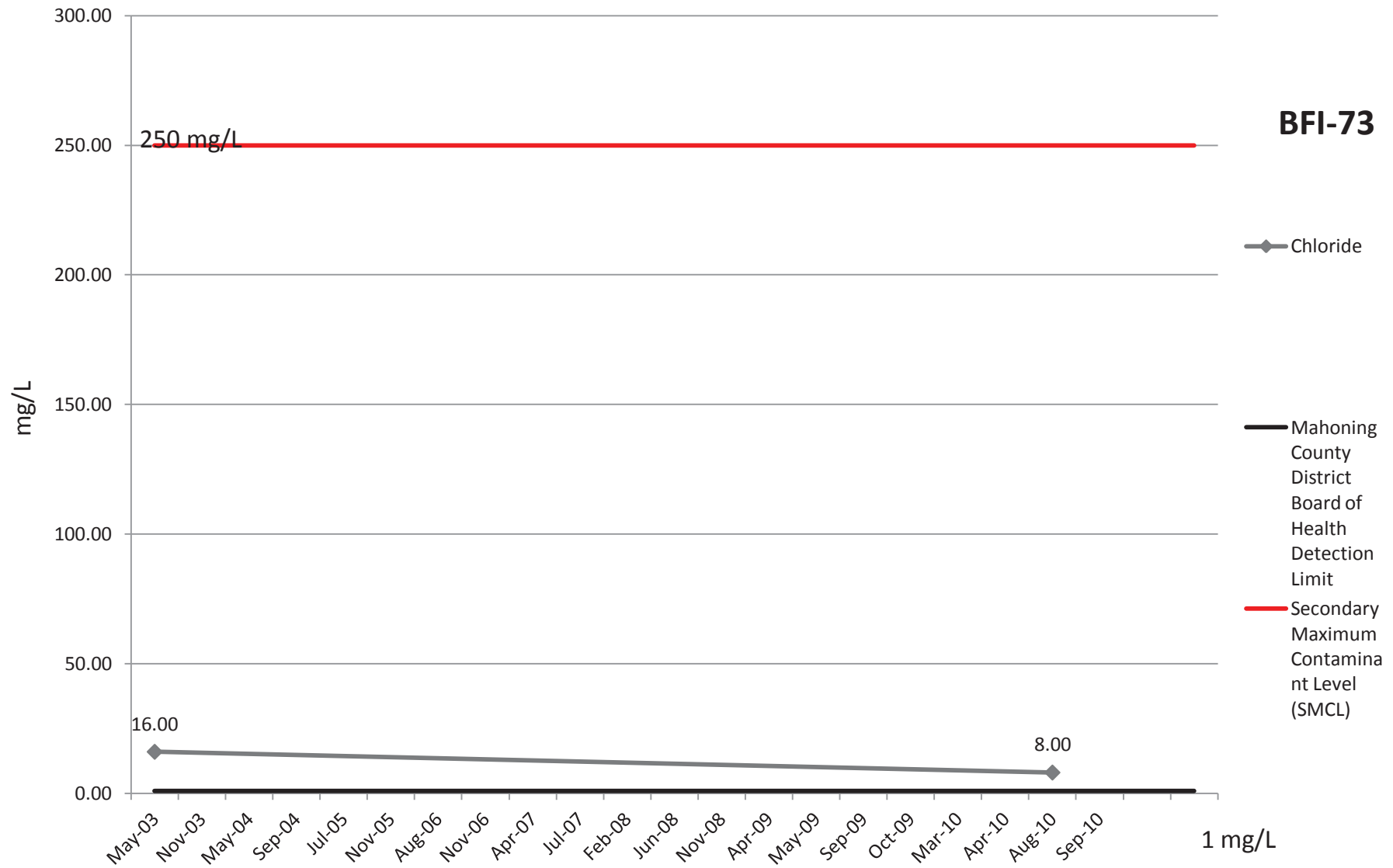
**BFI-73**



# Ammonia

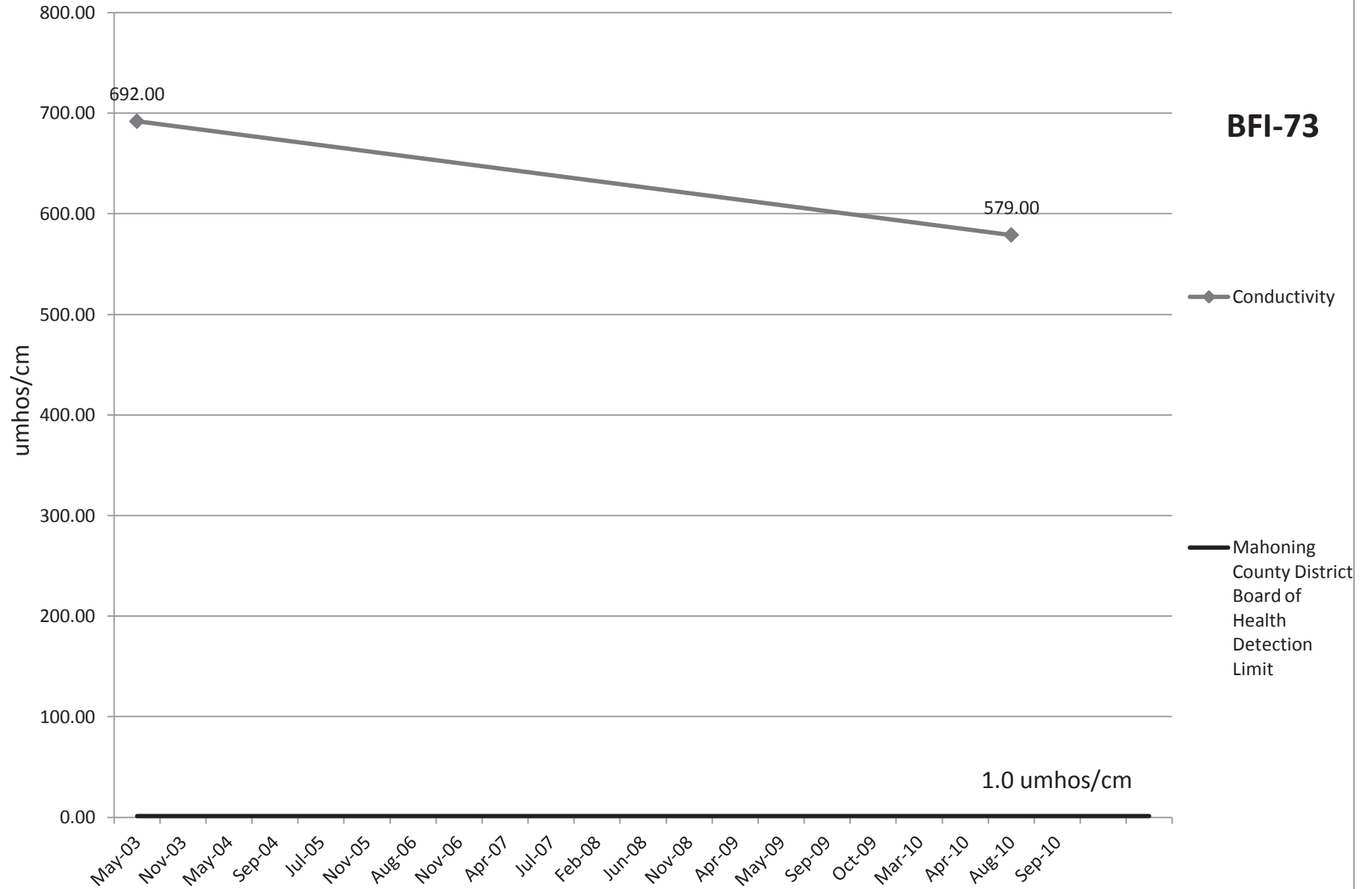


# Chloride

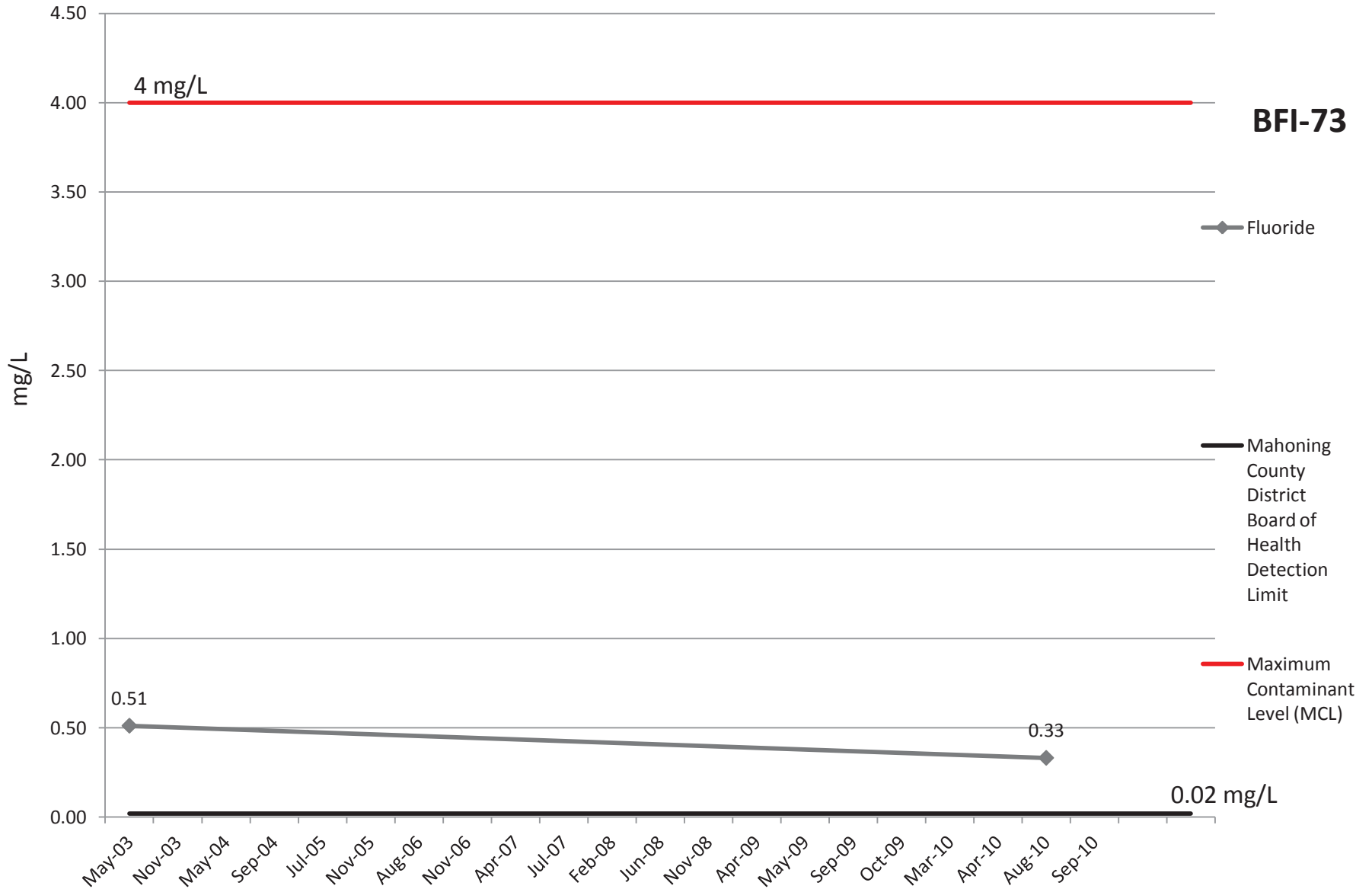


# Conductivity

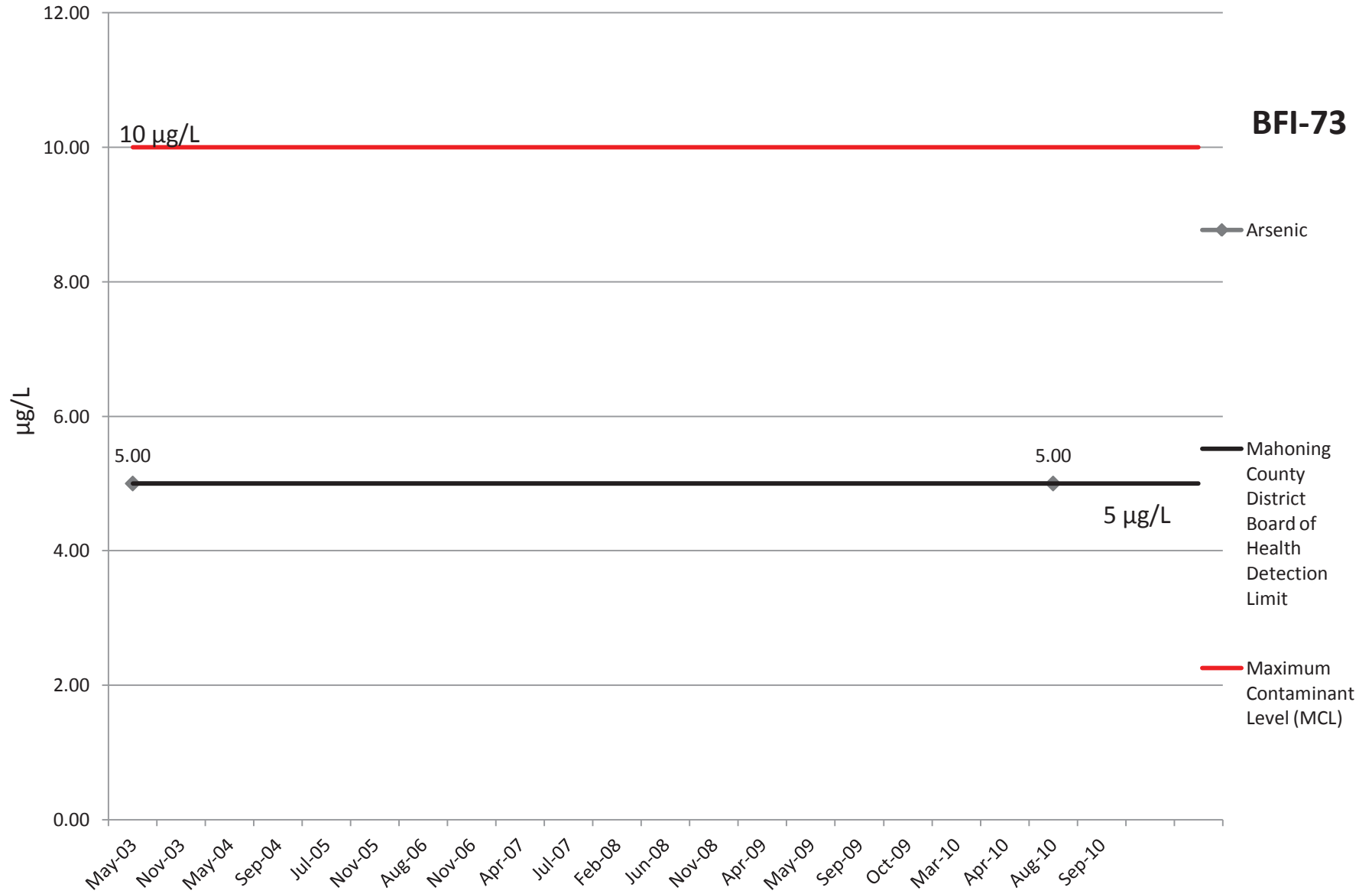
**BFI-73**



# Fluoride



# Arsenic



**BFI-73**

◆ Arsenic

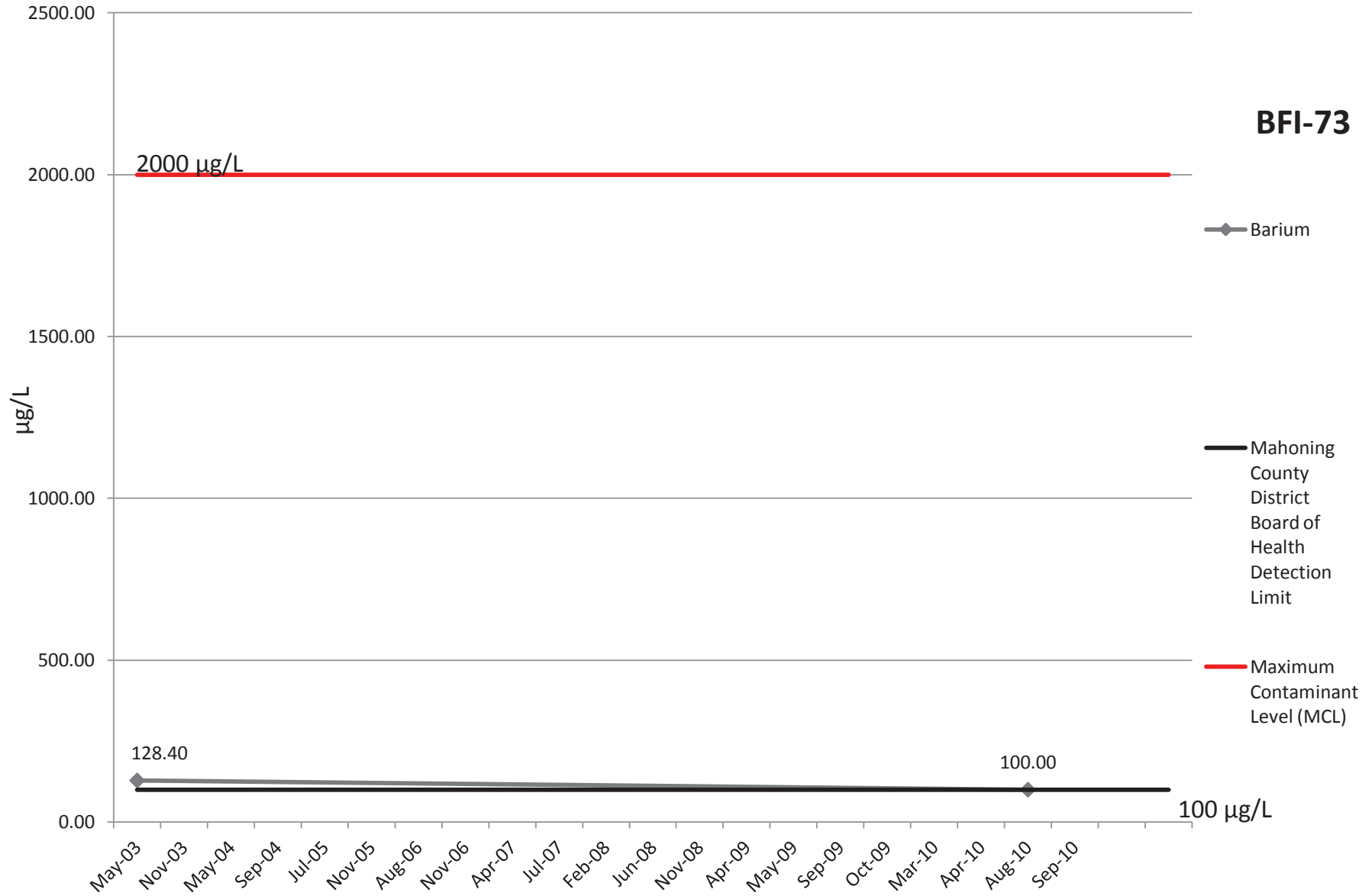
— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

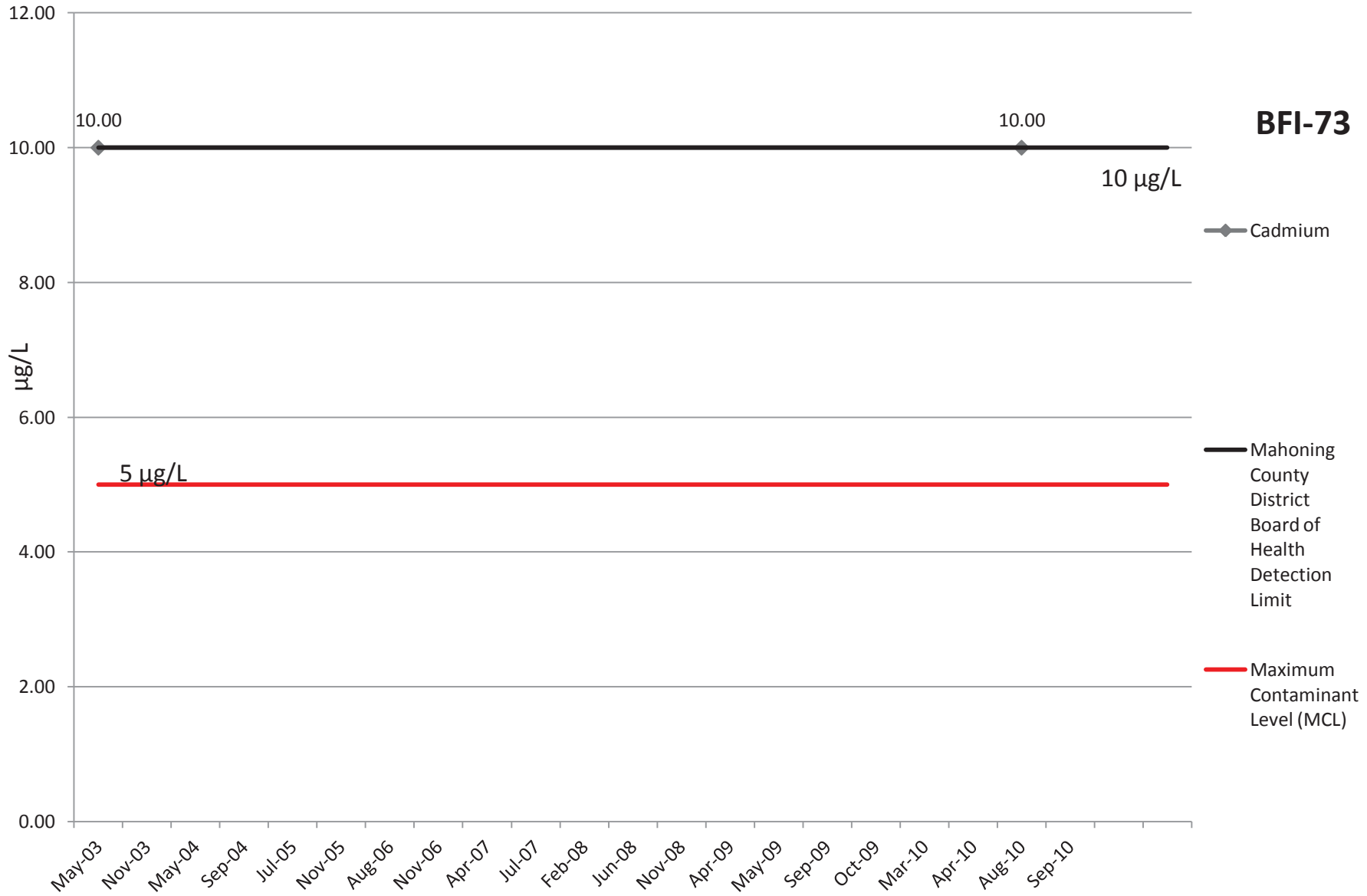


# Barium

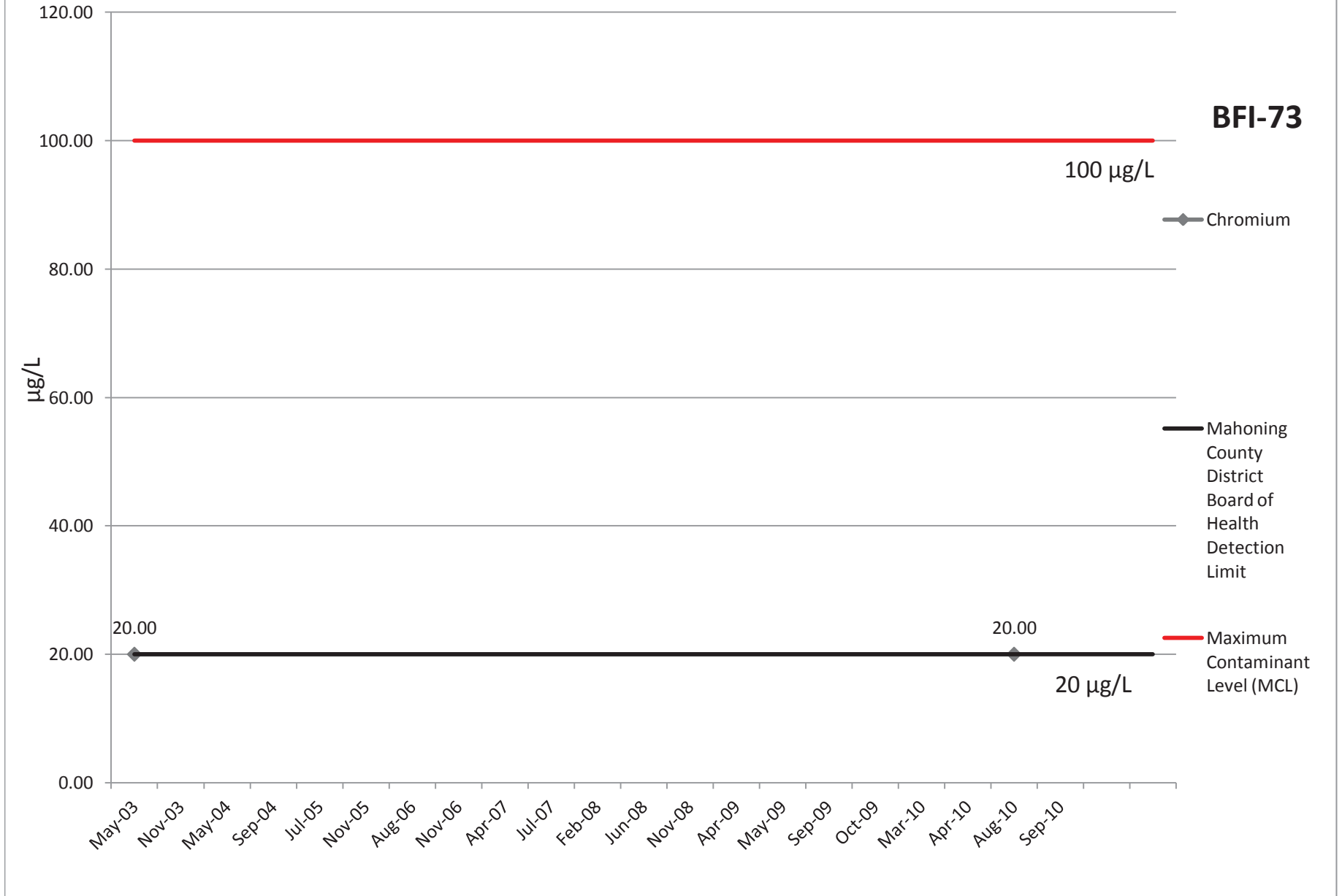
**BFI-73**



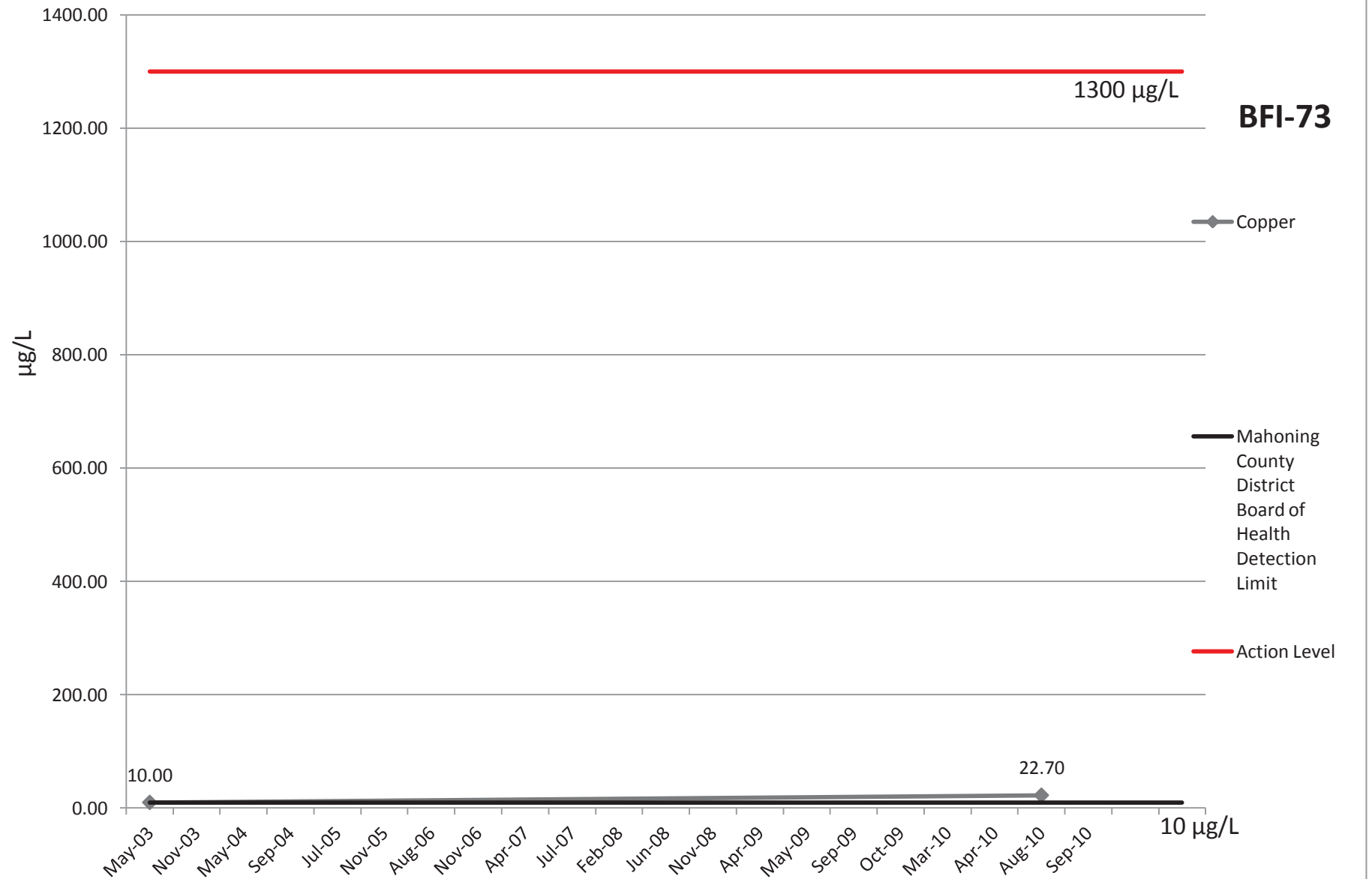
# Cadmium



# Chromium

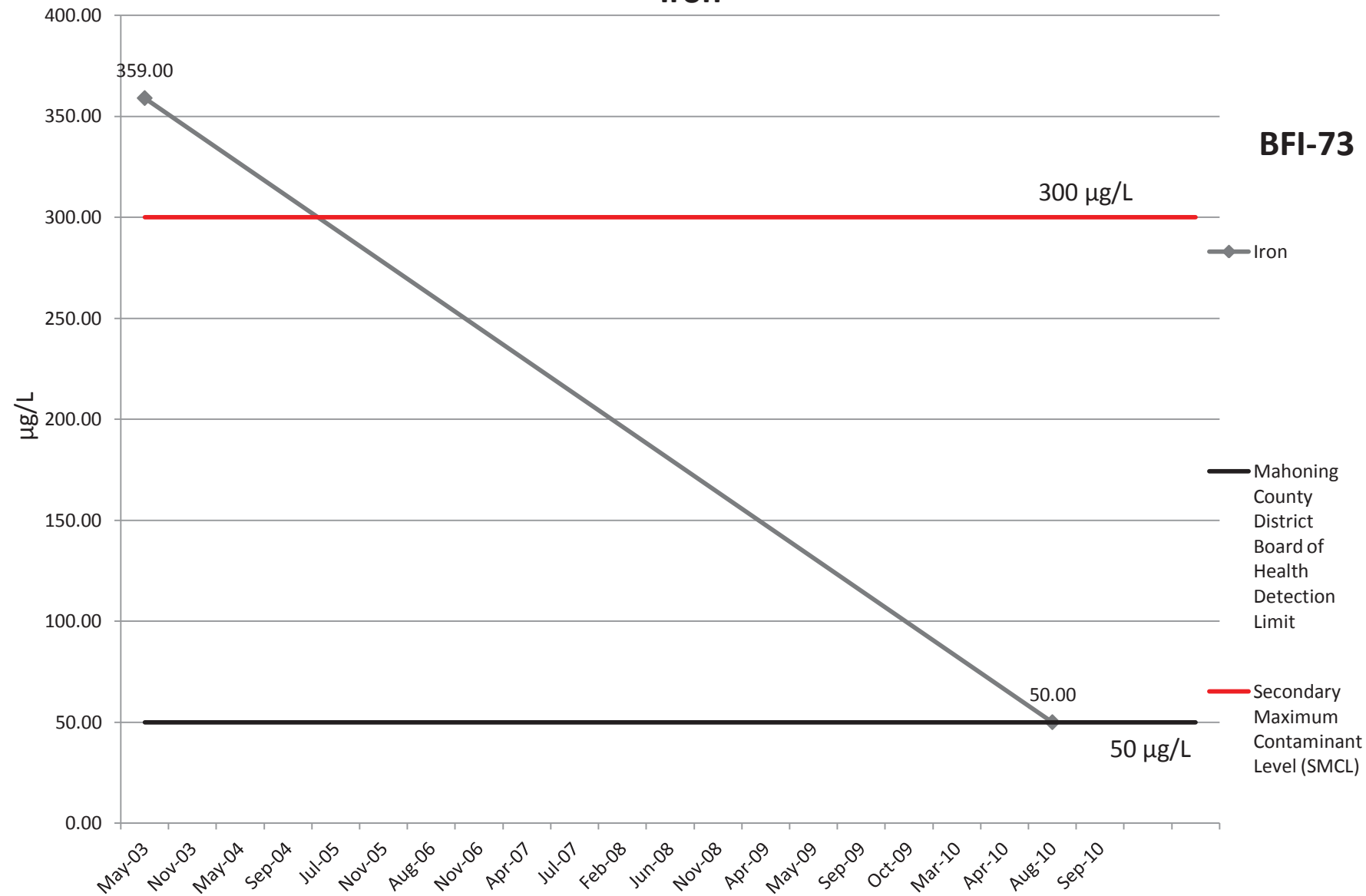


# Copper



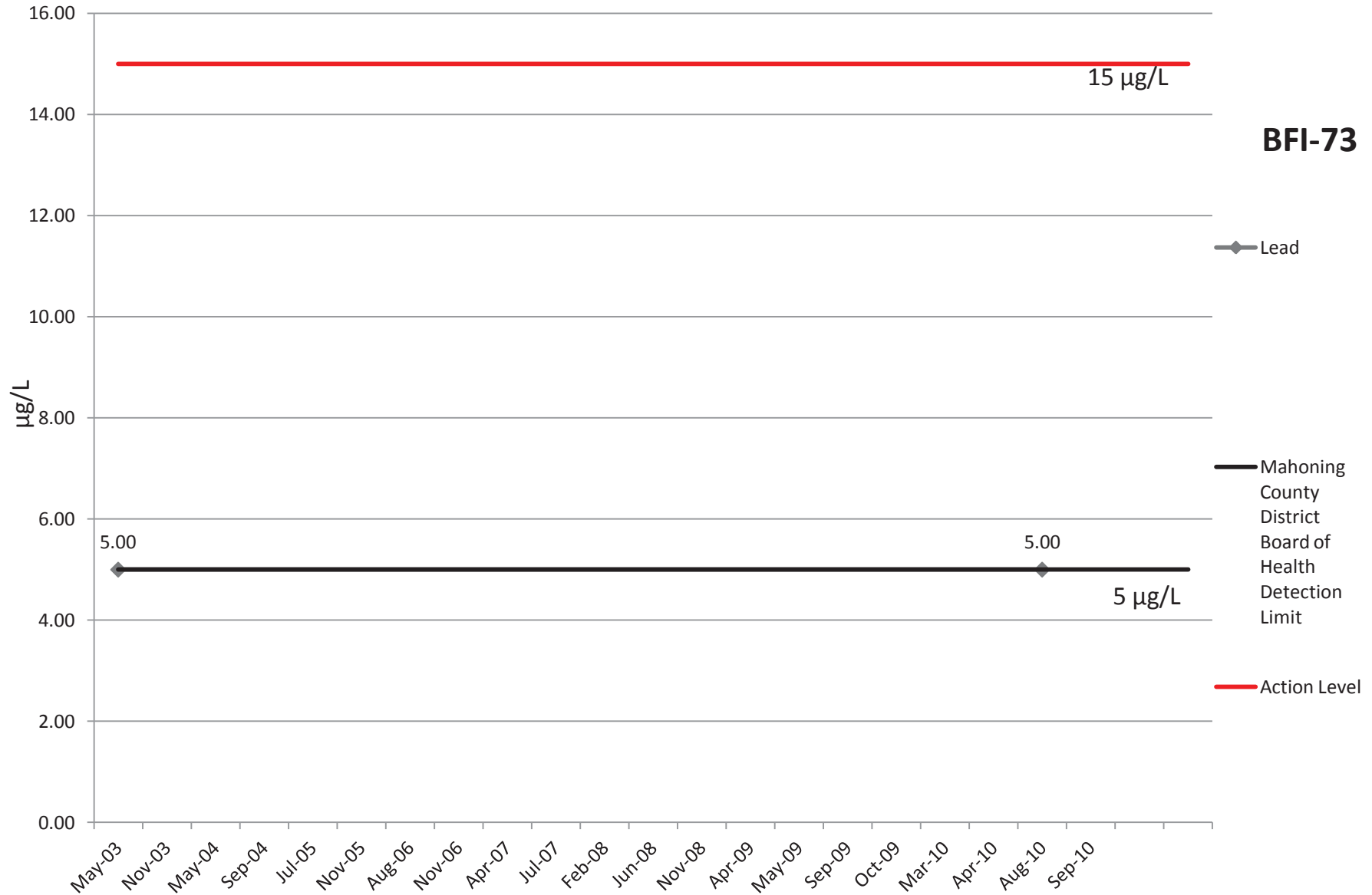
# Iron

**BFI-73**

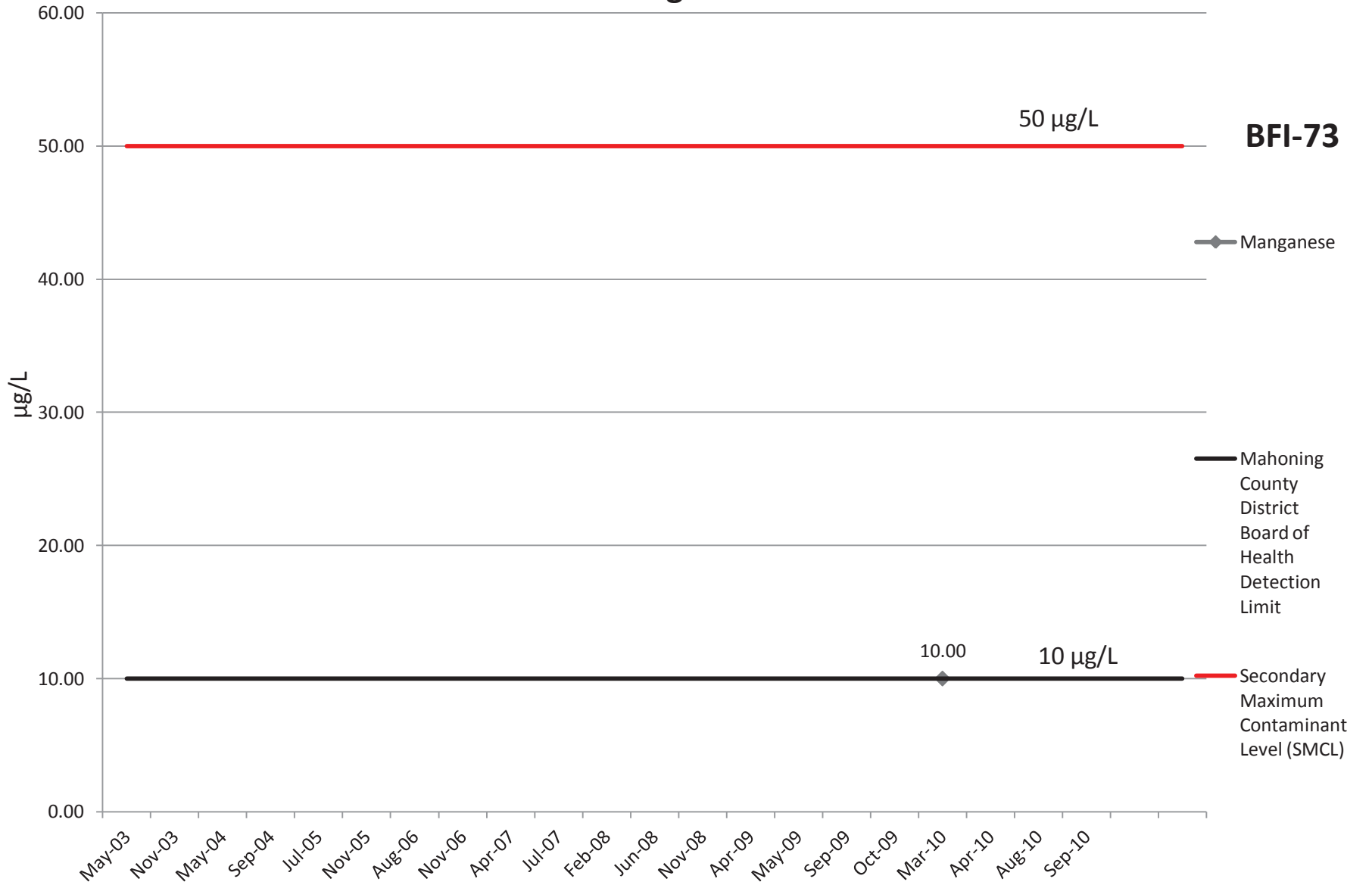


# Lead

**BFI-73**



# Manganese



# Mercury

**BFI-73**

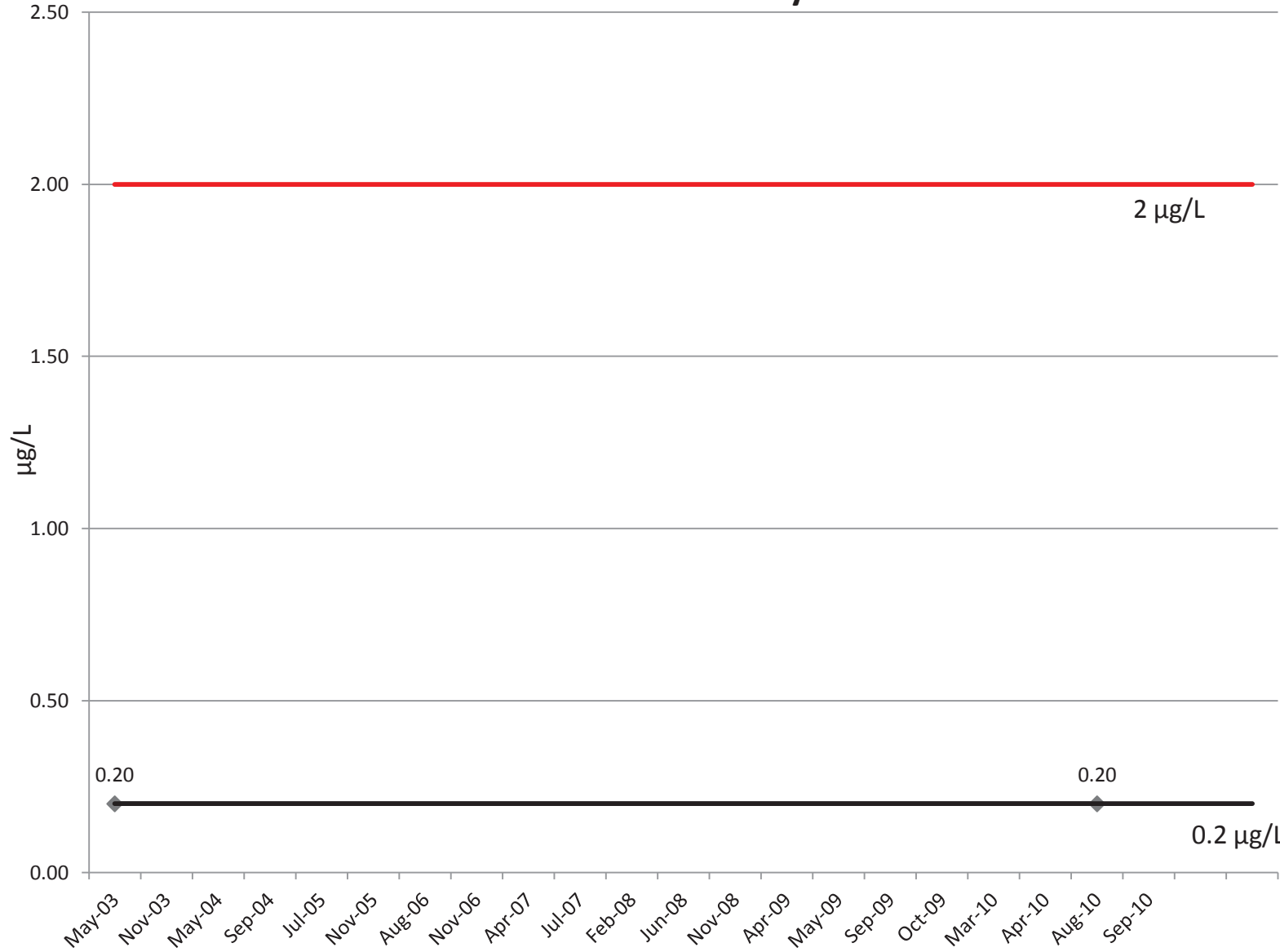
2 µg/L

Mercury

Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

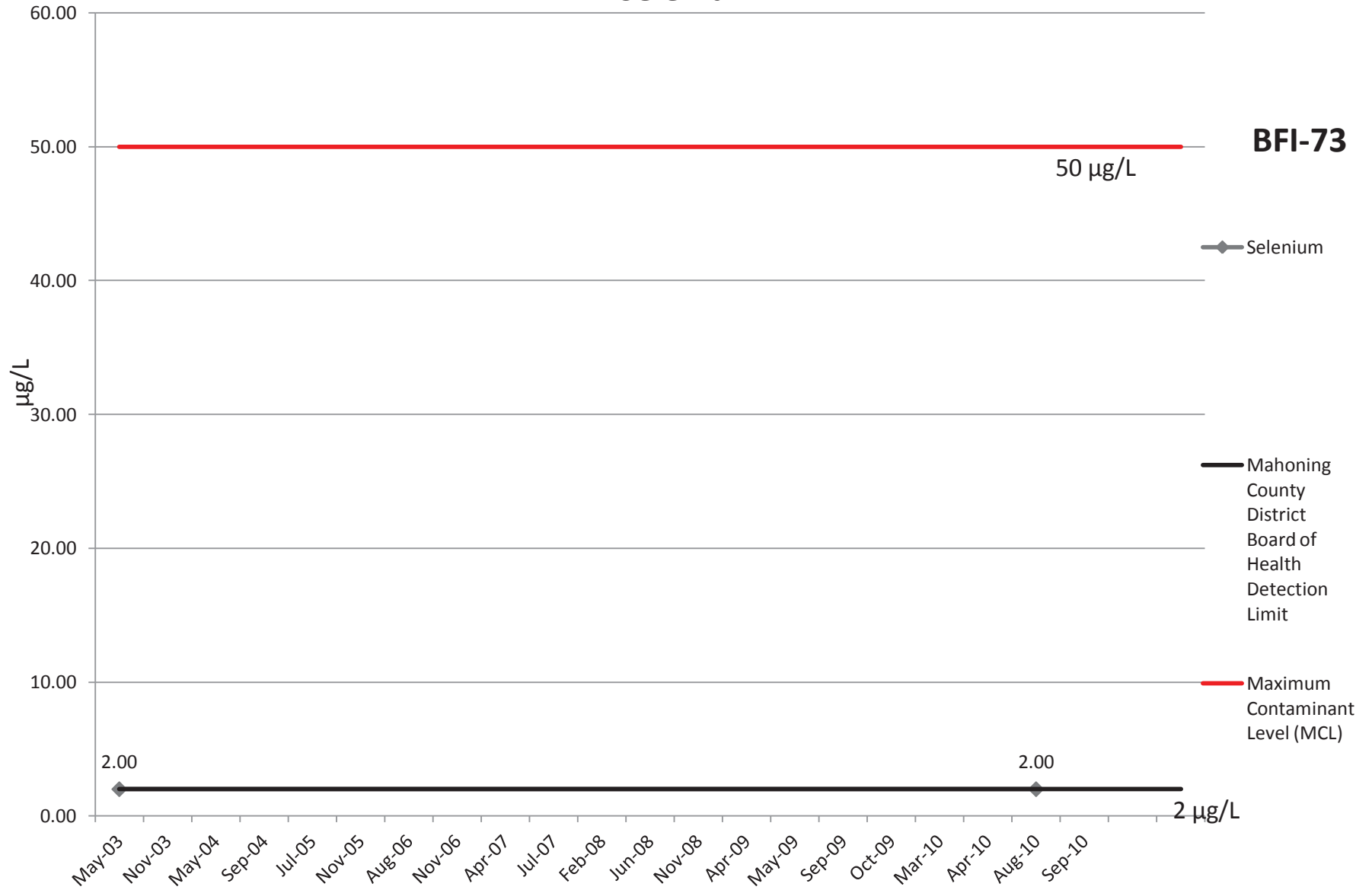
Maximum  
Contaminant  
Level (MCL)

0.2 µg/L

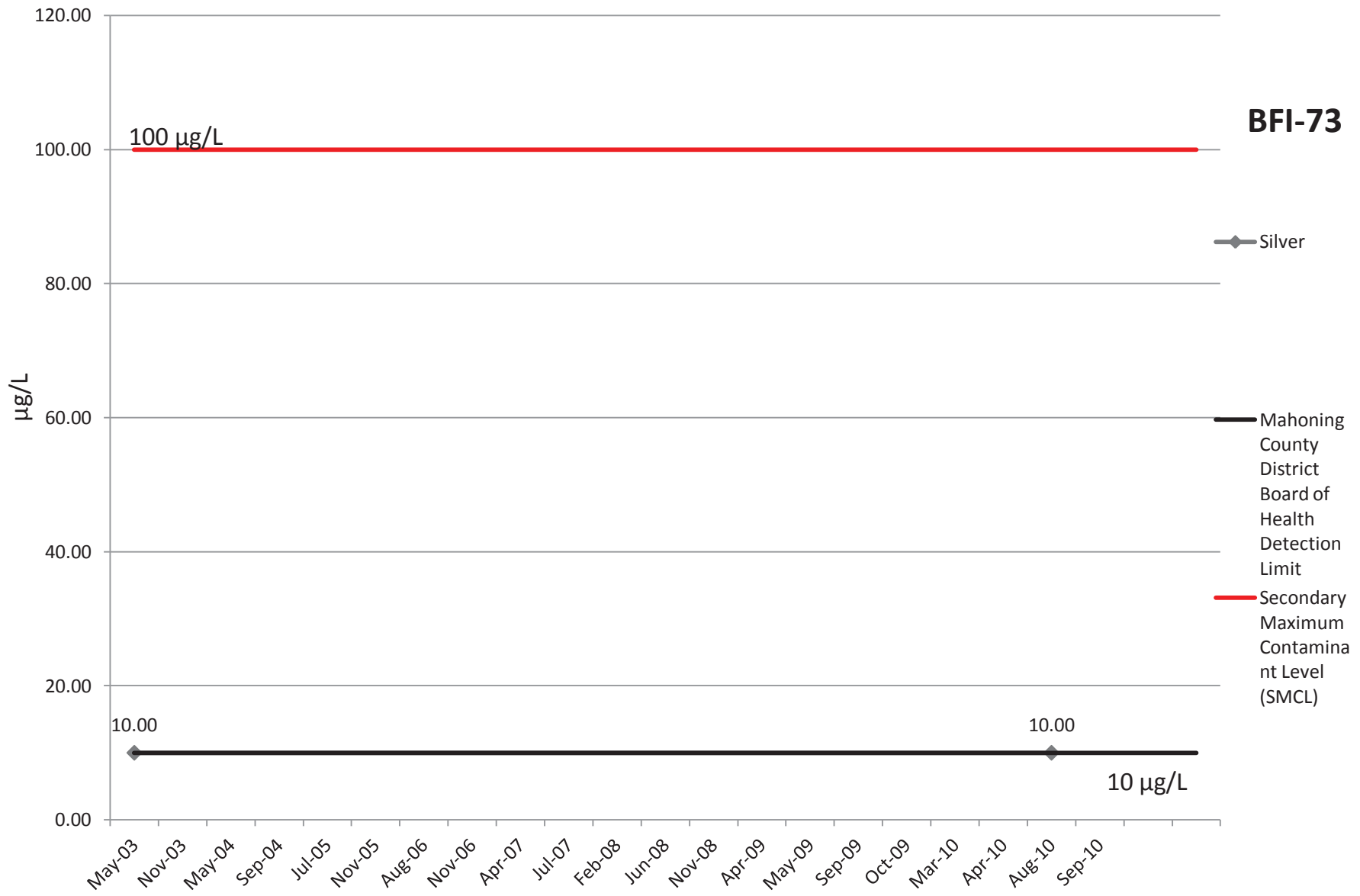




# Selenium



# Silver



**BFI-73**

◆ Silver

— Mahoning County District Board of Health Detection Limit  
— Secondary Maximum Contaminant Level (SMCL)

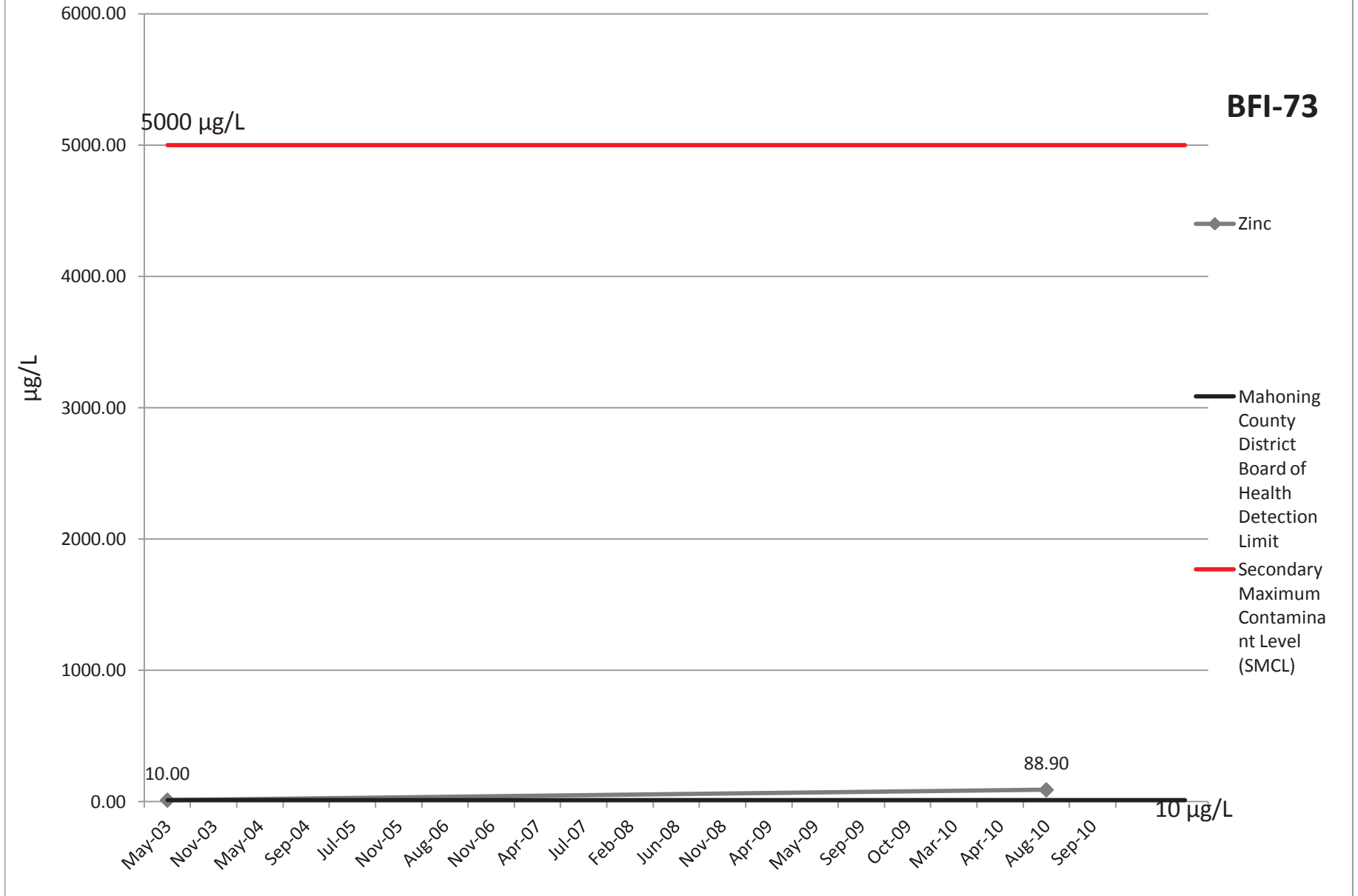
100 µg/L

10.00

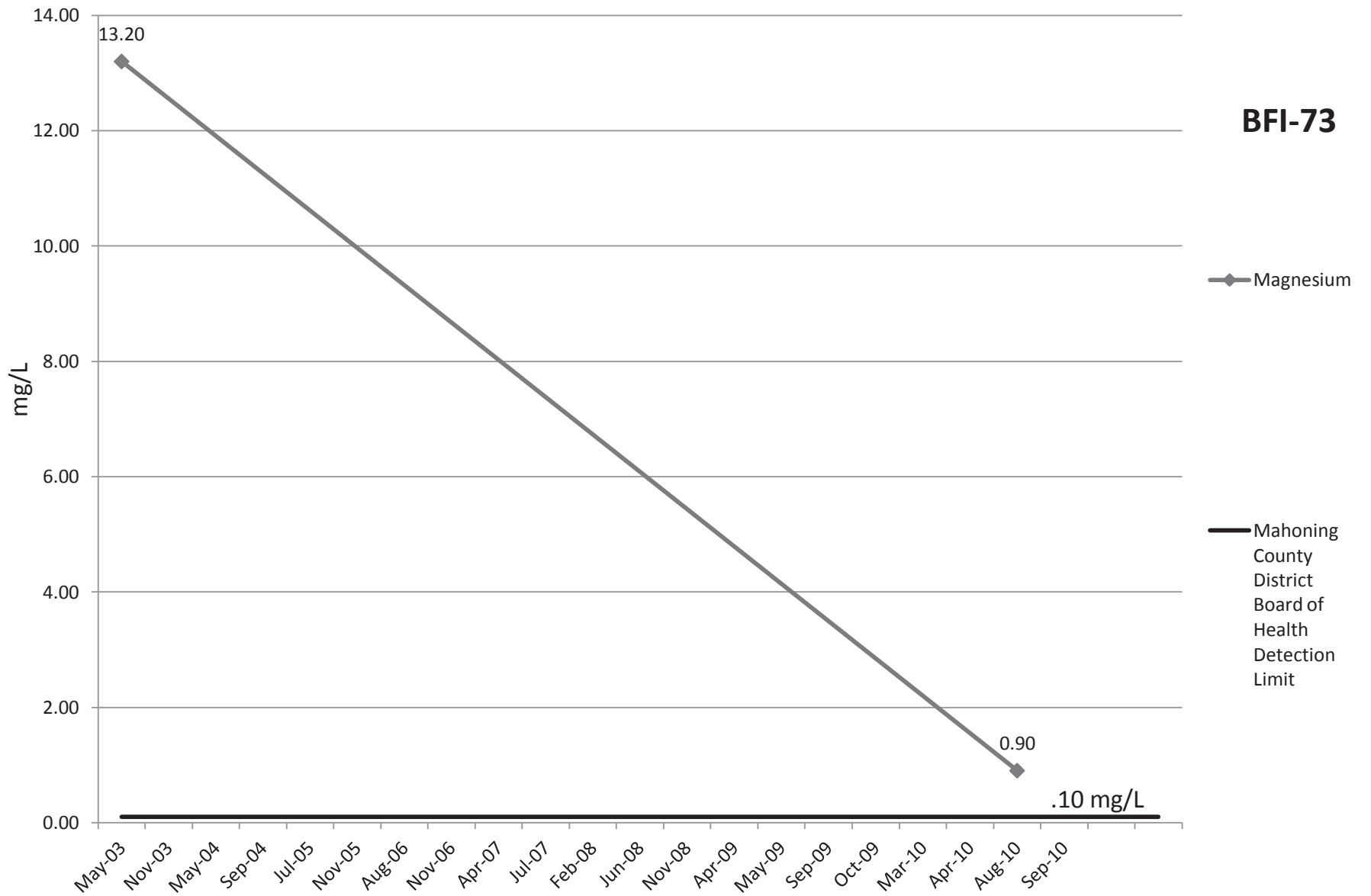
10.00

10 µg/L

# Zinc



# Magnesium

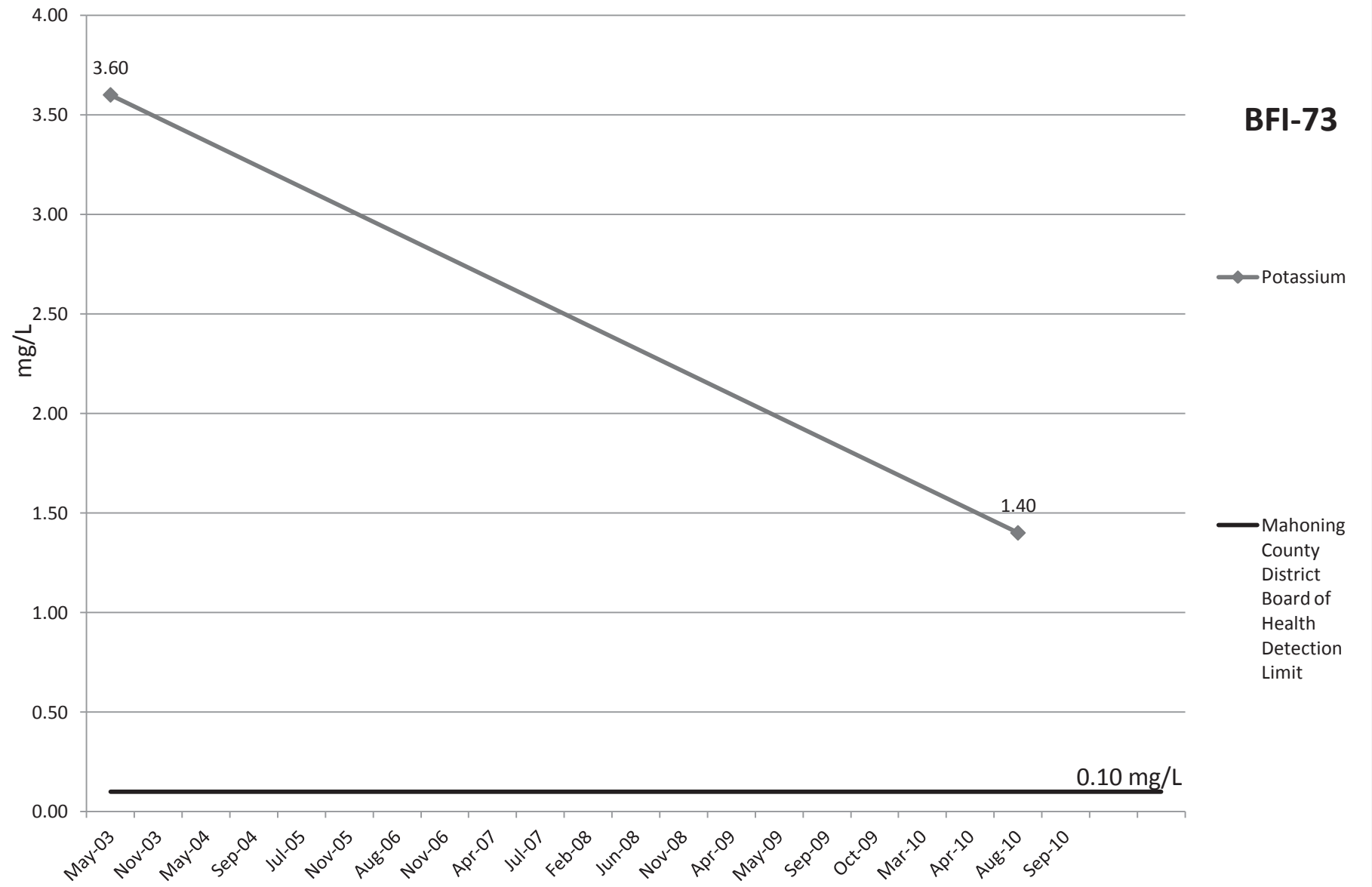


**BFI-73**

◆ Magnesium

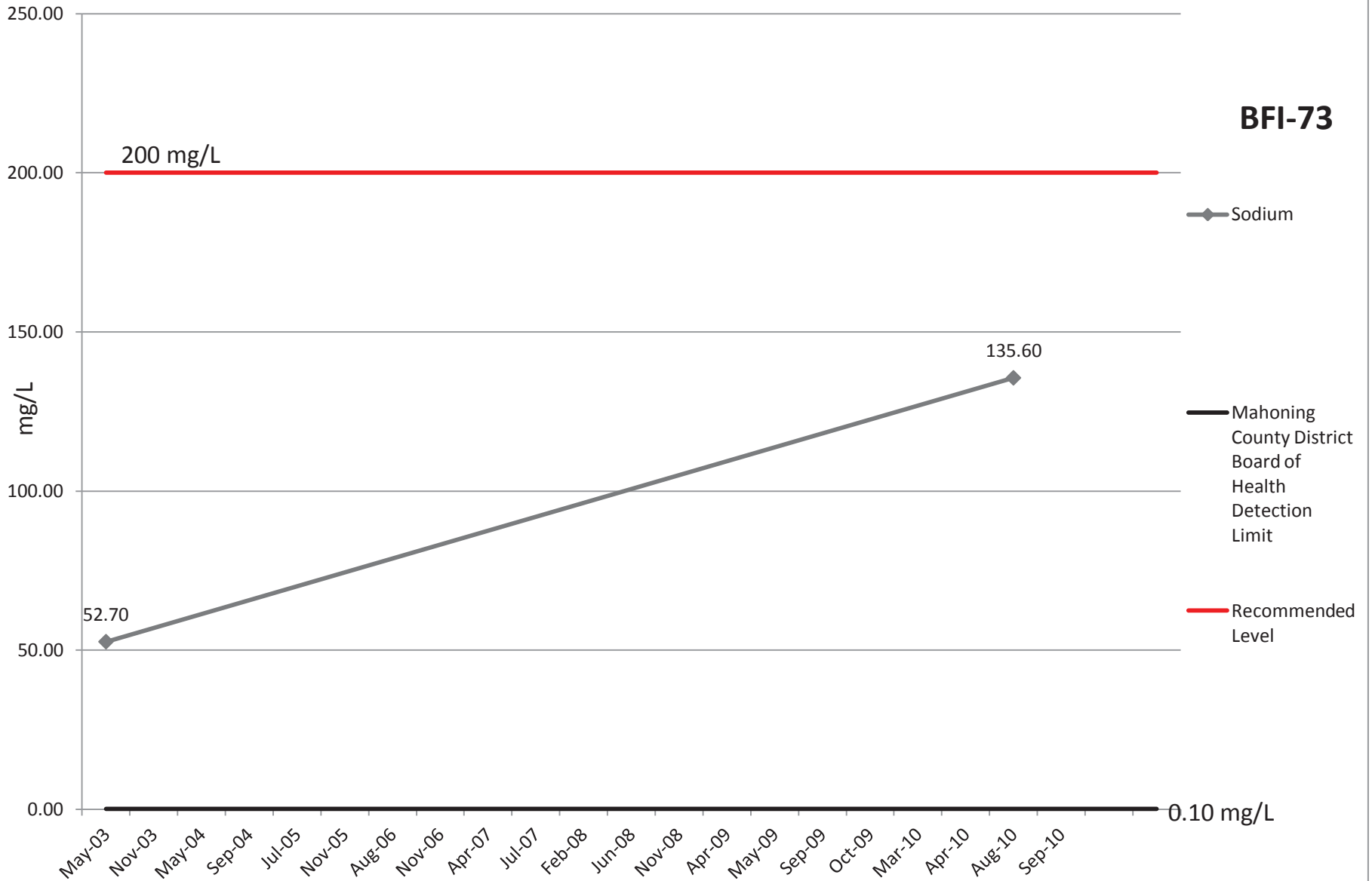
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

# Potassium

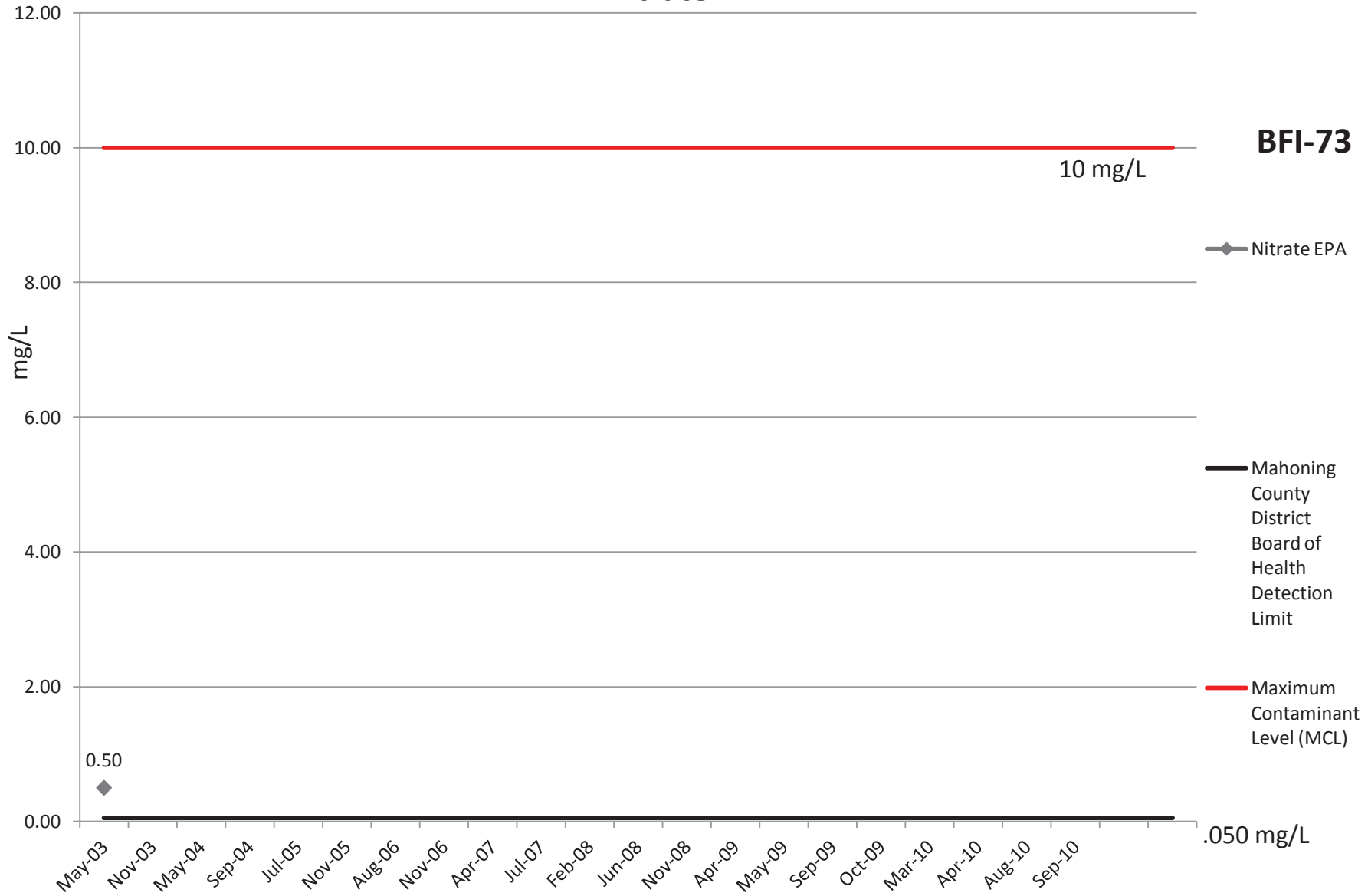


# Sodium

**BFI-73**



# Nitrate EPA



**BFI-73**

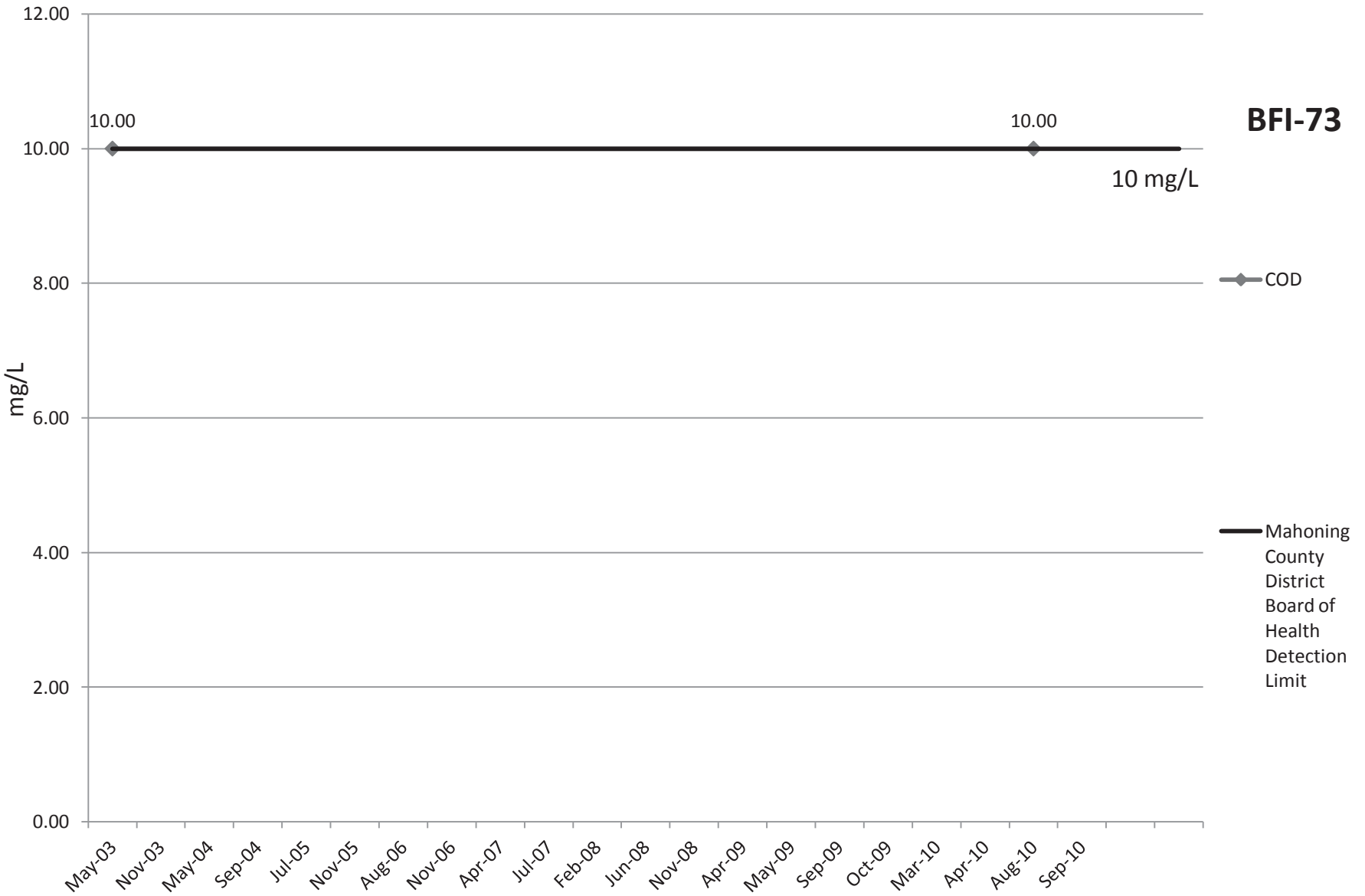
◆ Nitrate EPA

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)

# COD

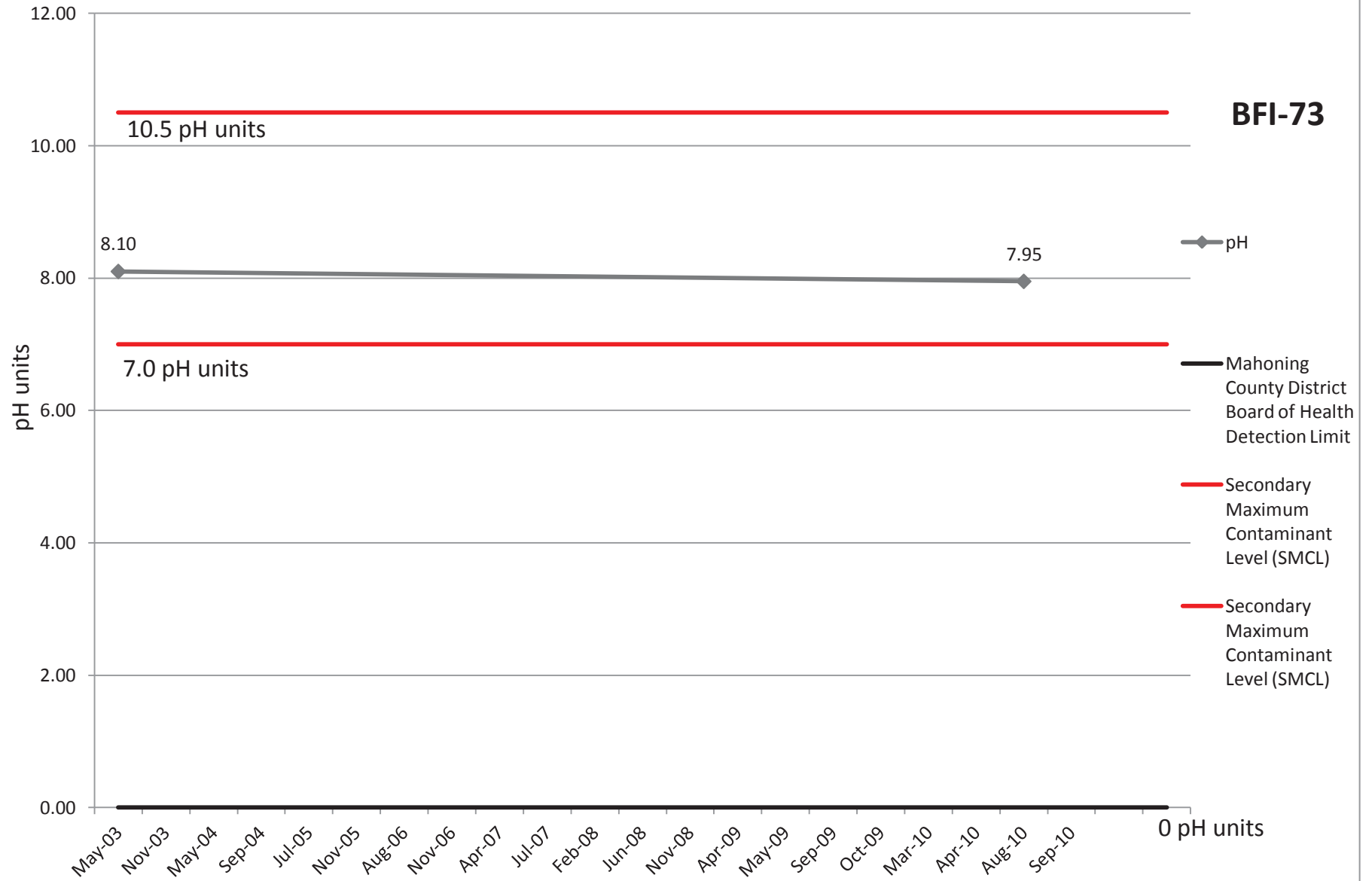
**BFI-73**





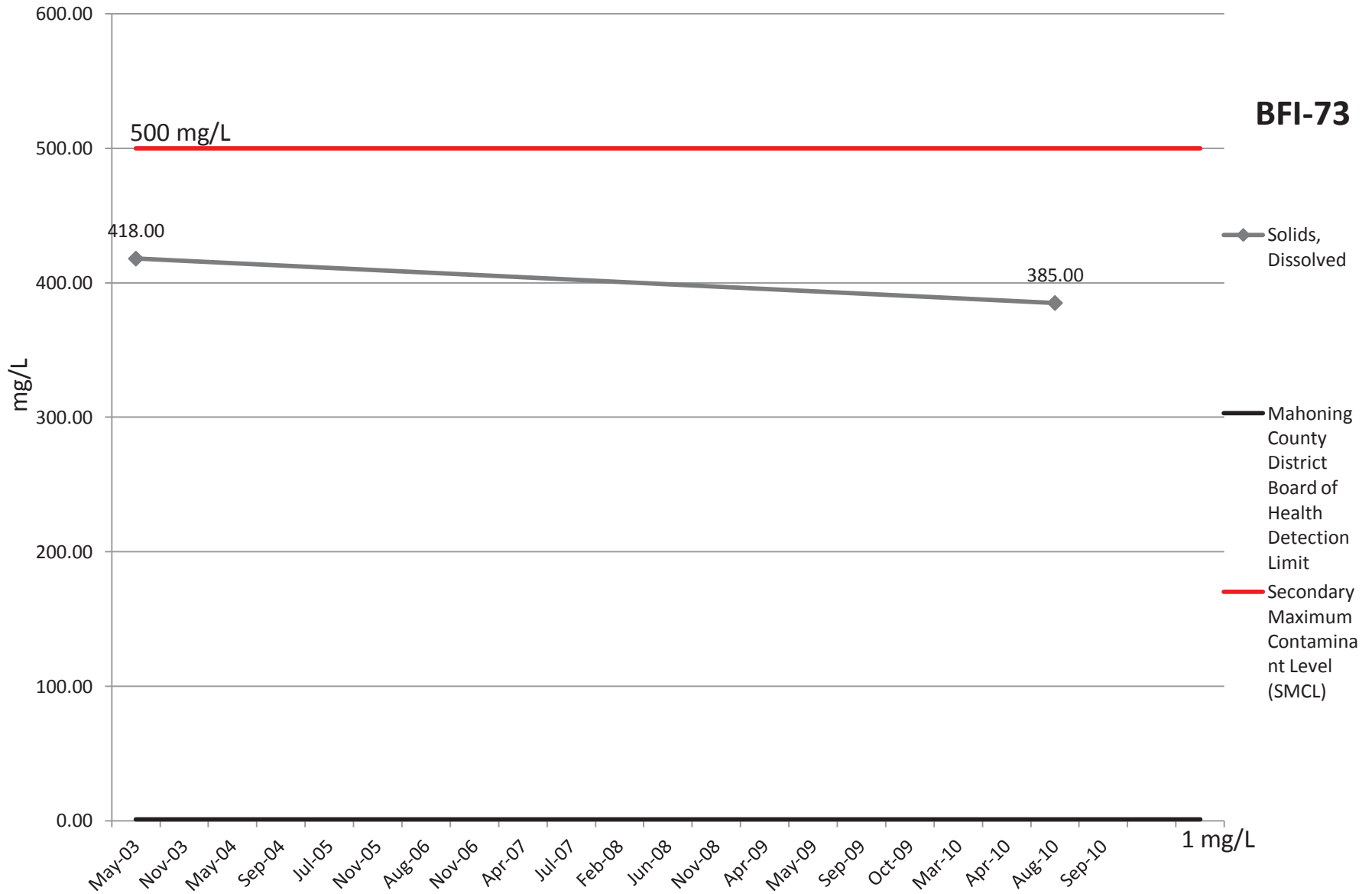
# pH

**BFI-73**



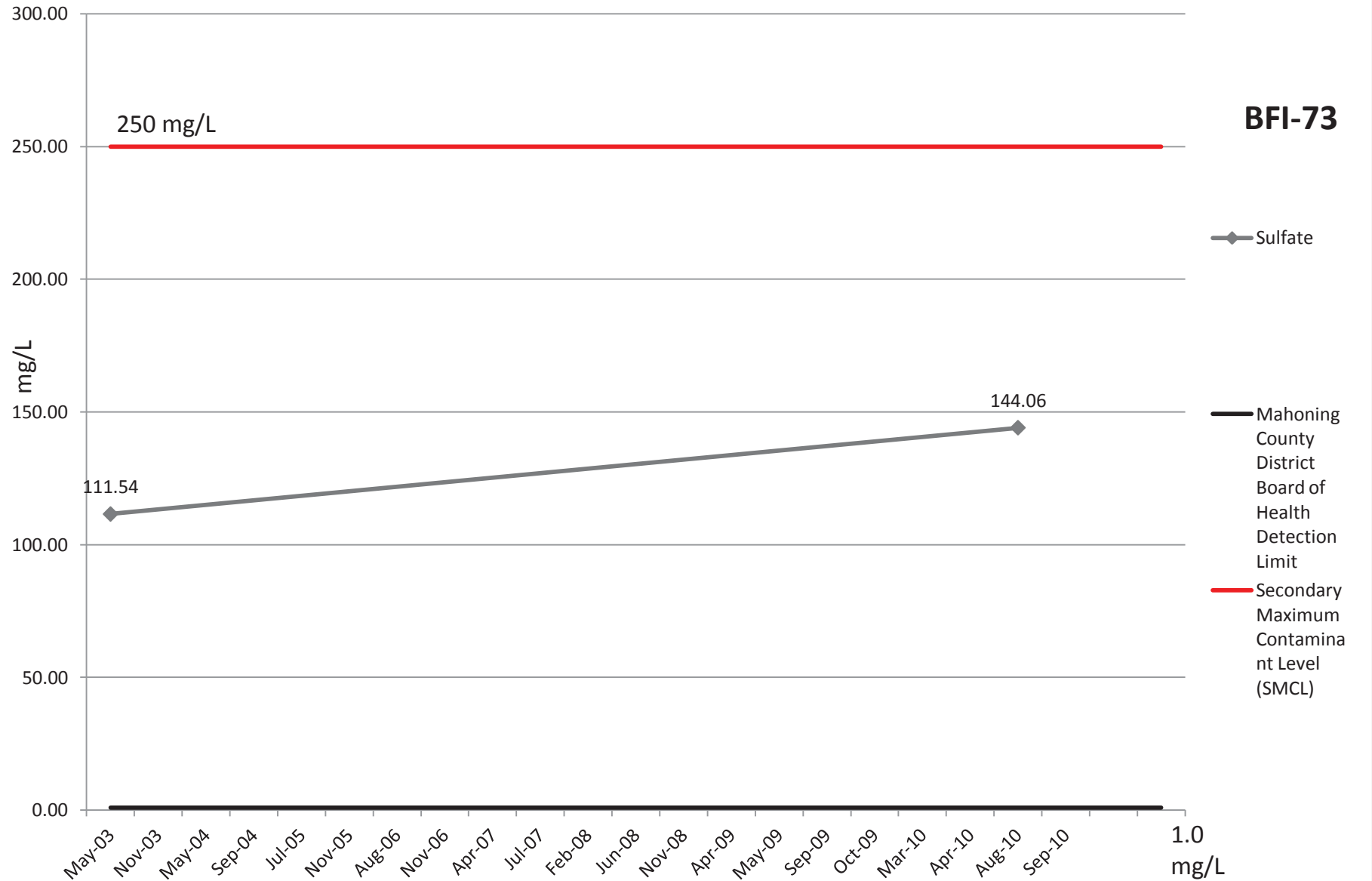
# Solids, Dissolved

**BFI-73**



# Sulfate

**BFI-73**



# Bacteria

**BFI-73**

Positive/Negative

◆ Bacteria

1.00

1.00

positive (1)

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

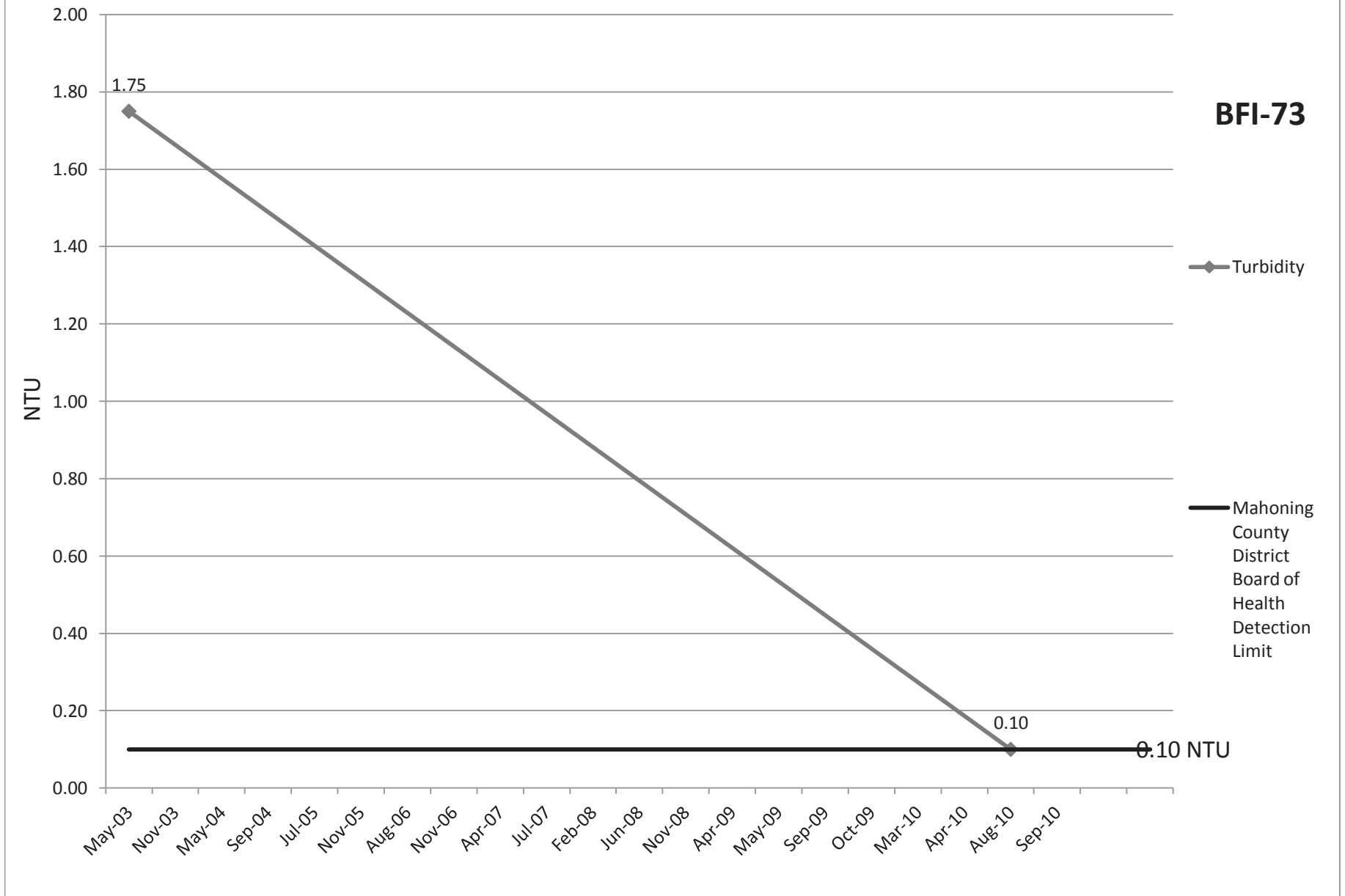
— Maximum  
Contaminant  
Level (MCL)

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

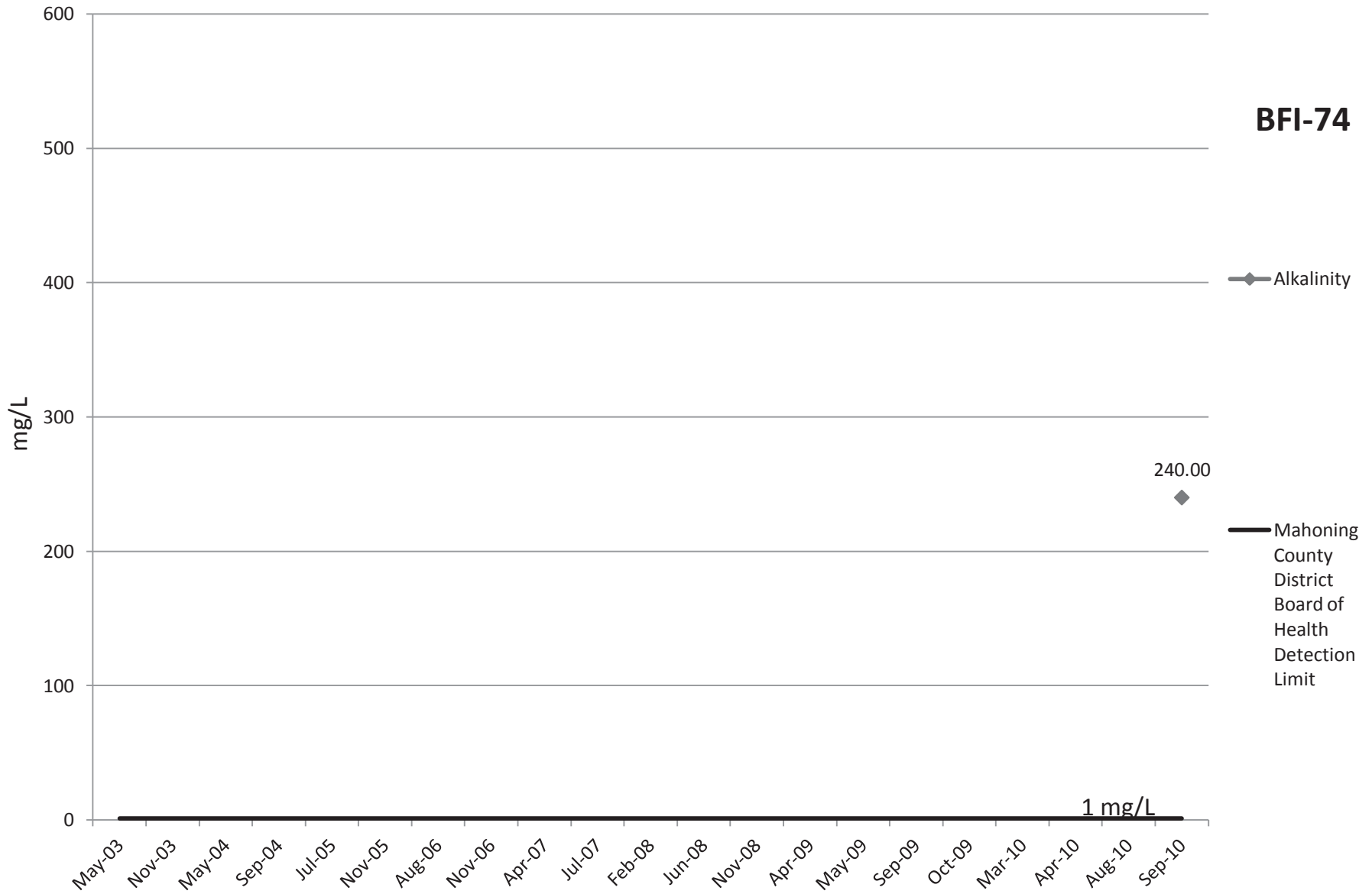


# Turbidity

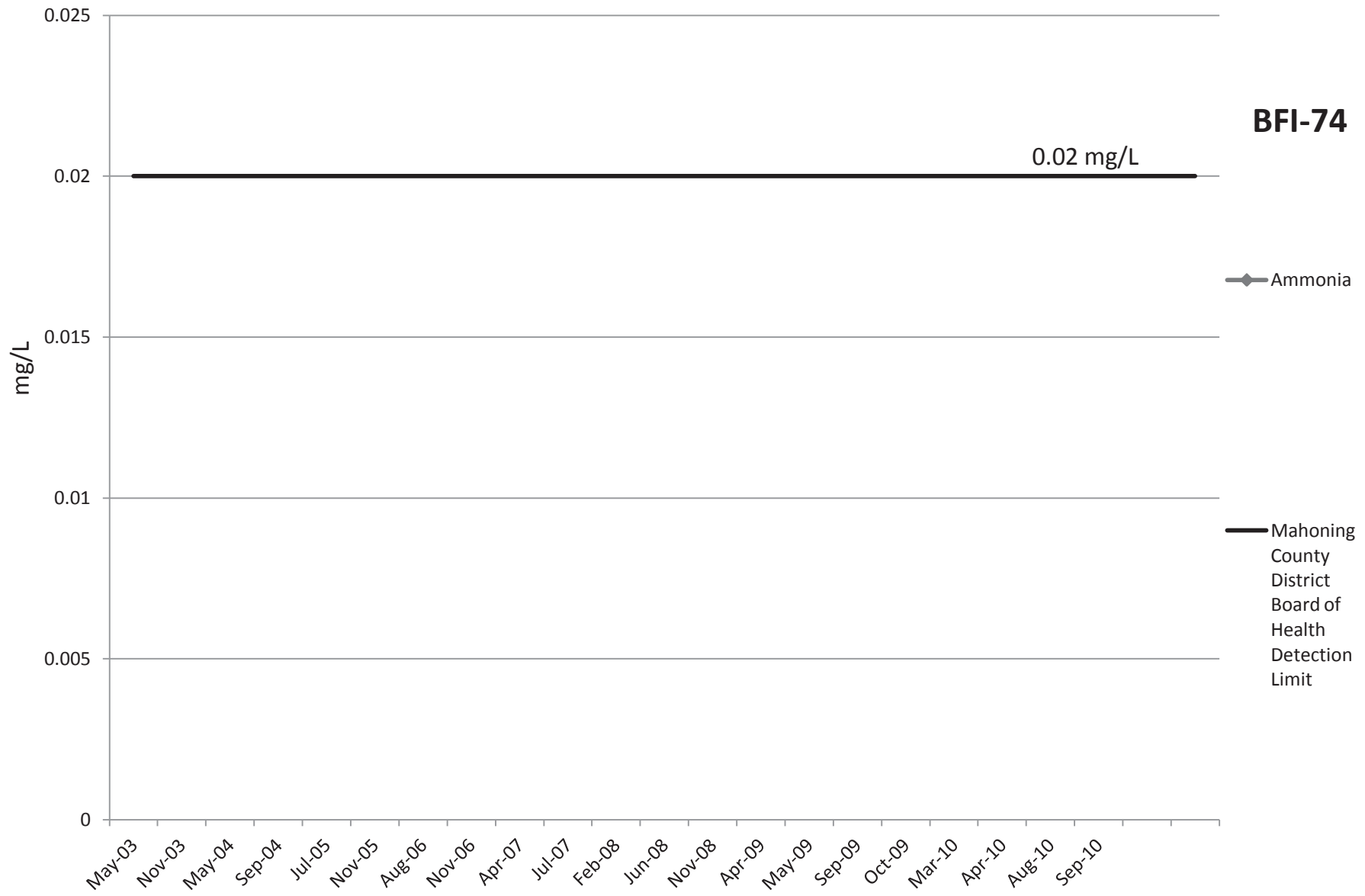


# Alkalinity

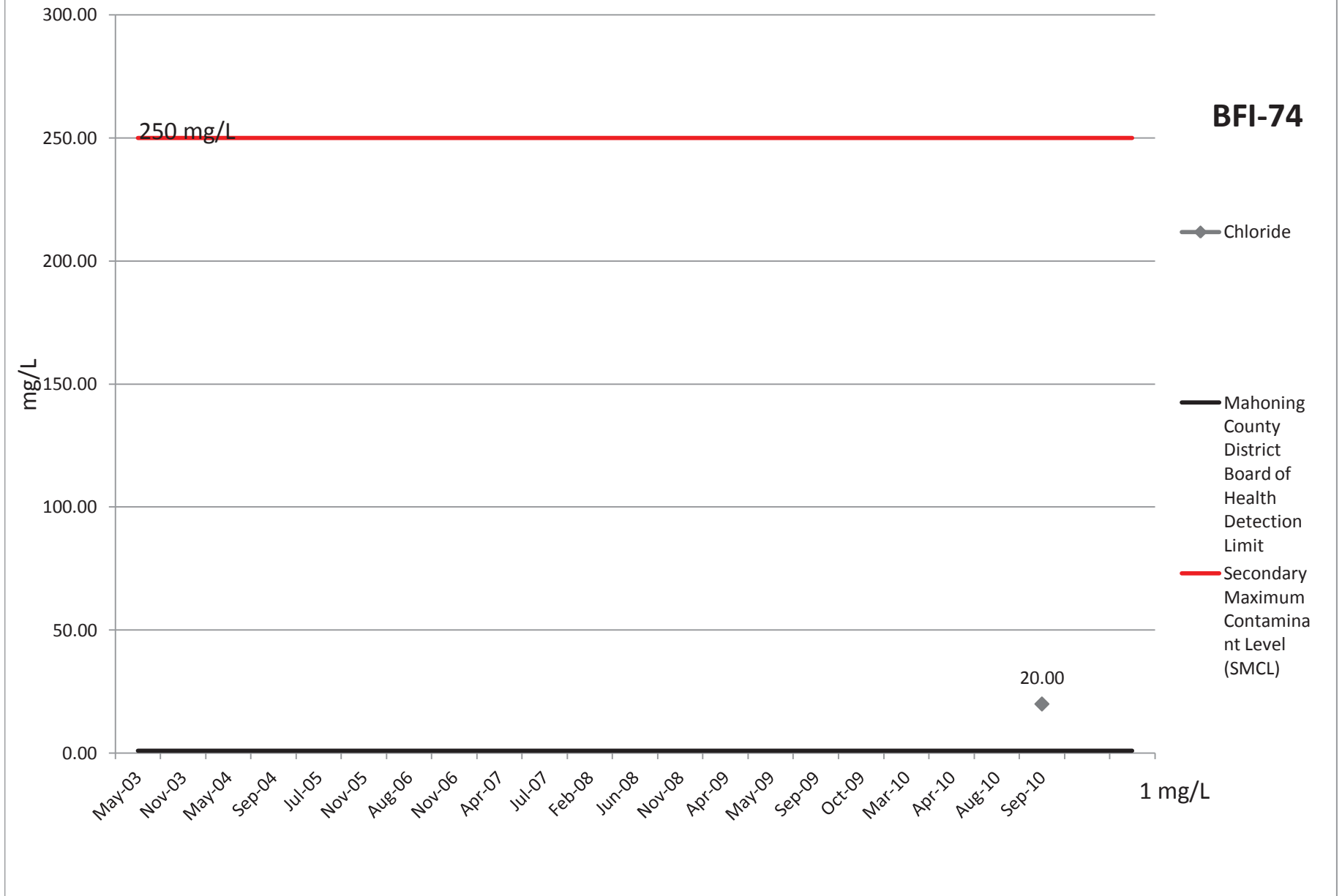
**BFI-74**



# Ammonia

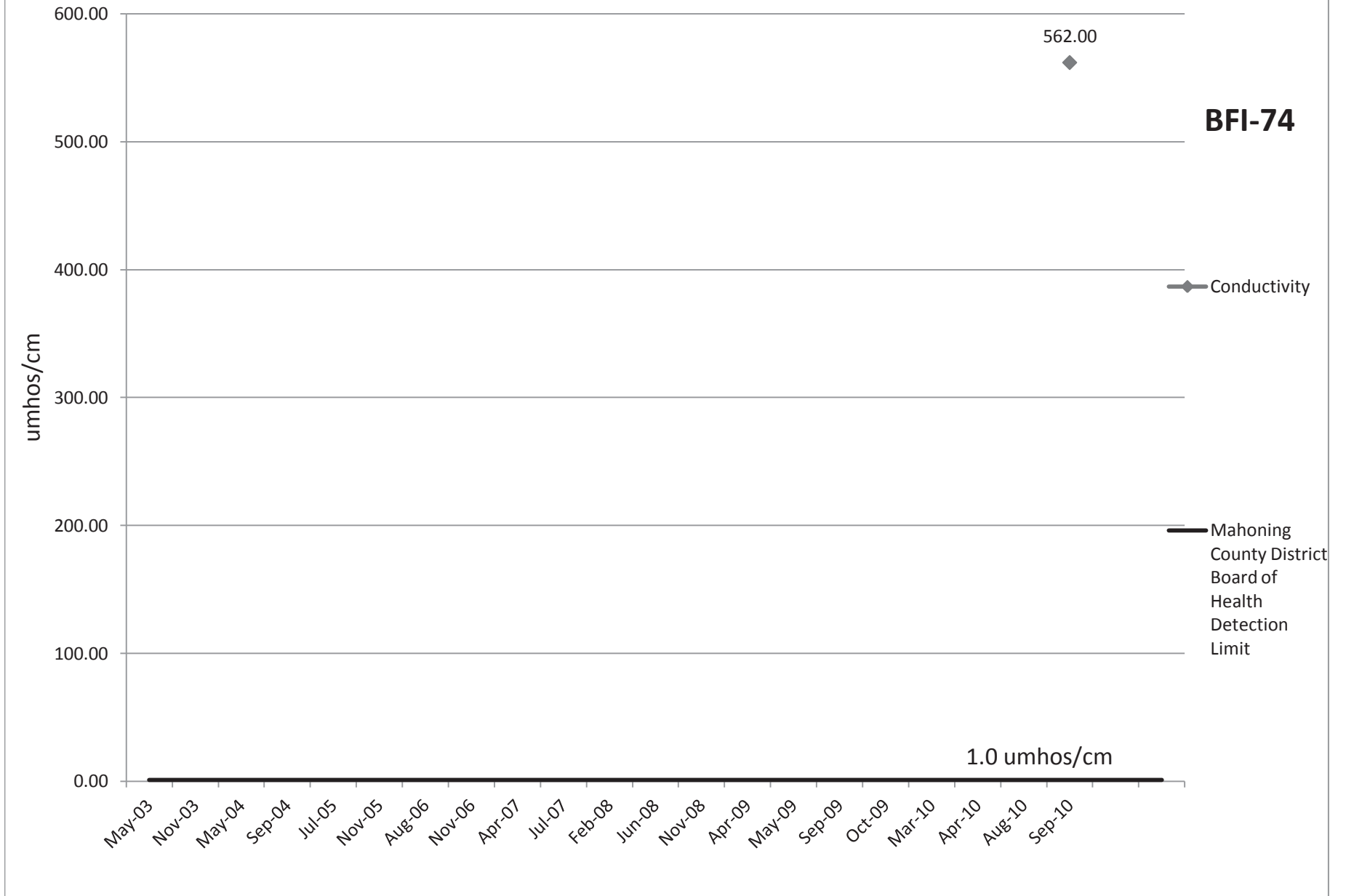


# Chloride

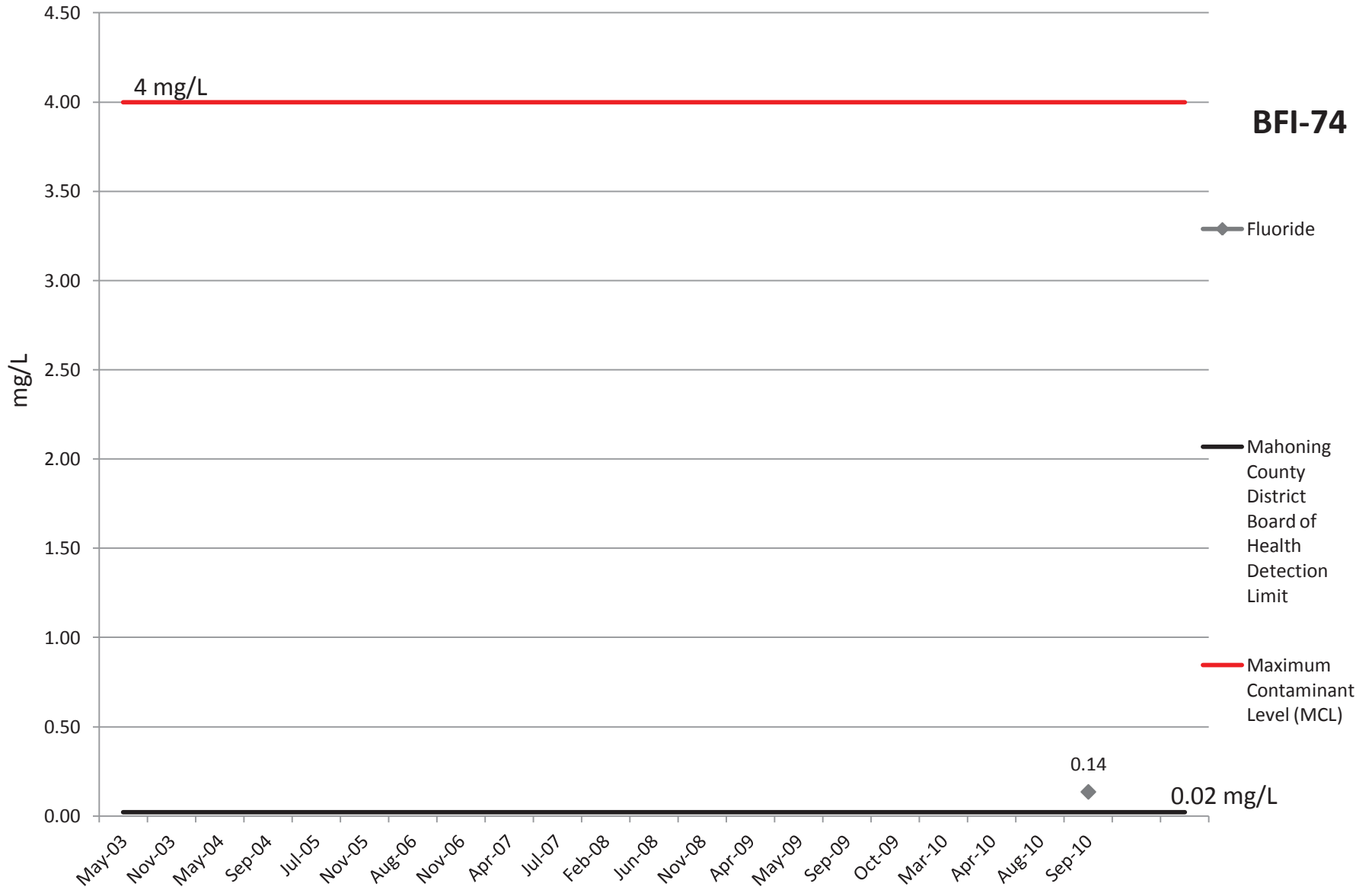




# Conductivity



# Fluoride



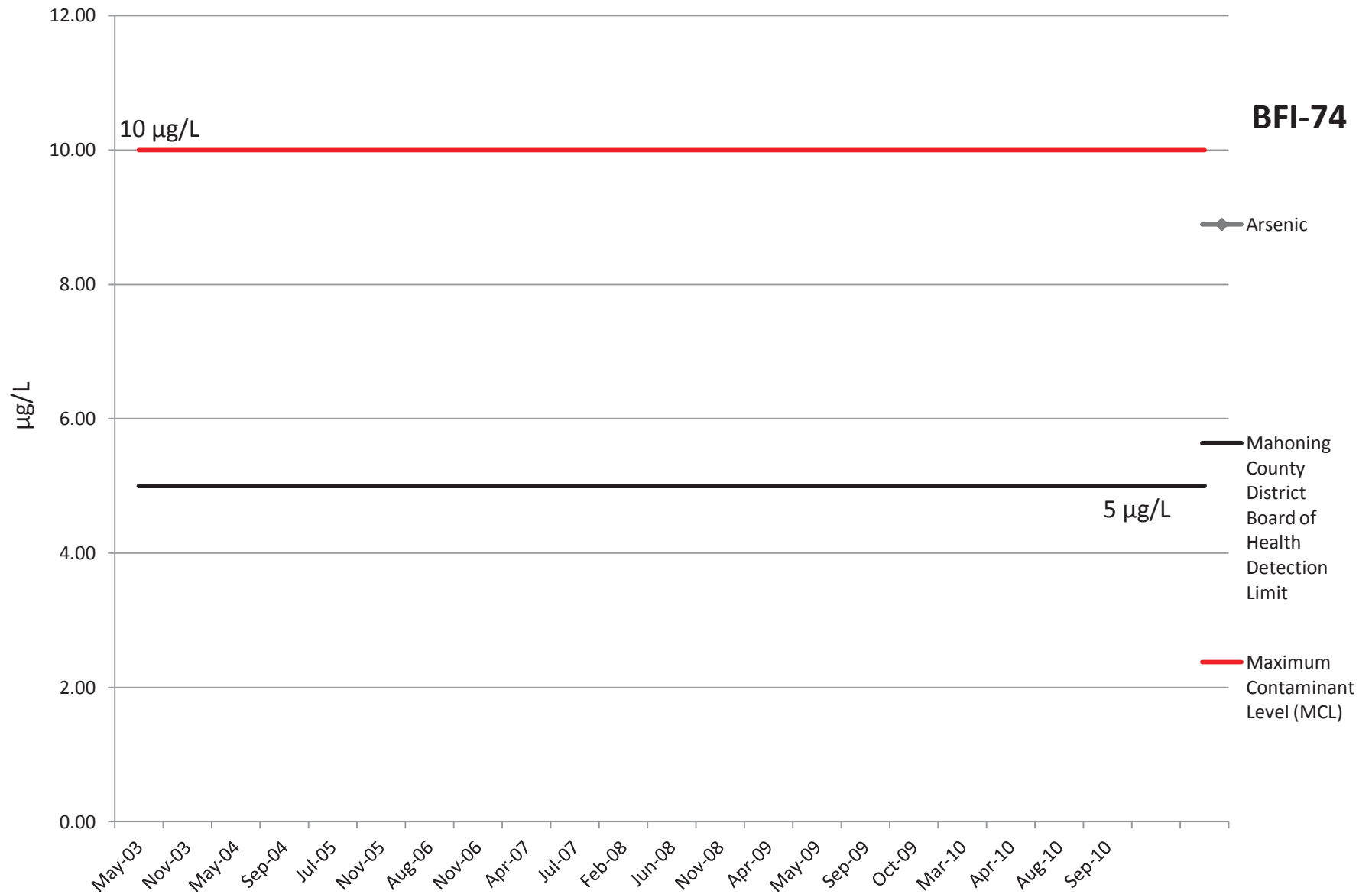
**BFI-74**

◆ Fluoride

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

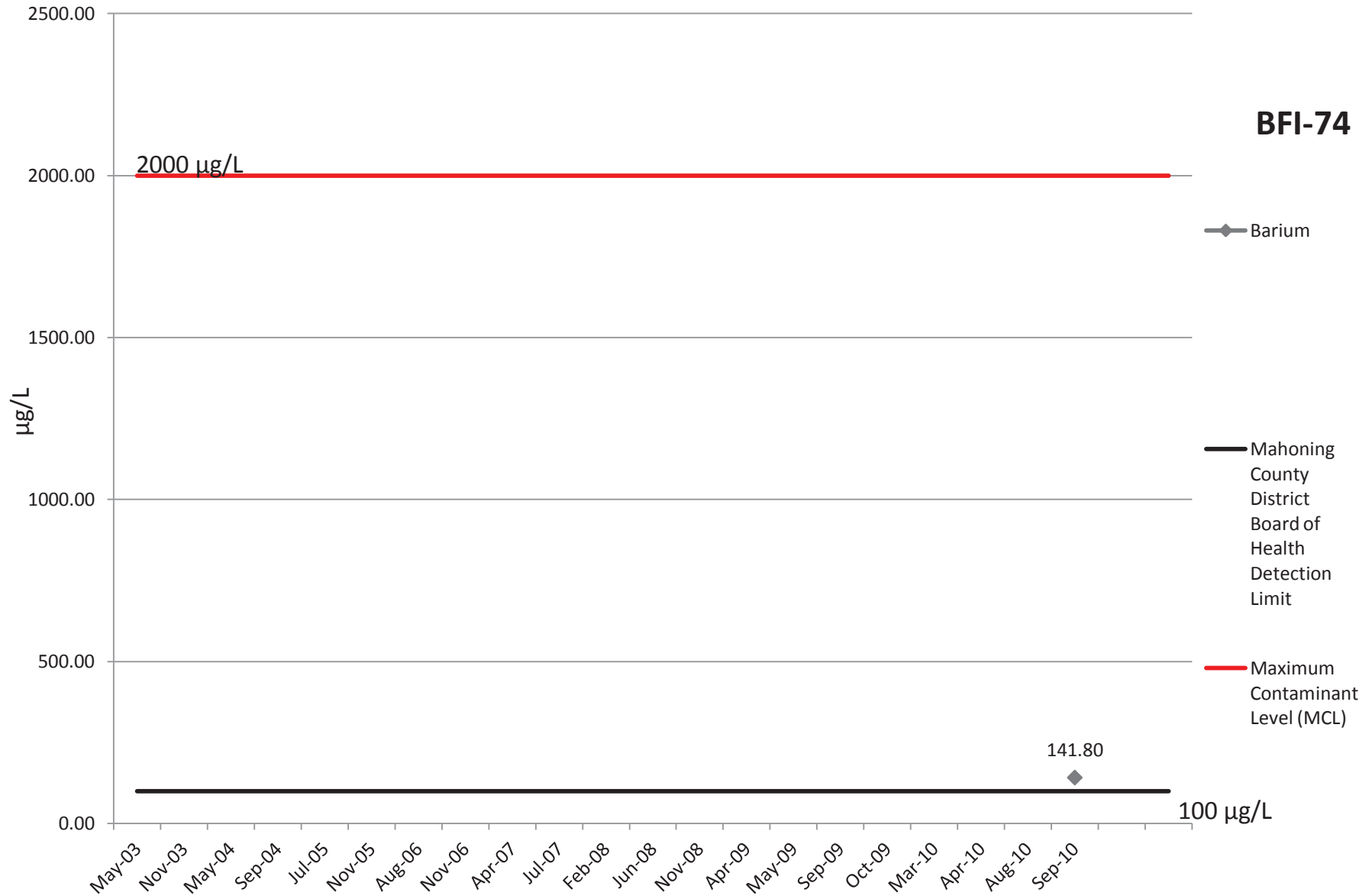
— Maximum  
Contaminant  
Level (MCL)

# Arsenic



# Barium

**BFI-74**



# Cadmium

**BFI-74**

10 µg/L

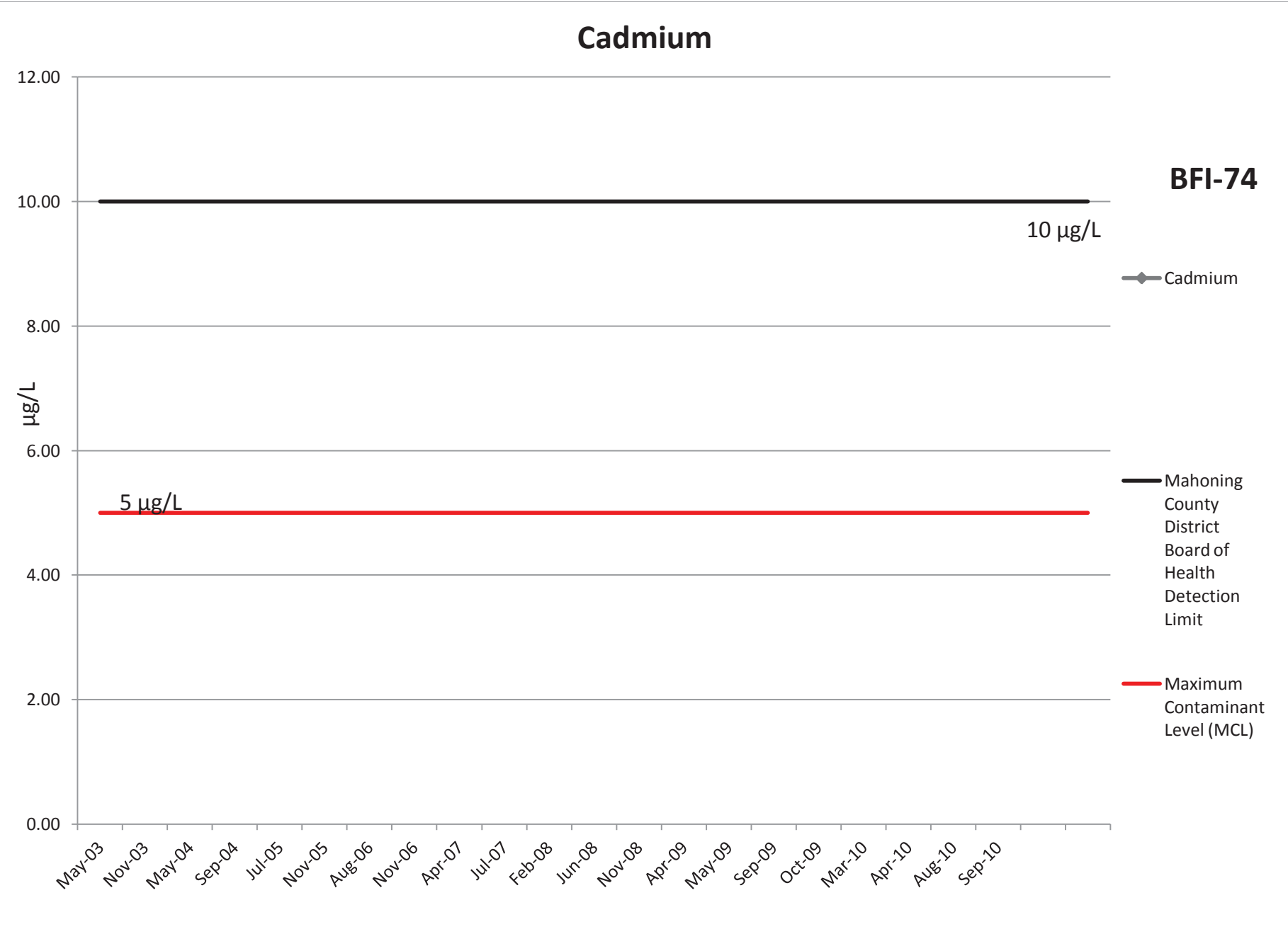
12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

5 µg/L

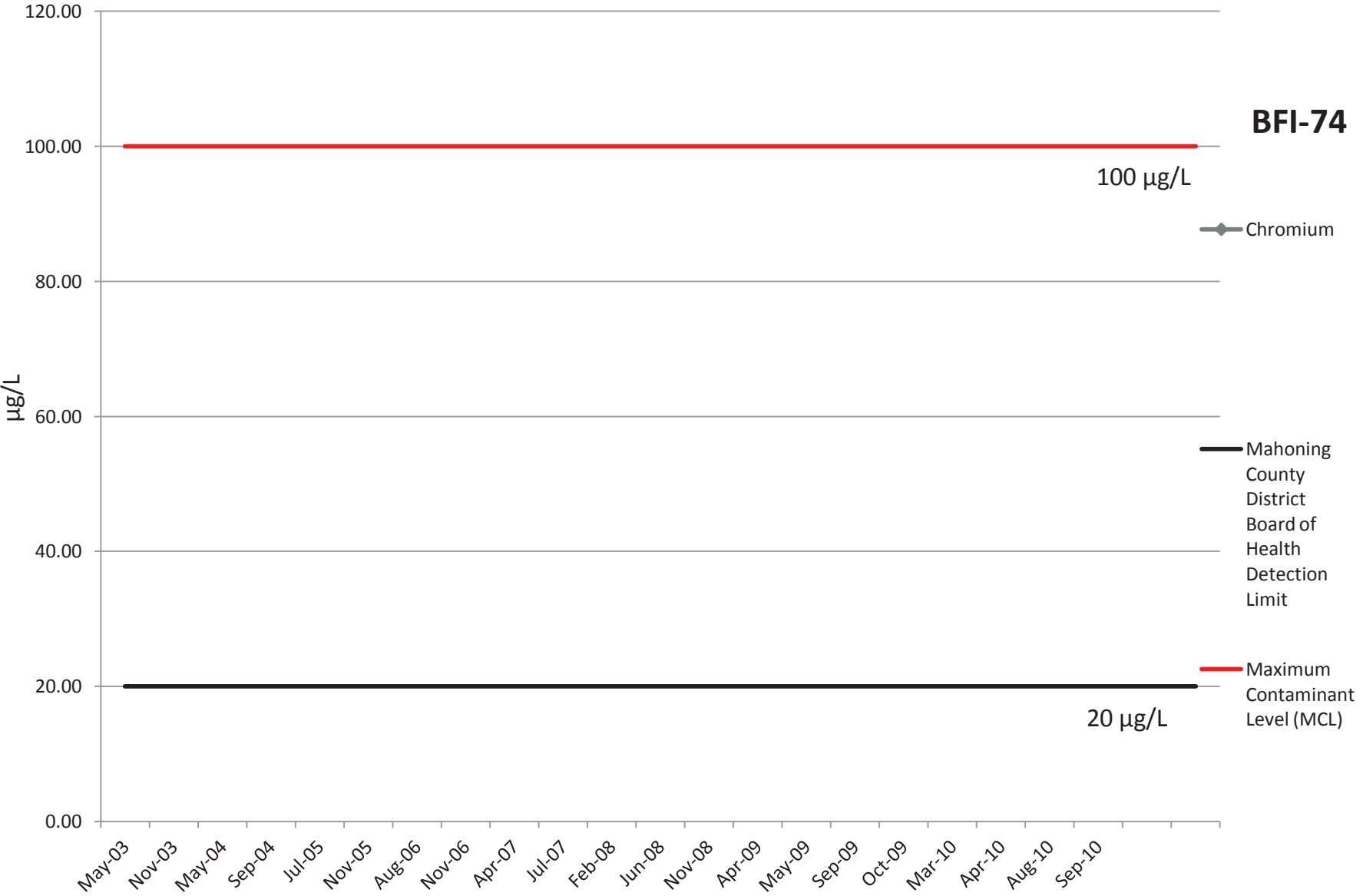
- ◆ Cadmium
- Mahoning County District Board of Health Detection Limit
- Maximum Contaminant Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

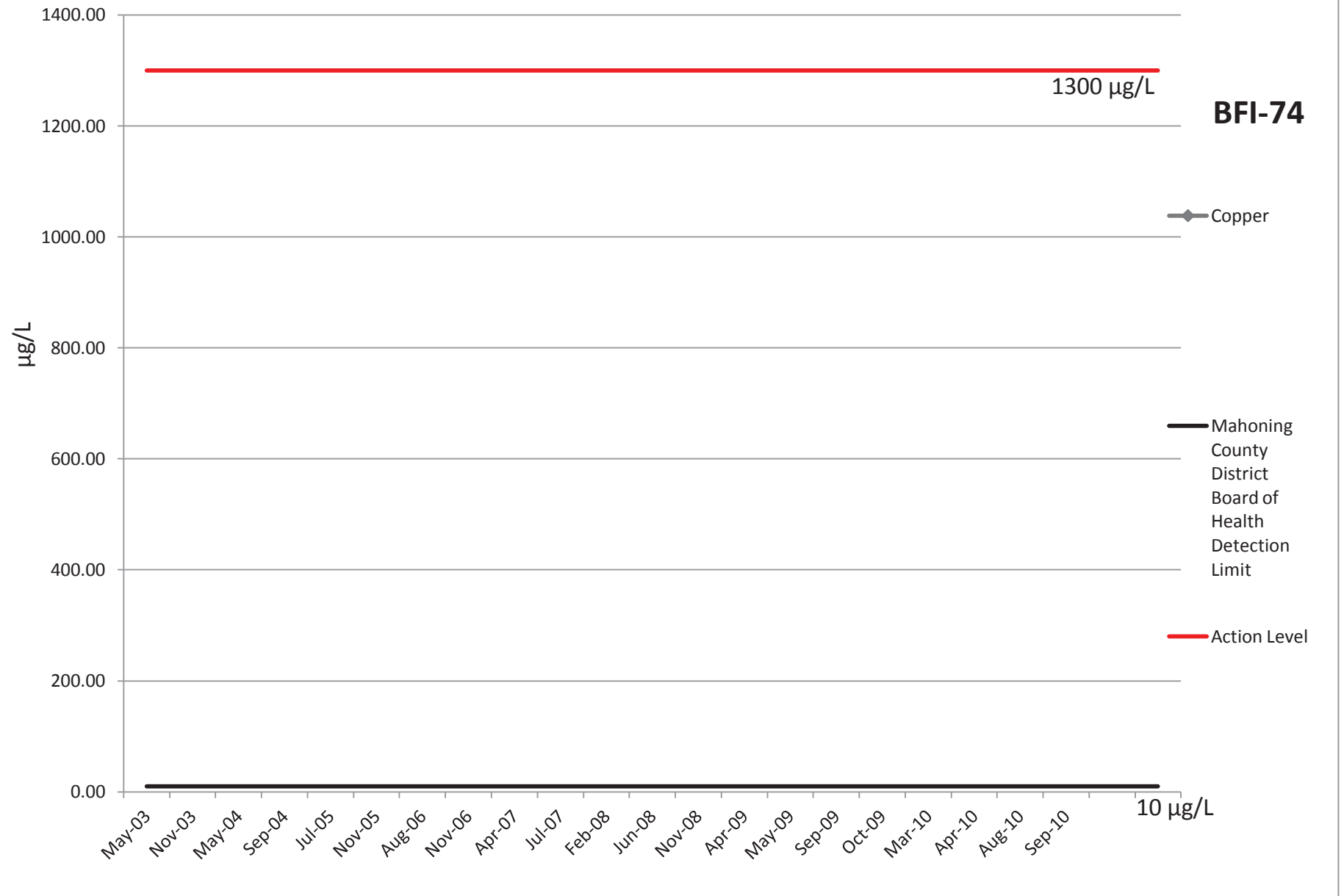


# Chromium

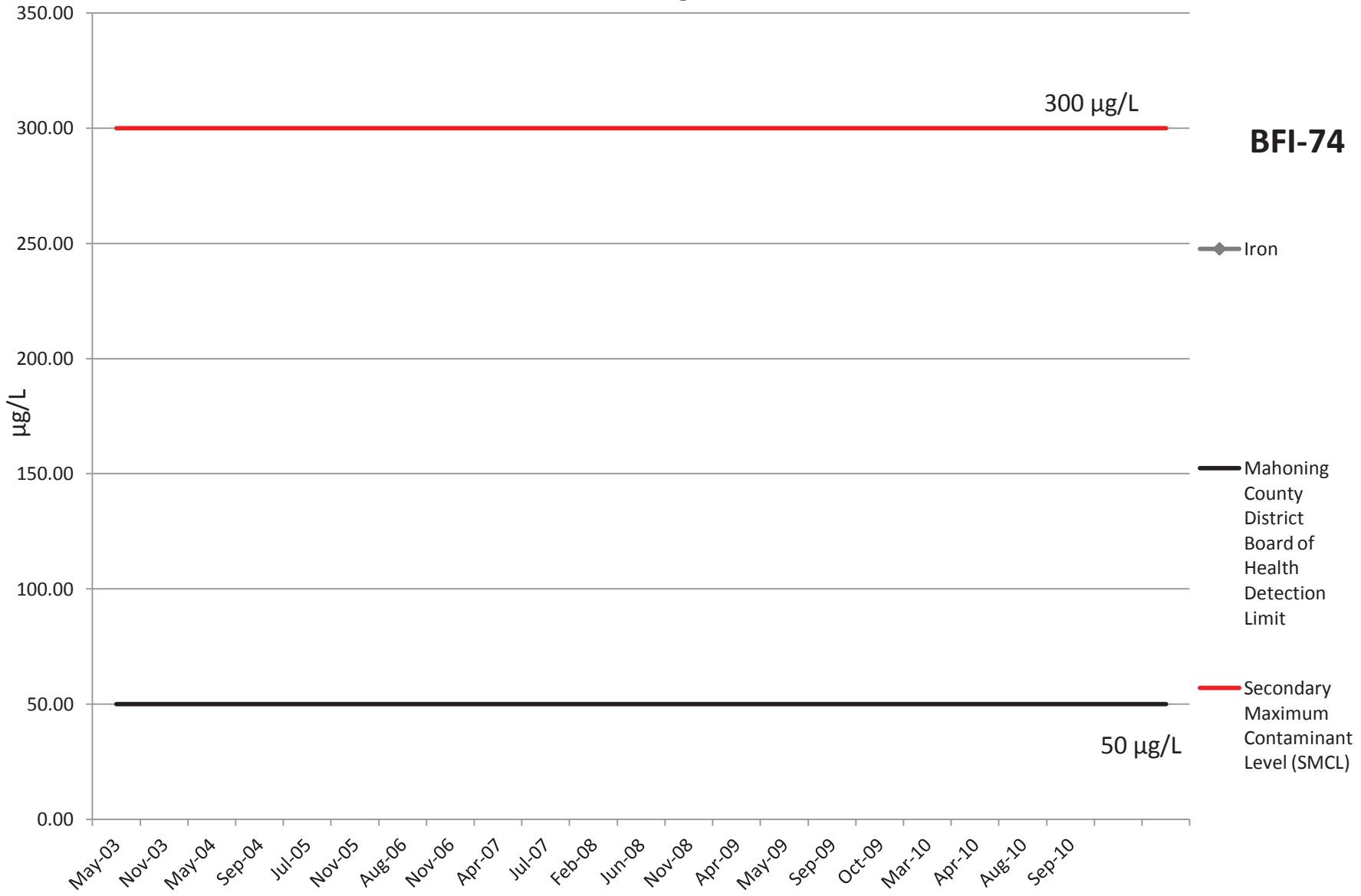
**BFI-74**



# Copper



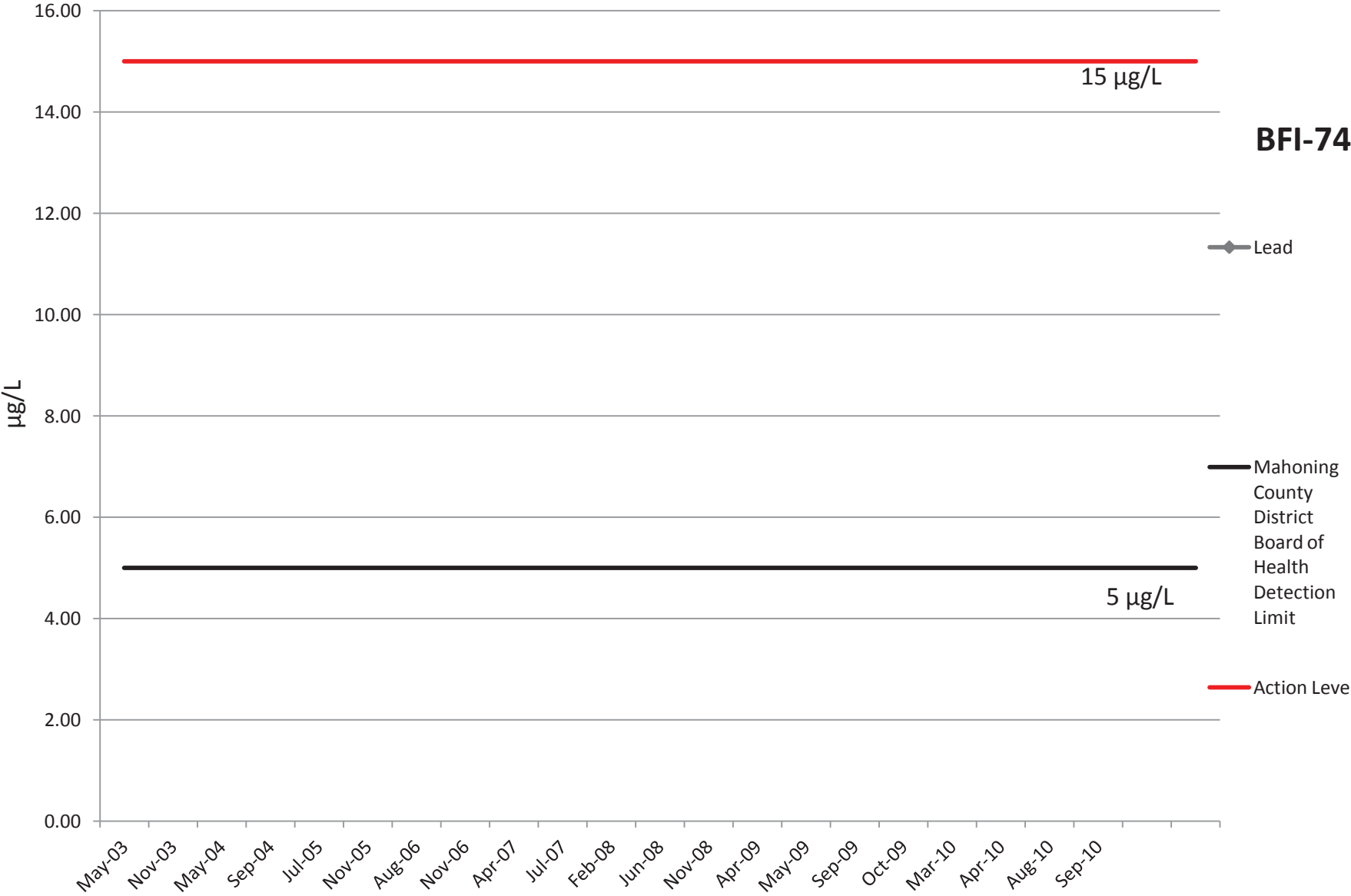
# Iron



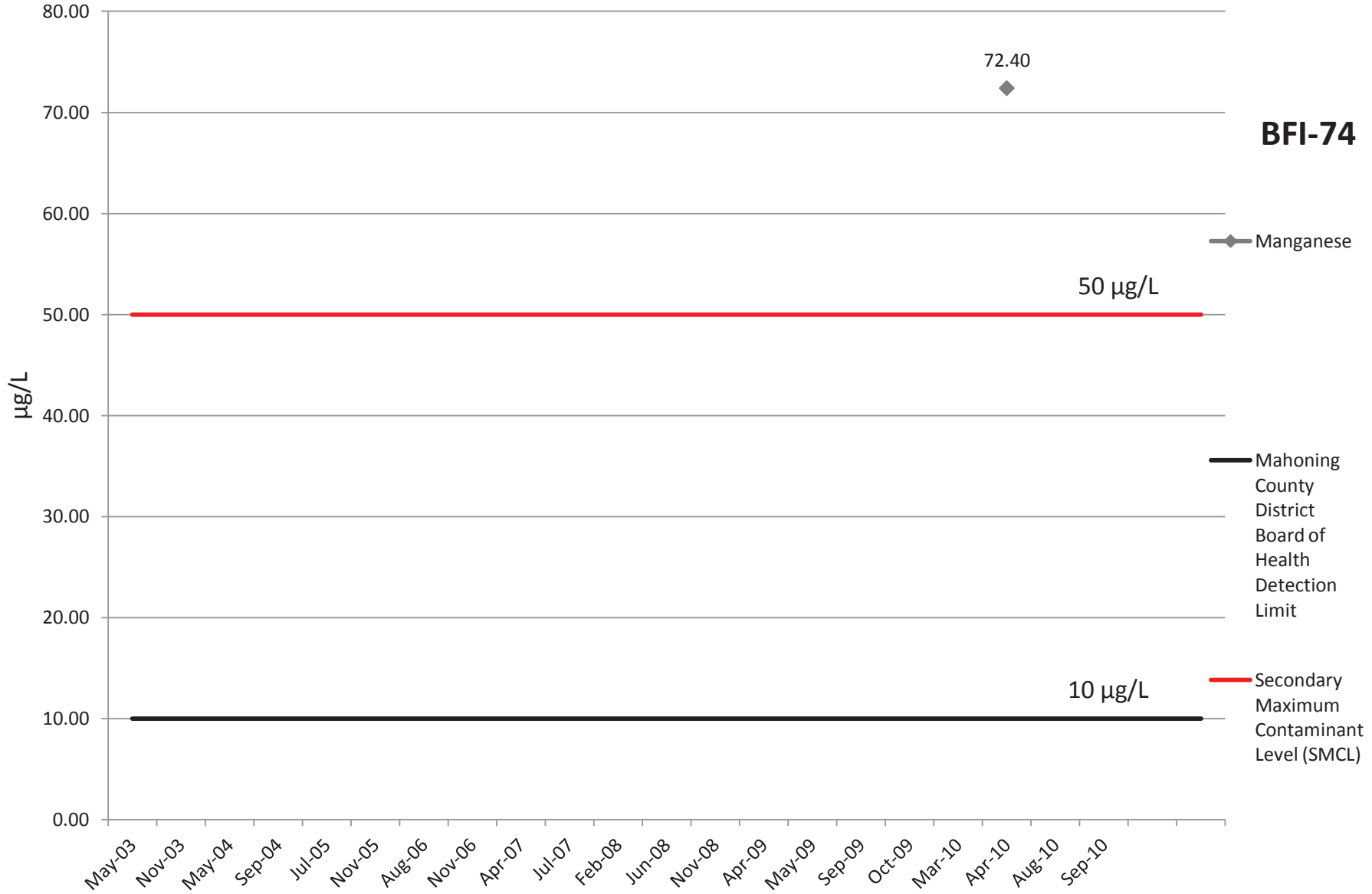


# Lead

**BFI-74**

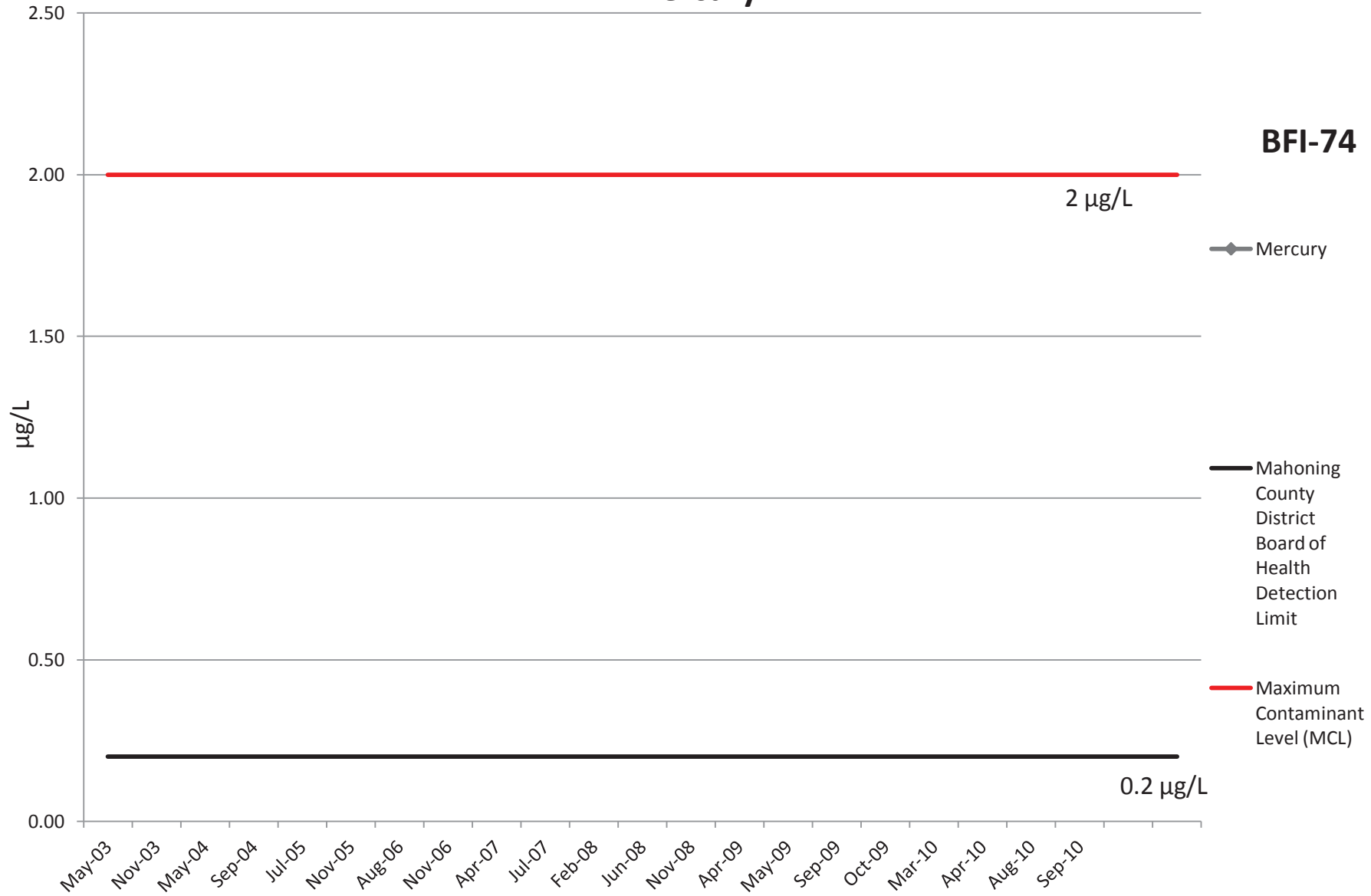


# Manganese

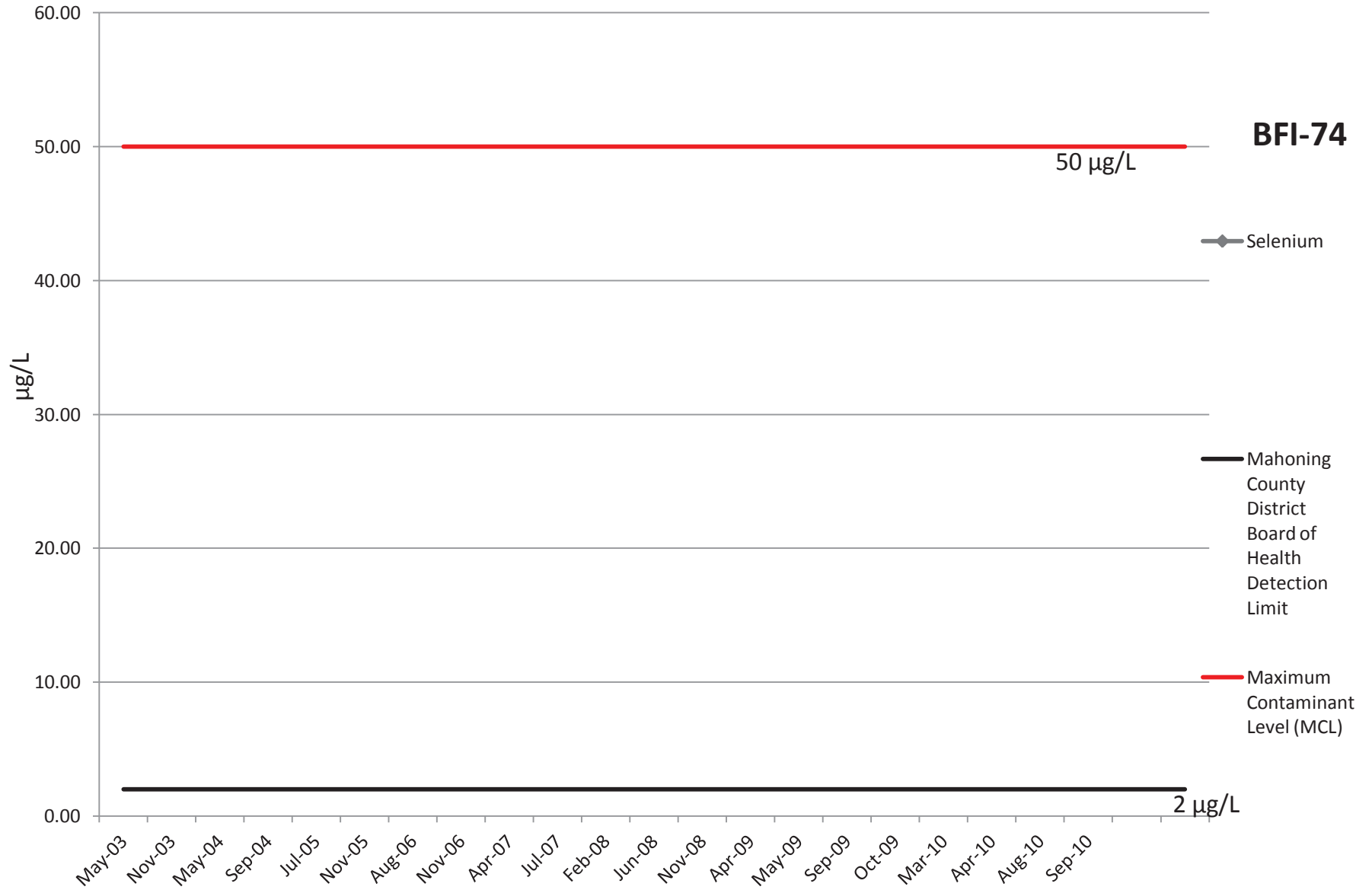


# Mercury

**BFI-74**

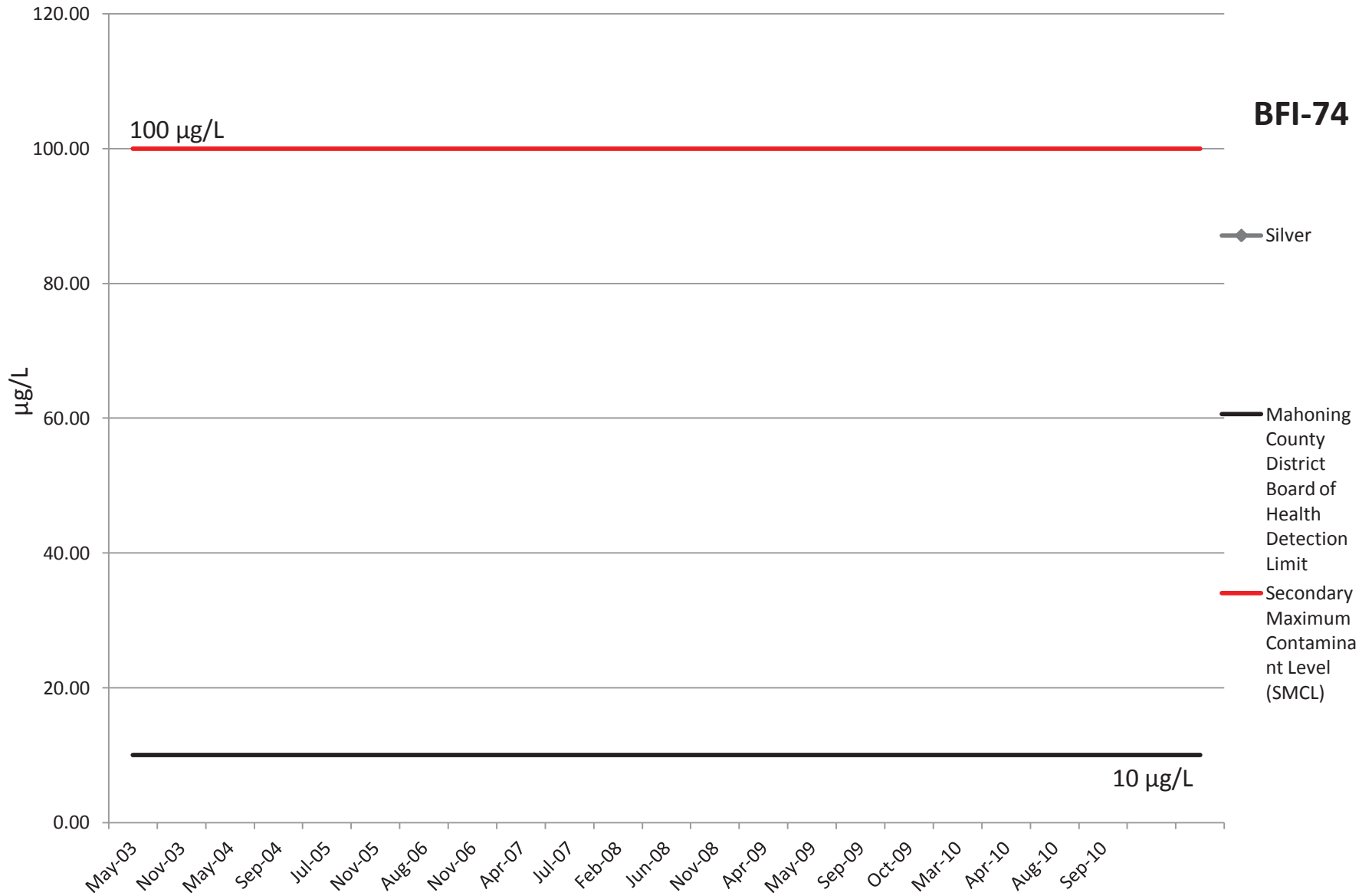


# Selenium

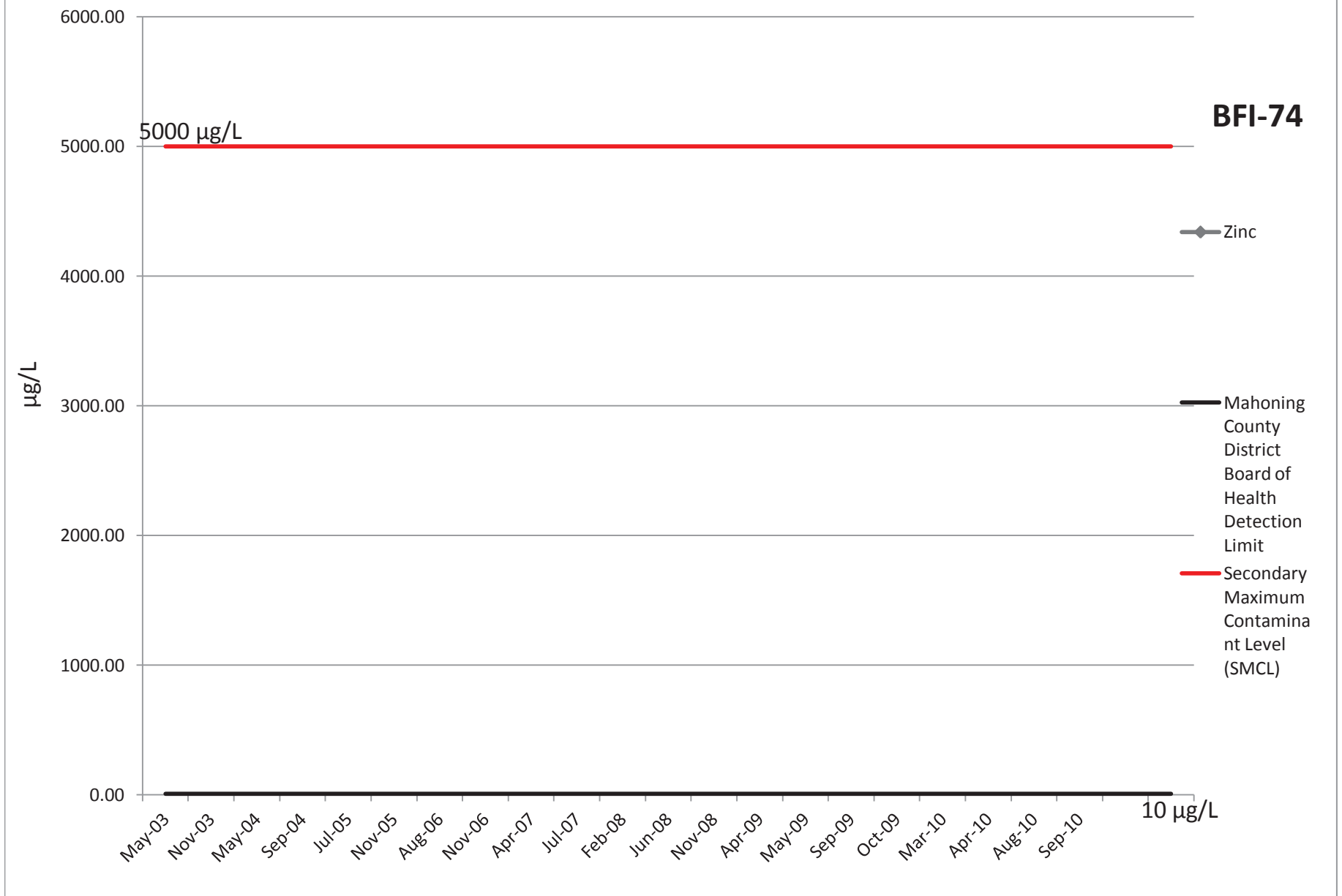


# Silver

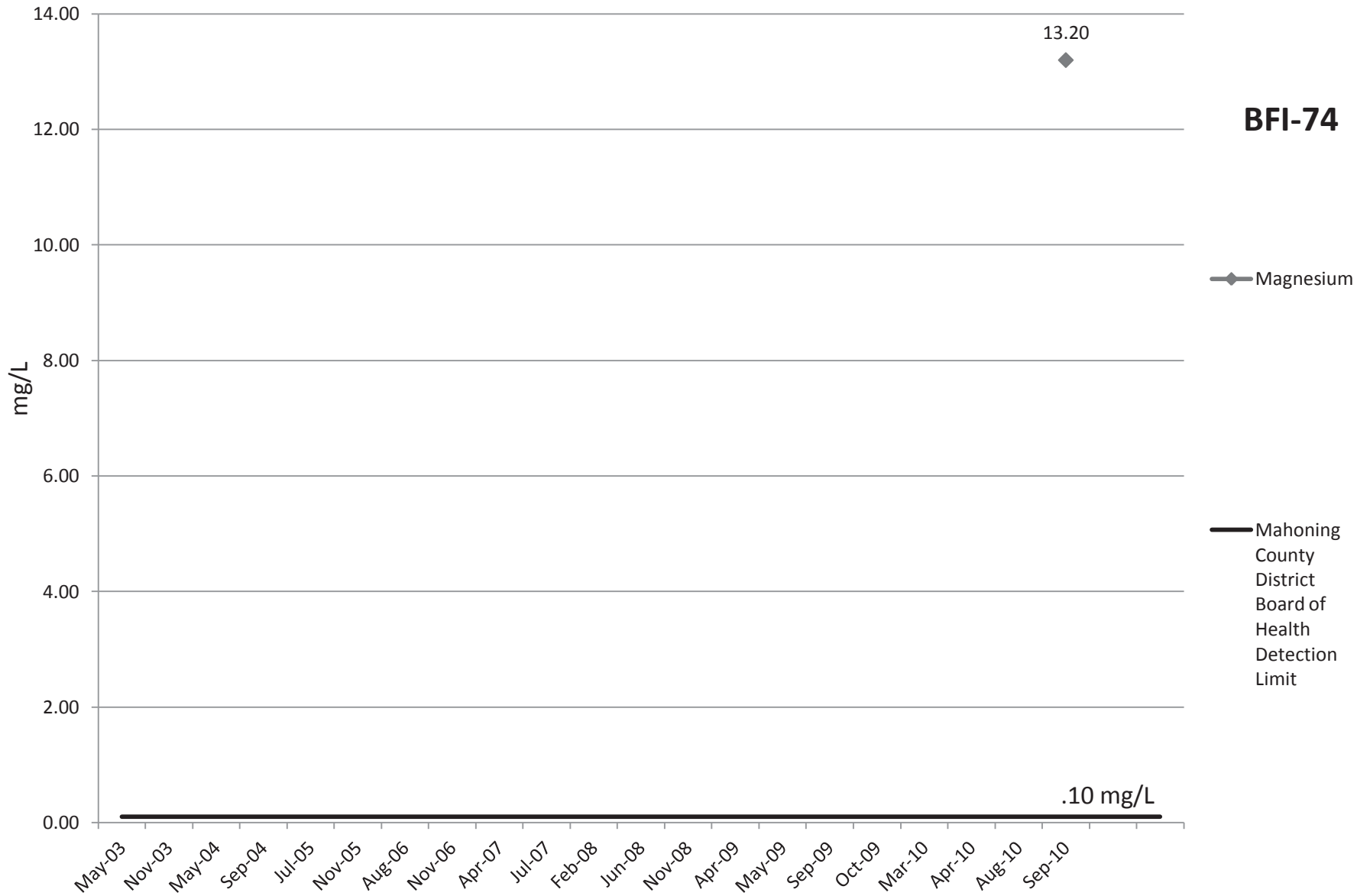
**BFI-74**



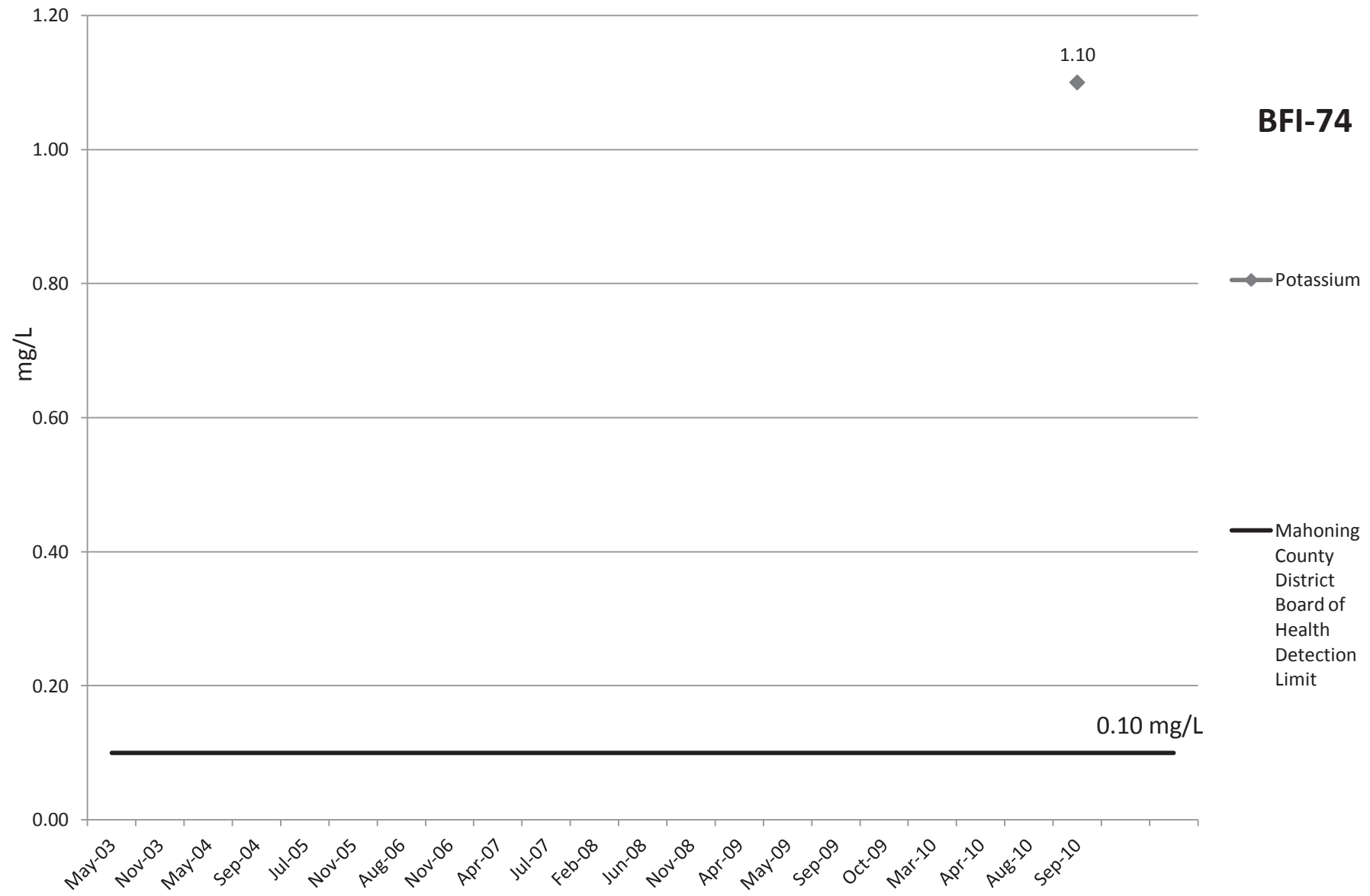
# Zinc



# Magnesium



# Potassium



**BFI-74**

◆ Potassium

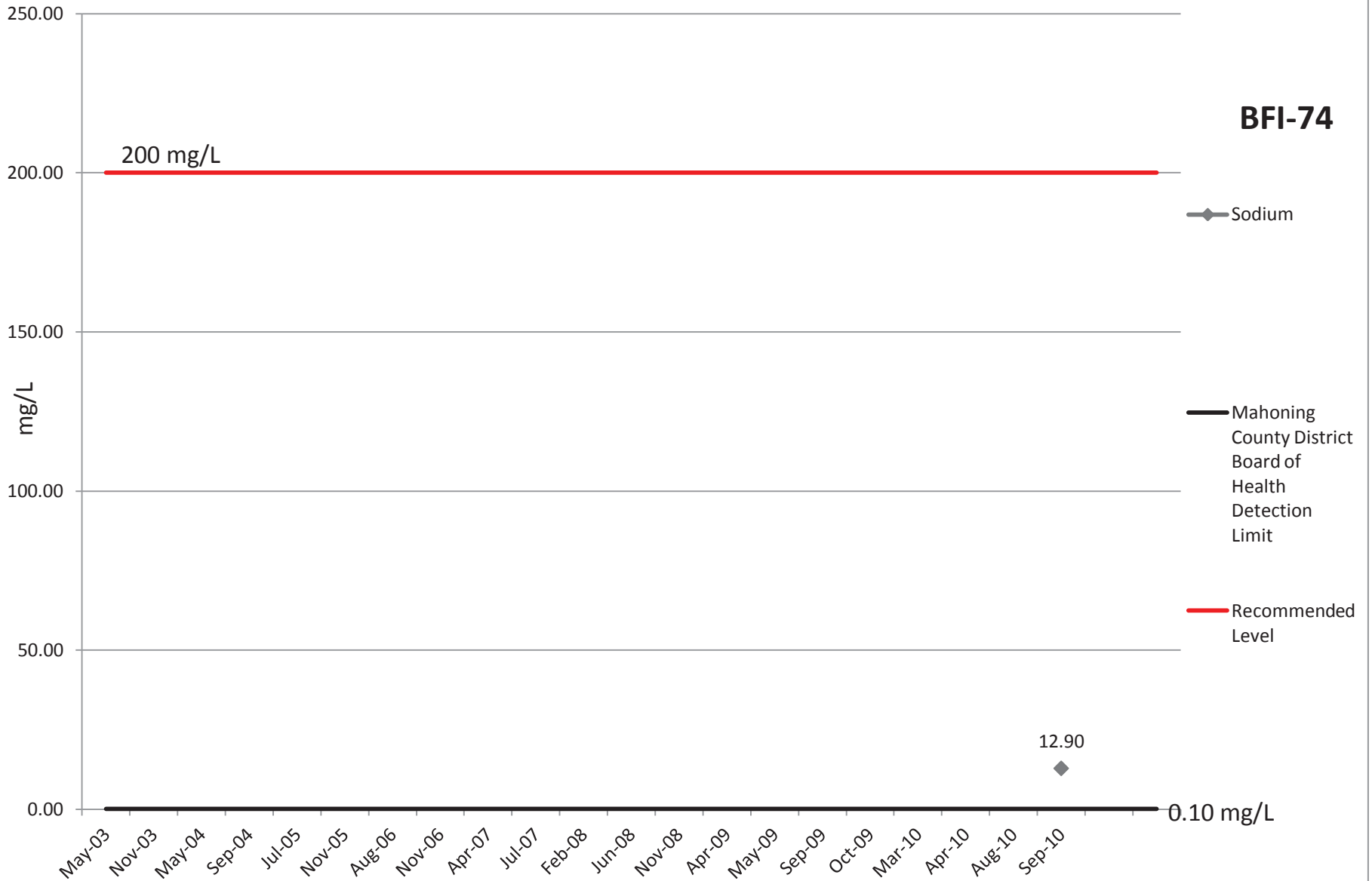
— Mahoning County District Board of Health Detection Limit

0.10 mg/L

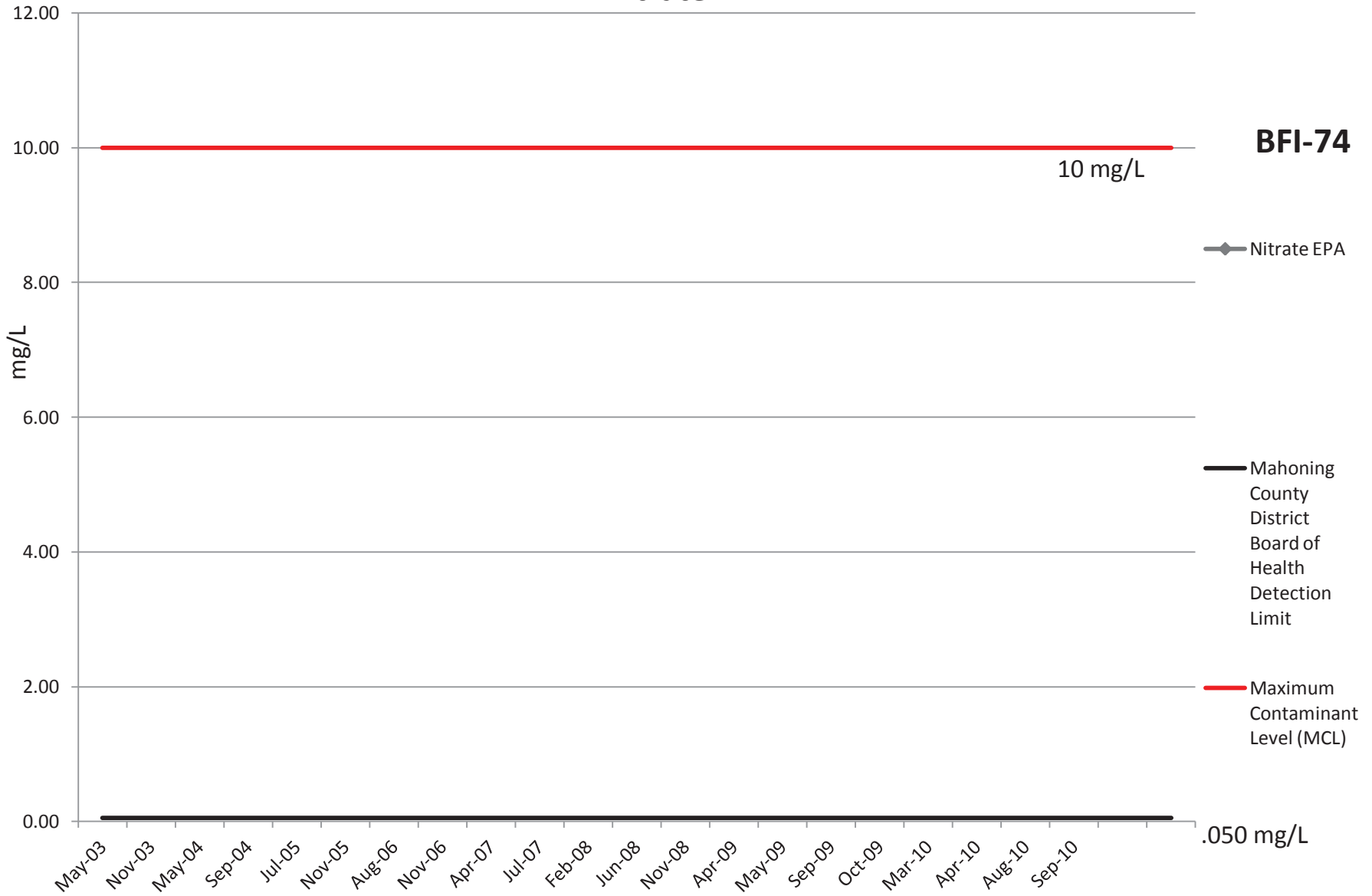


# Sodium

**BFI-74**

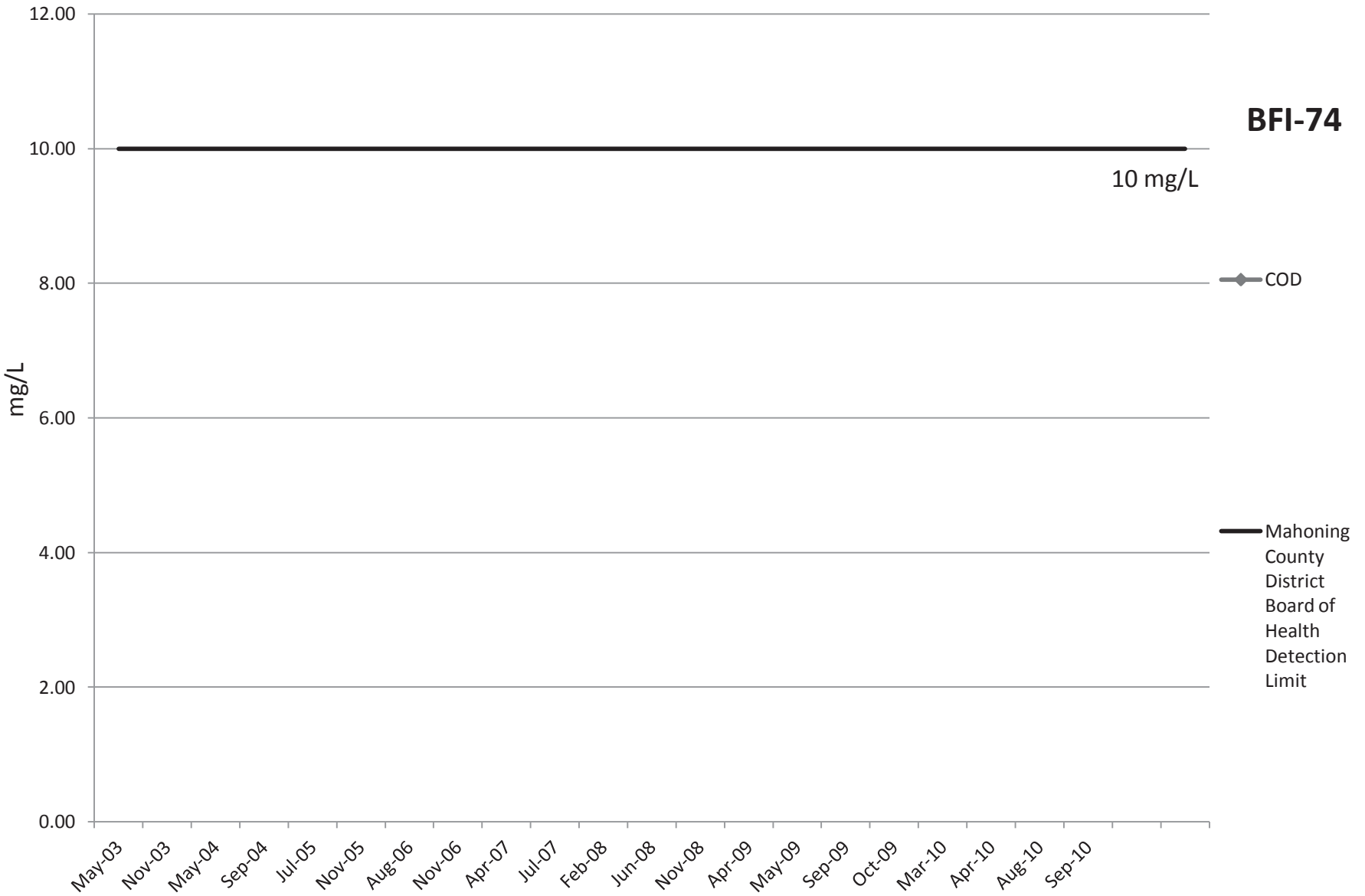


# Nitrate EPA



# COD

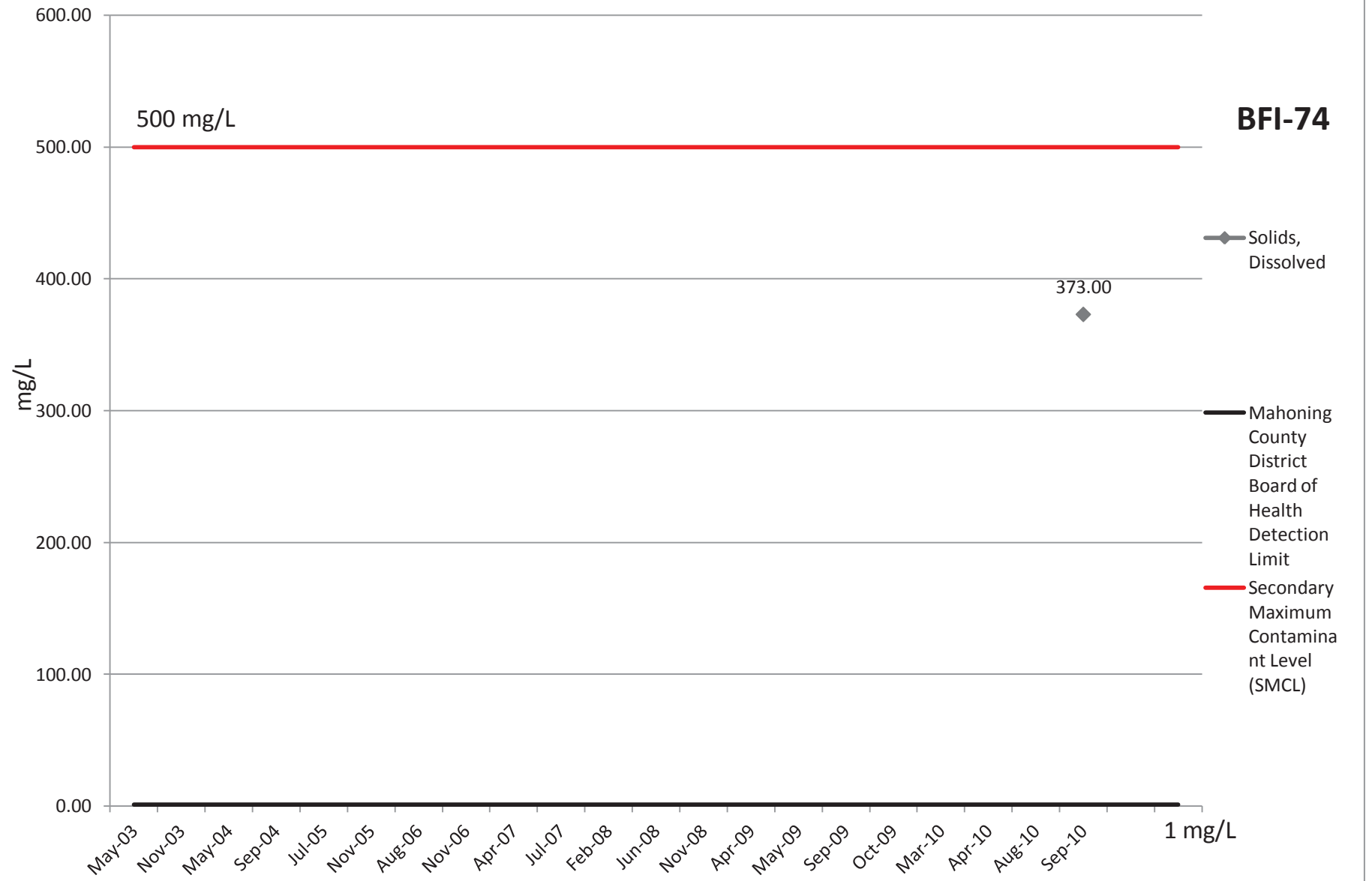
**BFI-74**



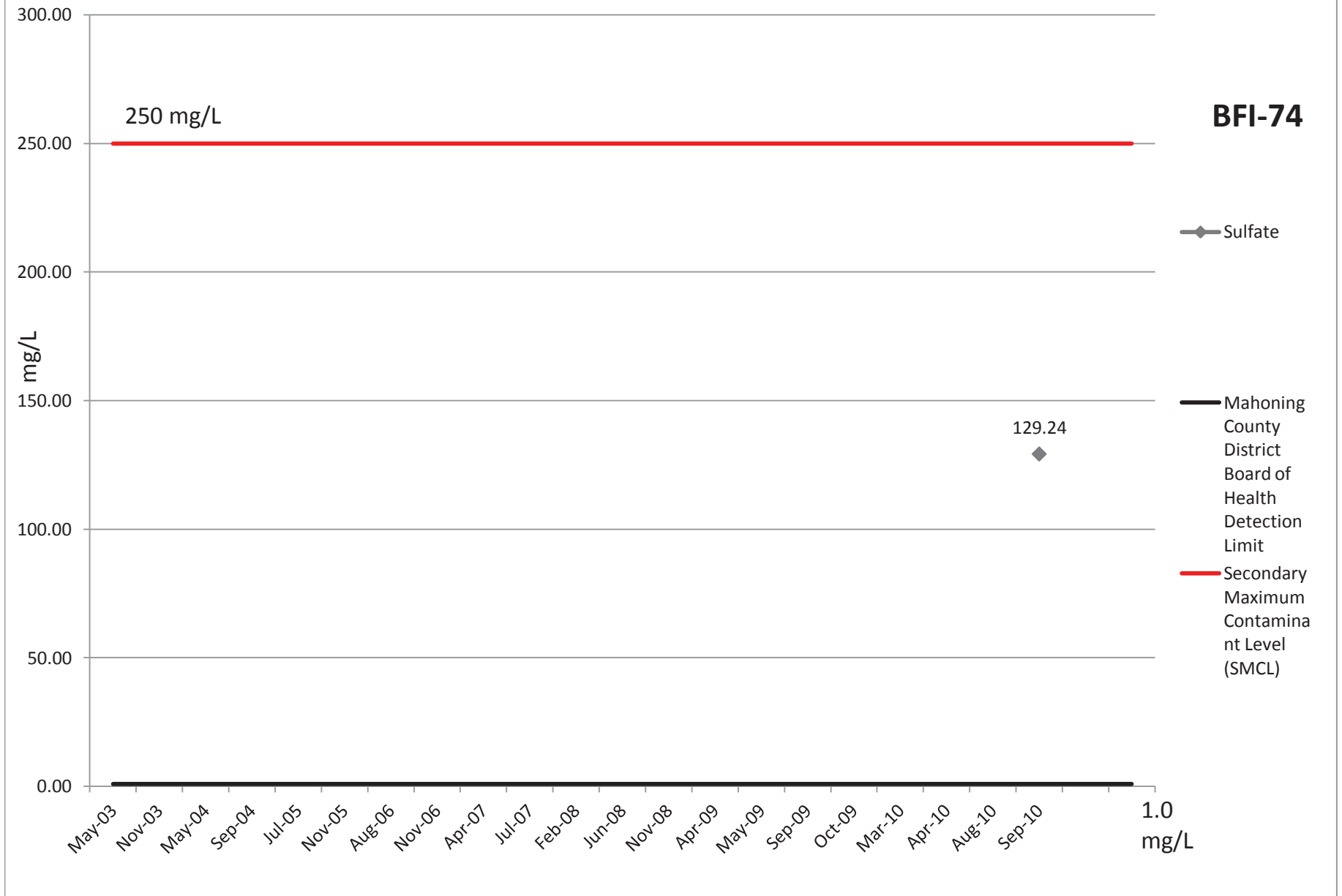
# pH



# Solids, Dissolved



# Sulfate



# Bacteria

positive (1)

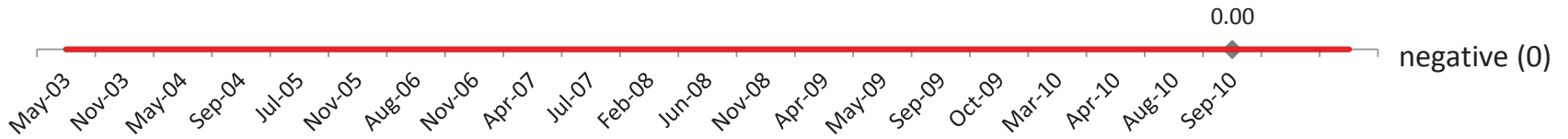
**BFI-74**

Positive/Negative

◆ Bacteria

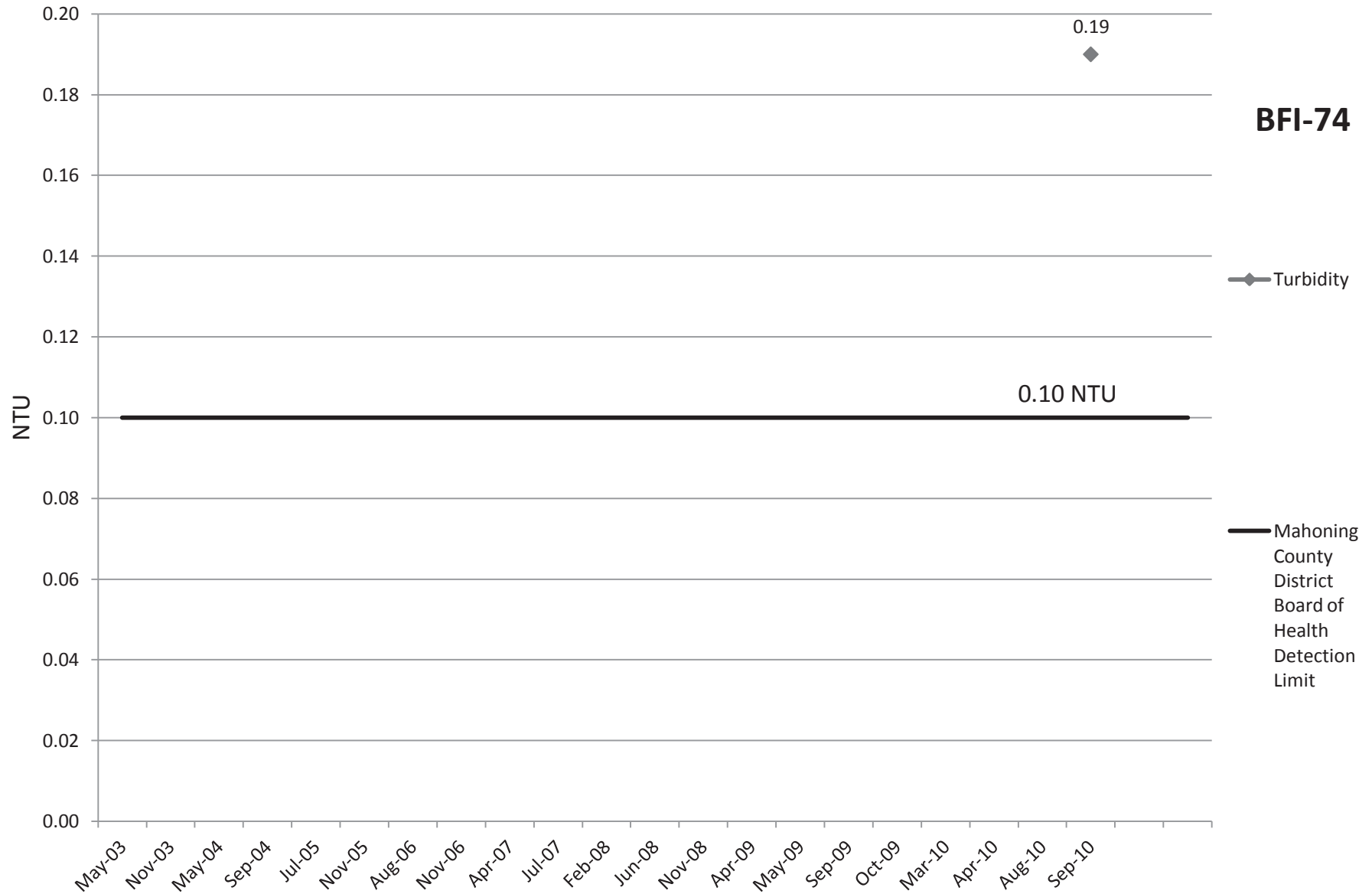
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)



negative (0)

# Turbidity



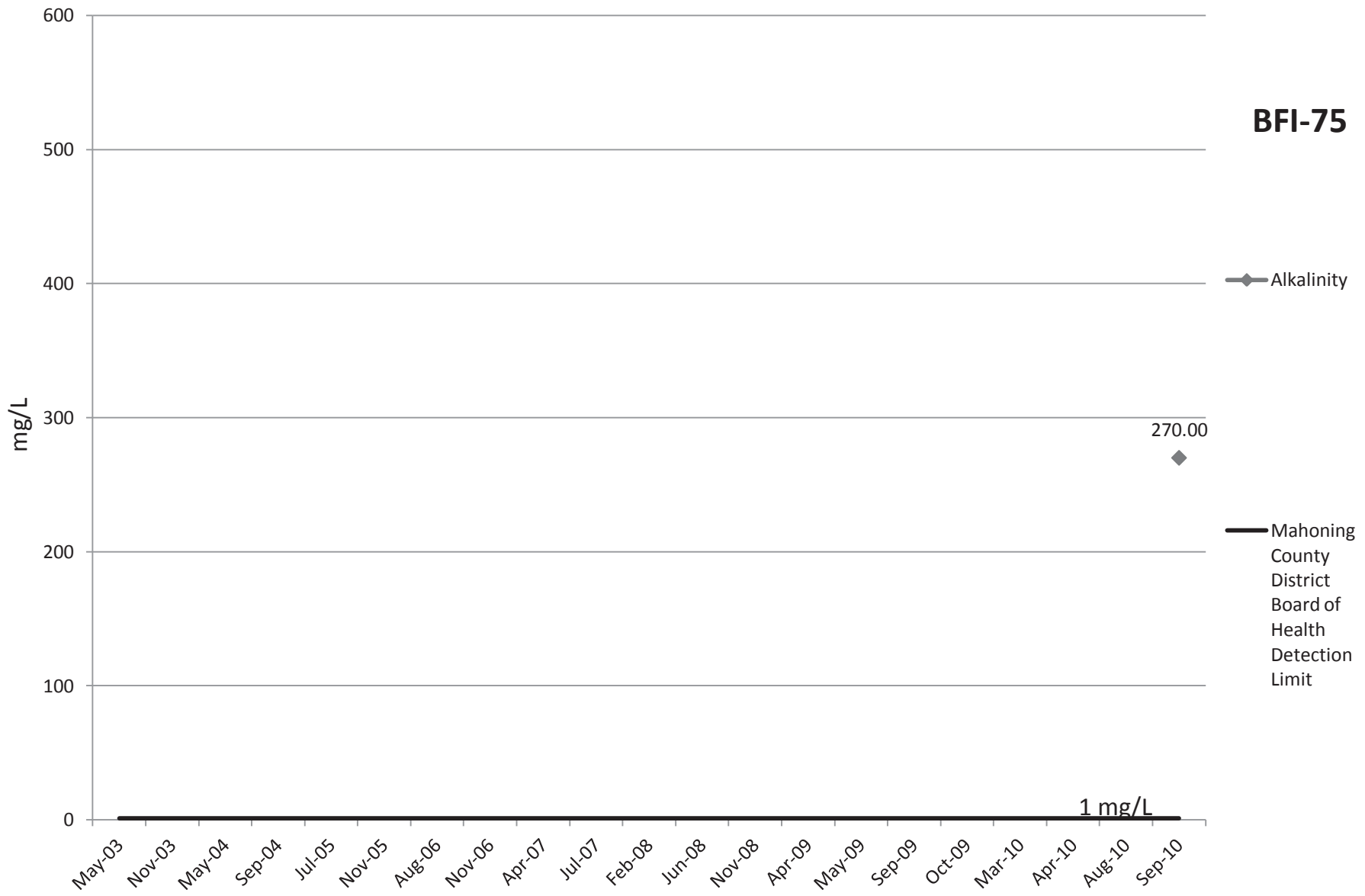
**BFI-74**

◆ Turbidity

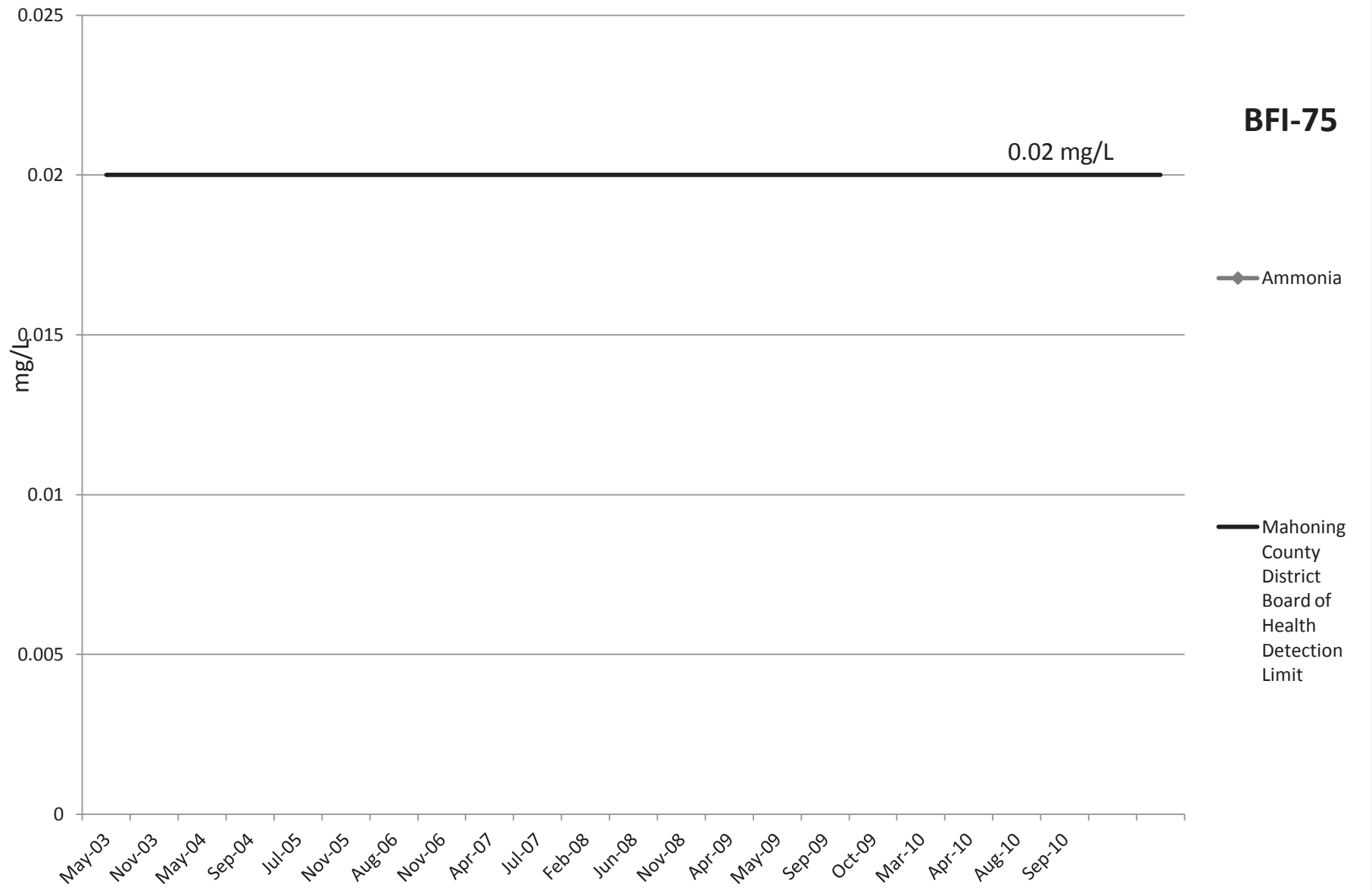
— Mahoning County District Board of Health Detection Limit



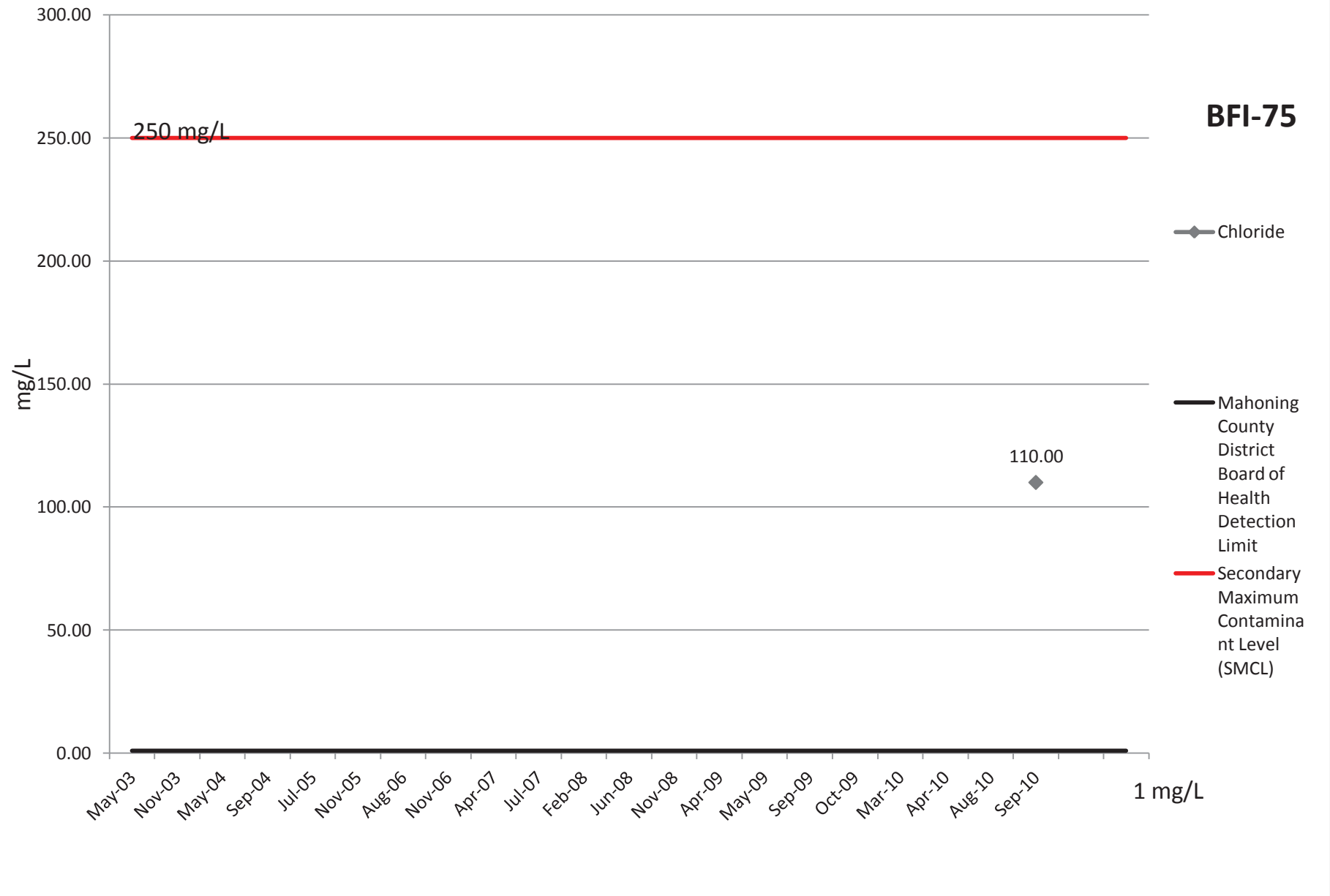
# Alkalinity



# Ammonia



# Chloride



**BFI-75**

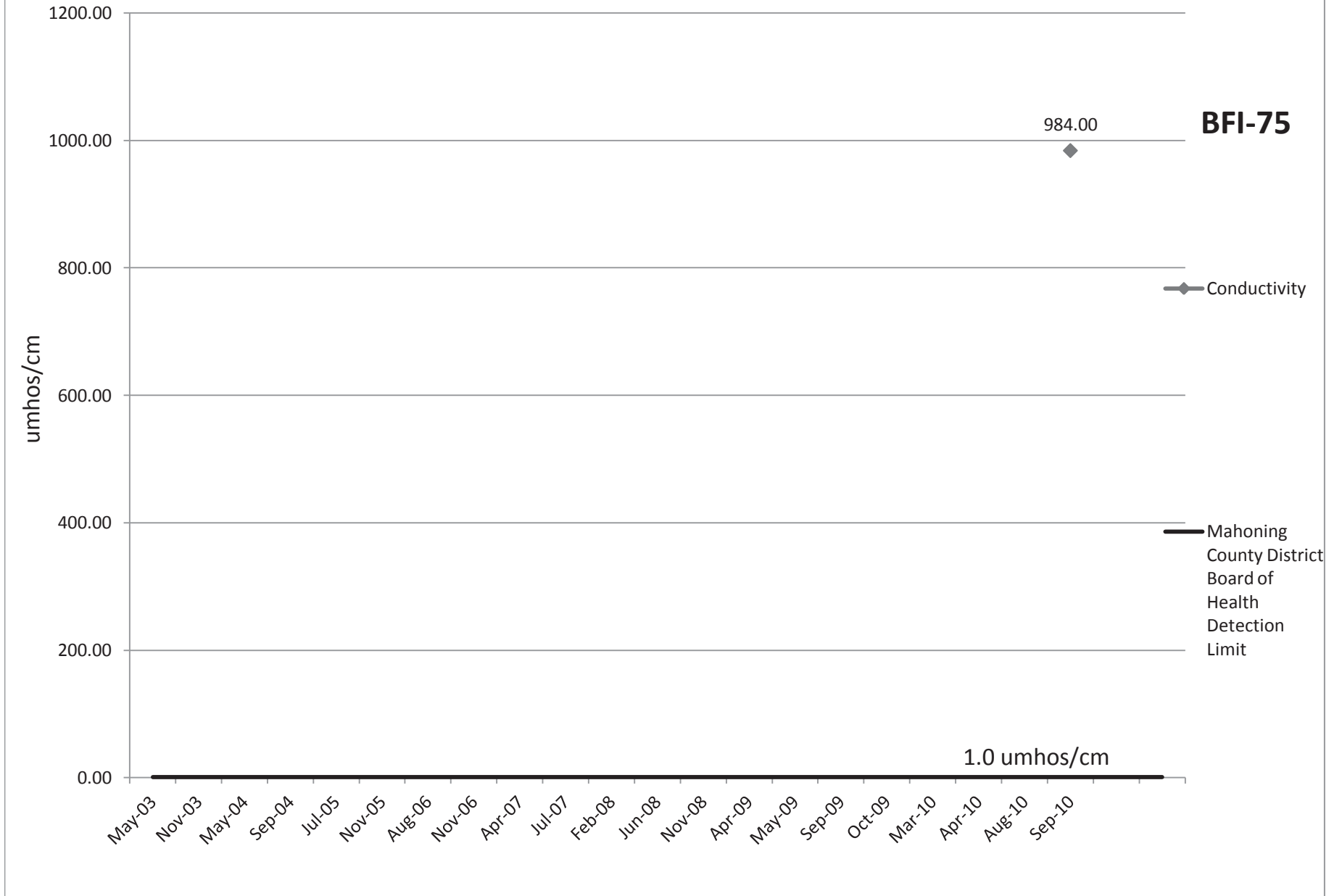
◆ Chloride

— Mahoning County District Board of Health Detection Limit

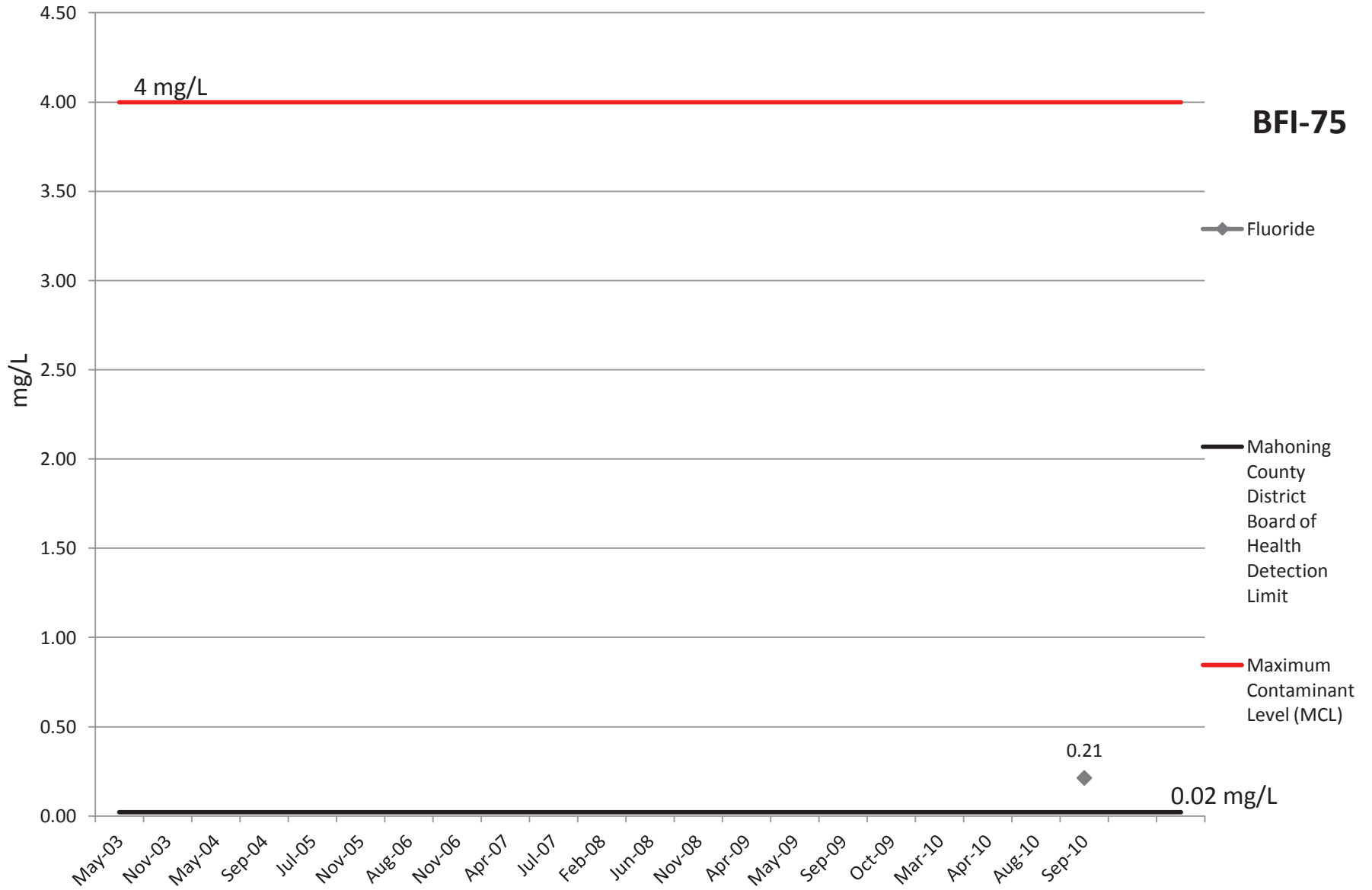
— Secondary Maximum Contaminant Level (SMCL)

1 mg/L

# Conductivity



# Fluoride



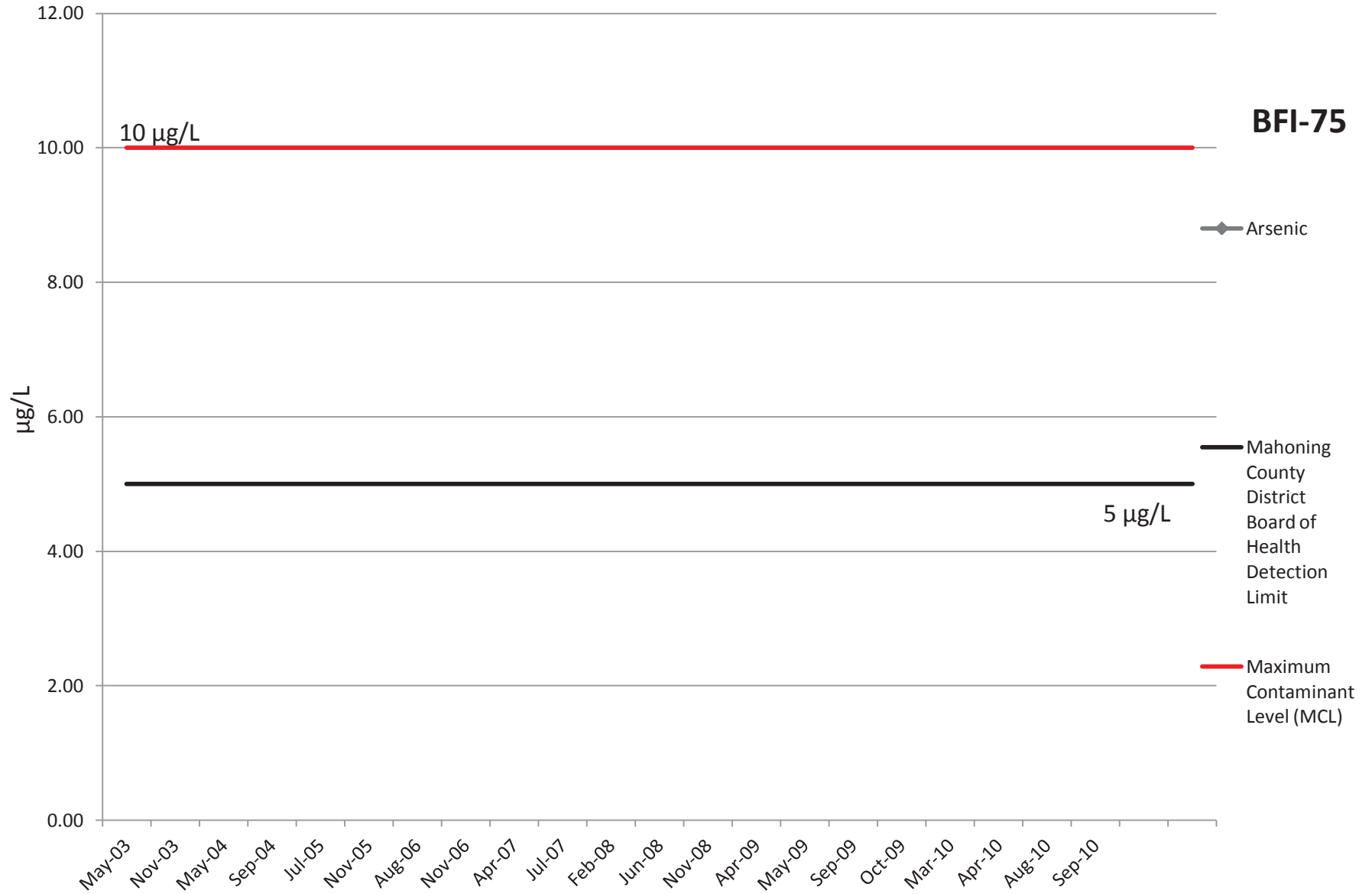
**BFI-75**

◆ Fluoride

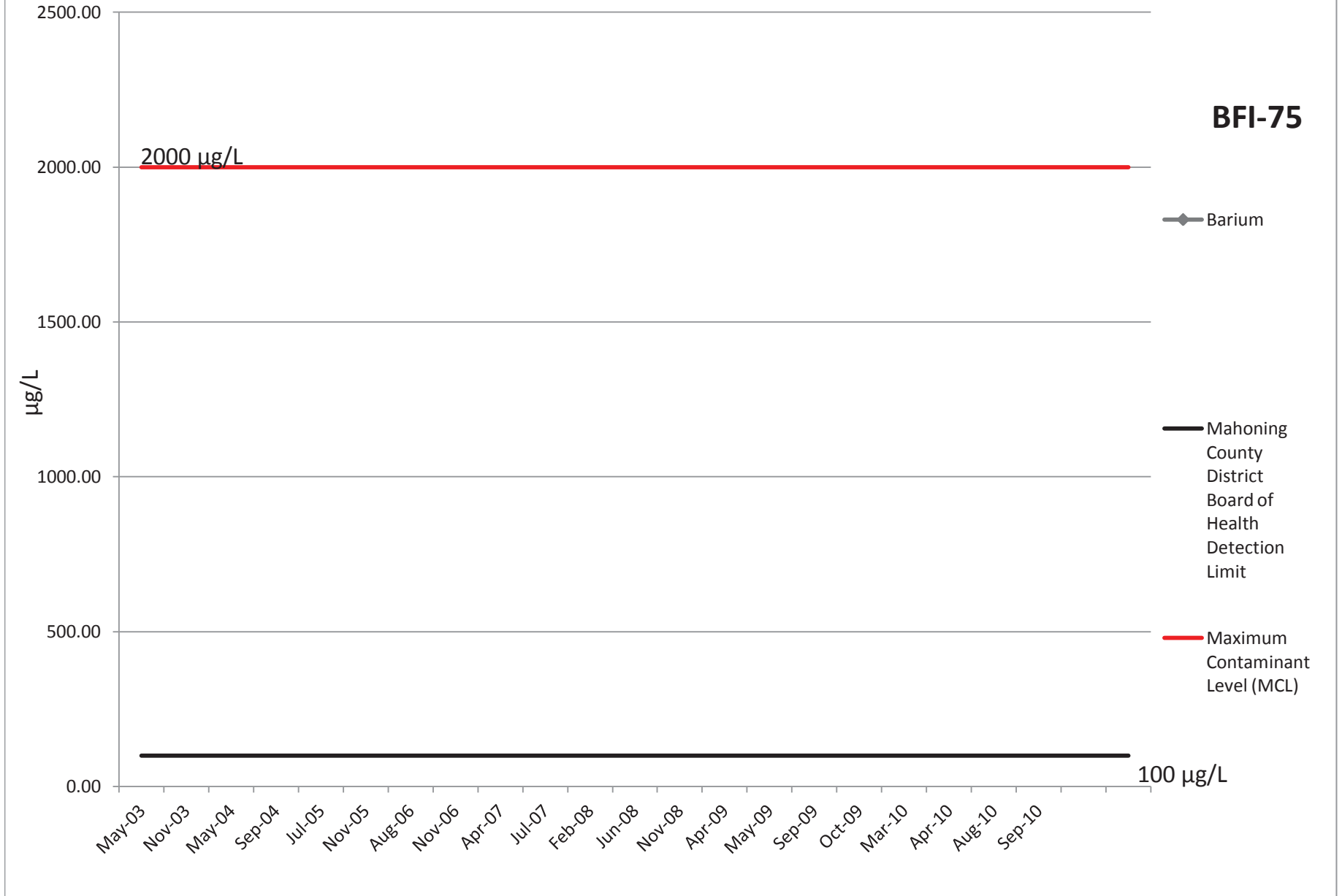
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

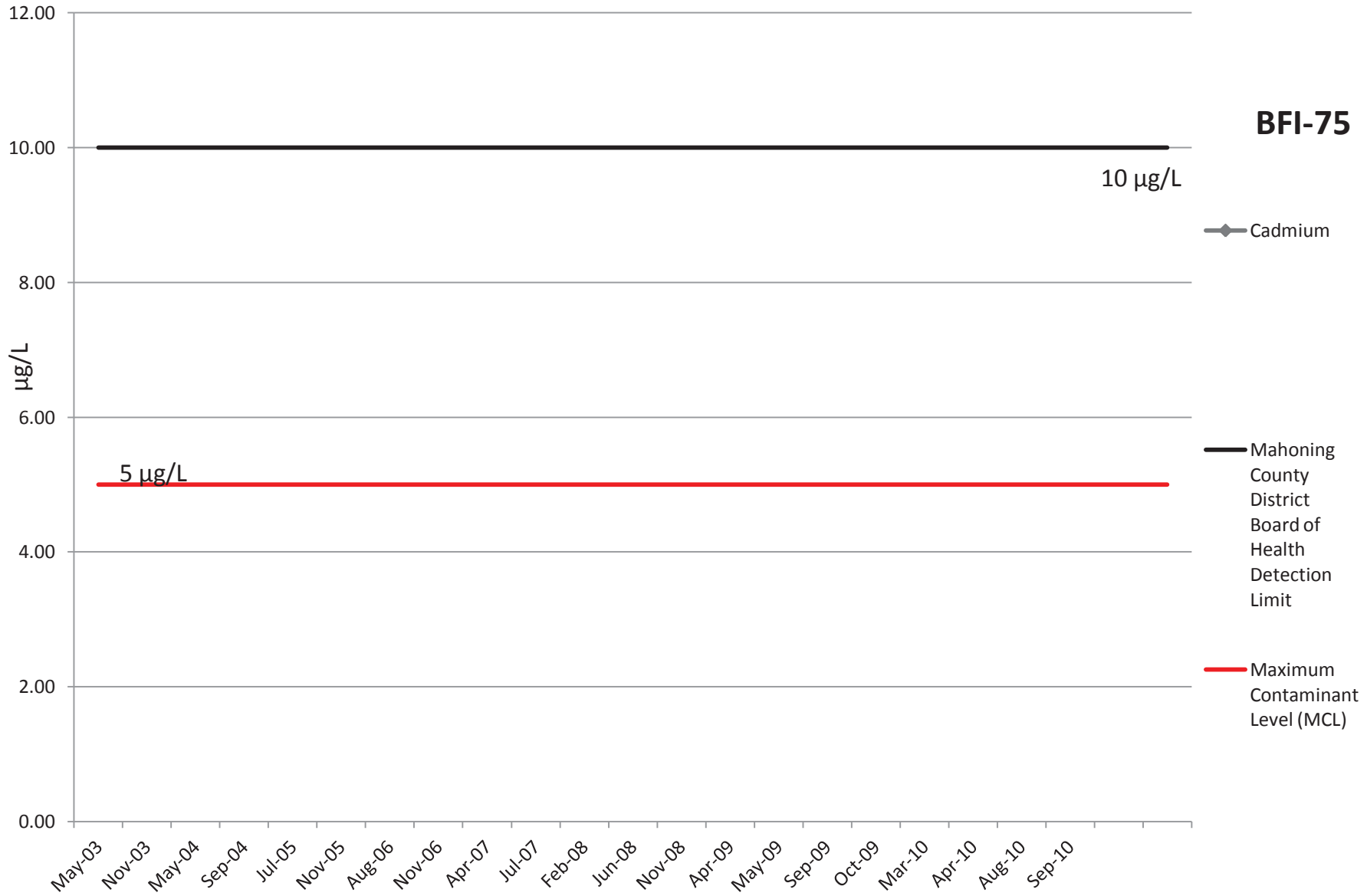
# Arsenic



# Barium

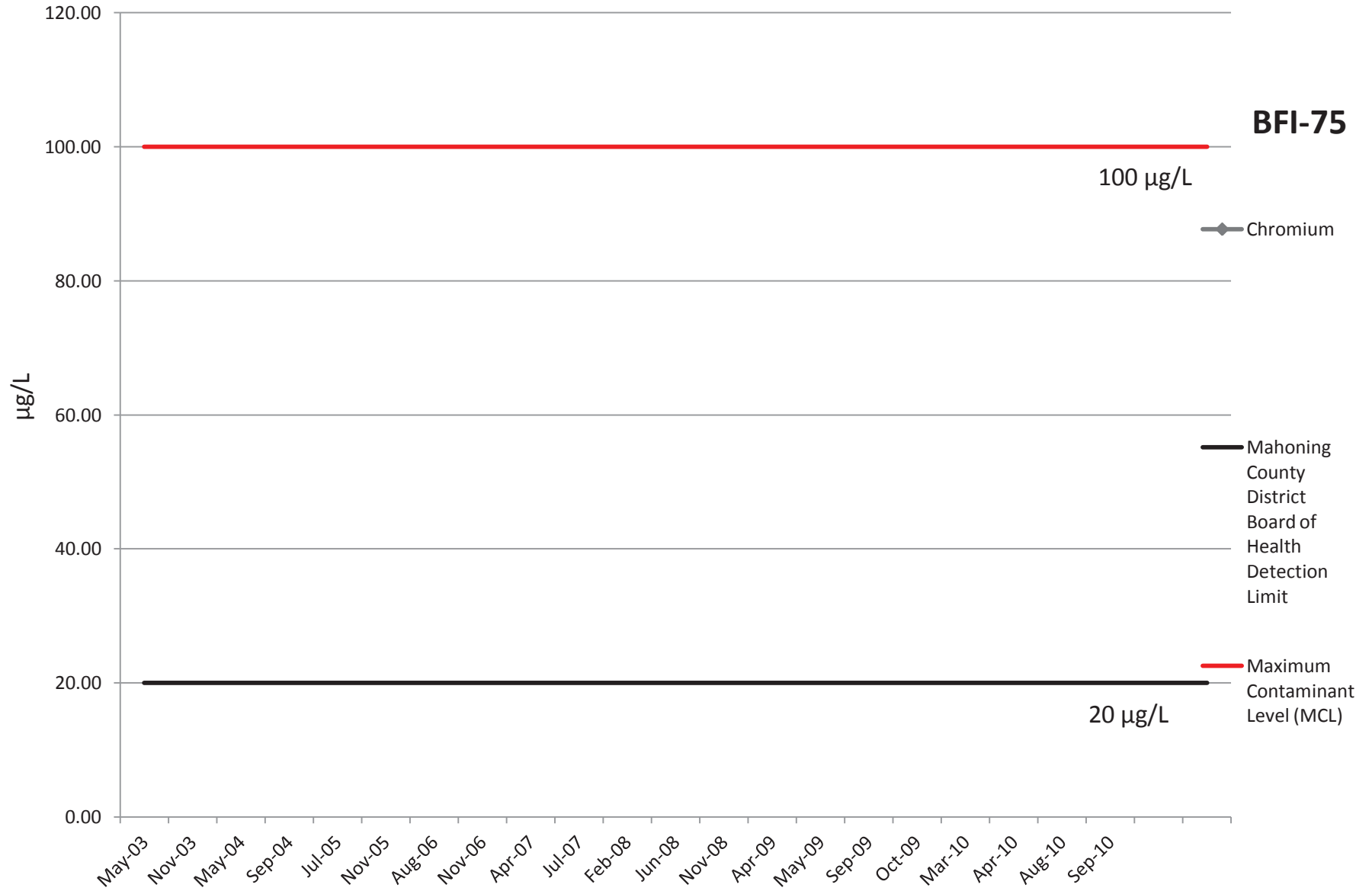


# Cadmium

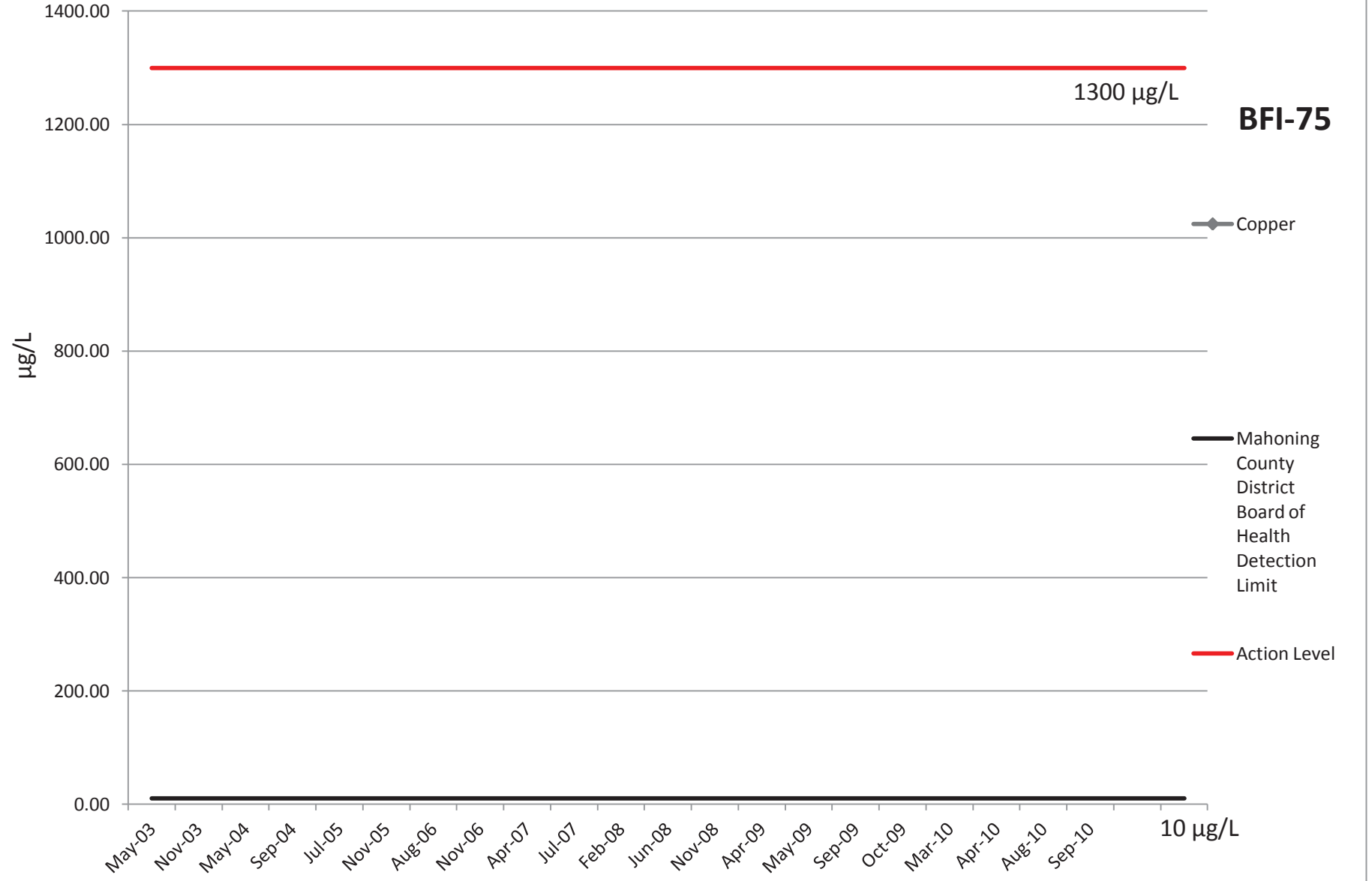




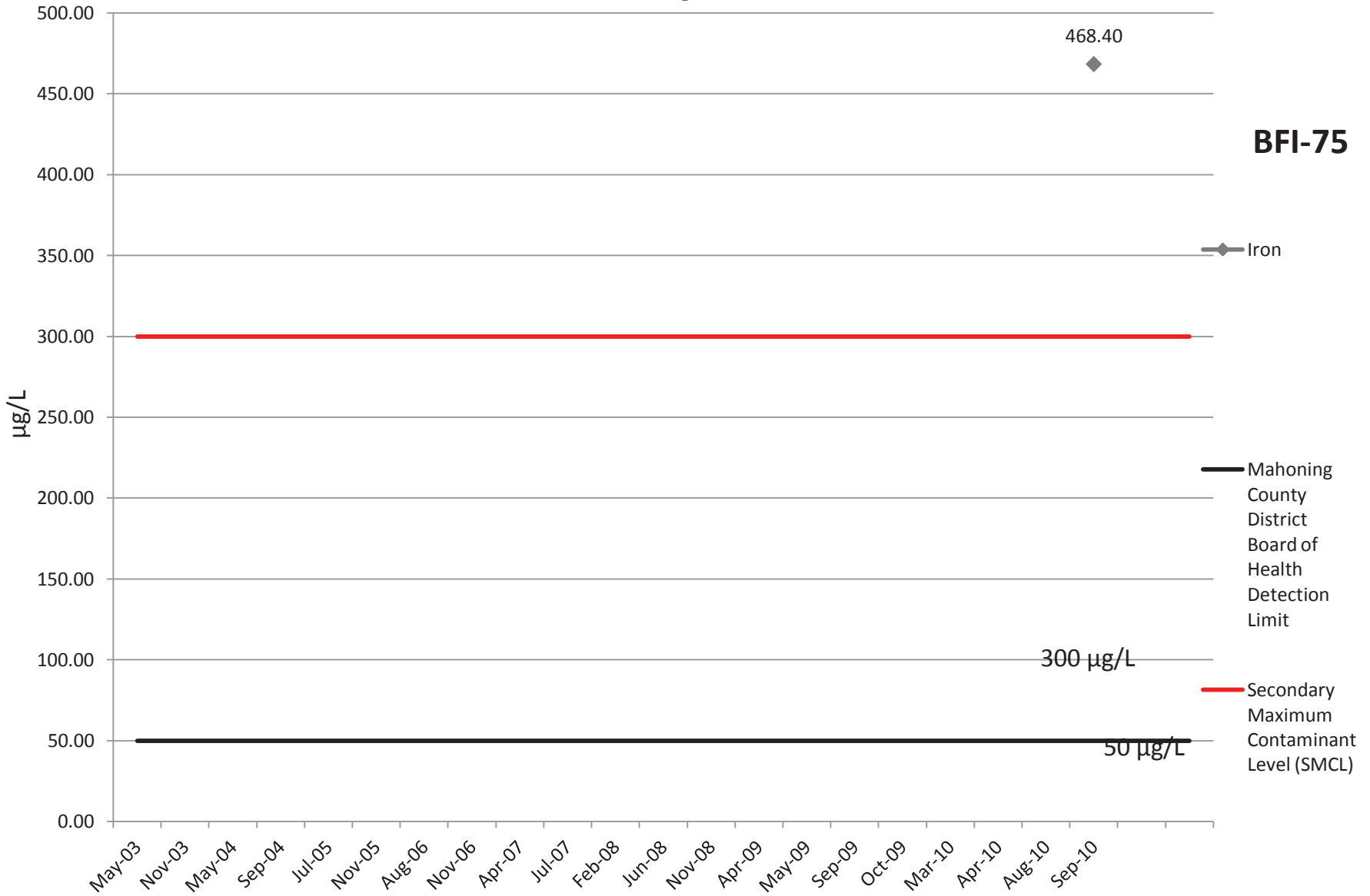
# Chromium



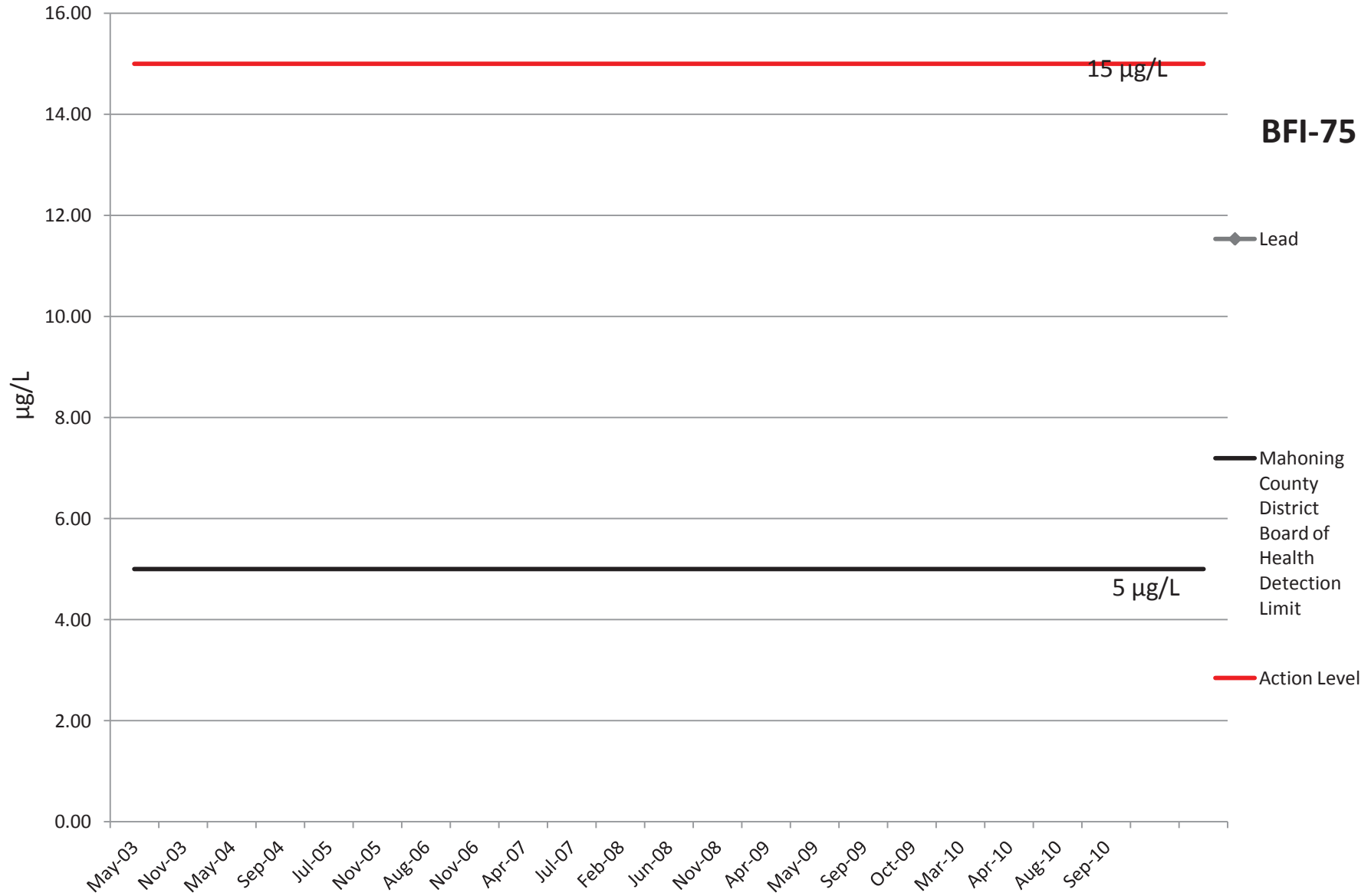
# Copper



# Iron



# Lead



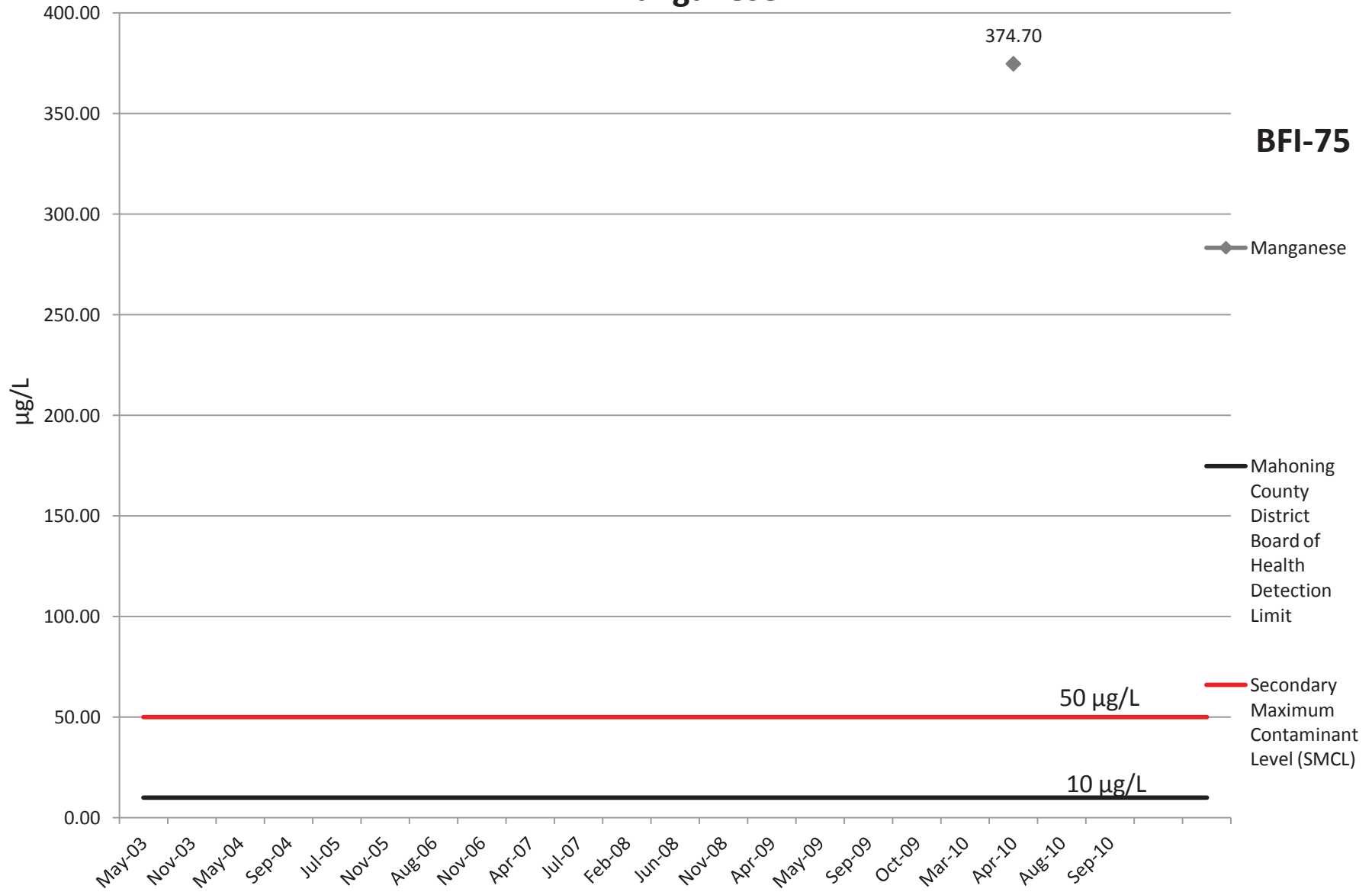
**BFI-75**

◆ Lead

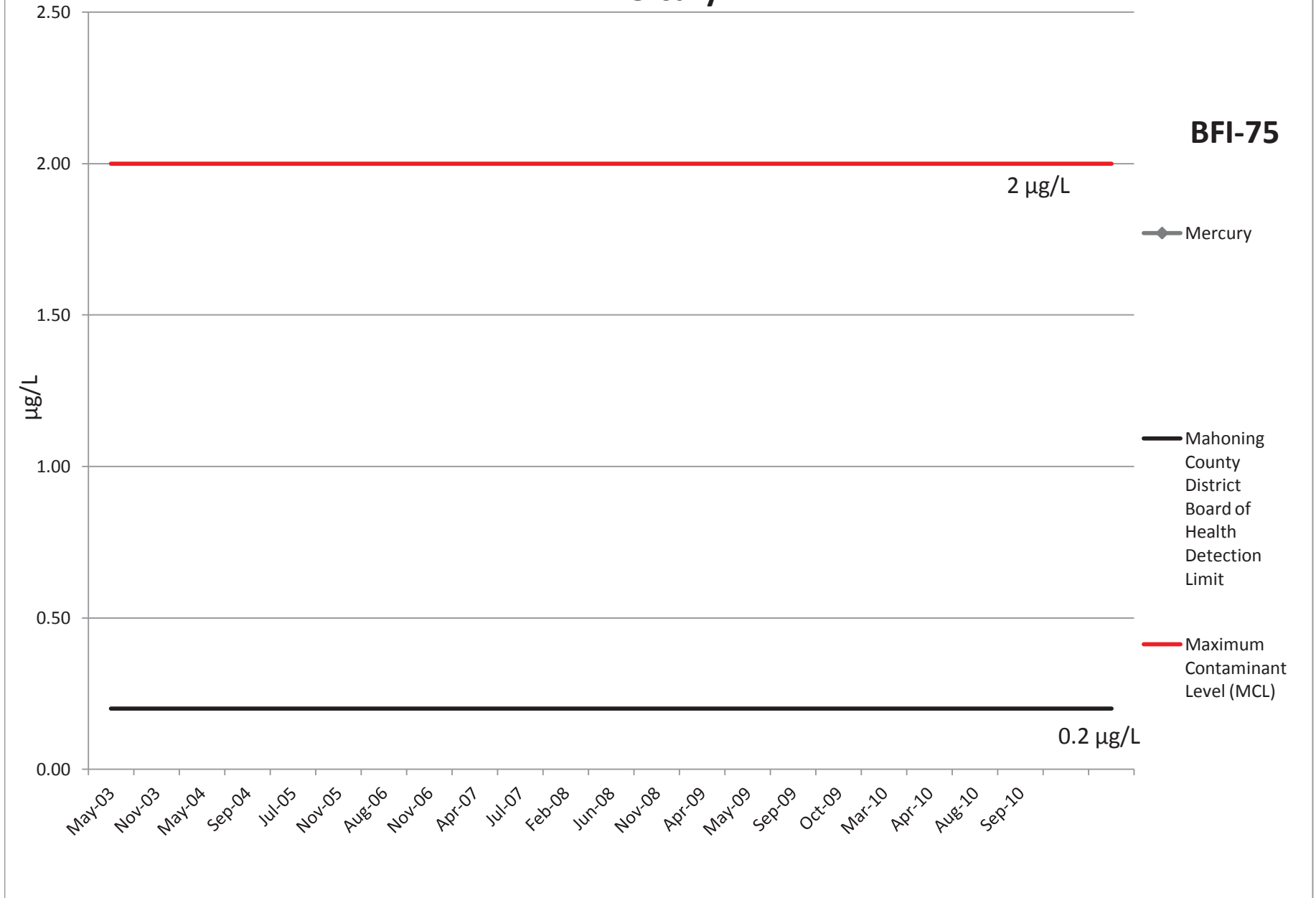
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Action Level

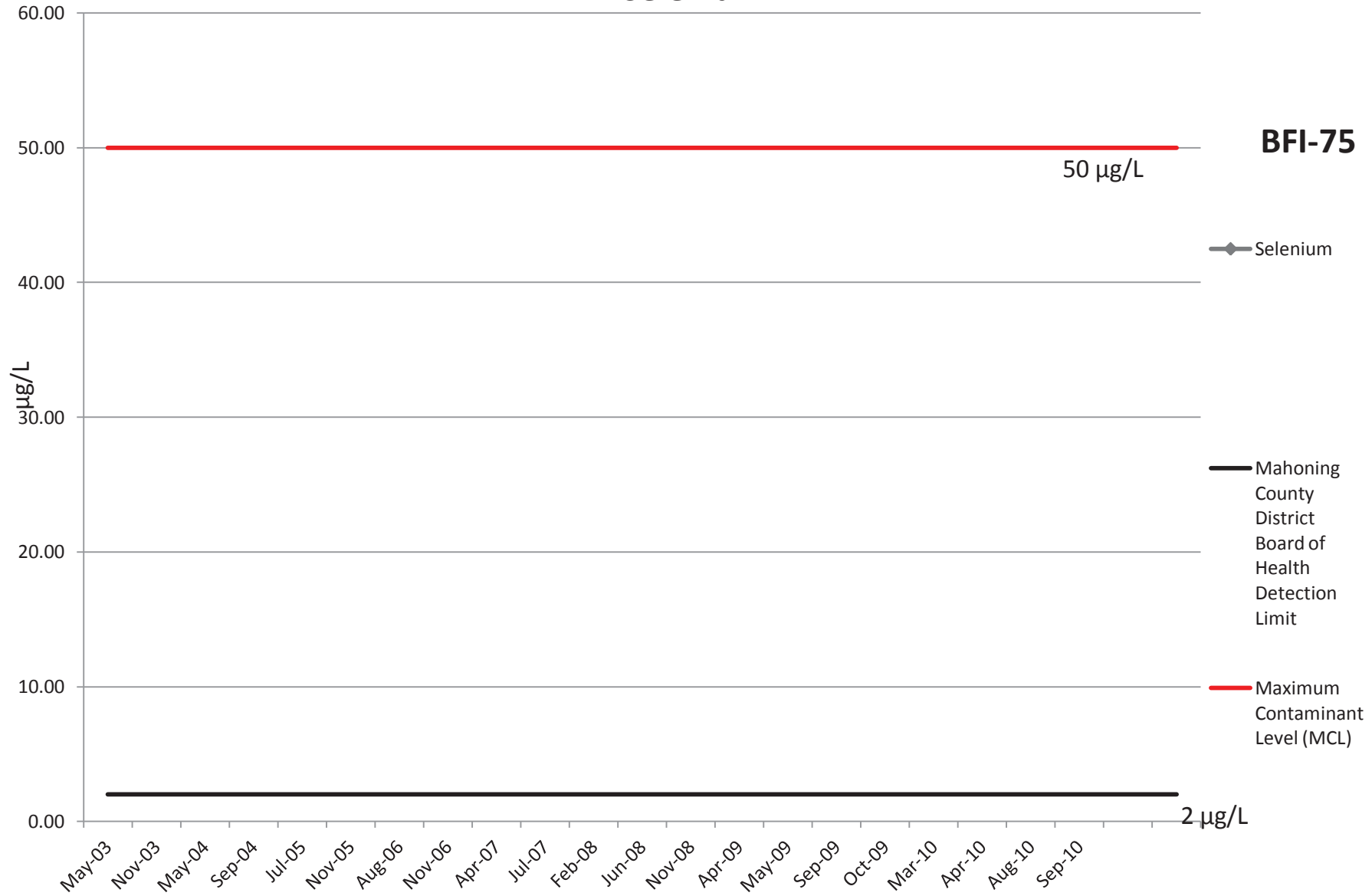
# Manganese



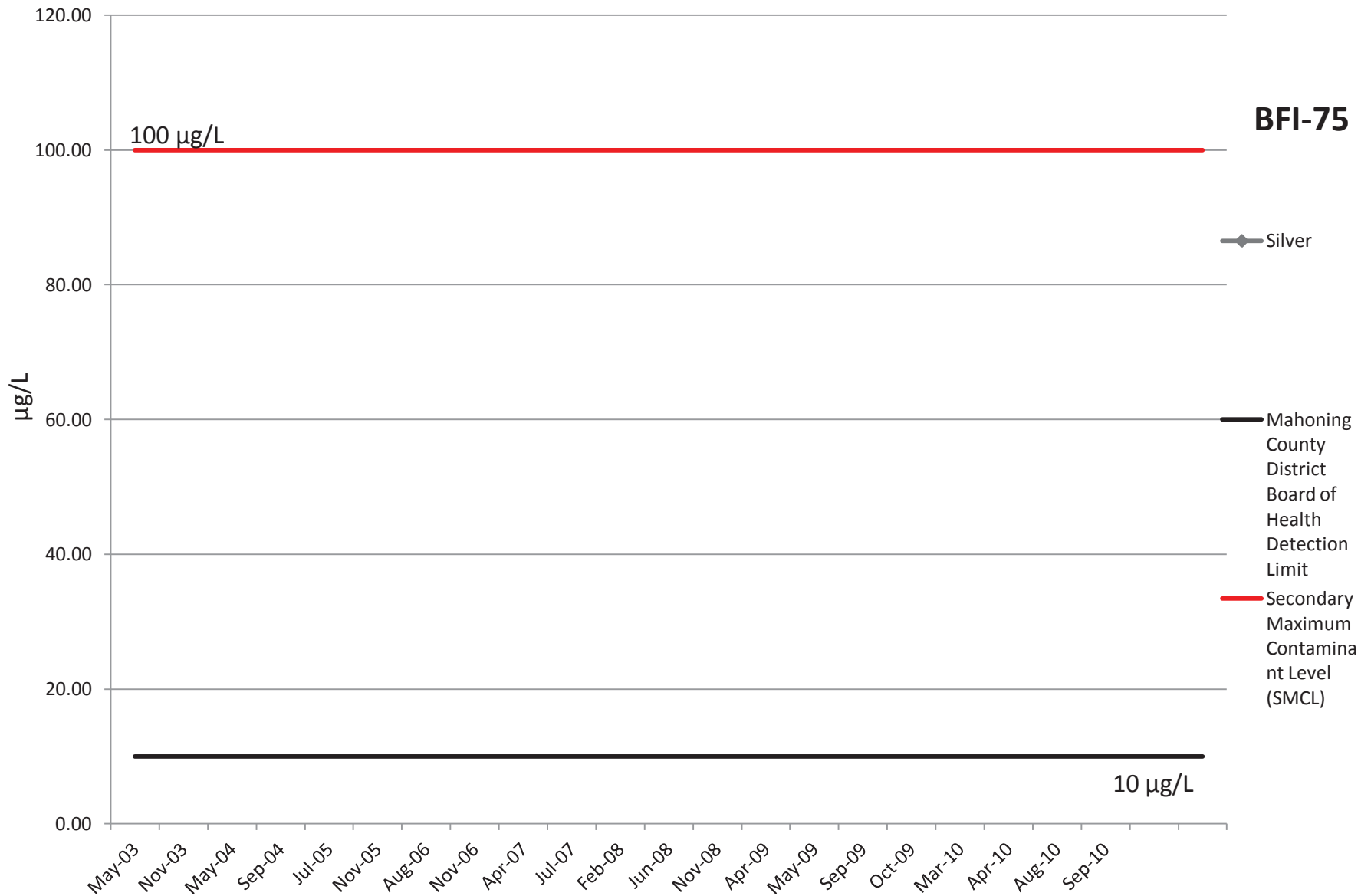
# Mercury



# Selenium

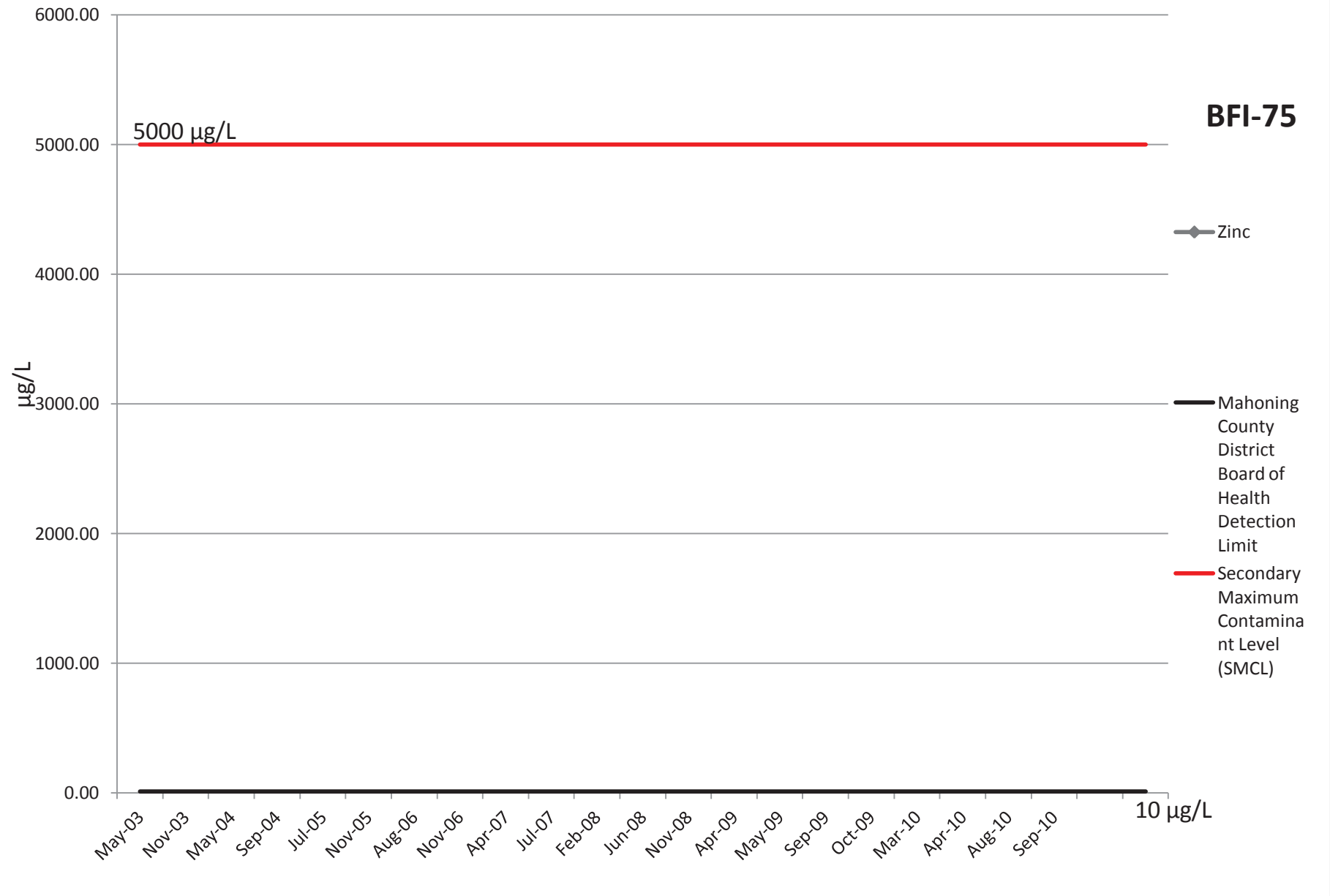


# Silver

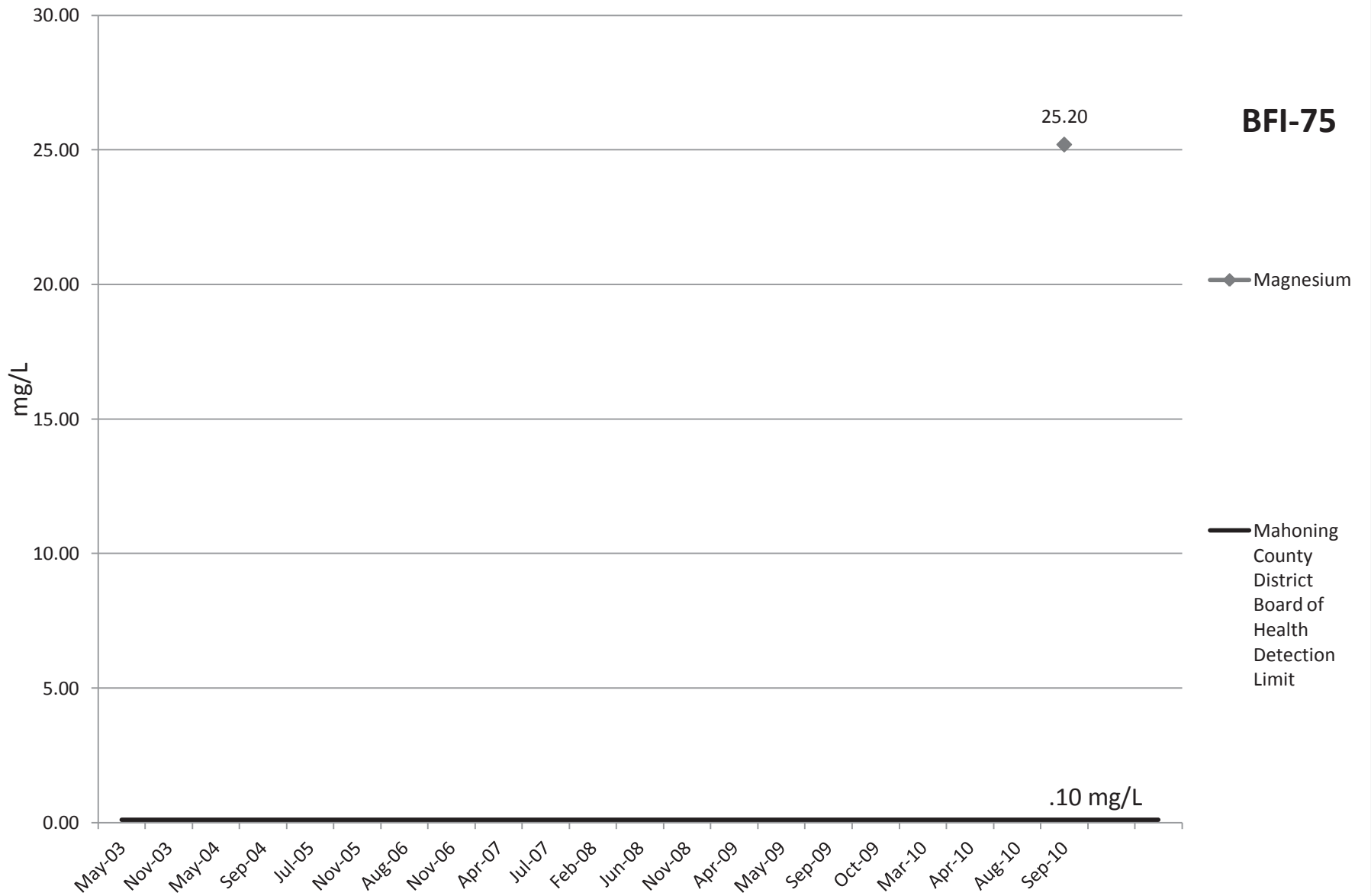




# Zinc



# Magnesium



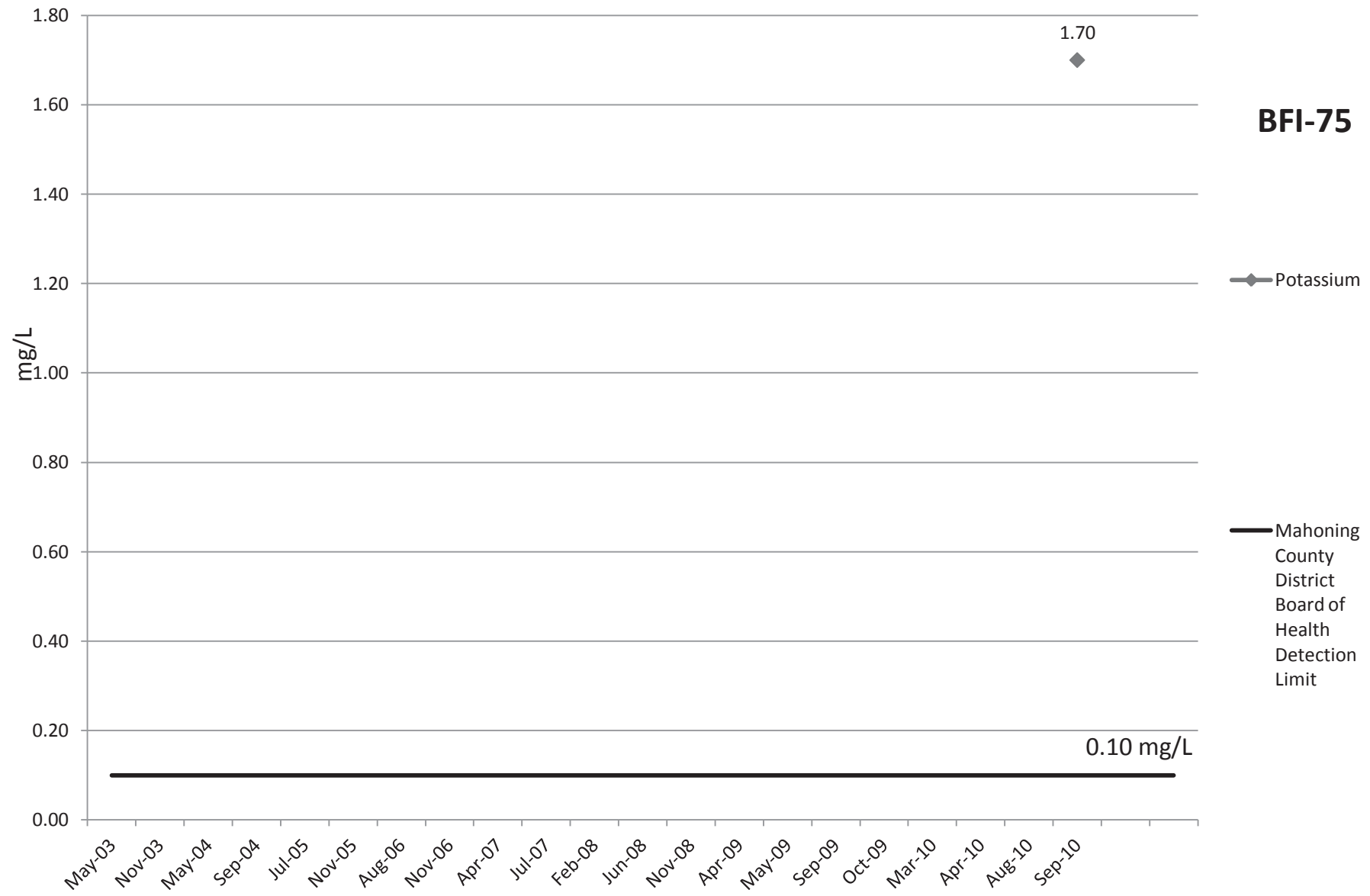
**BFI-75**

◆ Magnesium

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

.10 mg/L

# Potassium



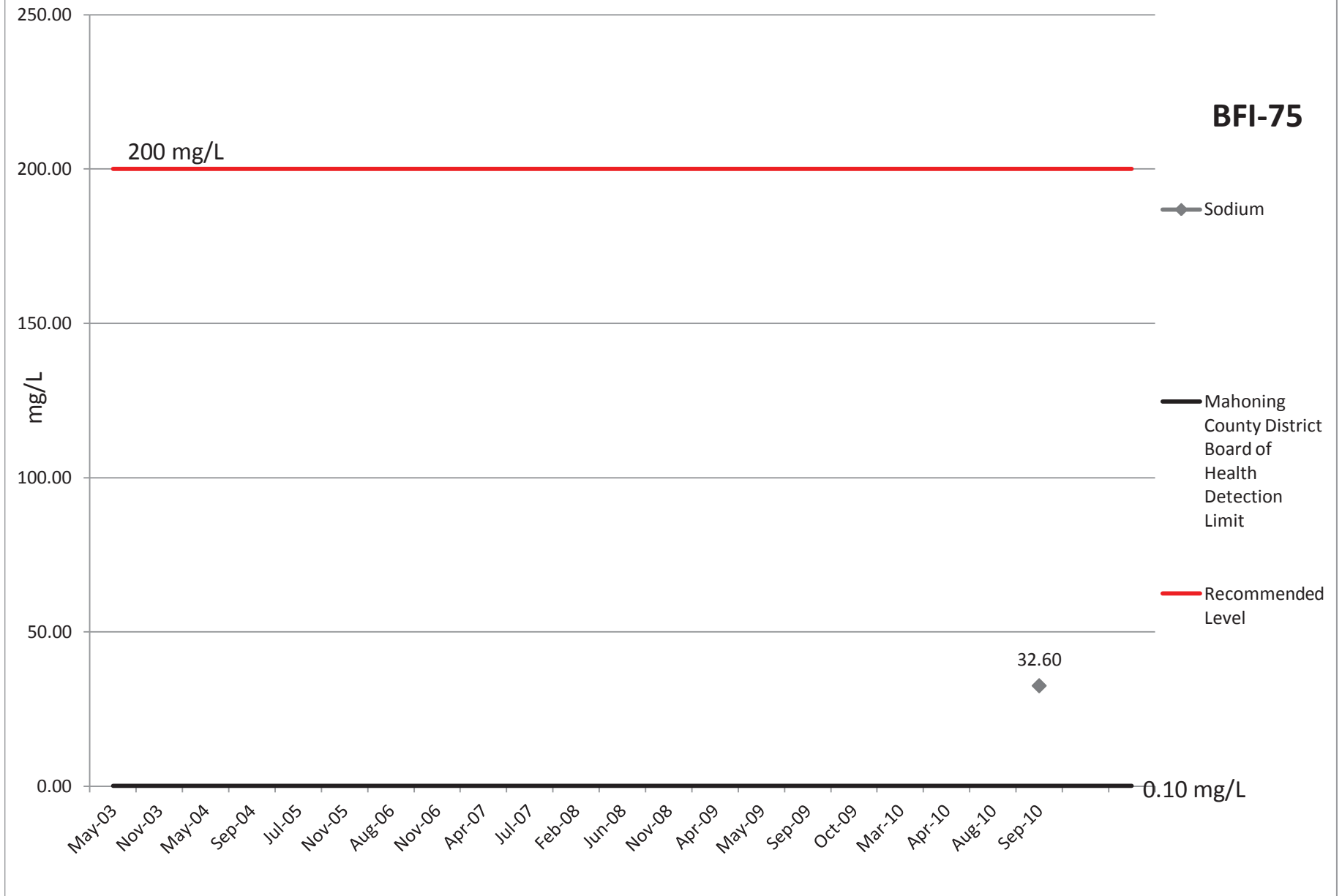
**BFI-75**

◆ Potassium

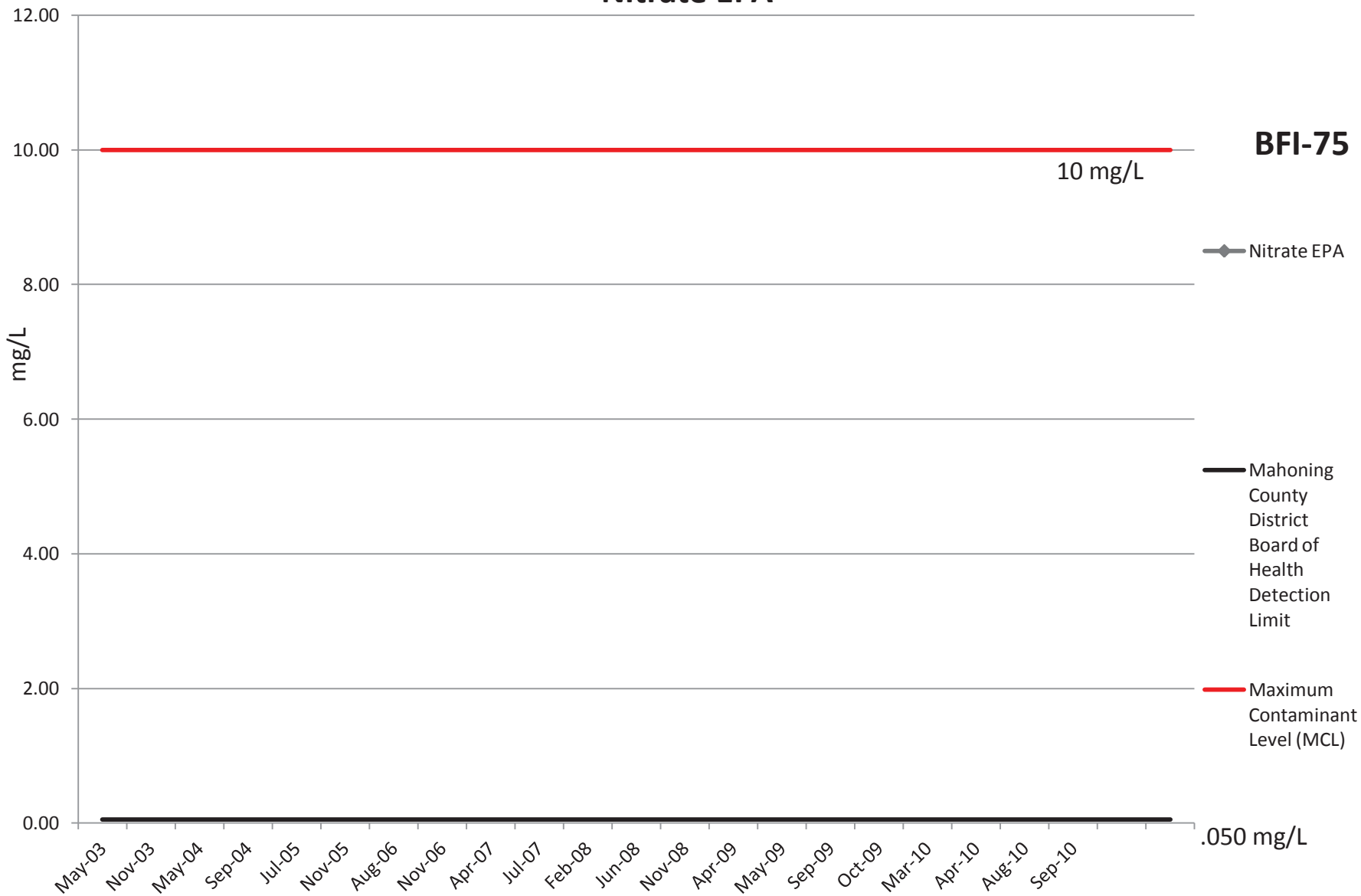
— Mahoning County District Board of Health Detection Limit

0.10 mg/L

# Sodium



# Nitrate EPA



# COD

**BFI-75**

10 mg/L

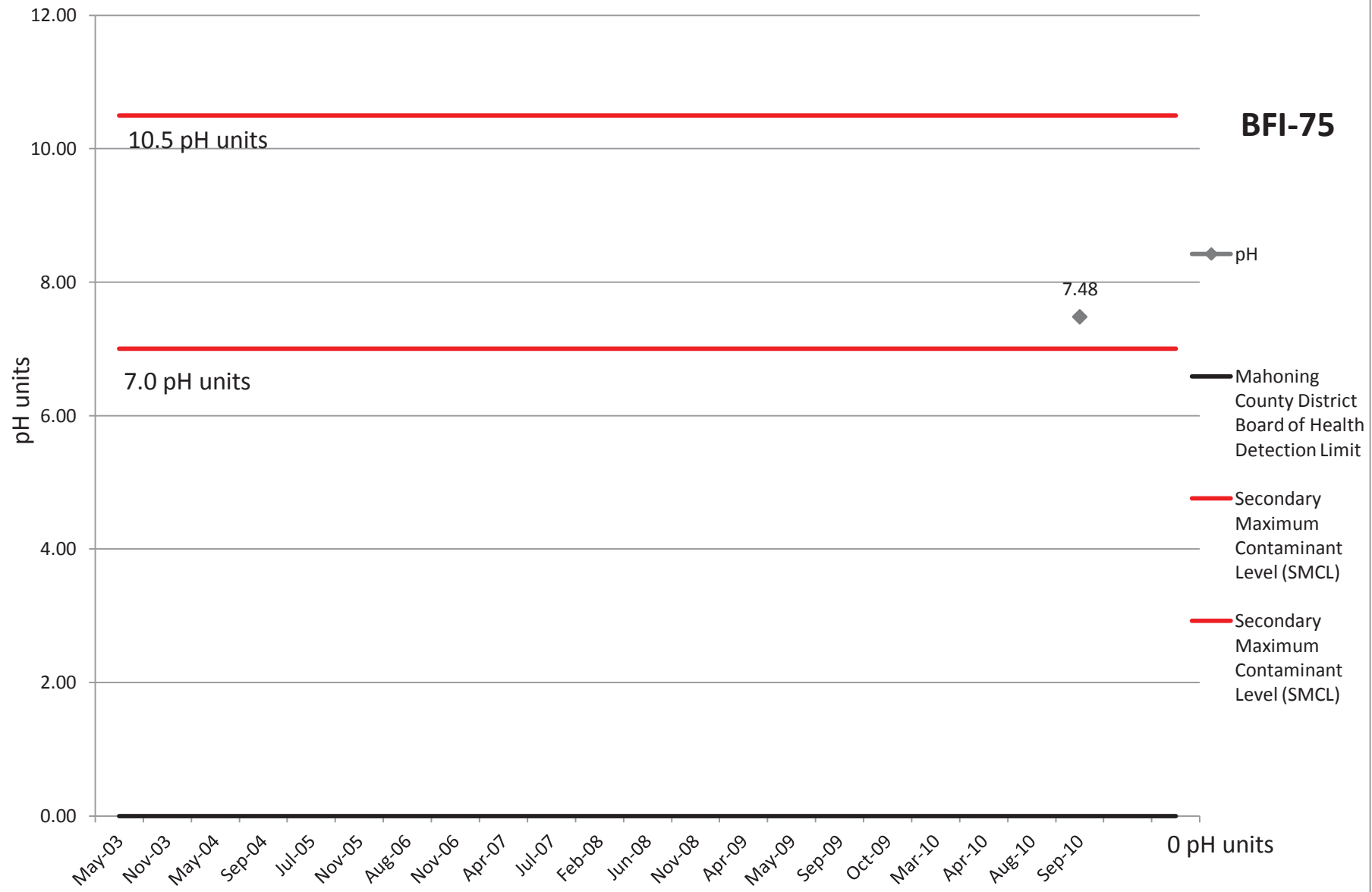
◆ COD

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

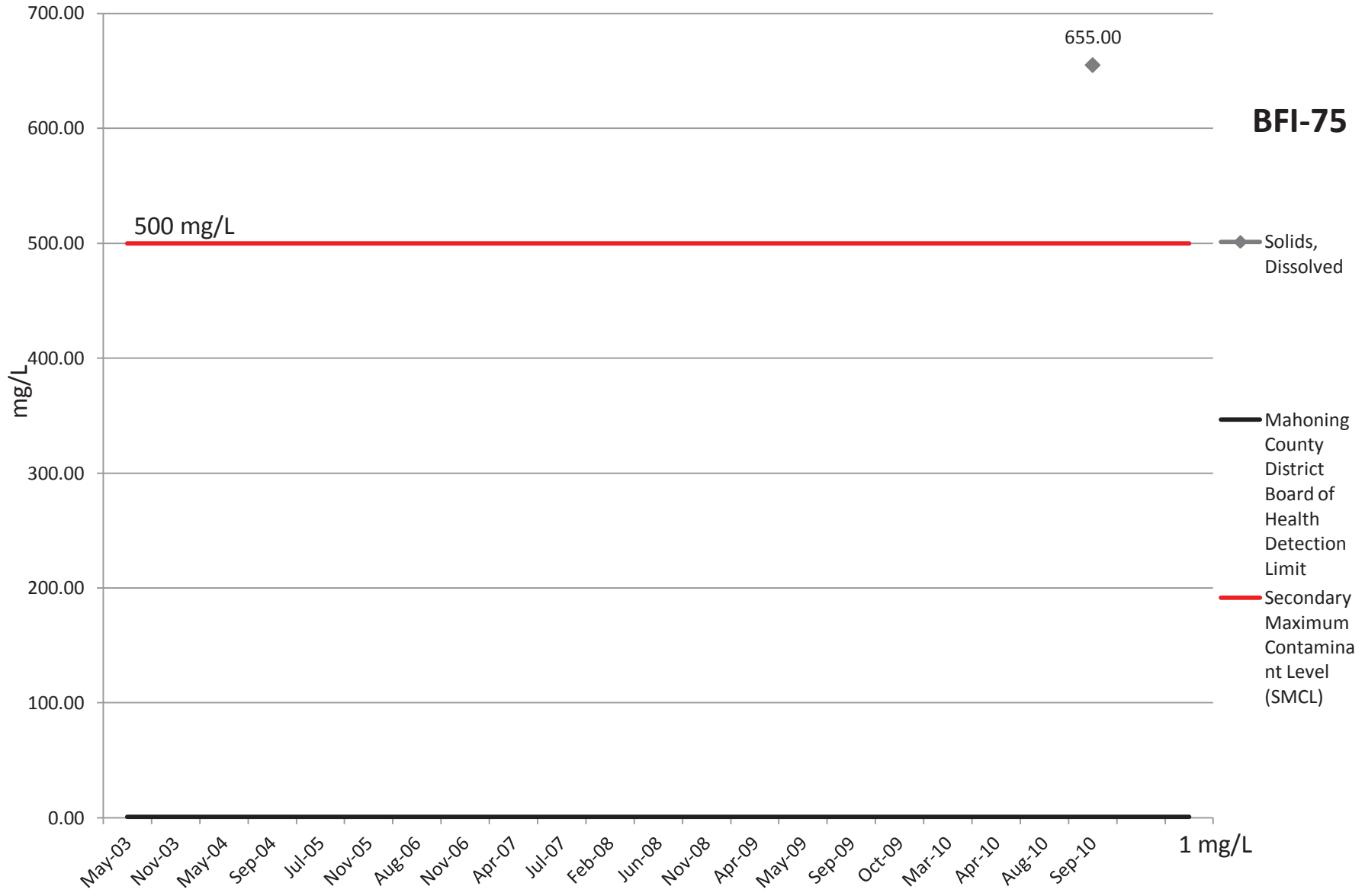


# pH

**BFI-75**



# Solids, Dissolved

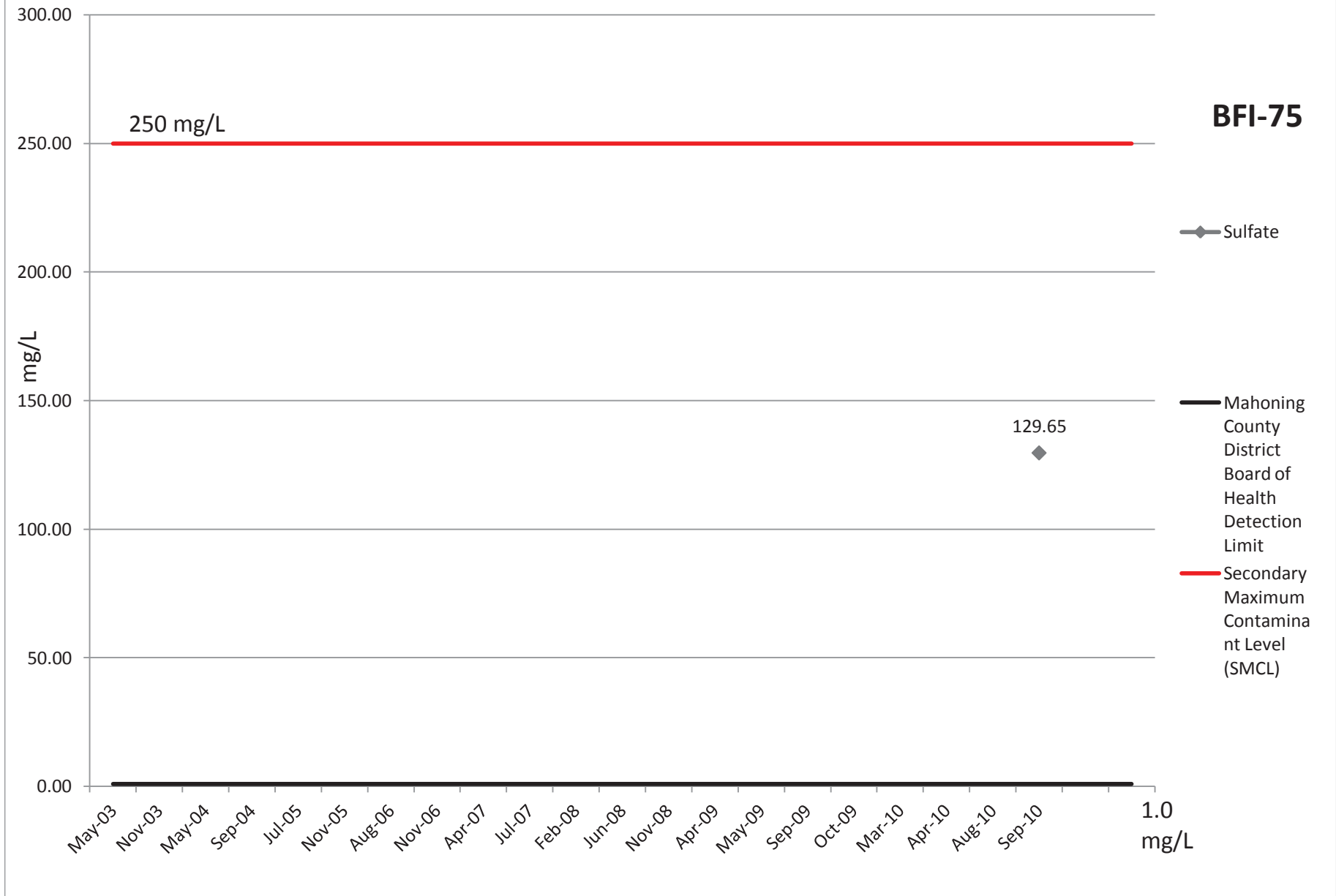


**BFI-75**

- ◆ Solids, Dissolved
- Mahoning County District Board of Health Detection Limit
- Secondary Maximum Contaminant Level (SMCL)



# Sulfate



**BFI-75**

◆ Sulfate

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

1.0 mg/L

# Bacteria

positive (1)

## BFI-75

Positive/Negative

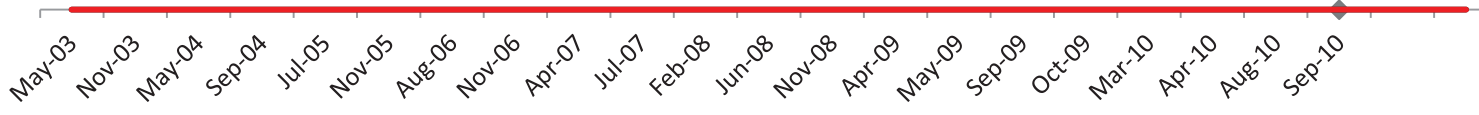
◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

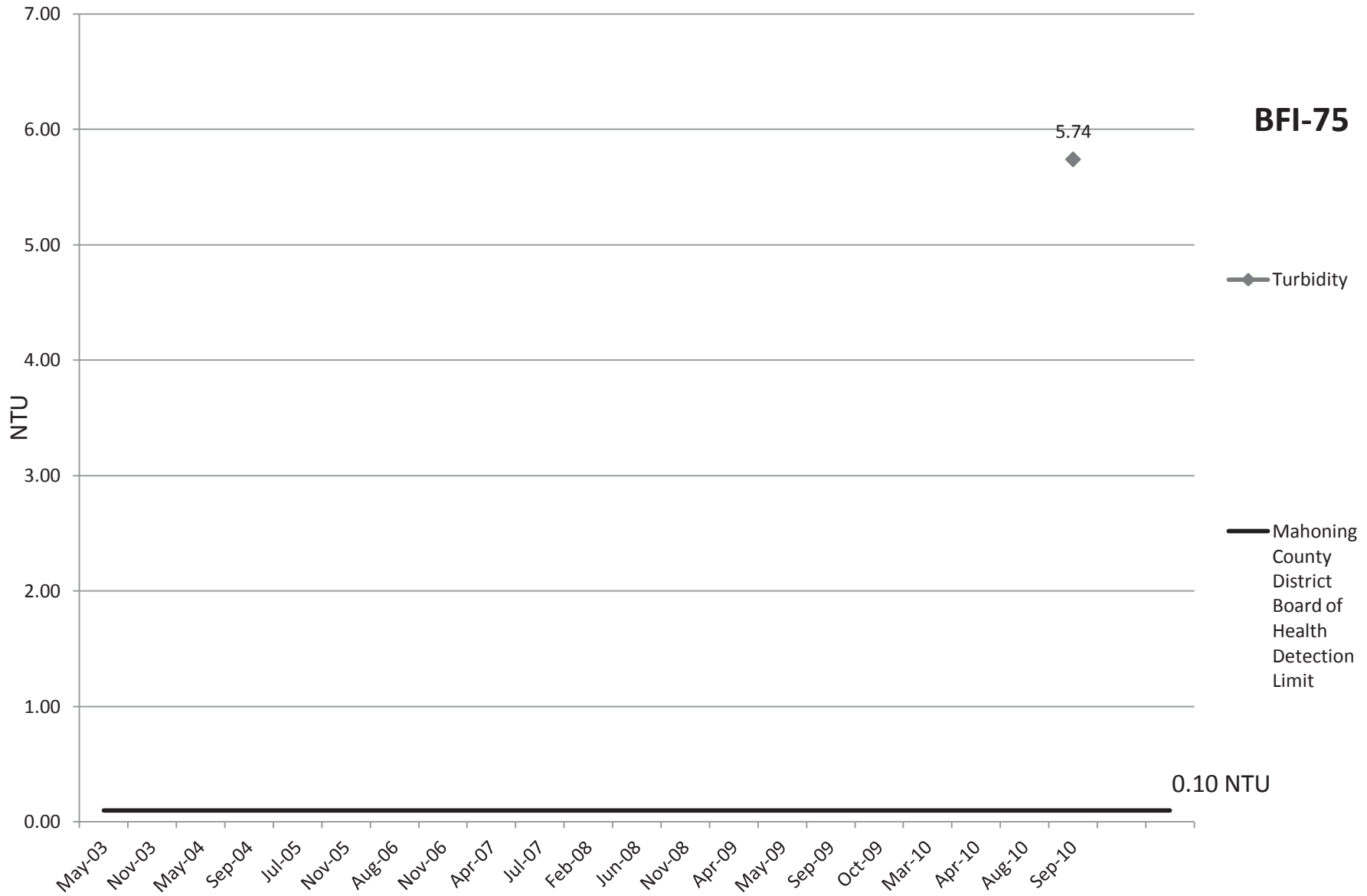
— Maximum  
Contaminant  
Level (MCL)

0.00

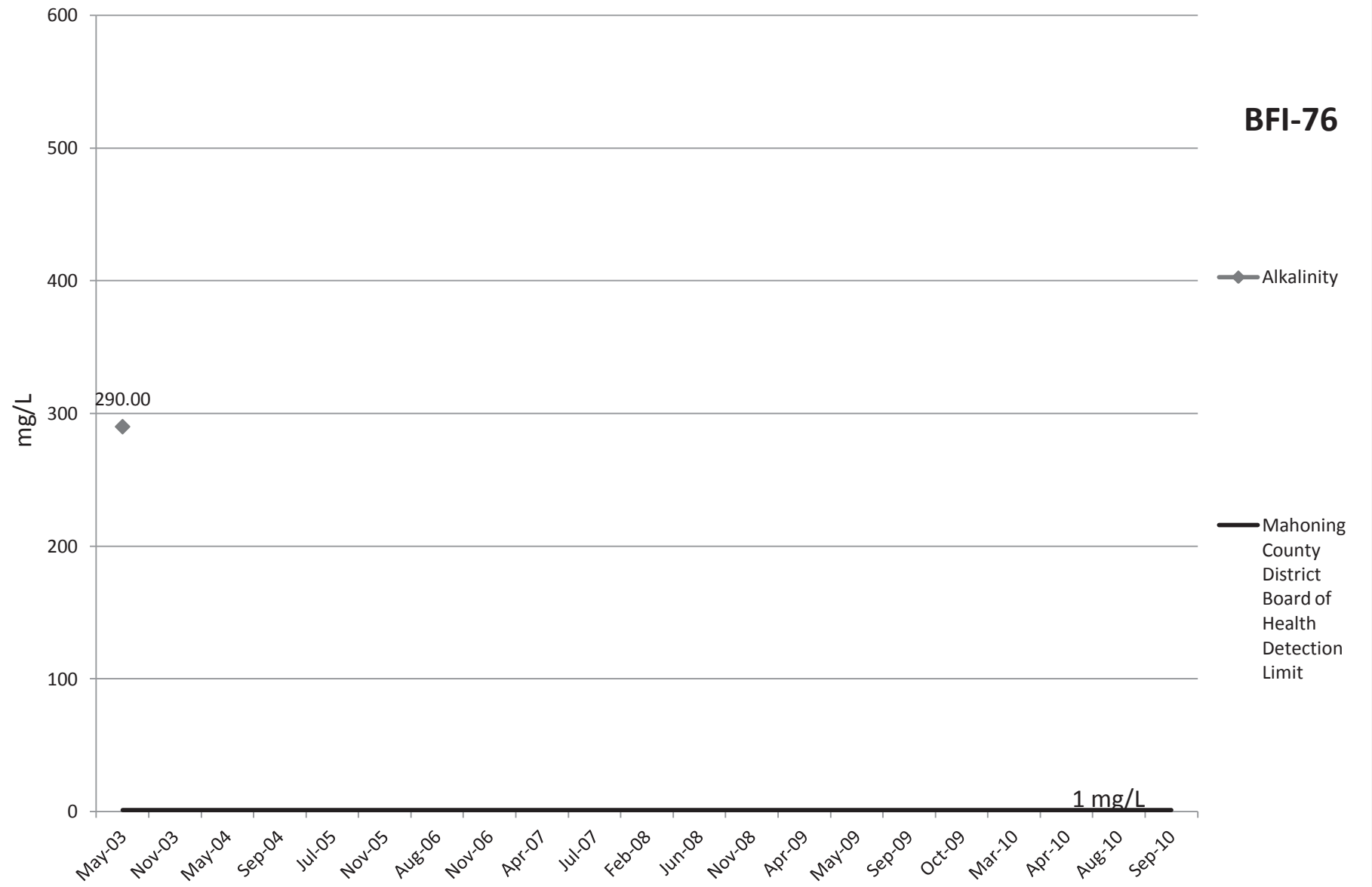
negative (0)



# Turbidity



# Alkalinity



**BFI-76**

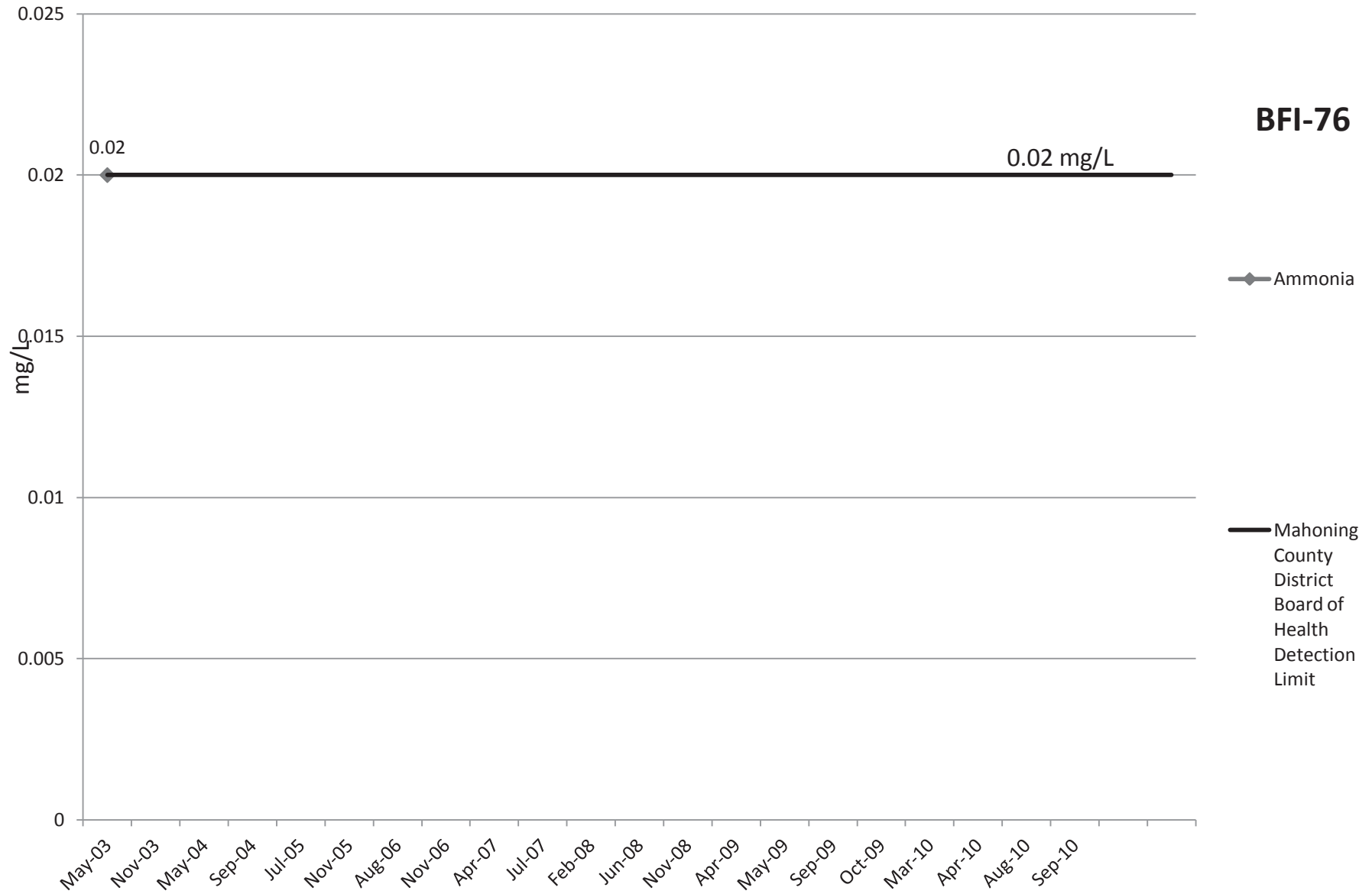
◆ Alkalinity

— Mahoning County District Board of Health Detection Limit

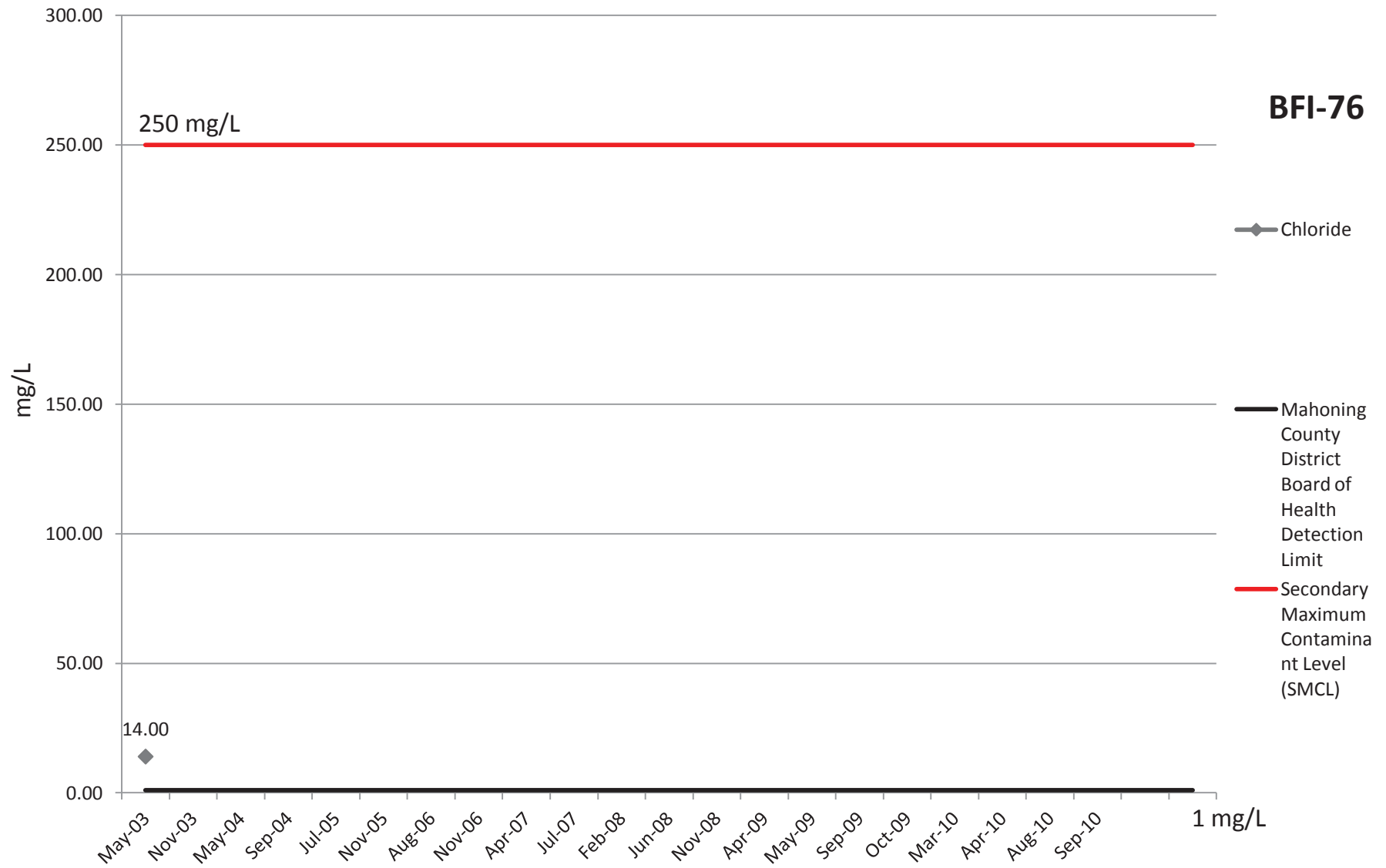
1 mg/L

# Ammonia

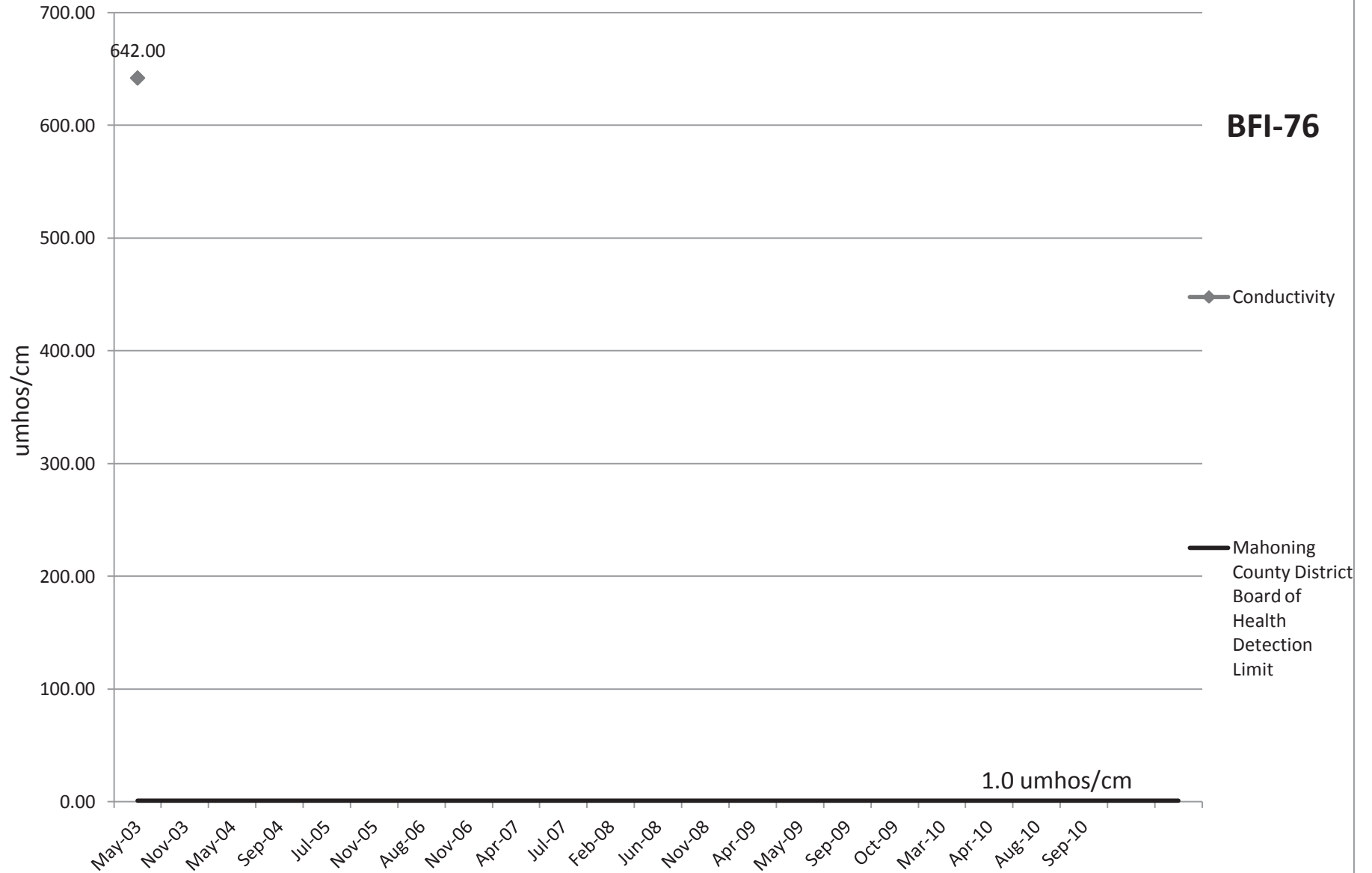
**BFI-76**



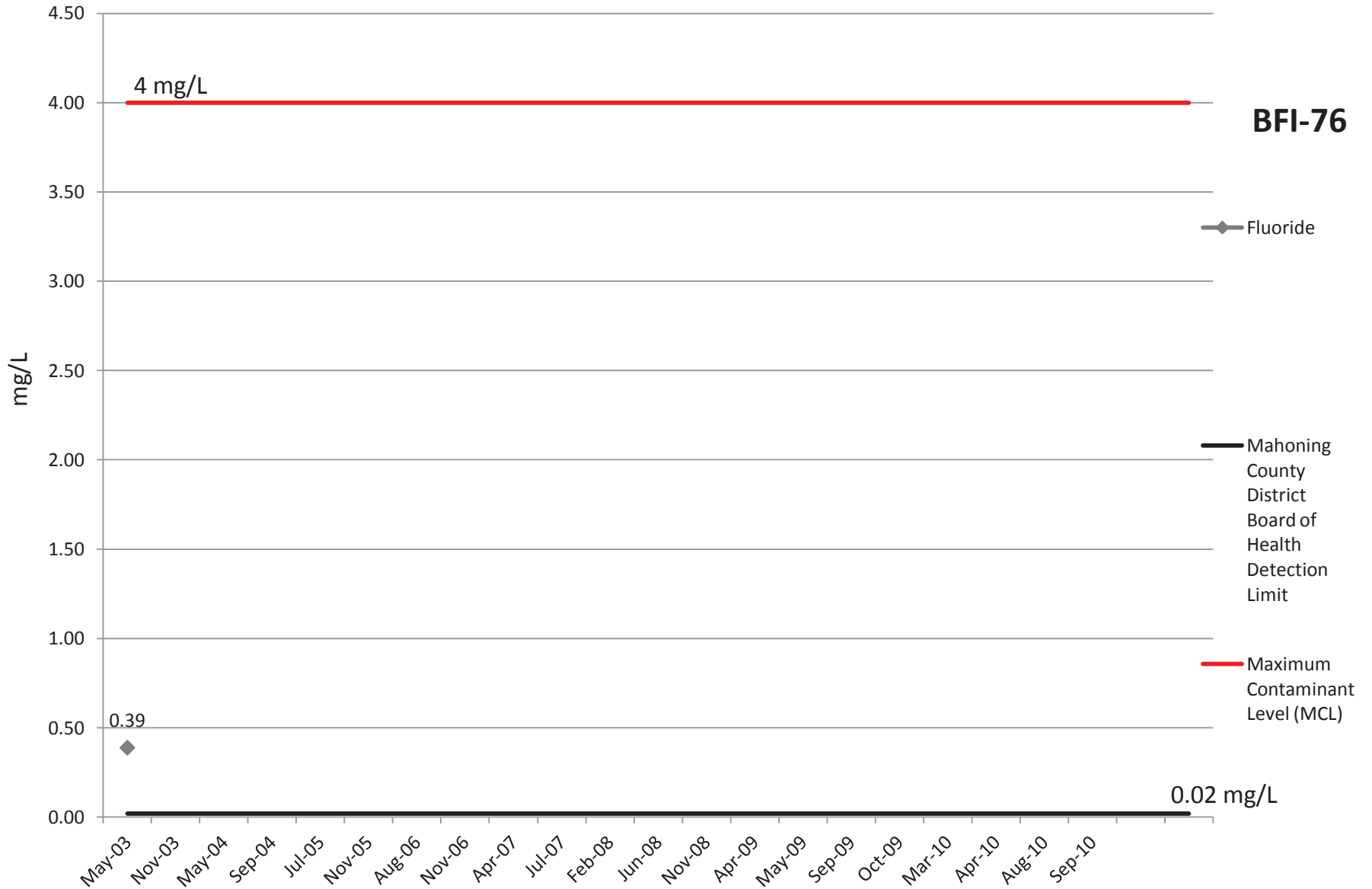
# Chloride



# Conductivity

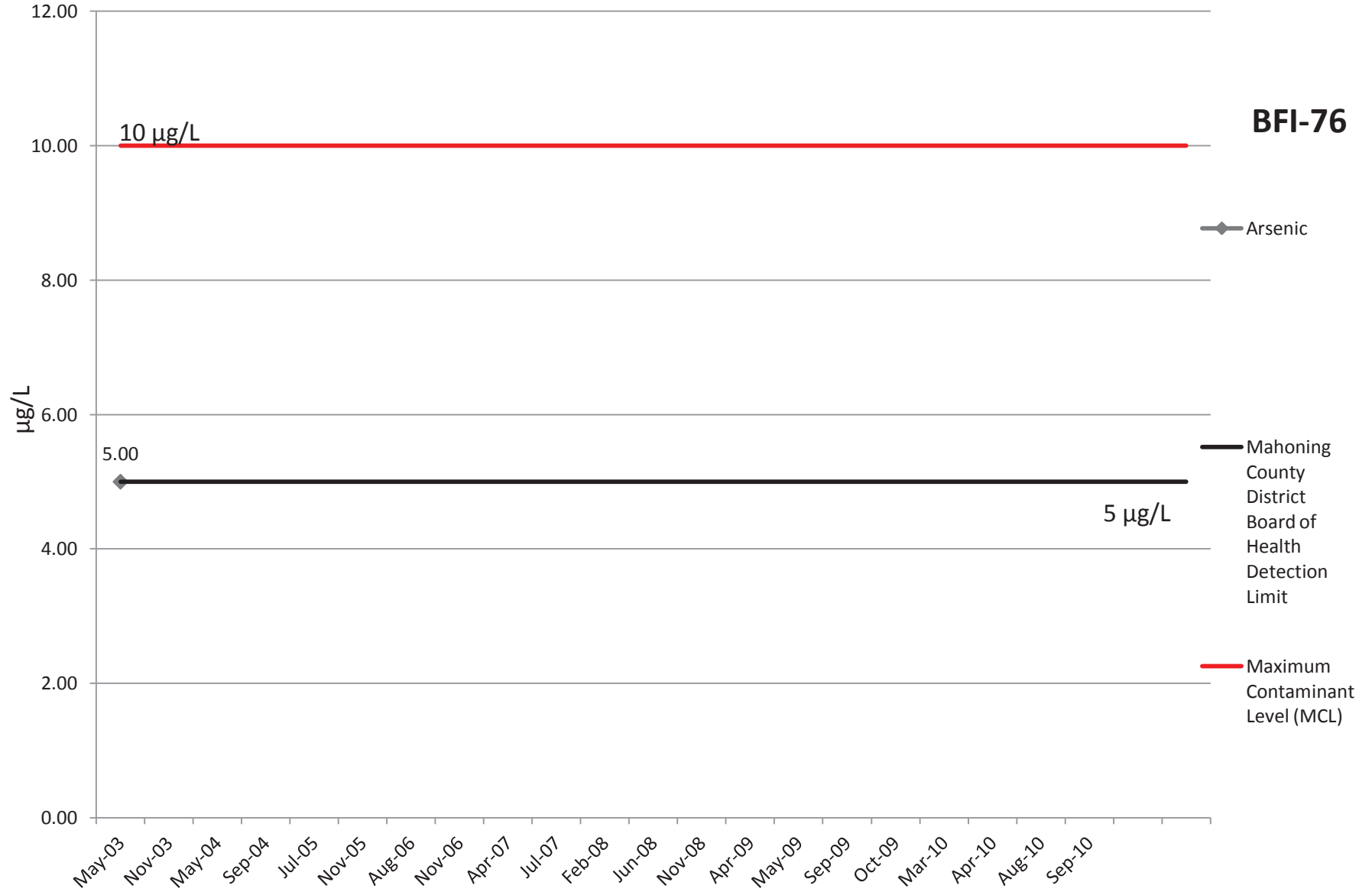


# Fluoride





# Arsenic



**BFI-76**

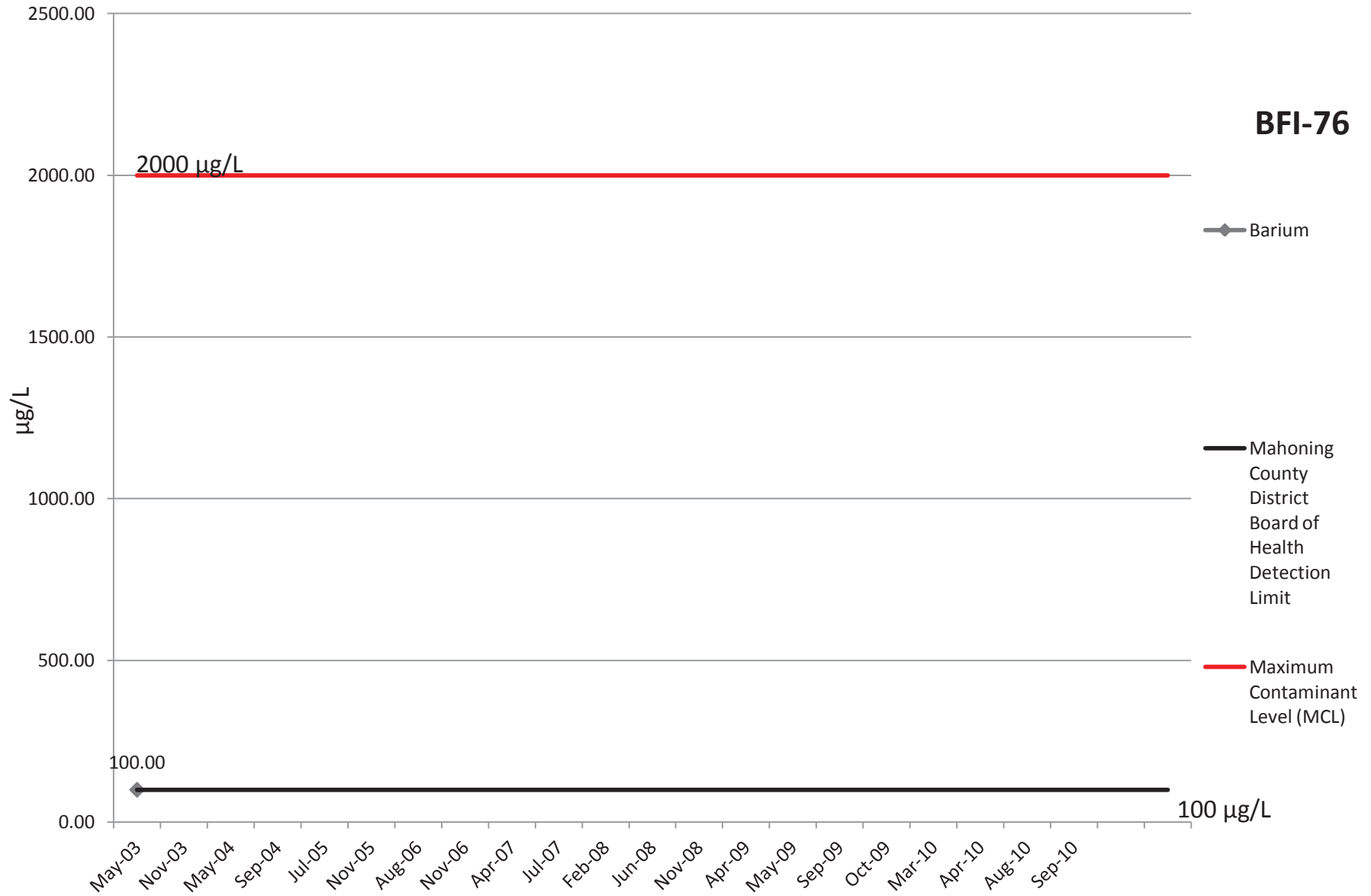
◆ Arsenic

— Mahoning County District Board of Health Detection Limit

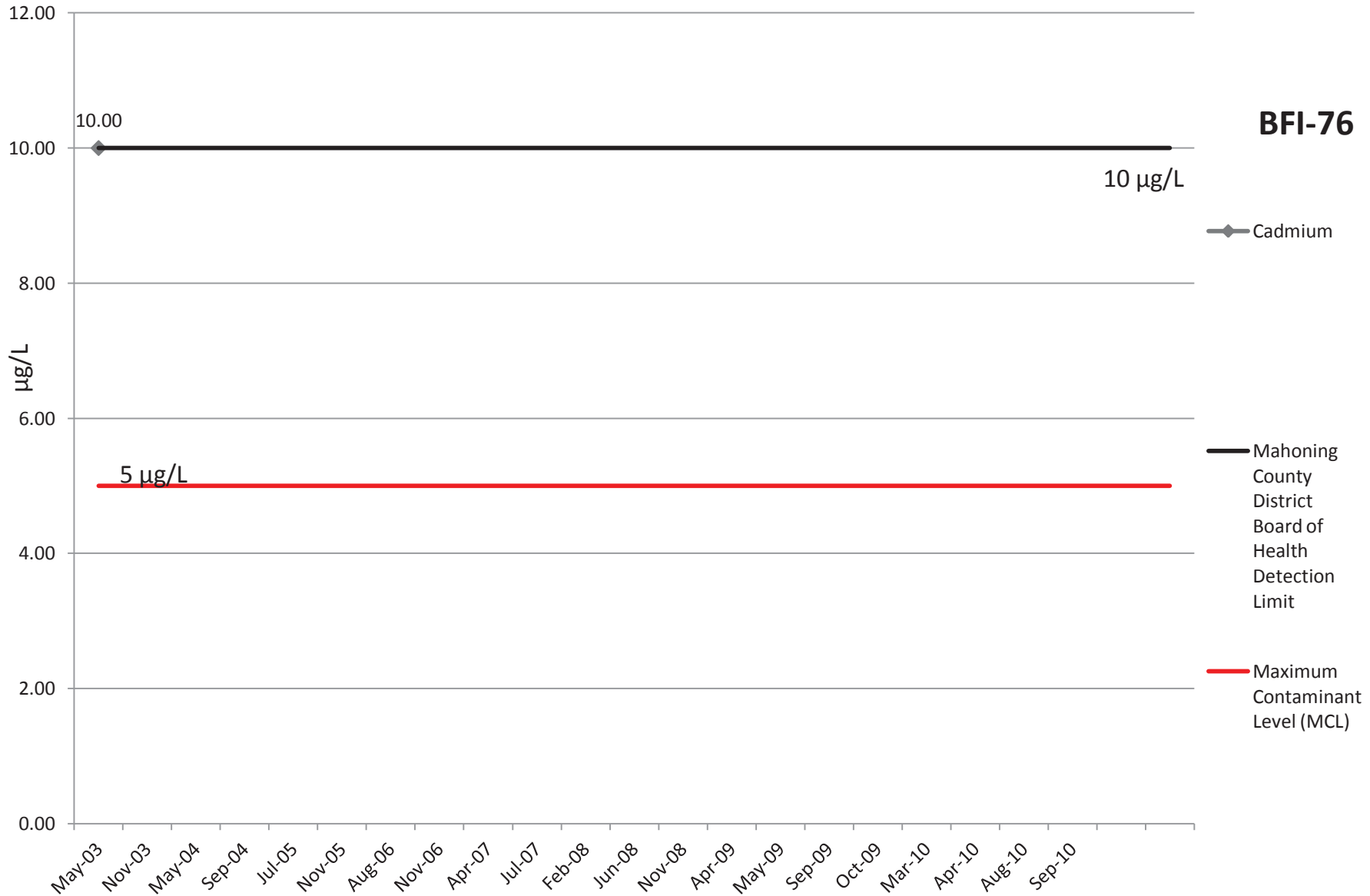
— Maximum Contaminant Level (MCL)

# Barium

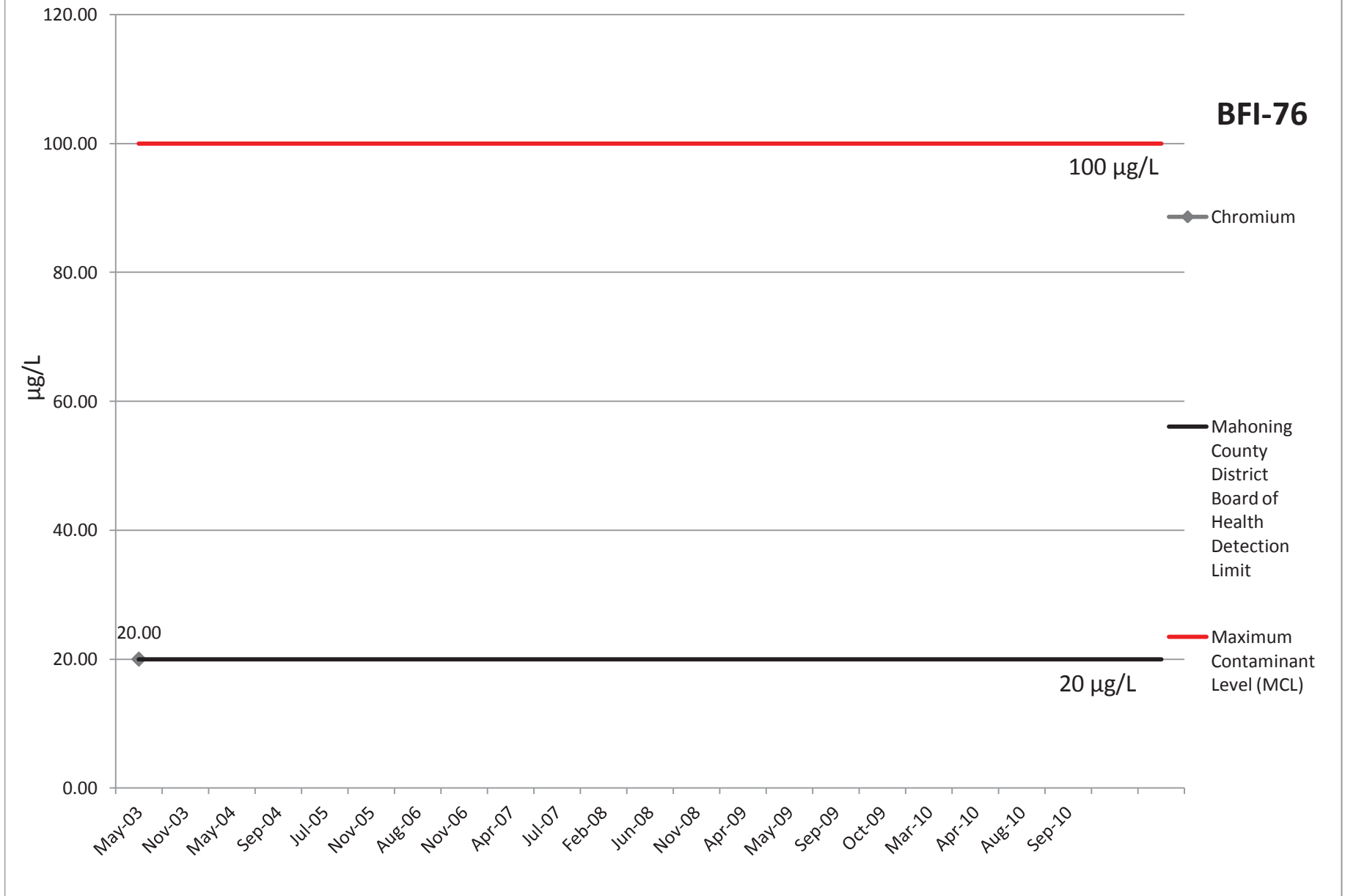
**BFI-76**



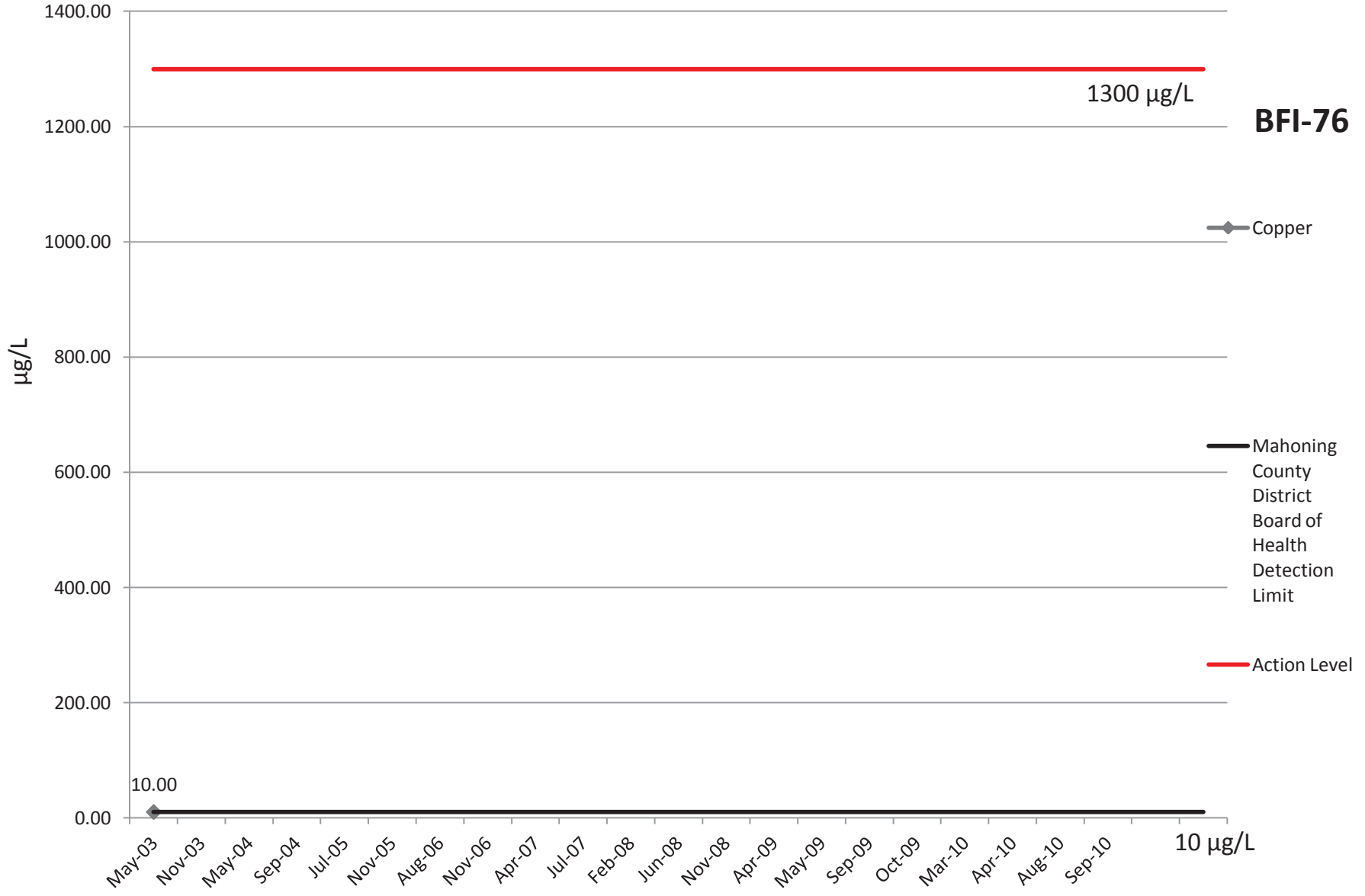
# Cadmium



# Chromium



# Copper



**BFI-76**

◆ Copper

— Mahoning County District Board of Health Detection Limit

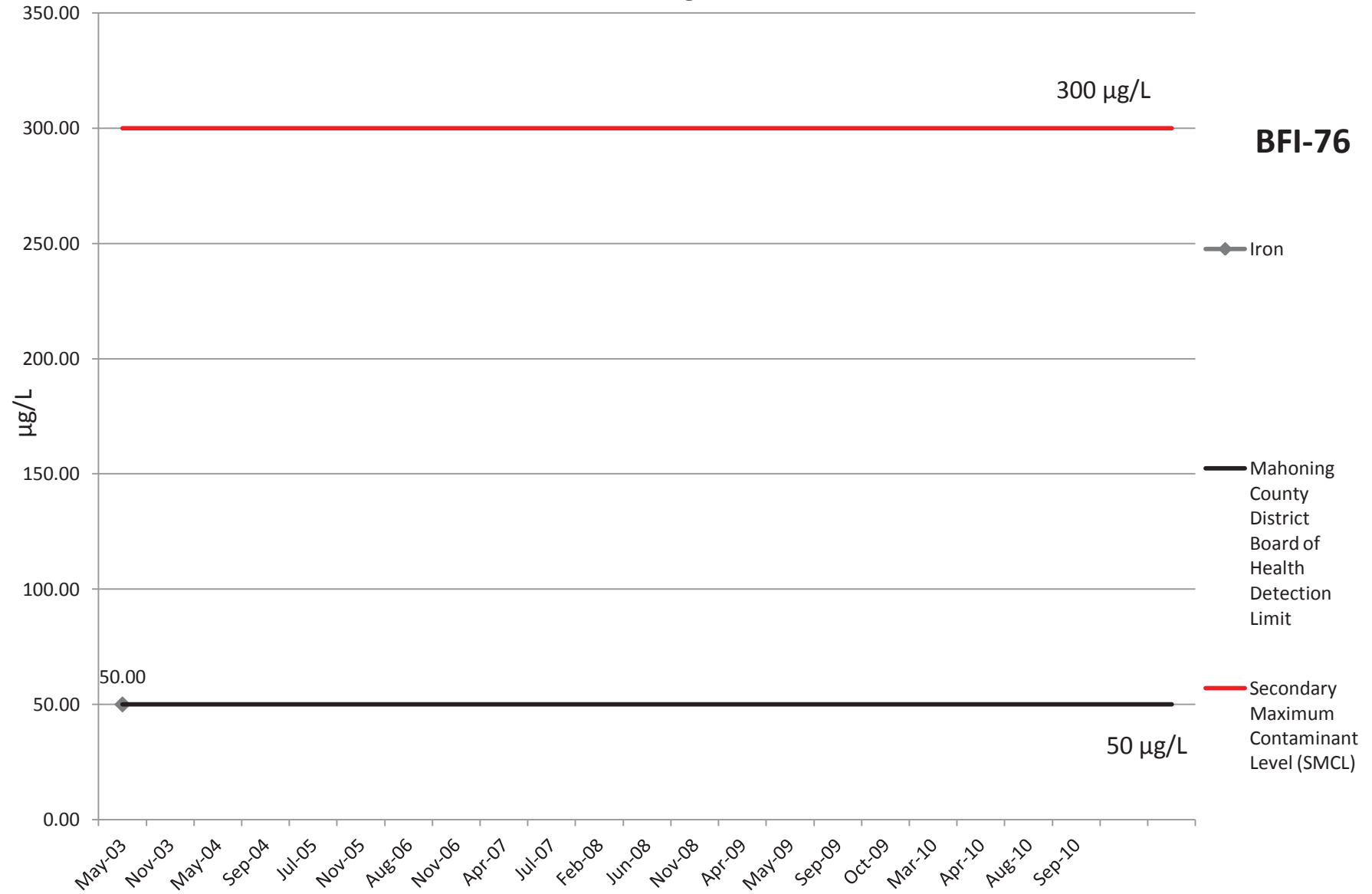
— Action Level

1300 µg/L

10.00

10 µg/L

# Iron



**BFI-76**

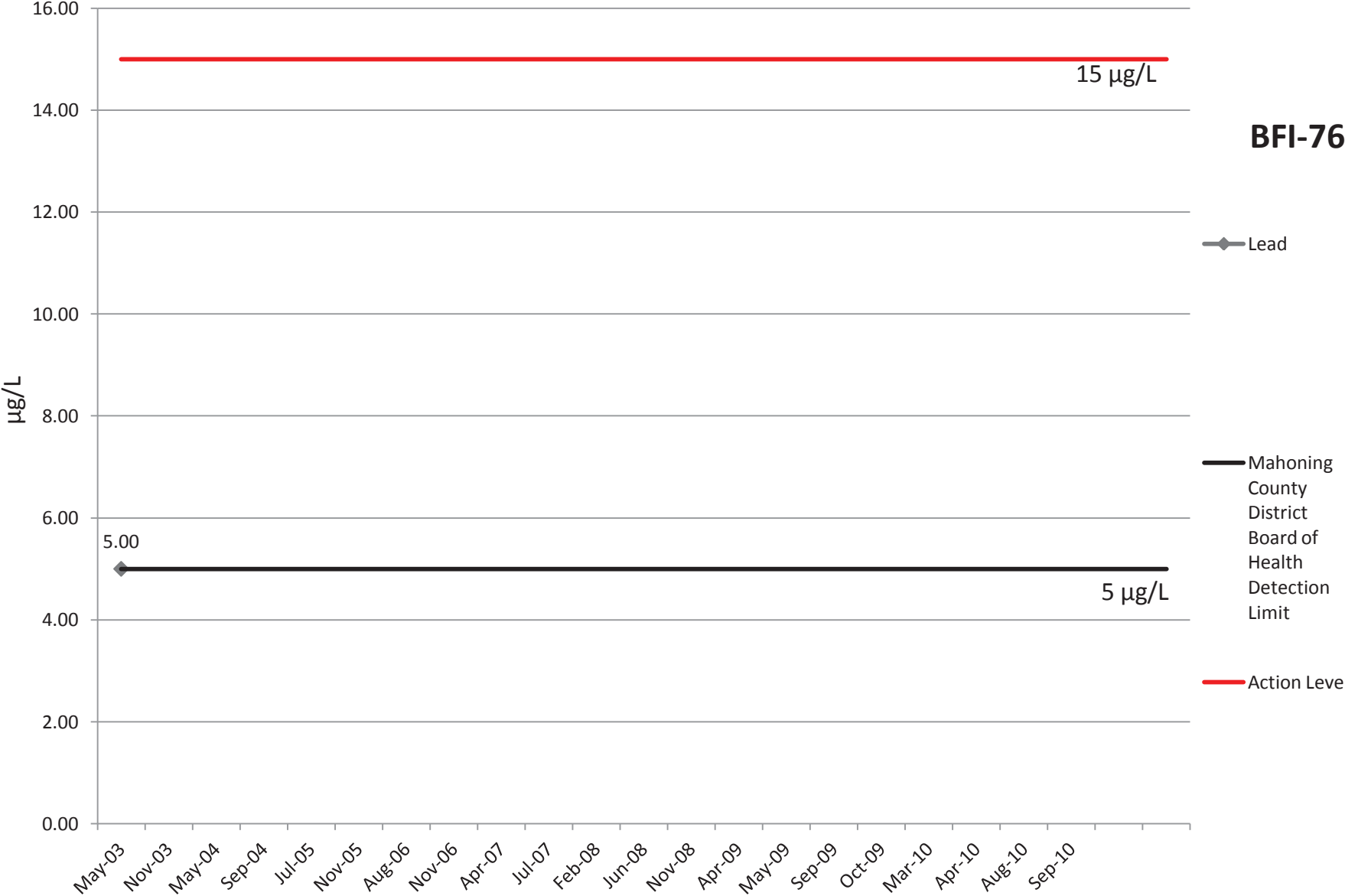
Iron

Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

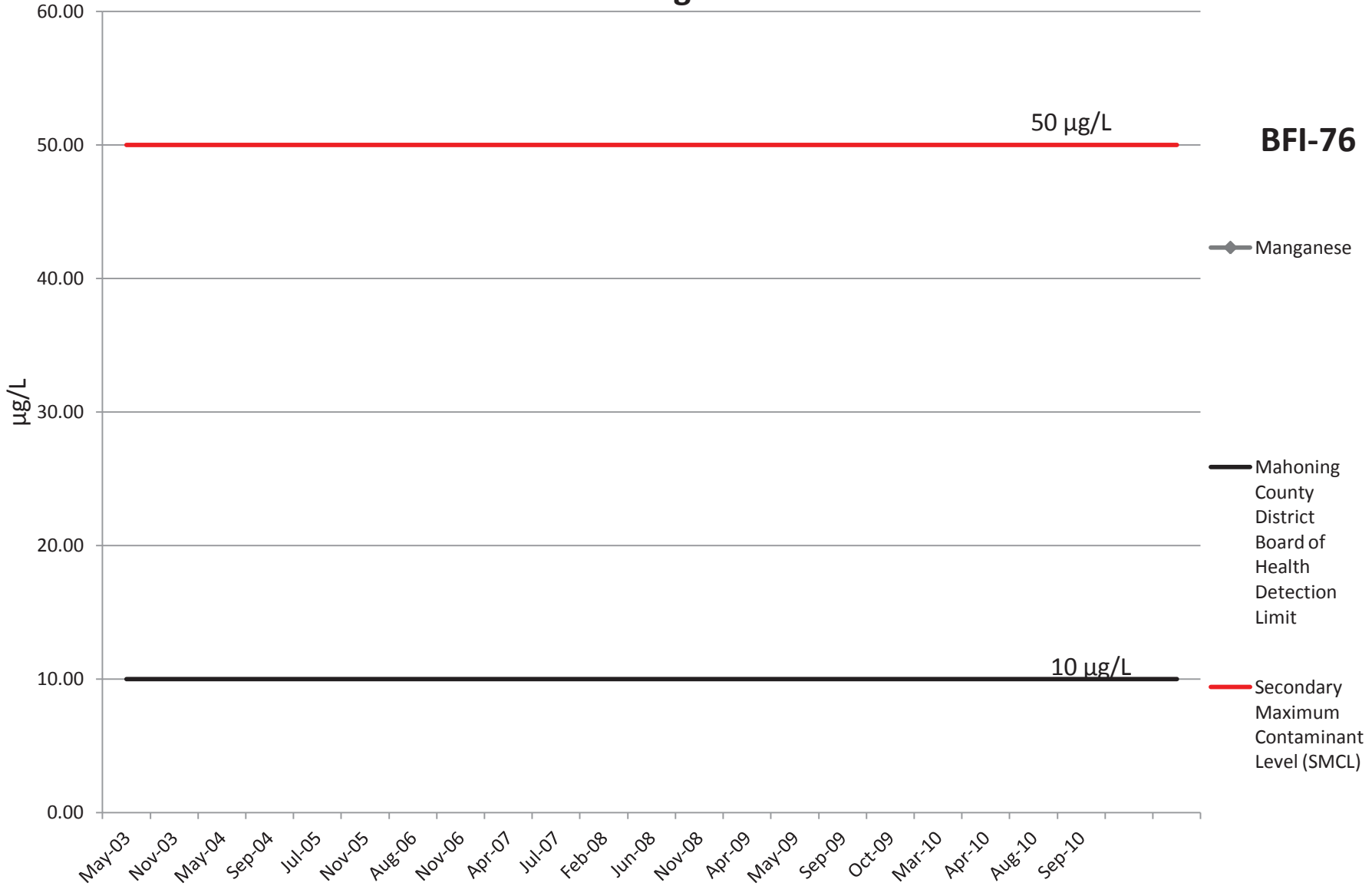
Secondary  
Maximum  
Contaminant  
Level (SMCL)

# Lead

**BFI-76**



# Manganese



**BFI-76**

◆ Manganese

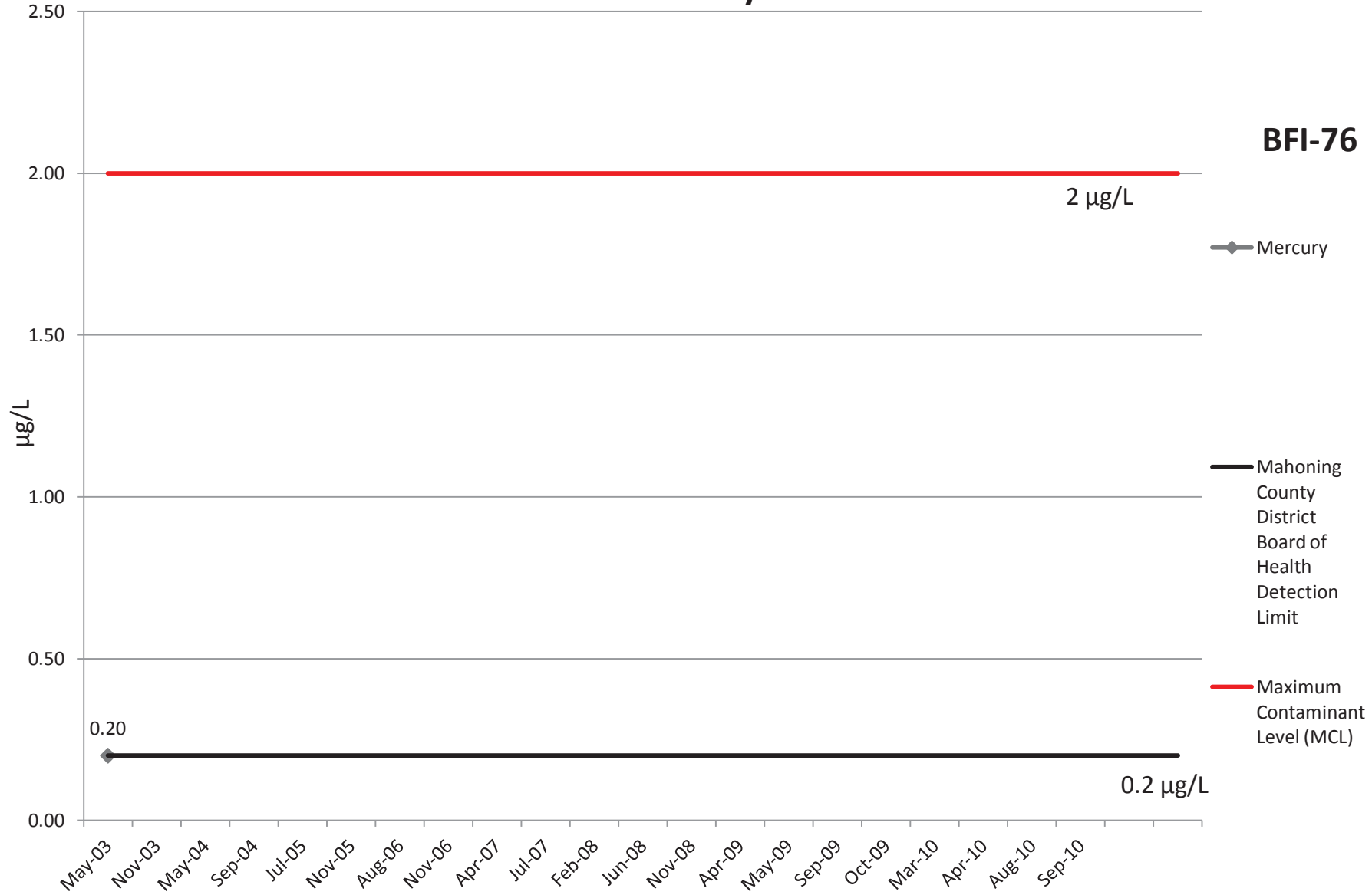
— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

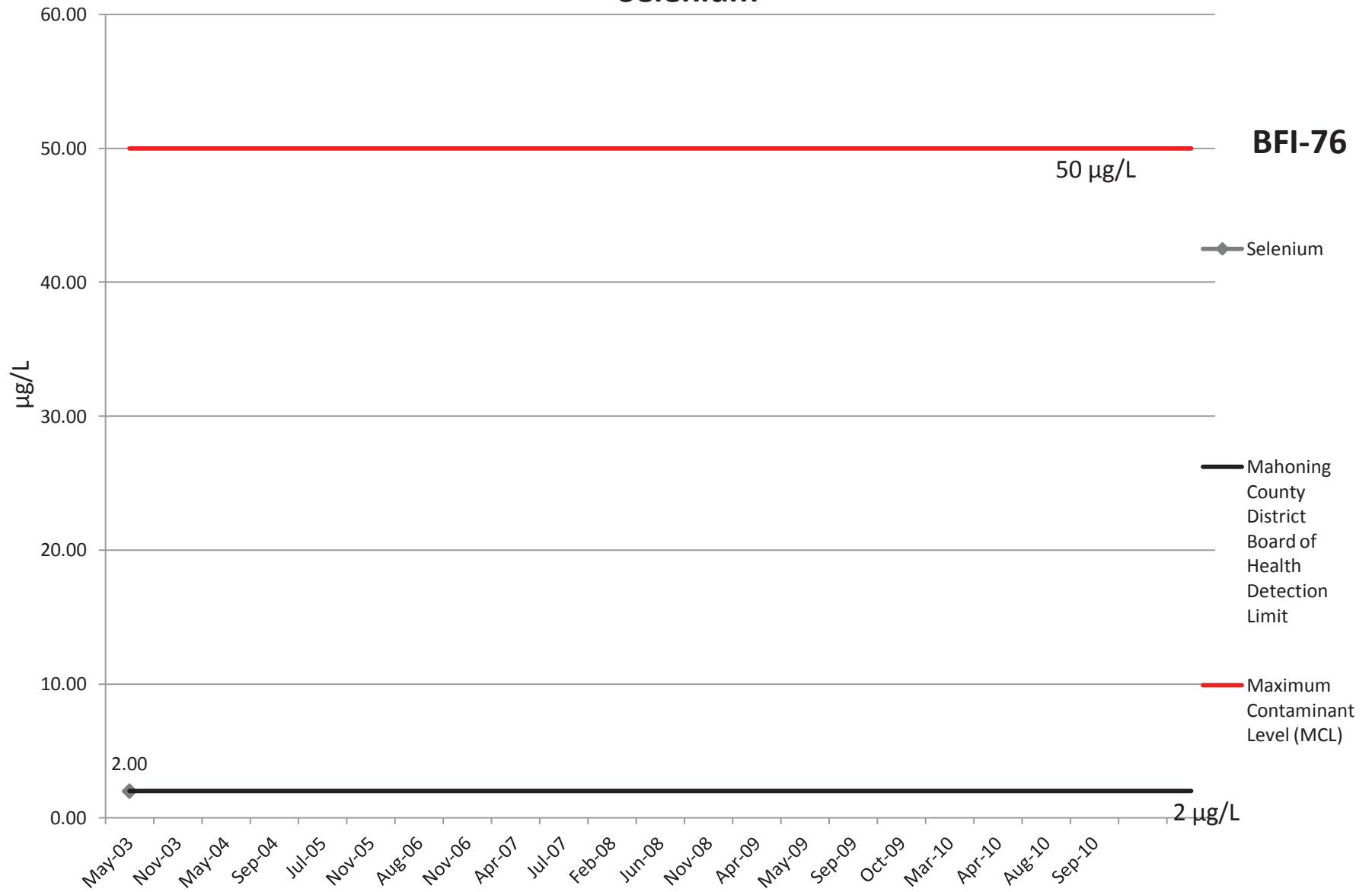


# Mercury

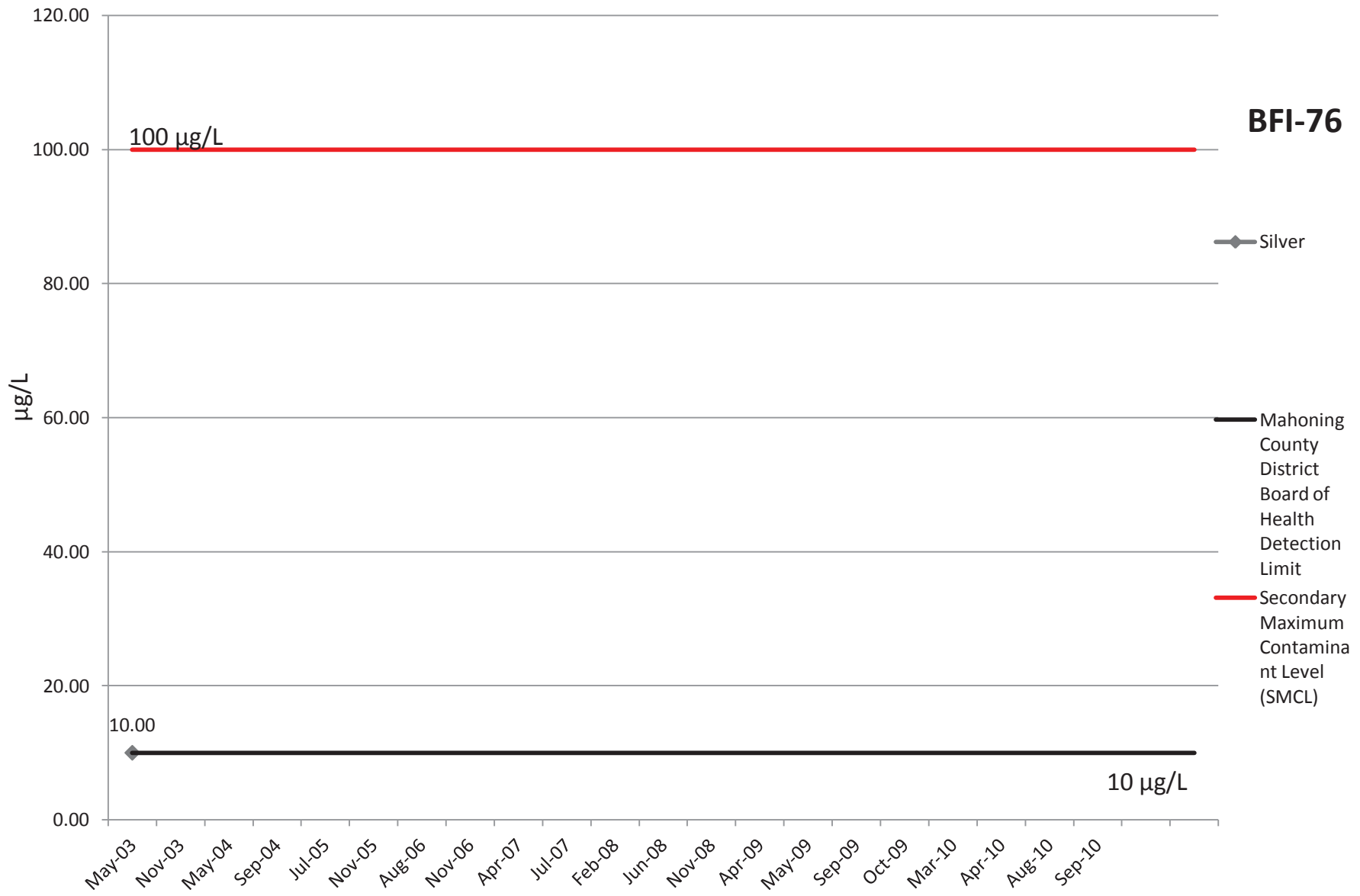
**BFI-76**



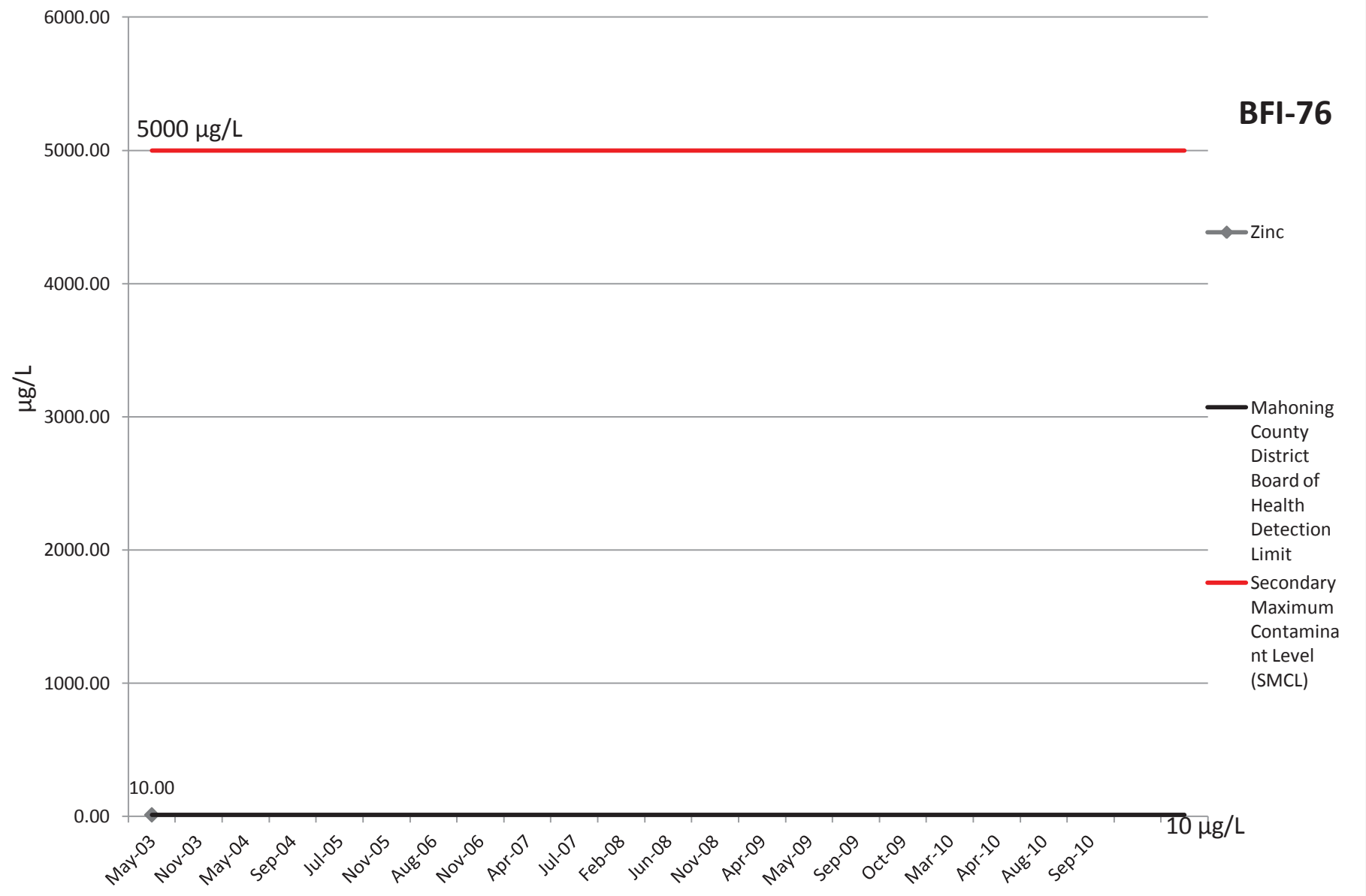
# Selenium



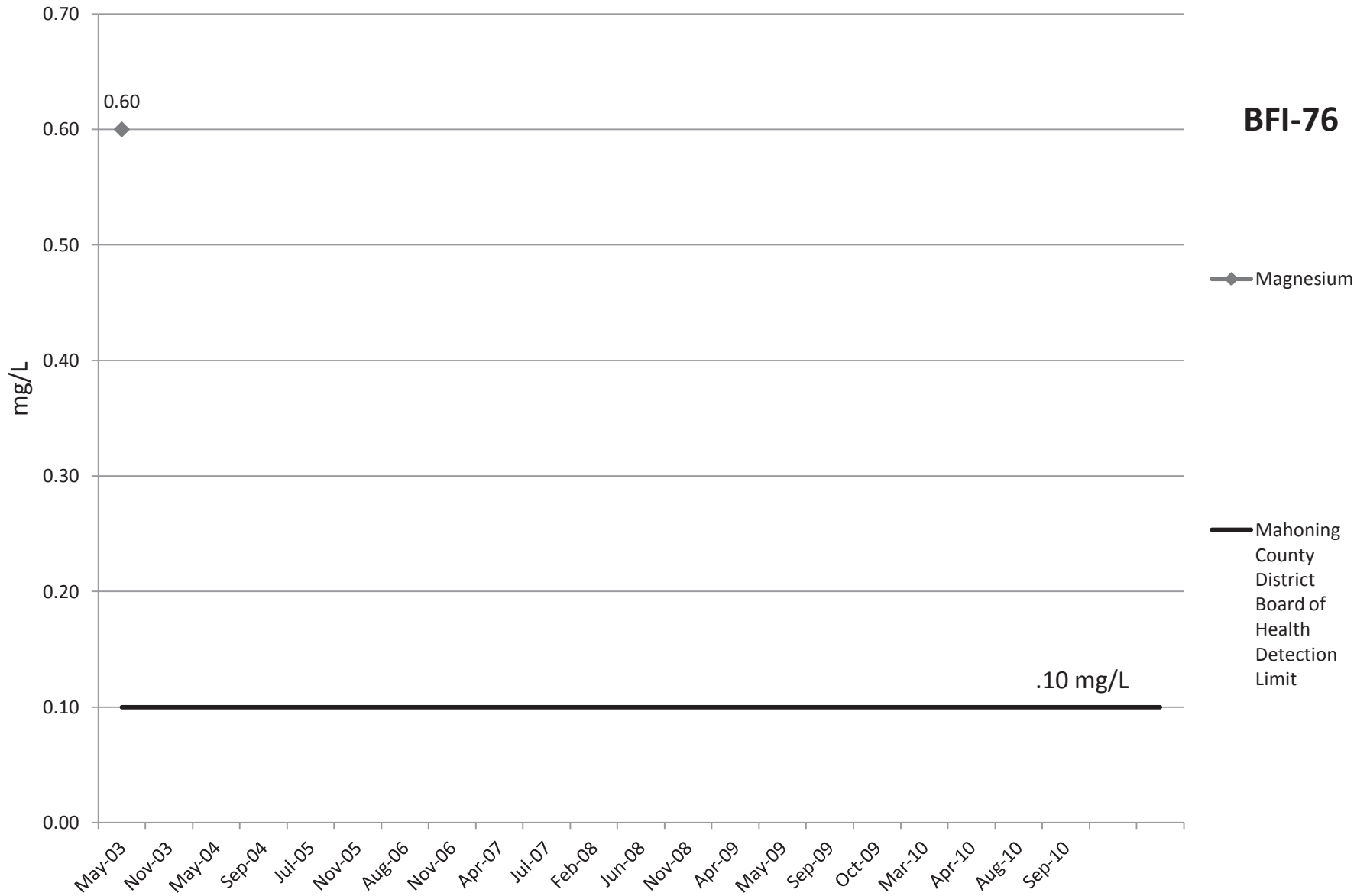
# Silver



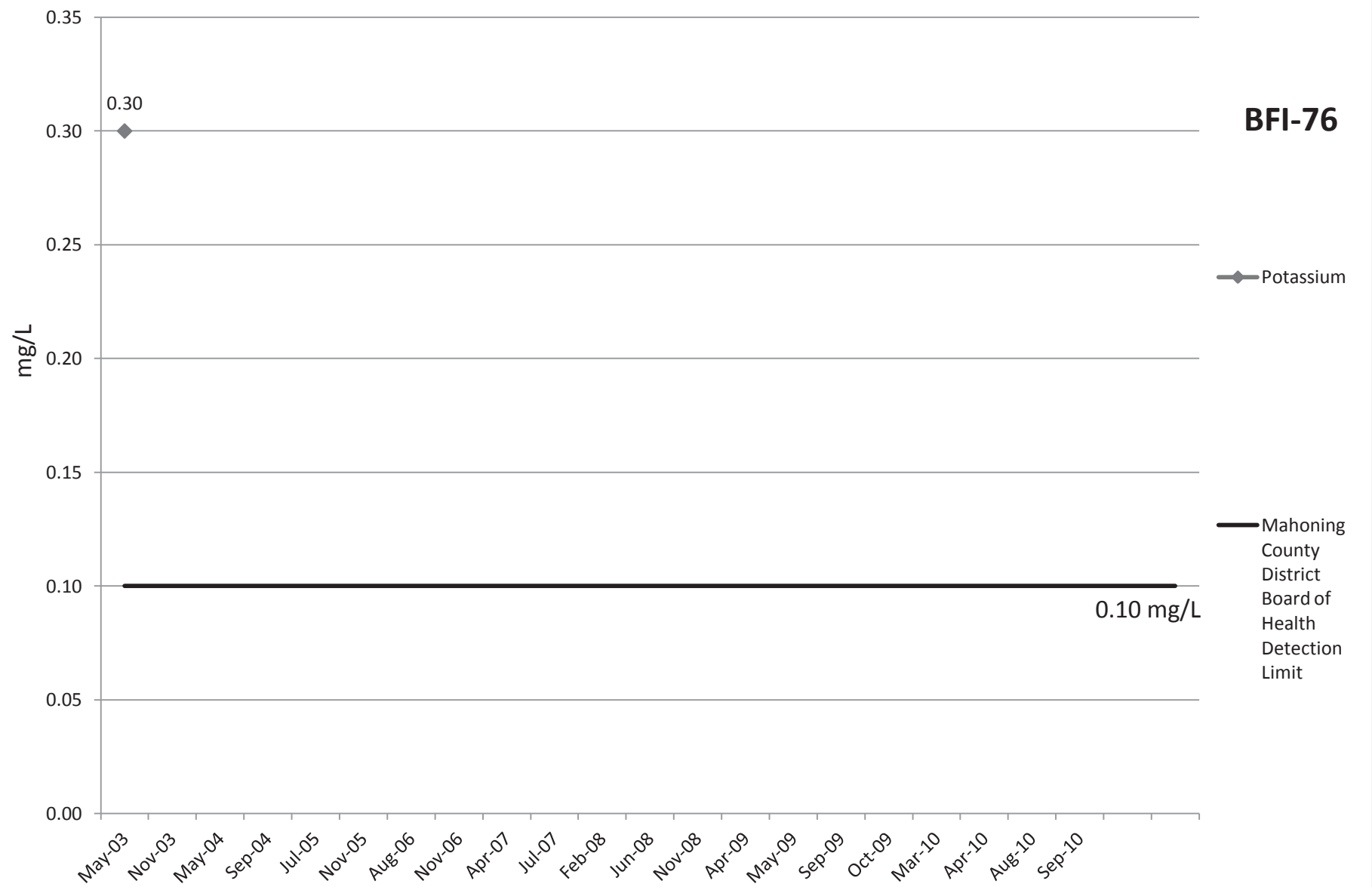
# Zinc



# Magnesium



# Potassium



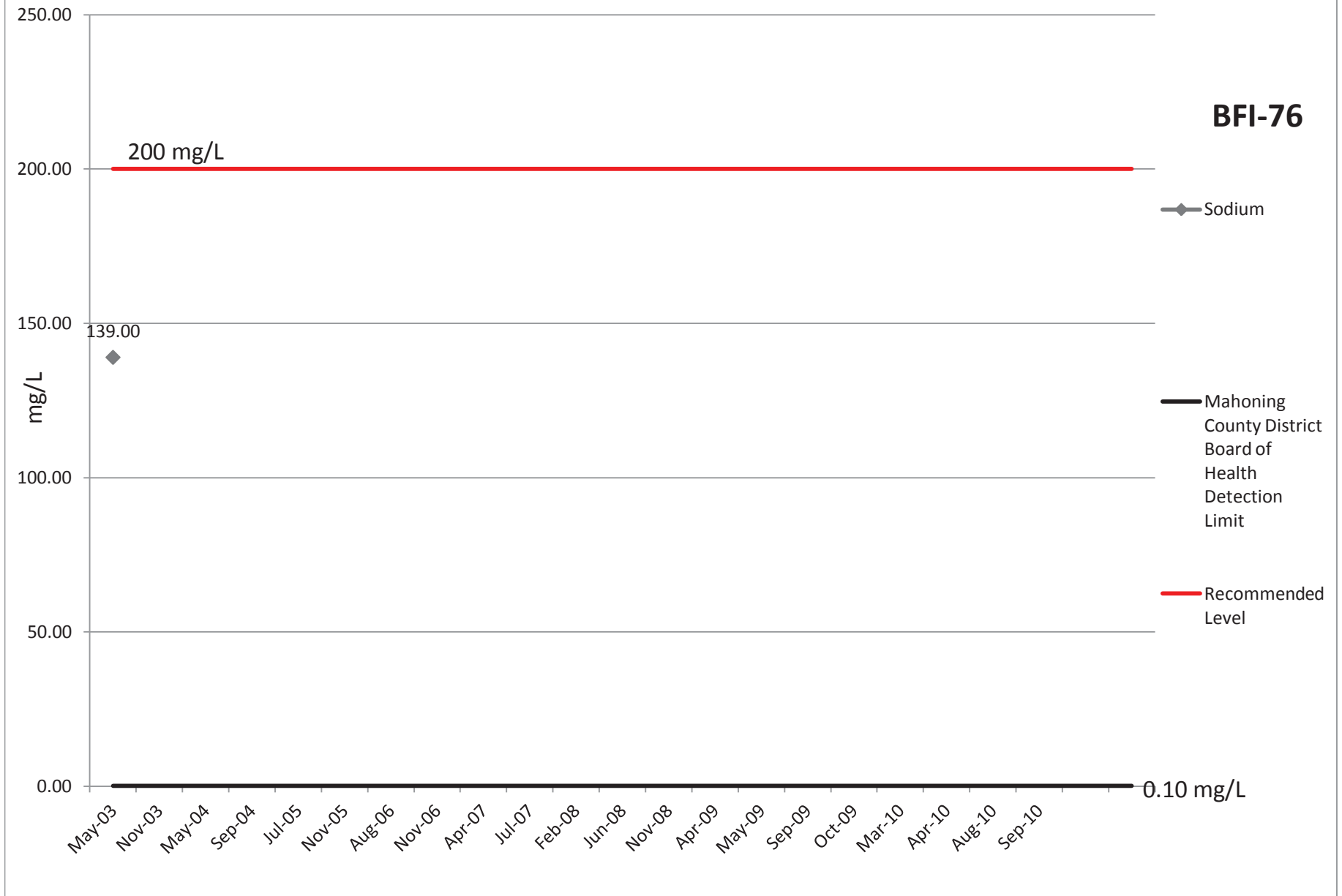
**BFI-76**

◆ Potassium

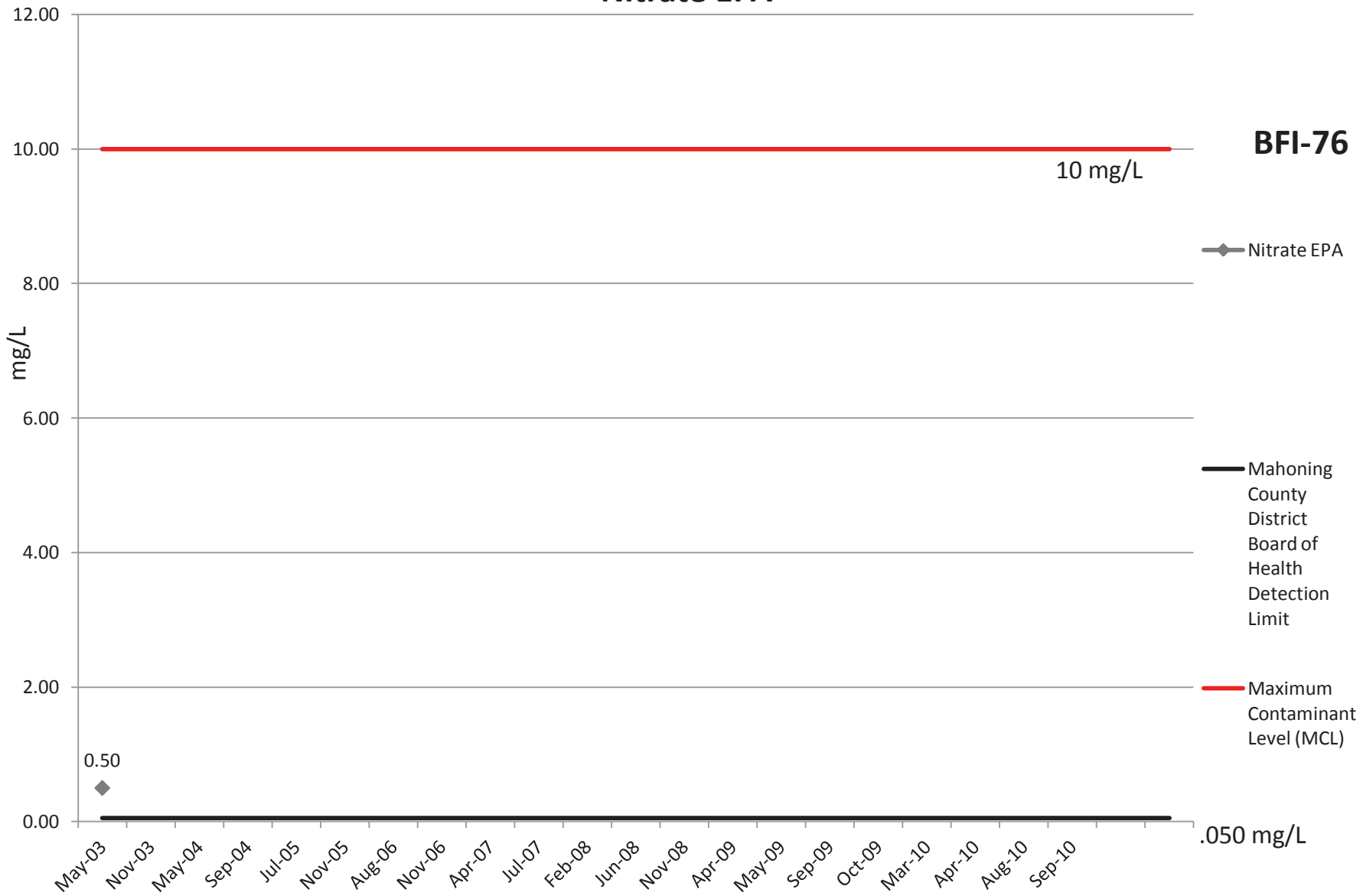
— Mahoning County District Board of Health Detection Limit

0.10 mg/L

# Sodium



# Nitrate EPA



**BFI-76**

◆ Nitrate EPA

— Mahoning County District Board of Health Detection Limit

— Maximum Contaminant Level (MCL)



# COD

**BFI-76**

10 mg/L

—◆— COD

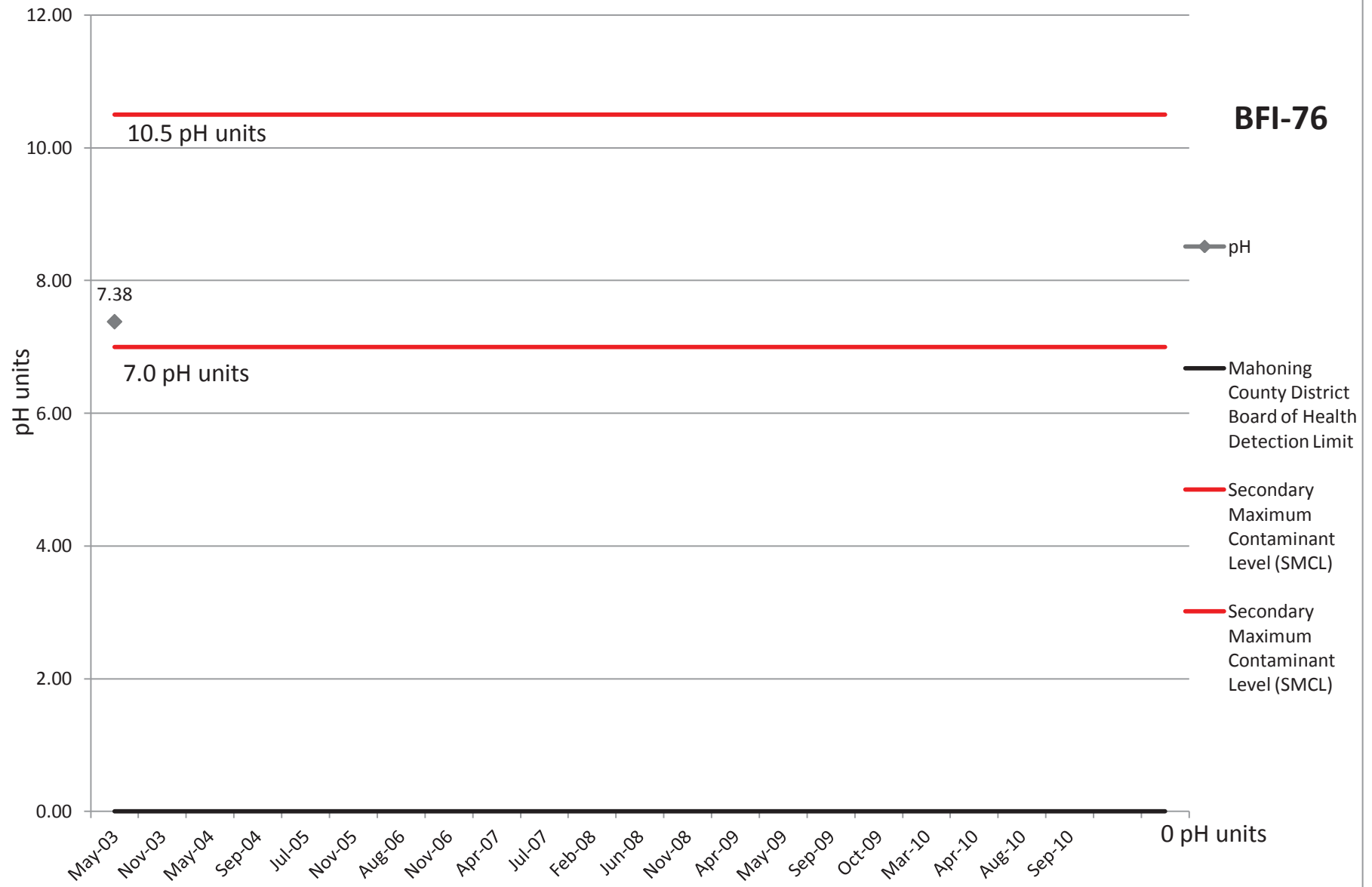
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit



May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

# pH

**BFI-76**



—◆— pH

— Mahoning  
County District  
Board of Health  
Detection Limit

— Secondary  
Maximum  
Contaminant  
Level (SMCL)

— Secondary  
Maximum  
Contaminant  
Level (SMCL)

10.5 pH units

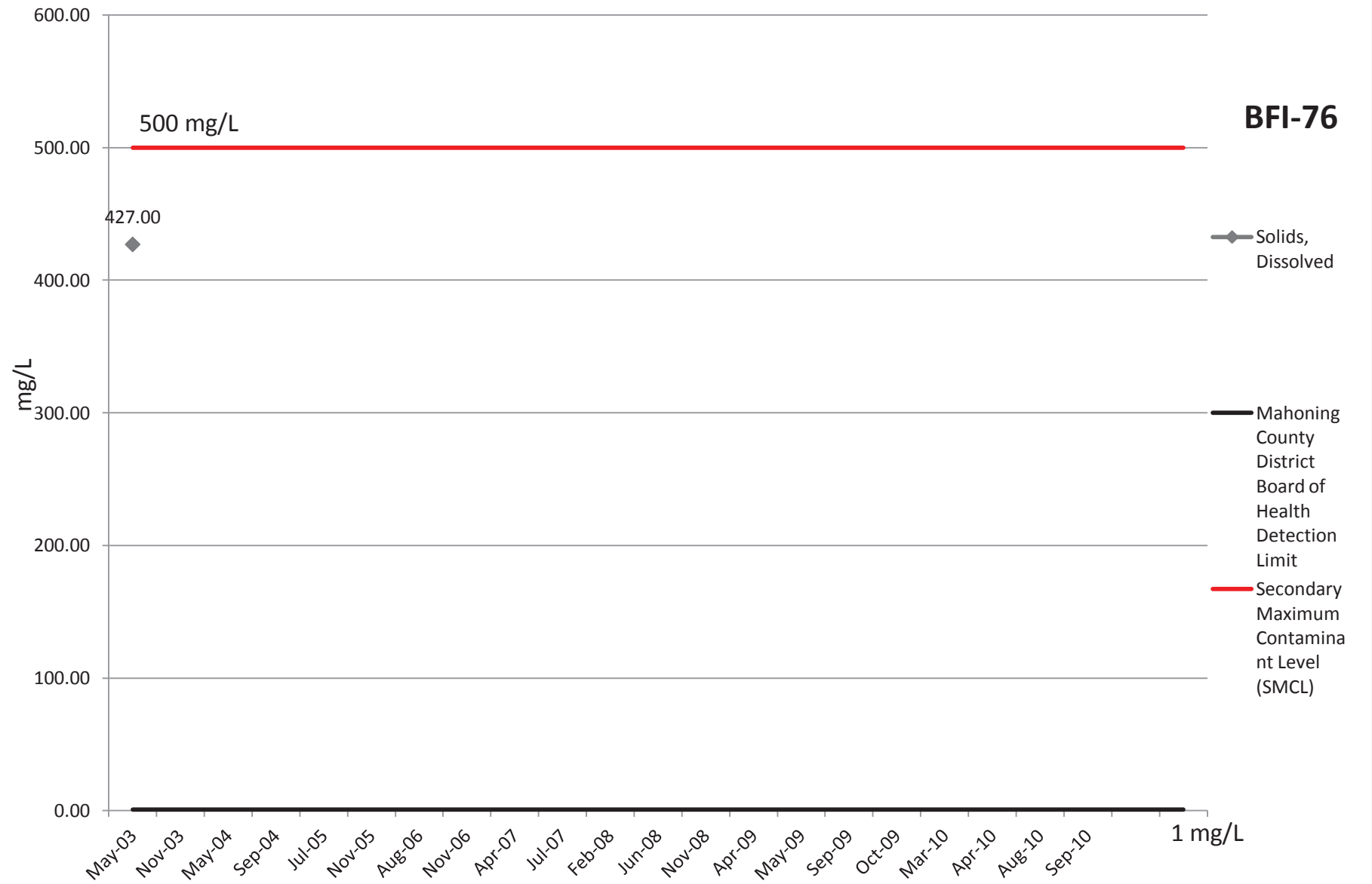
7.38

7.0 pH units

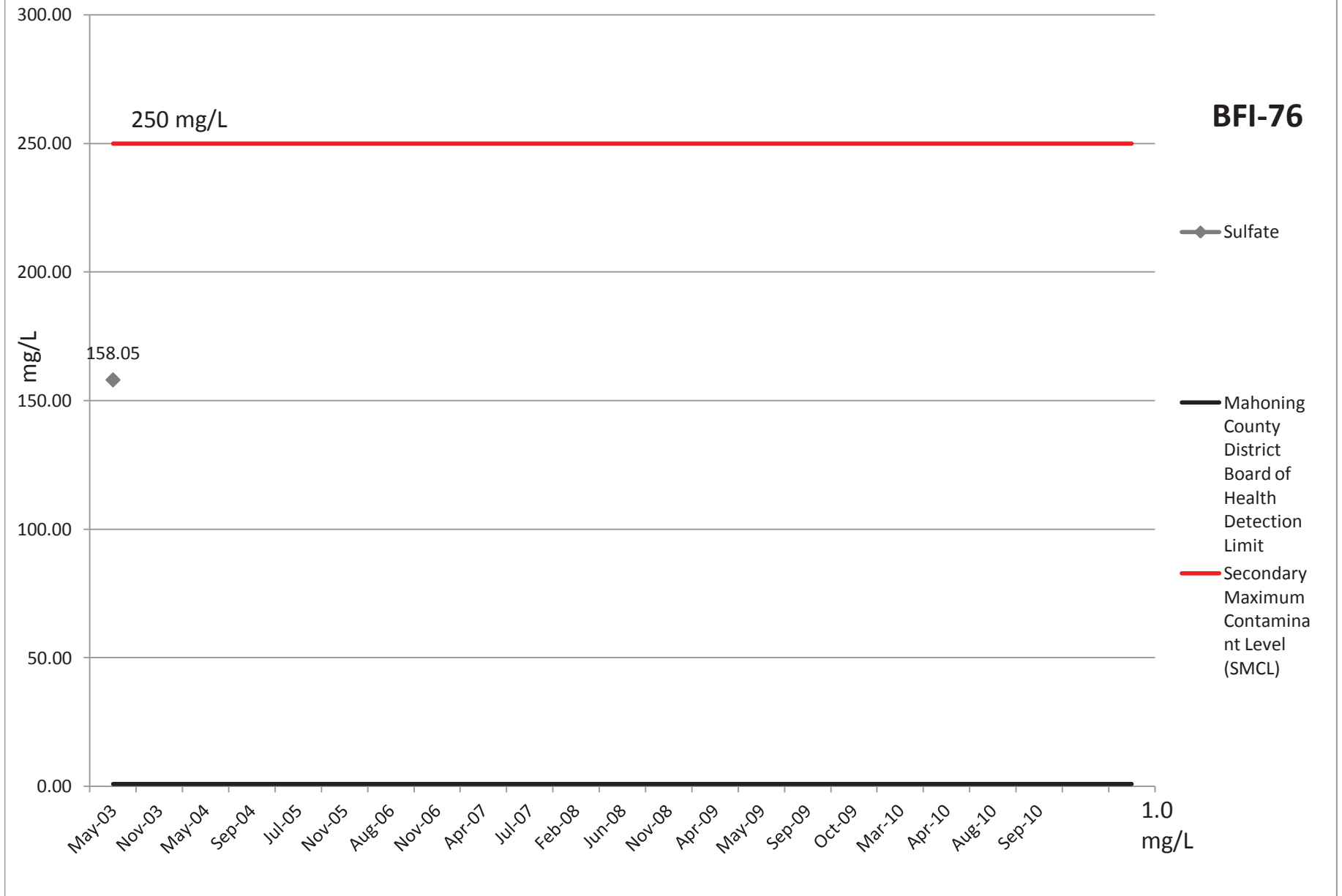
0 pH units

pH units

# Solids, Dissolved



# Sulfate



# Bacteria

positive (1)

**BFI-76**

Positive/Negative

◆ Bacteria

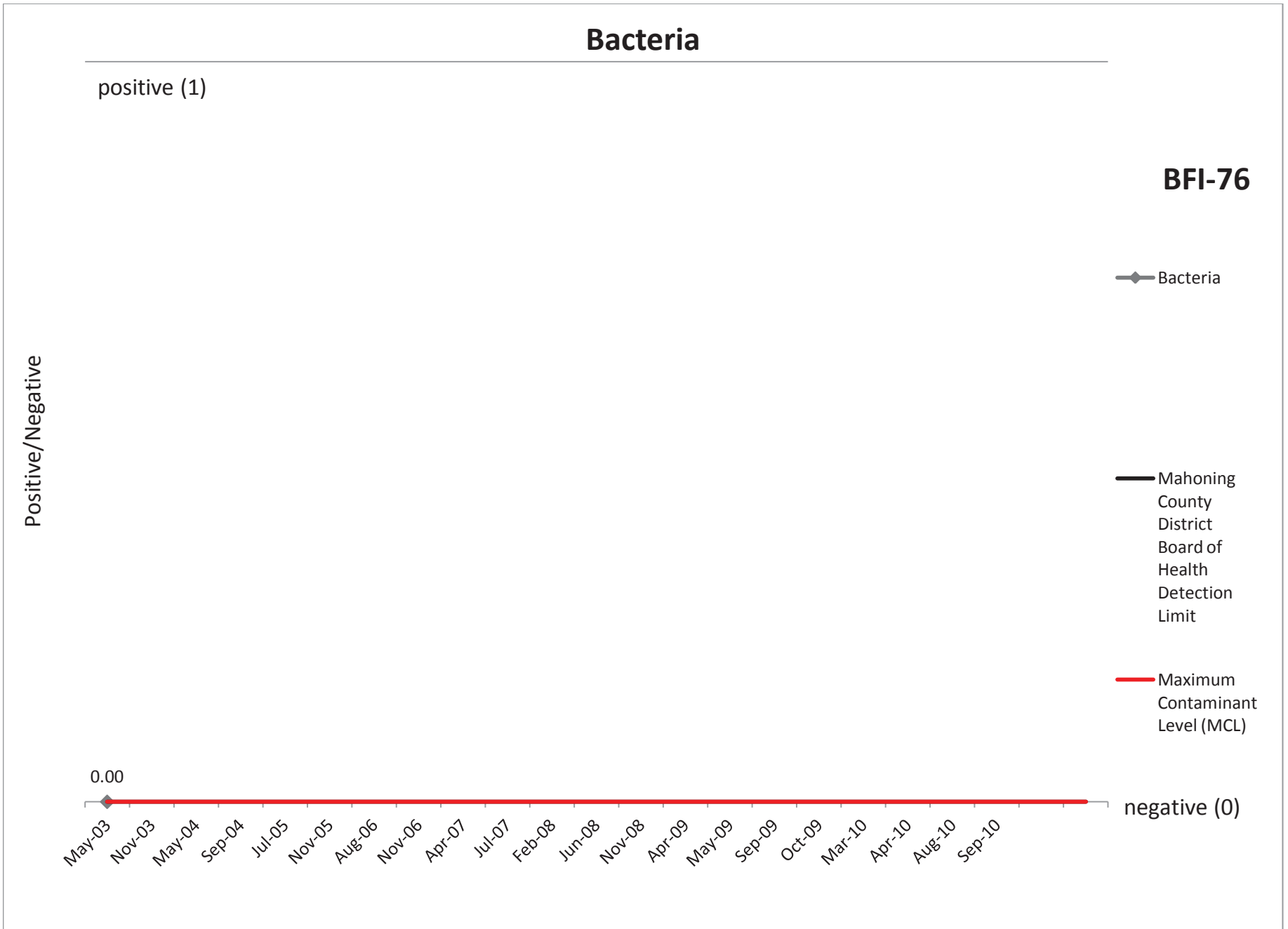
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

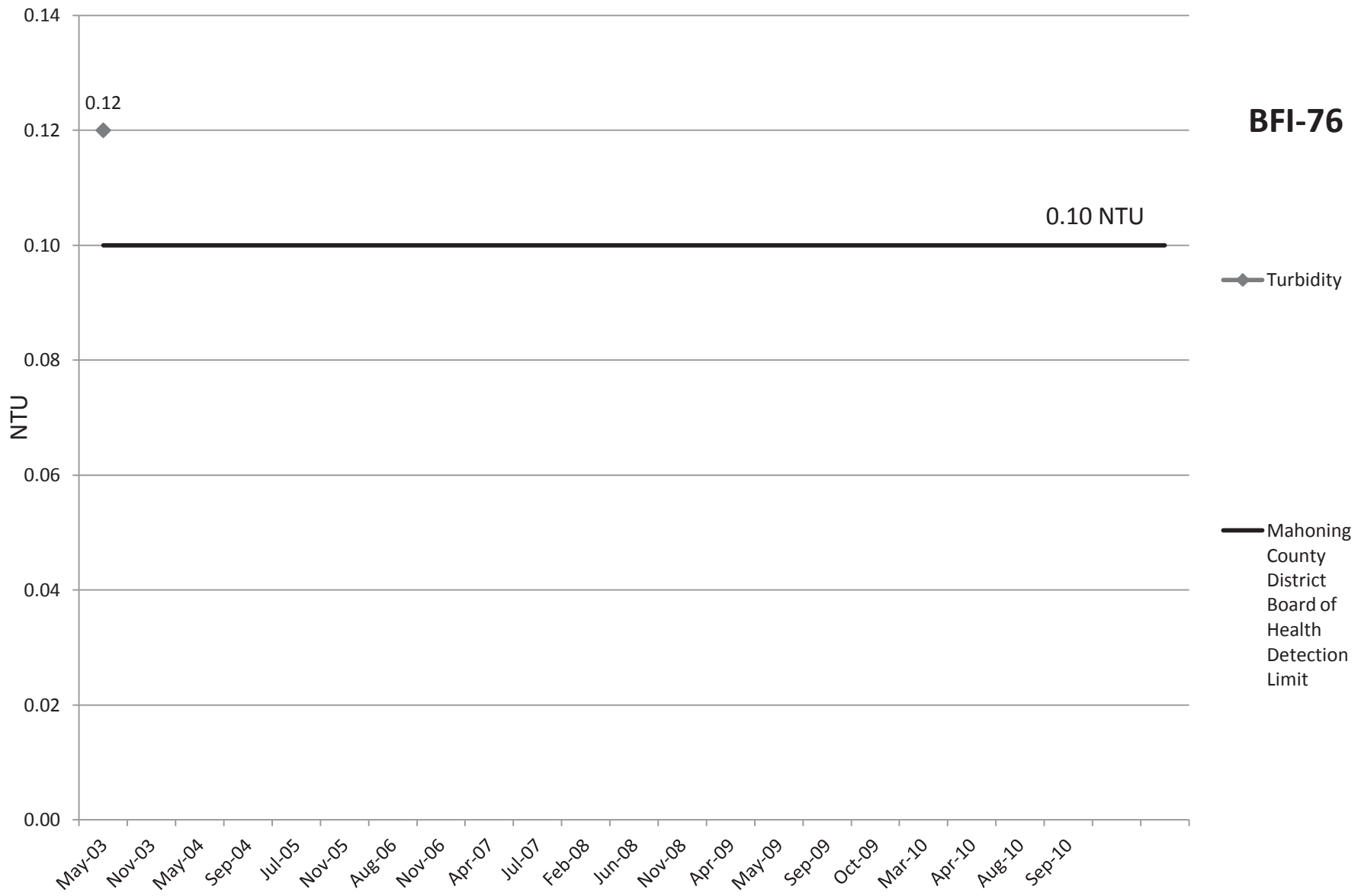
0.00

negative (0)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



# Turbidity



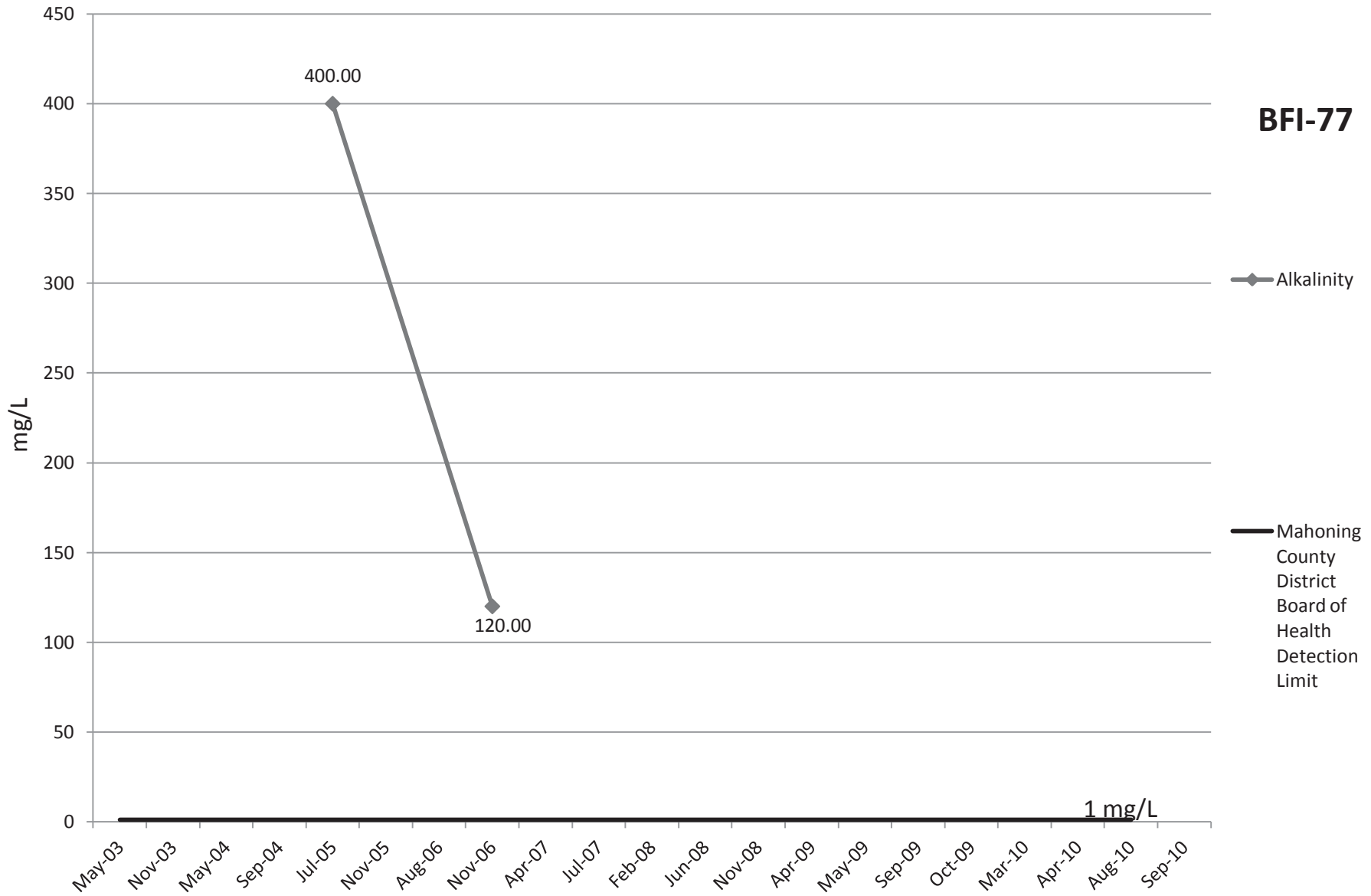
**BFI-76**

0.10 NTU

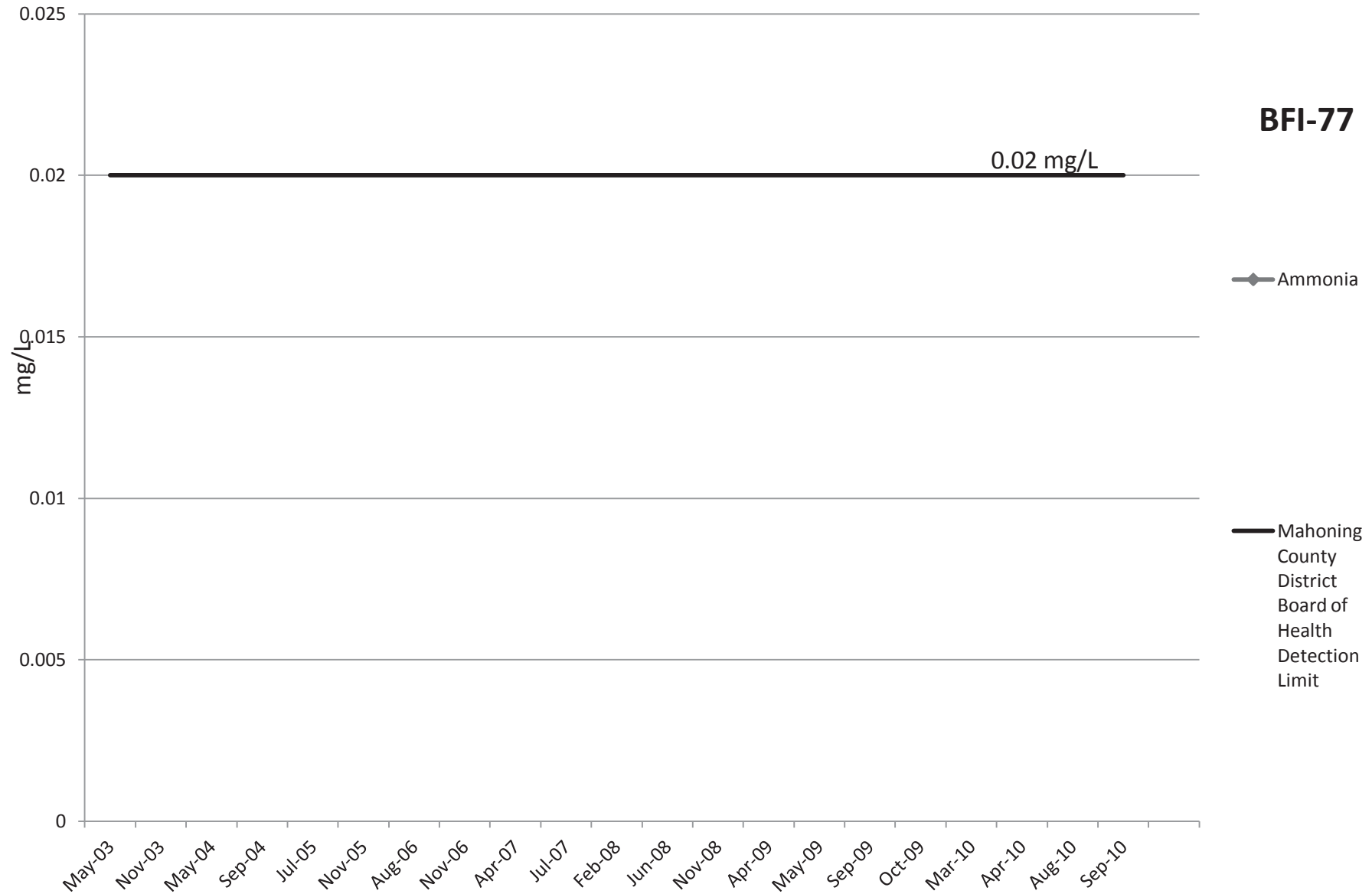
◆ Turbidity

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

# Alkalinity



# Ammonia



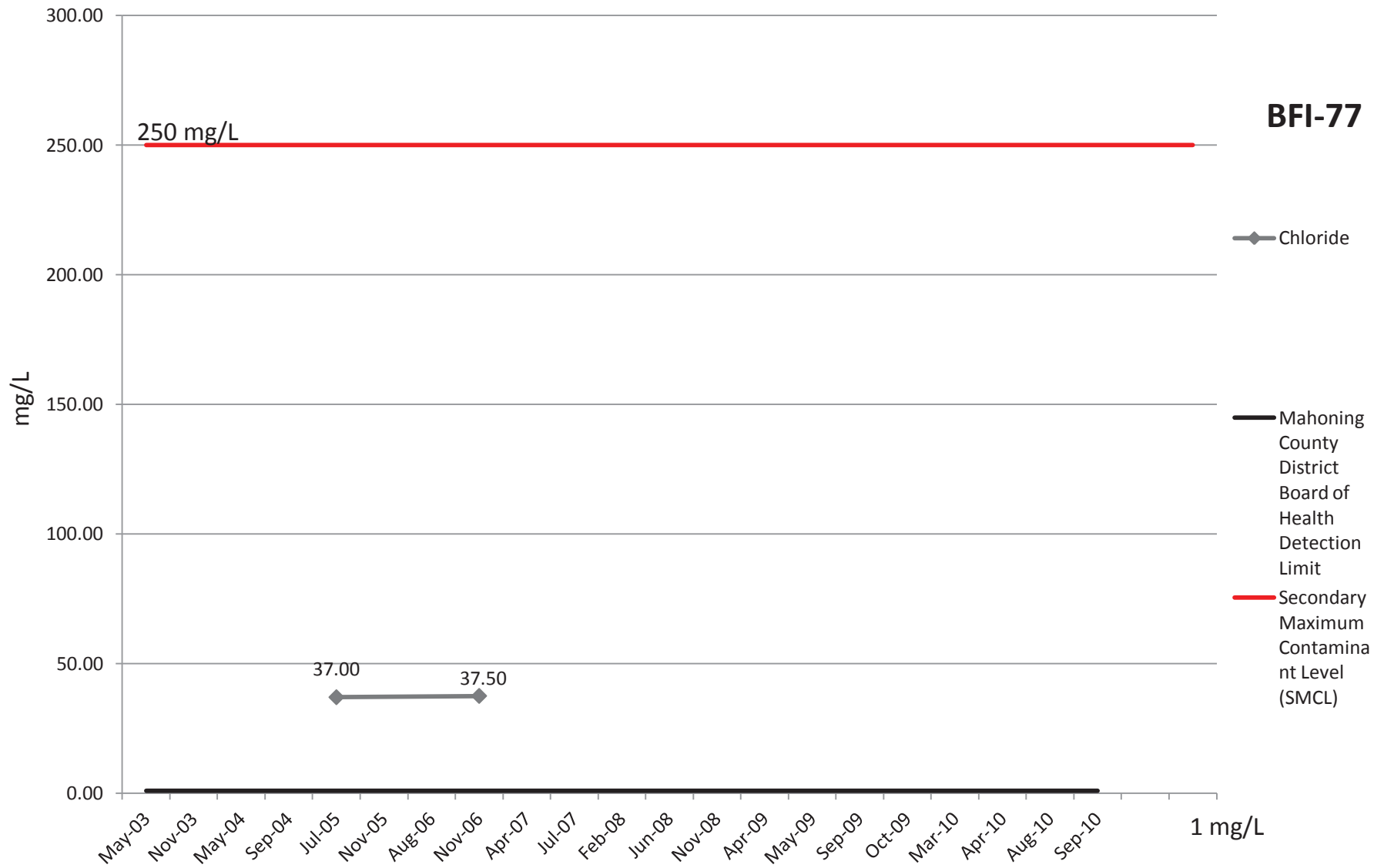
**BFI-77**

◆ Ammonia

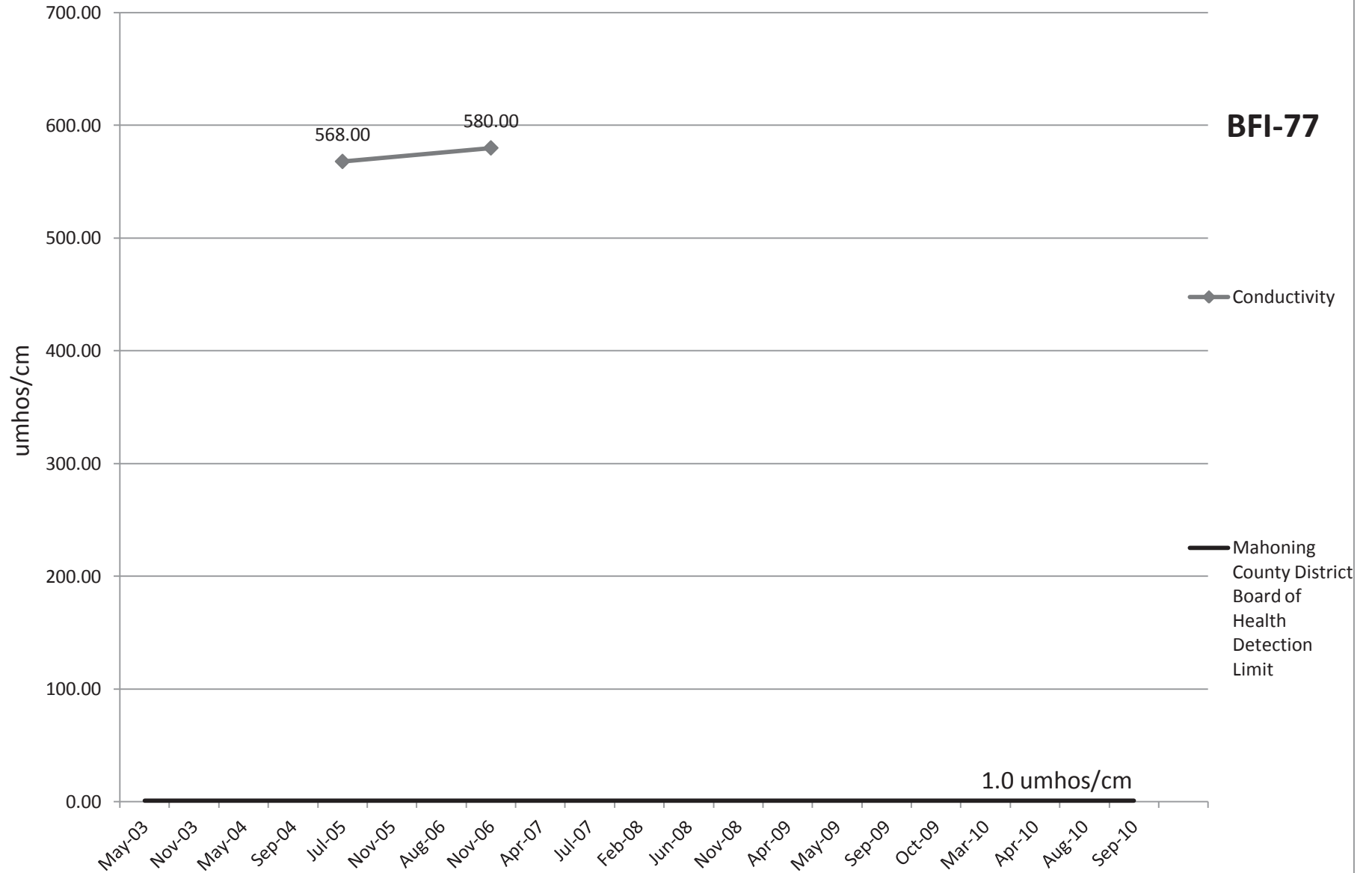
— Mahoning County District Board of Health Detection Limit



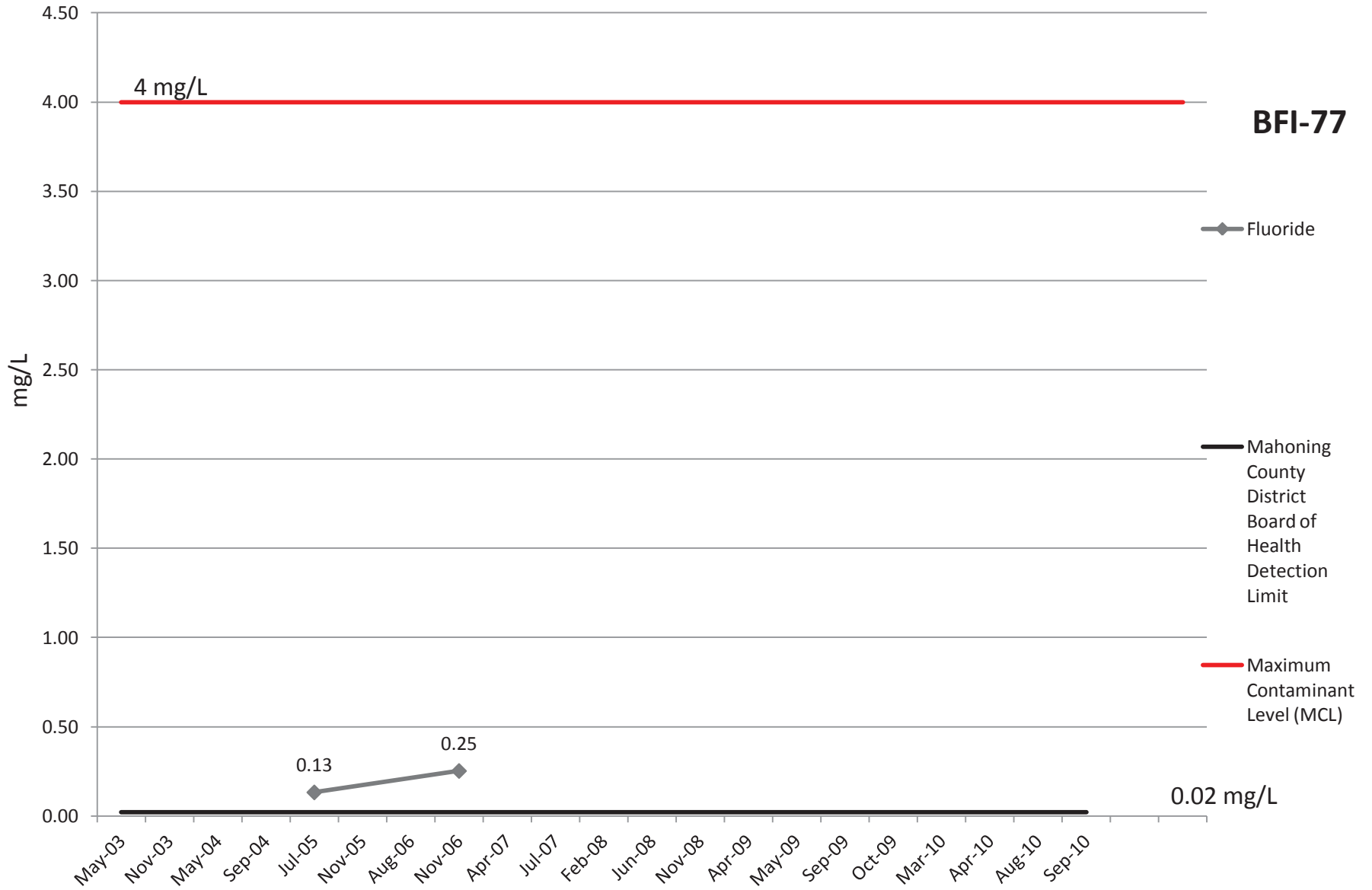
# Chloride



# Conductivity

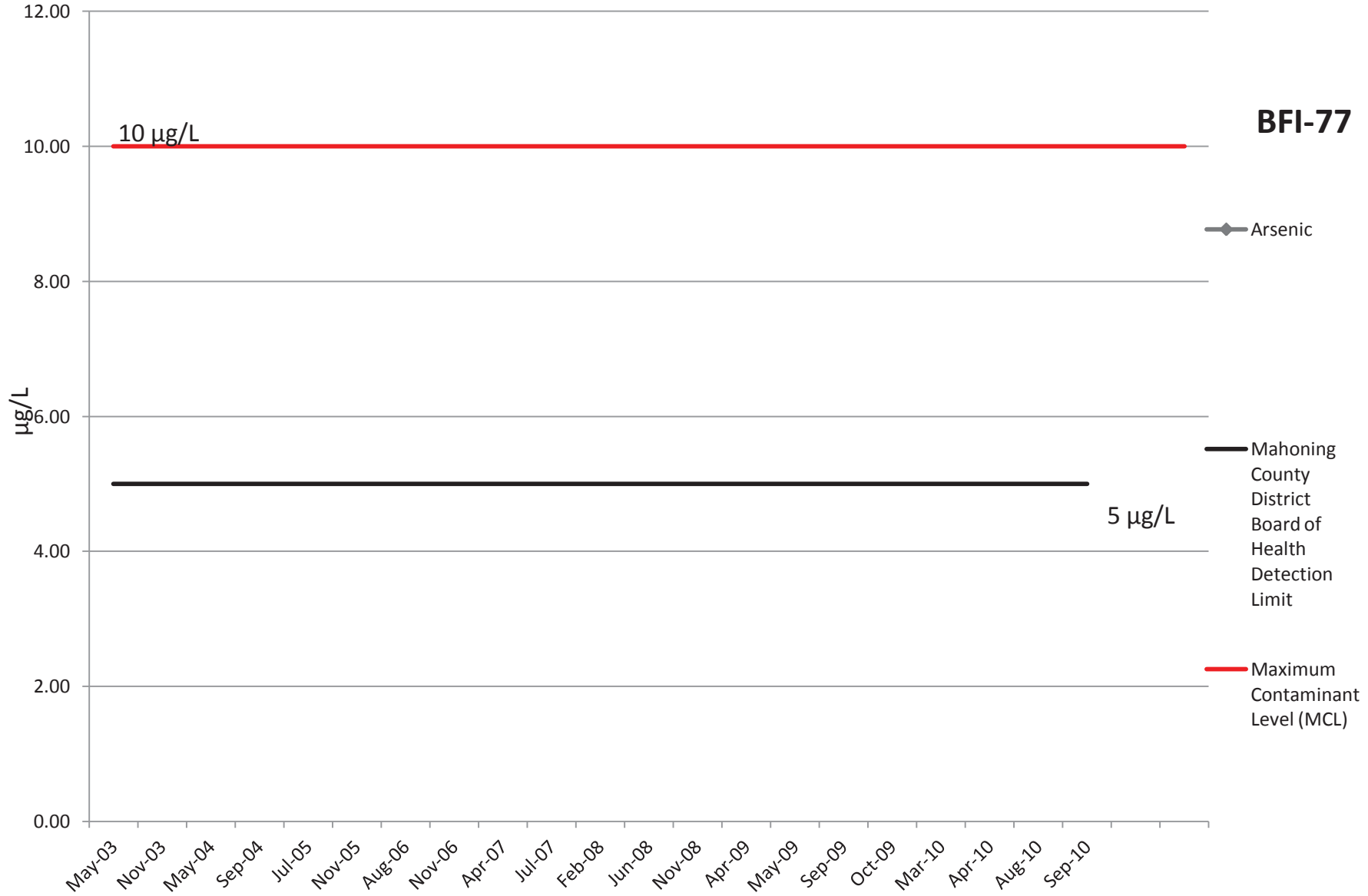


# Fluoride

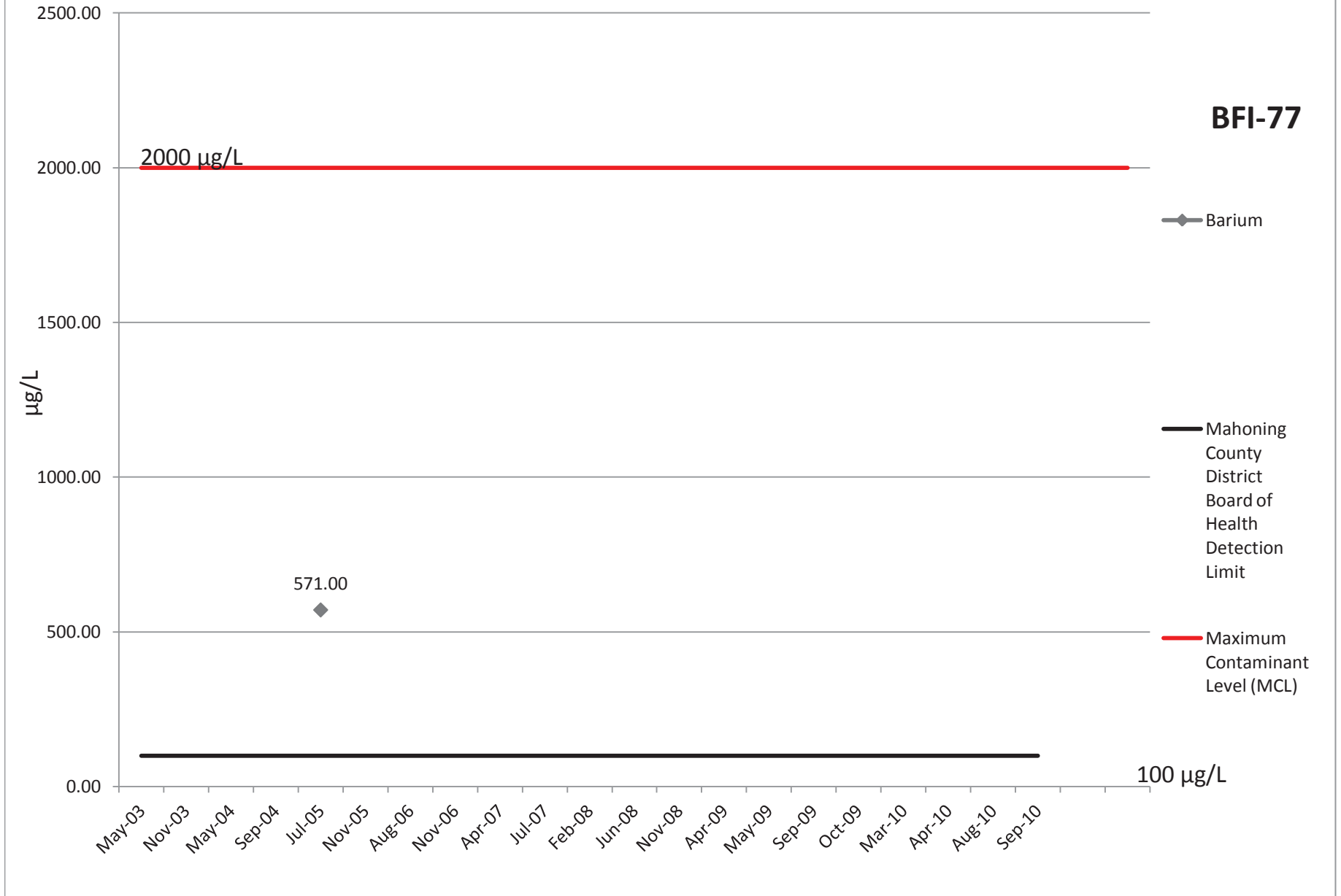


# Arsenic

**BFI-77**



# Barium



# Cadmium

**BFI-77**

10 µg/L

12.00  
10.00  
8.00  
6.00  
4.00  
2.00  
0.00

µg/L

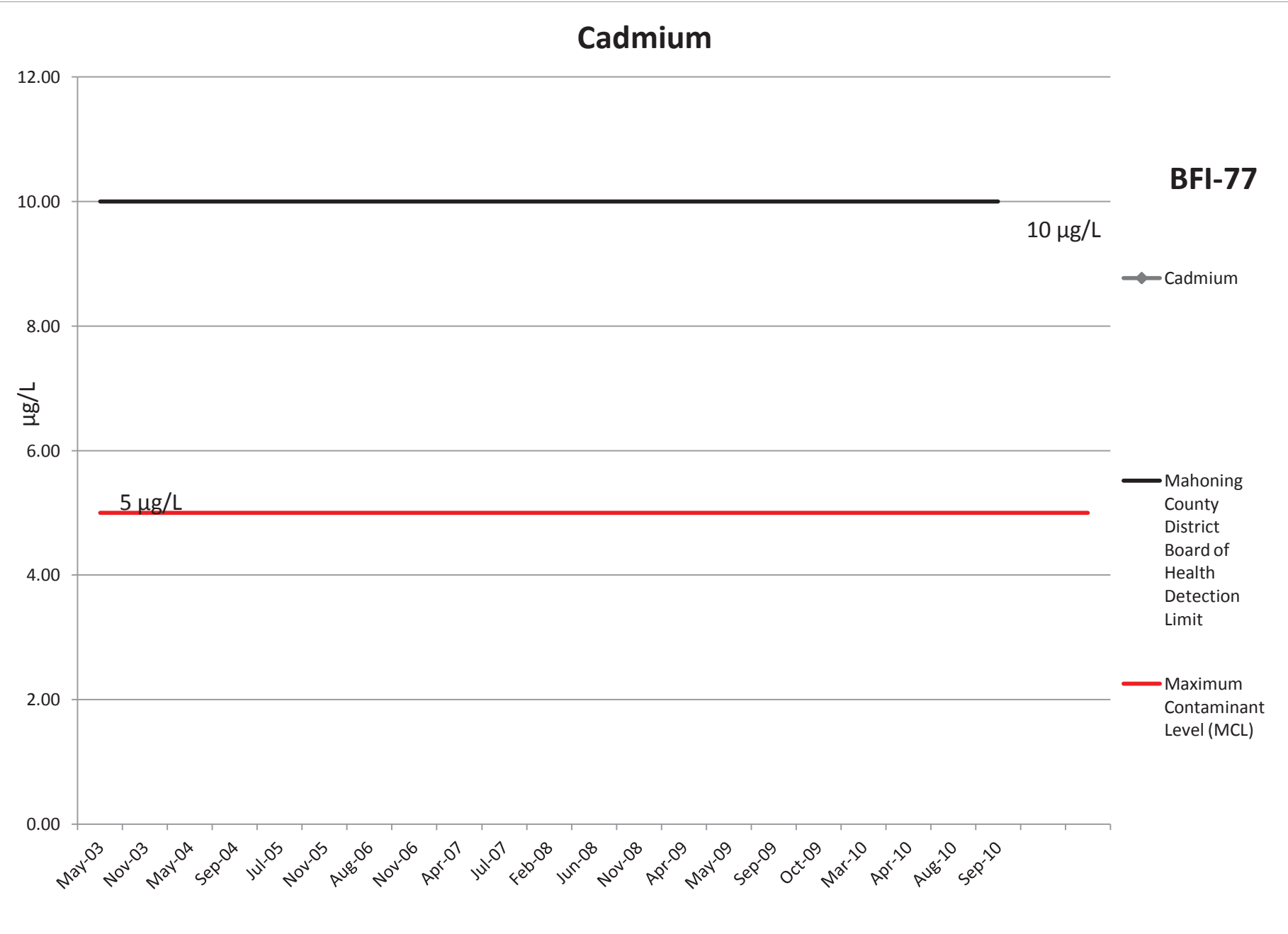
5 µg/L

◆ Cadmium

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

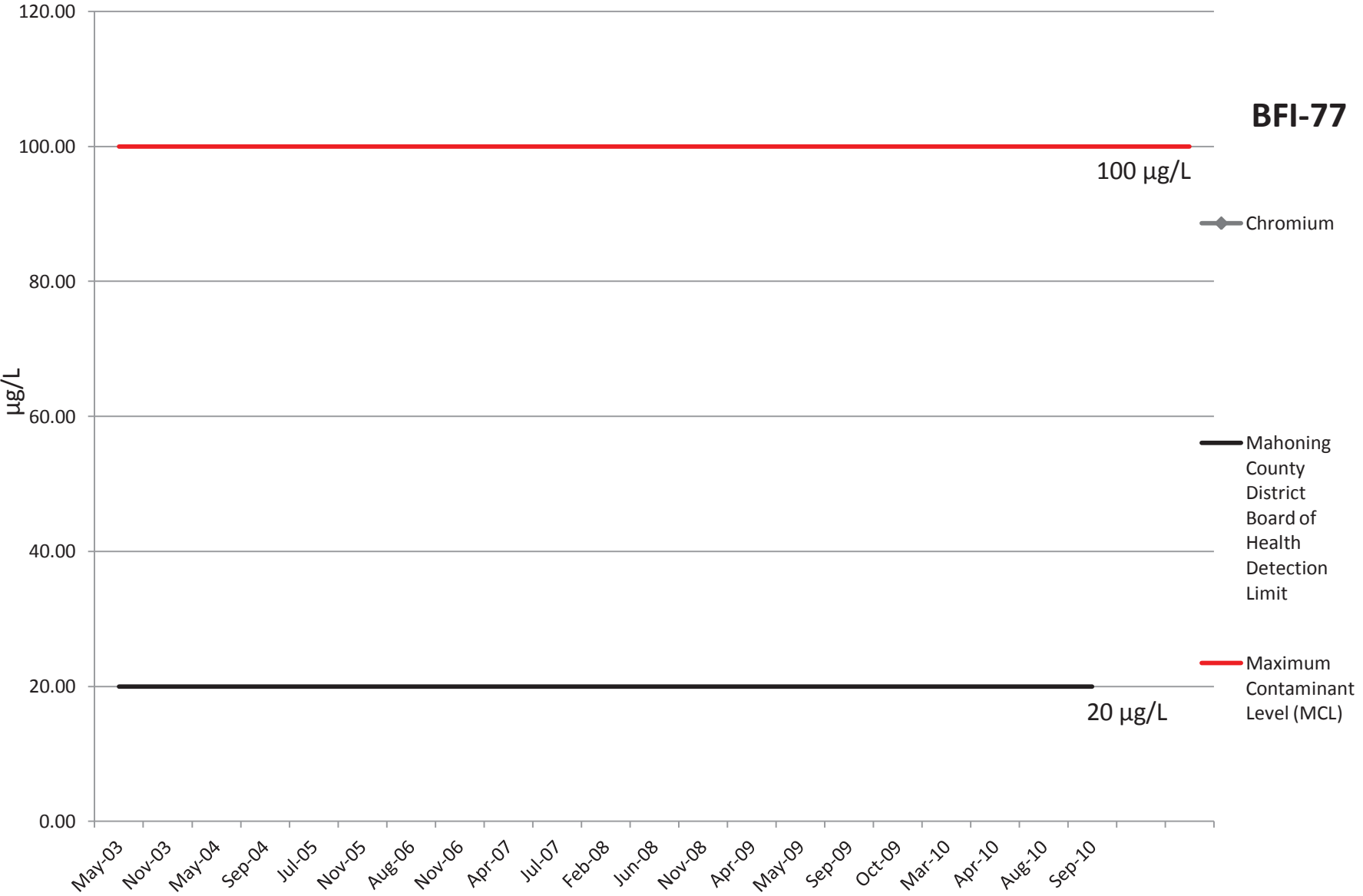
— Maximum  
Contaminant  
Level (MCL)

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

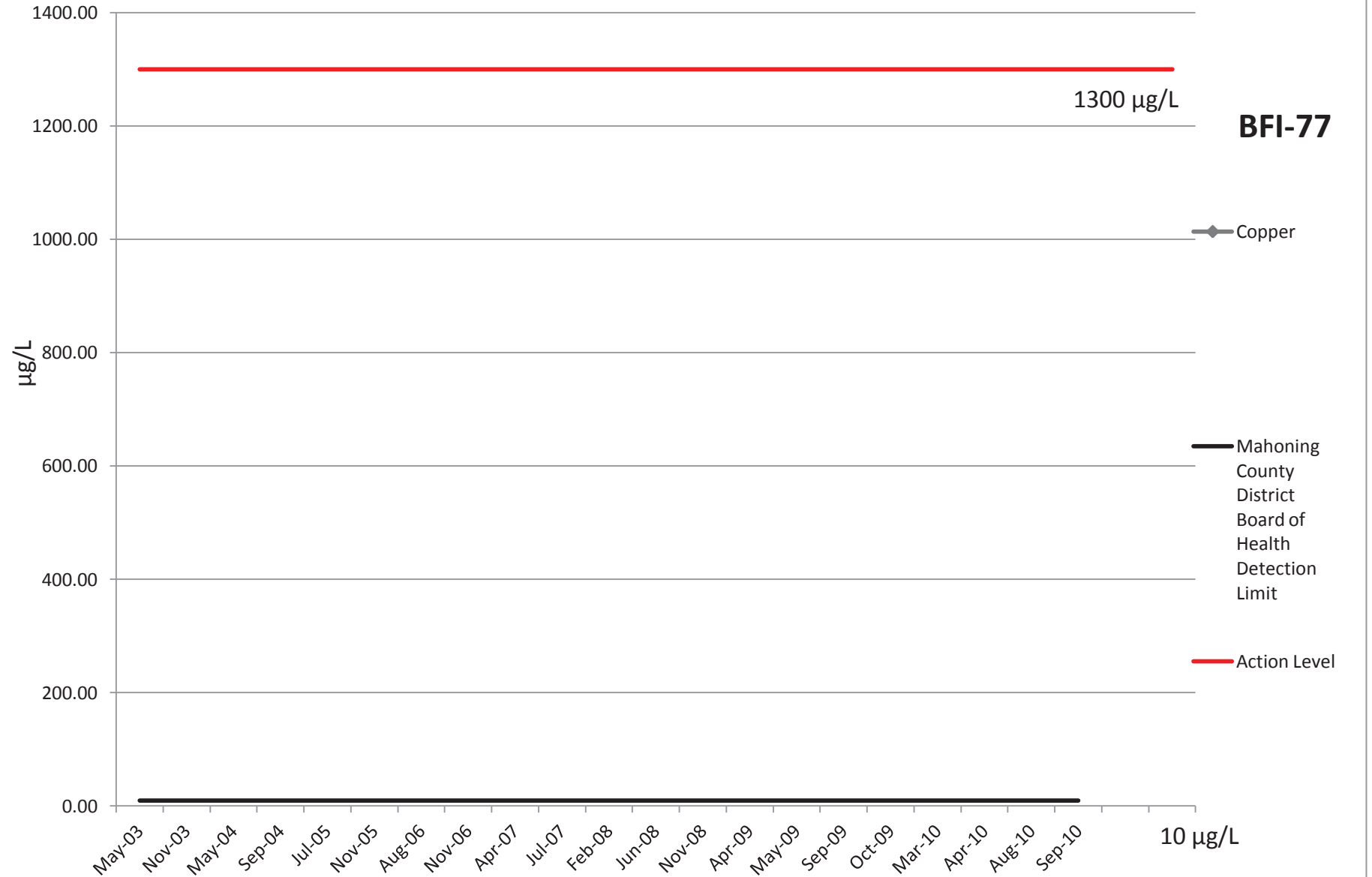


# Chromium

**BFI-77**



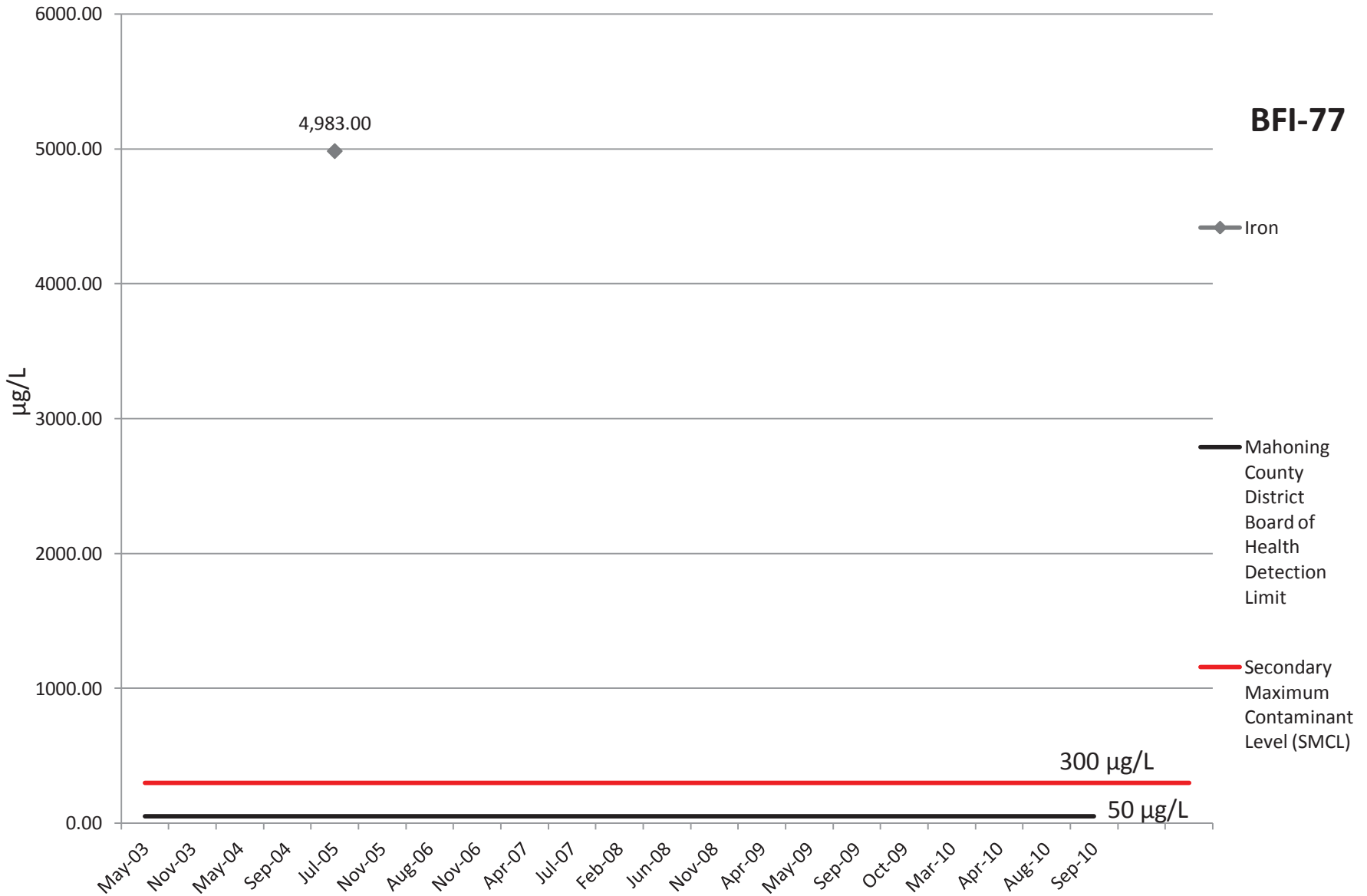
# Copper



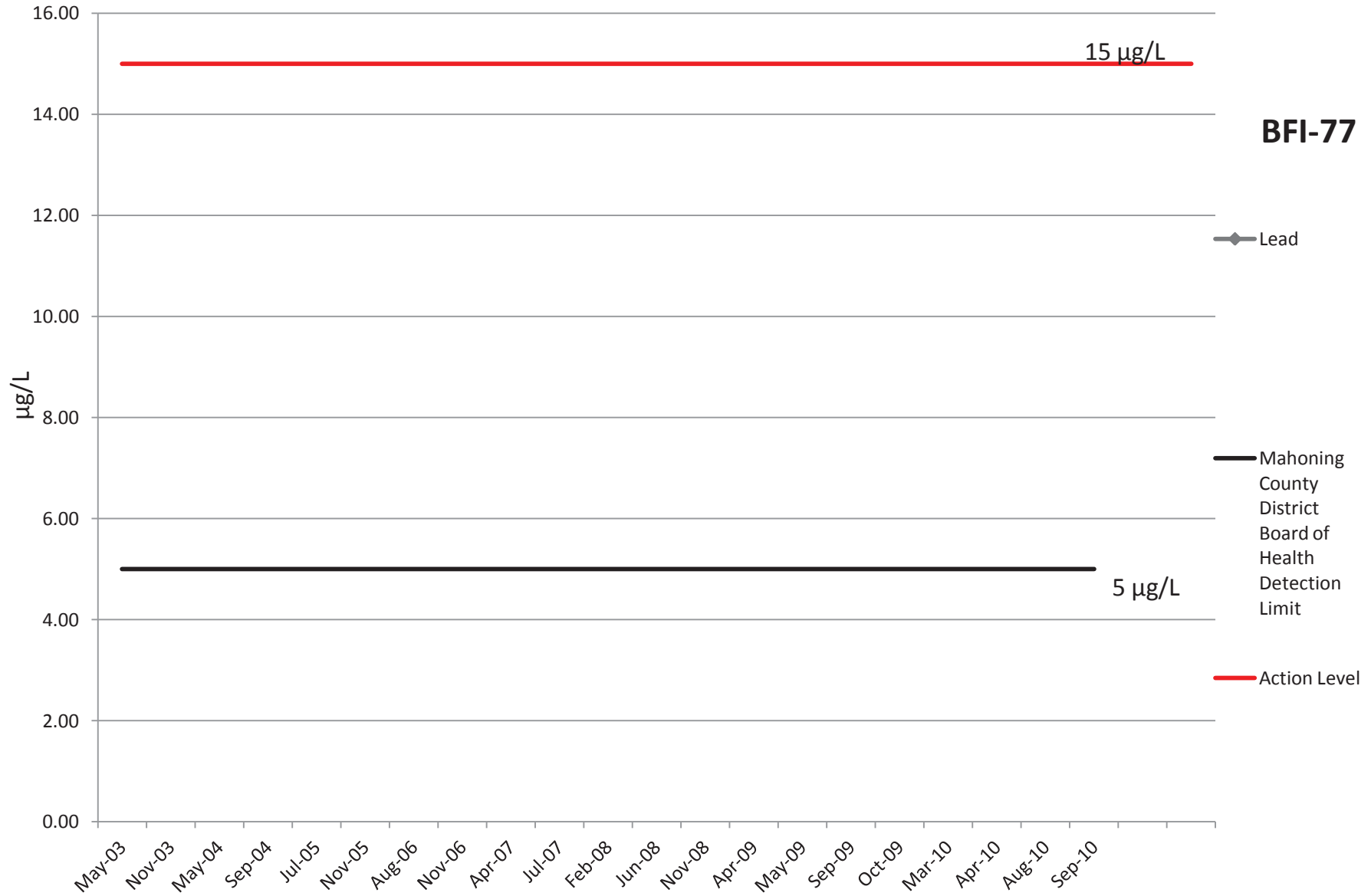


# Iron

**BFI-77**

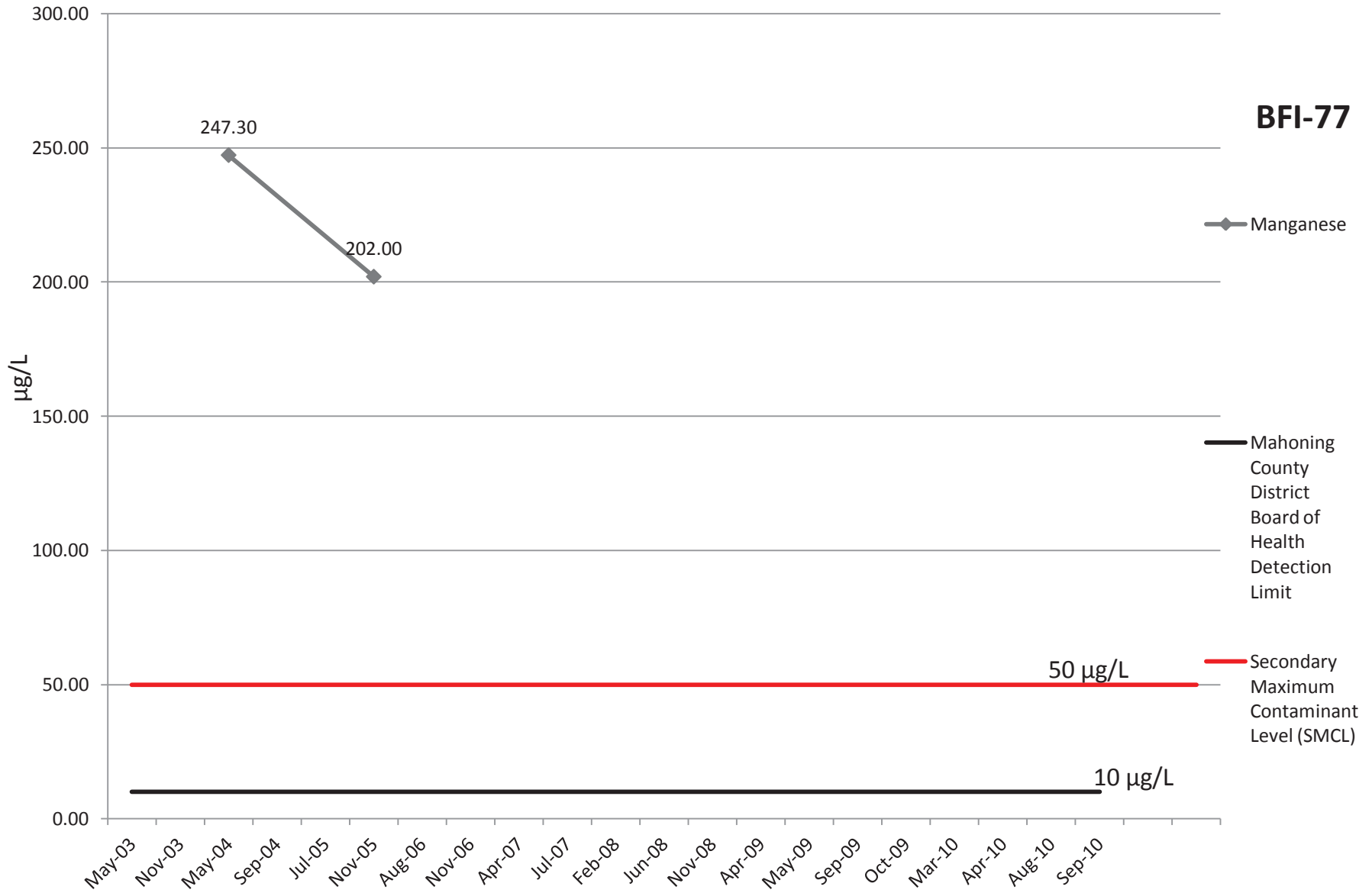


# Lead



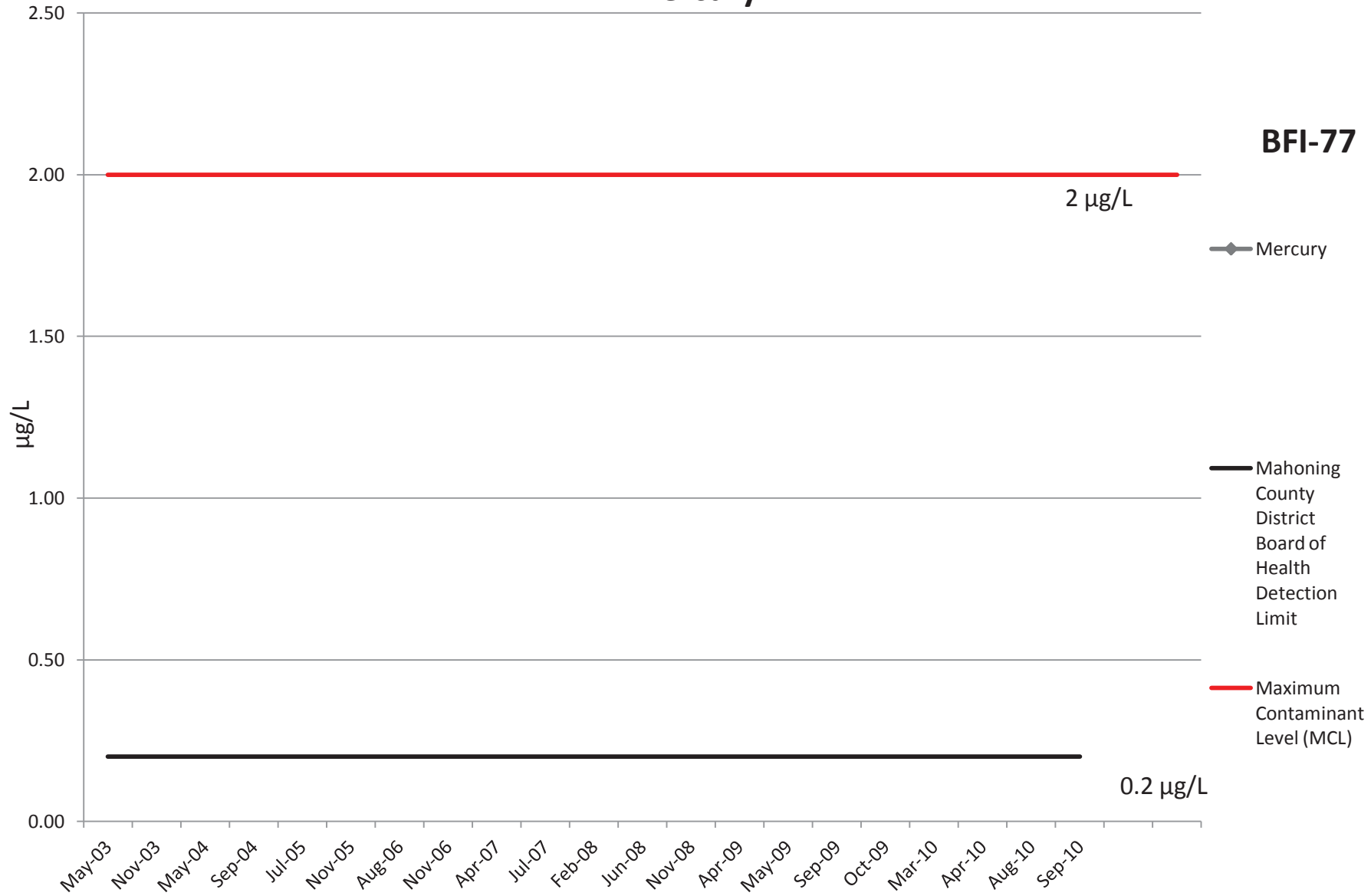
# Manganese

**BFI-77**

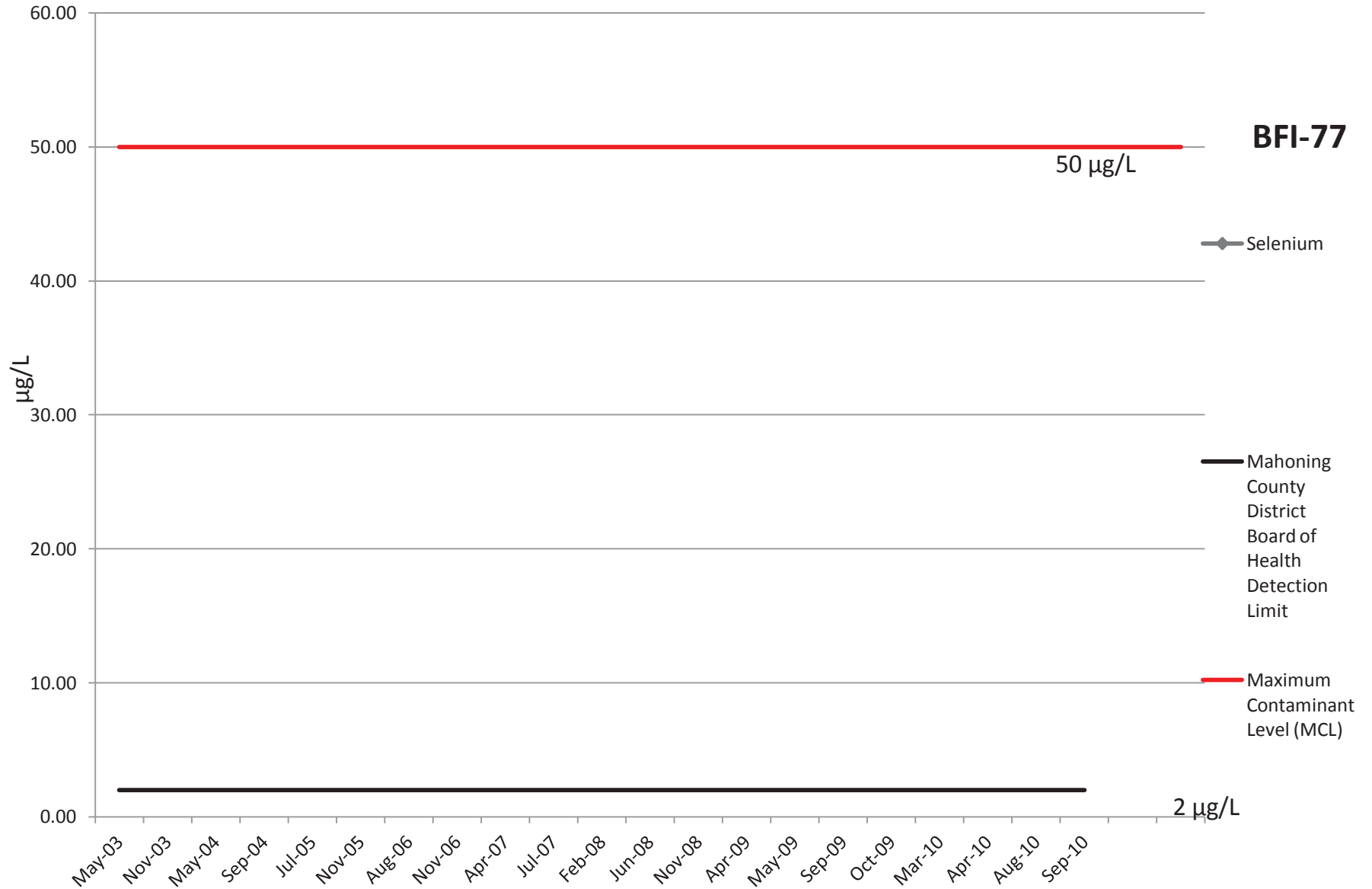


# Mercury

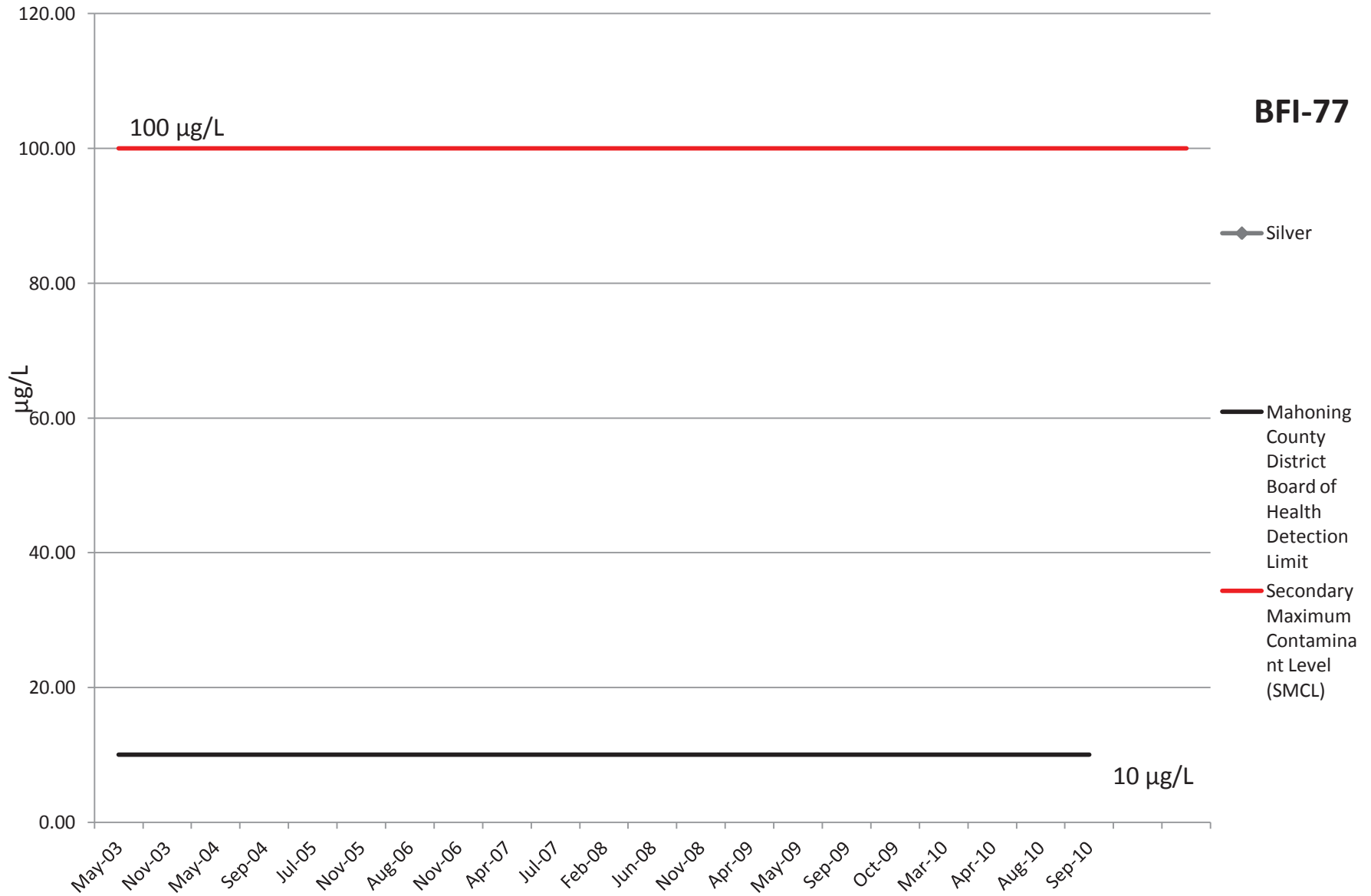
**BFI-77**



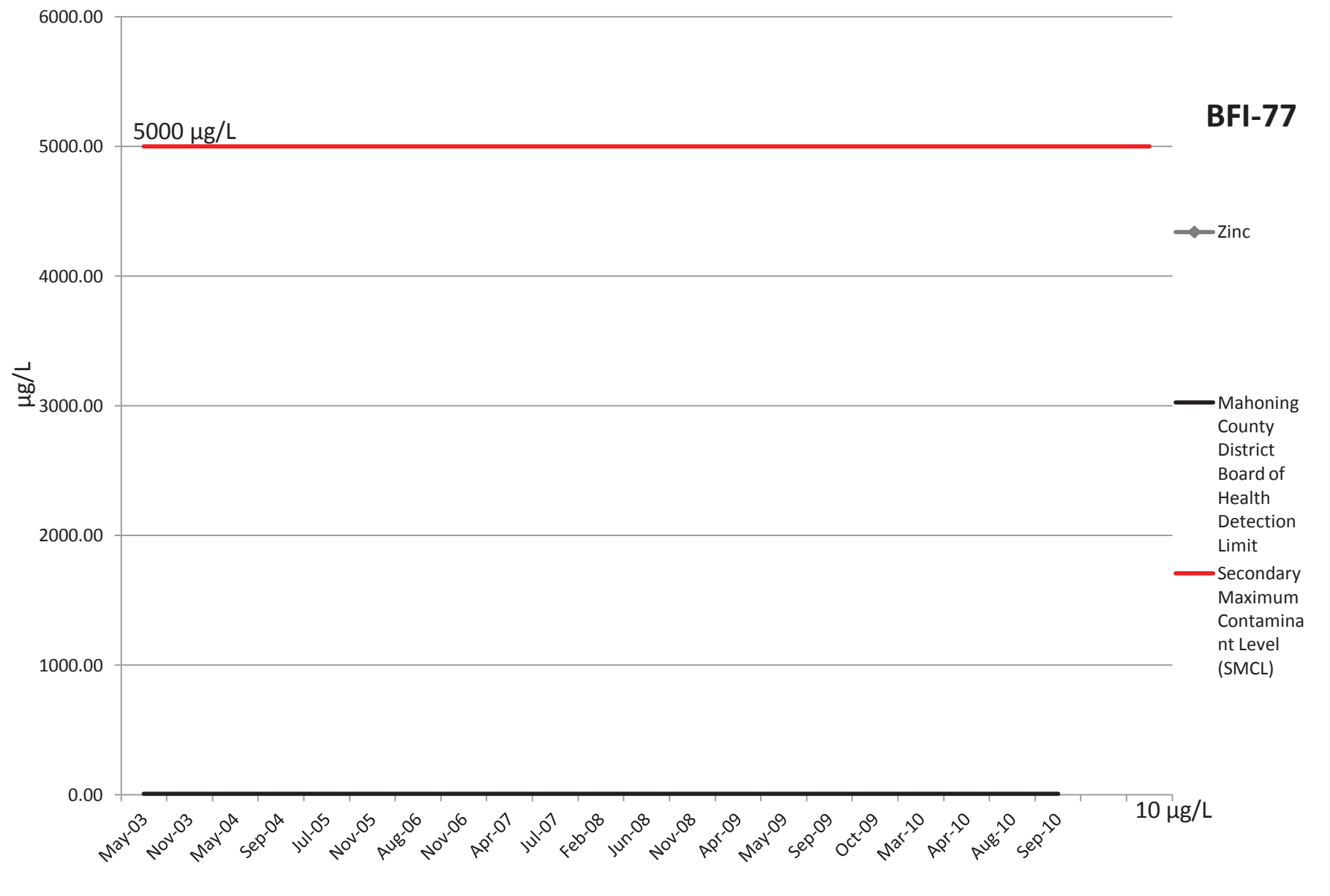
# Selenium



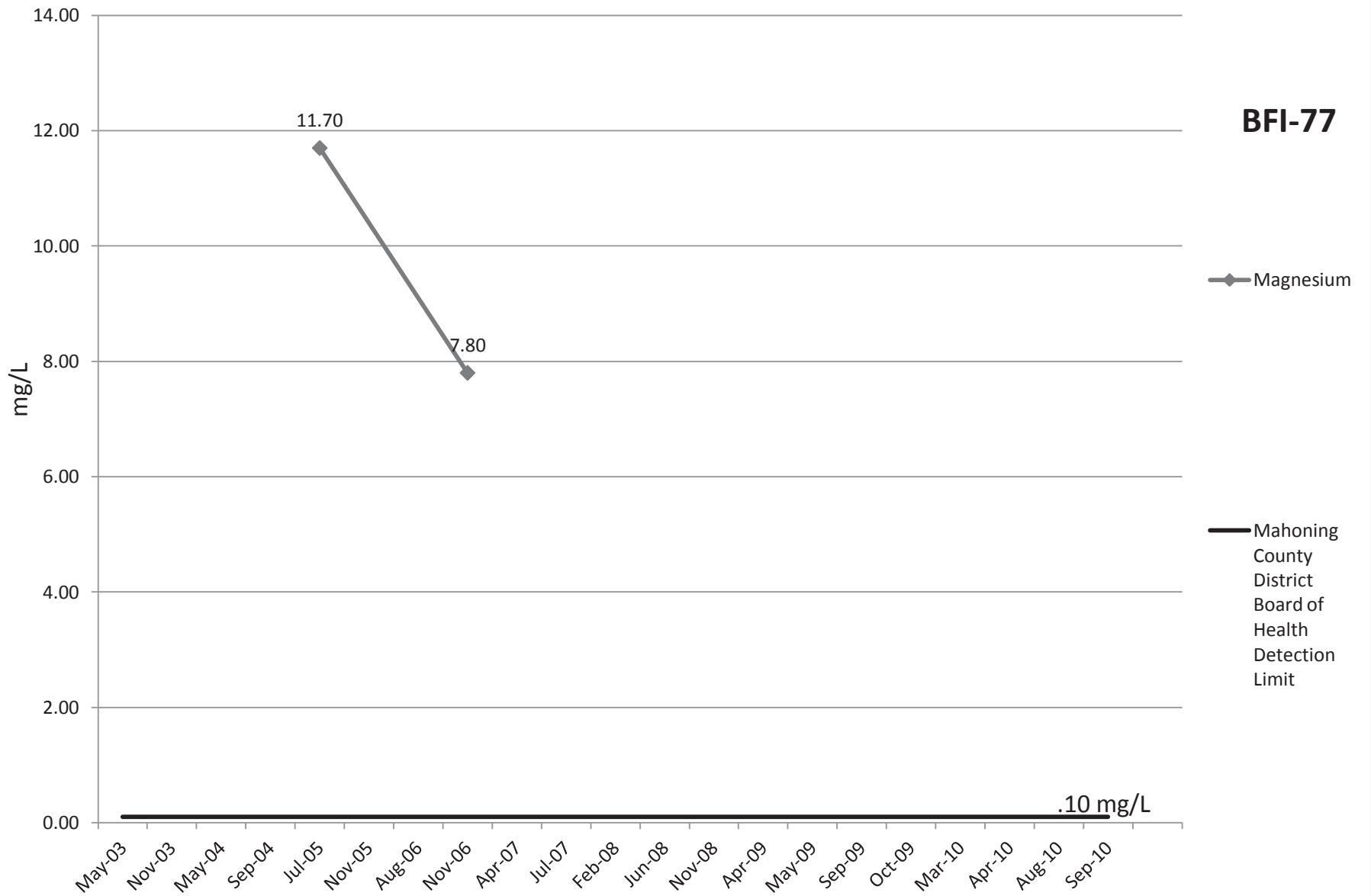
# Silver



# Zinc

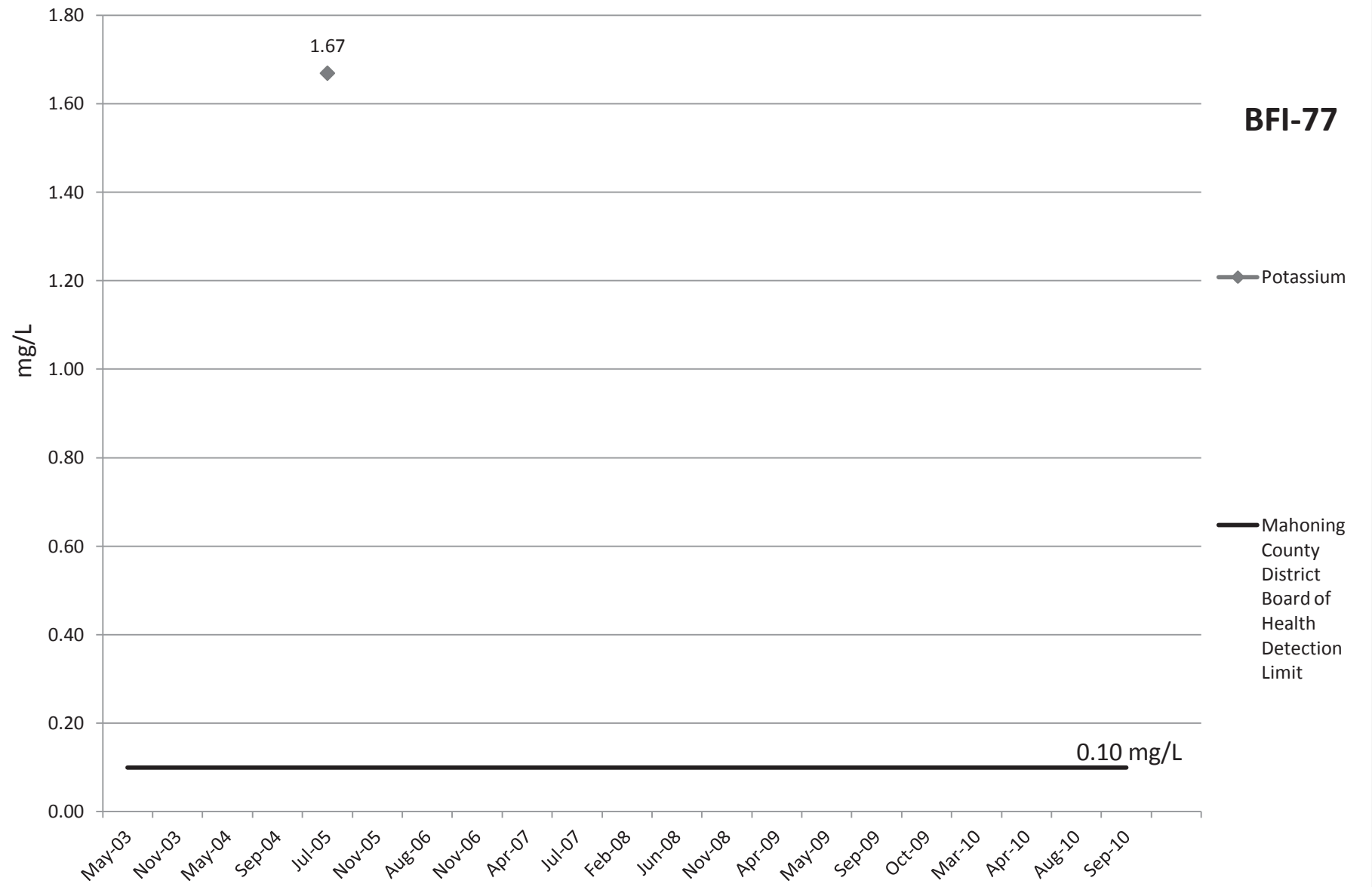


# Magnesium

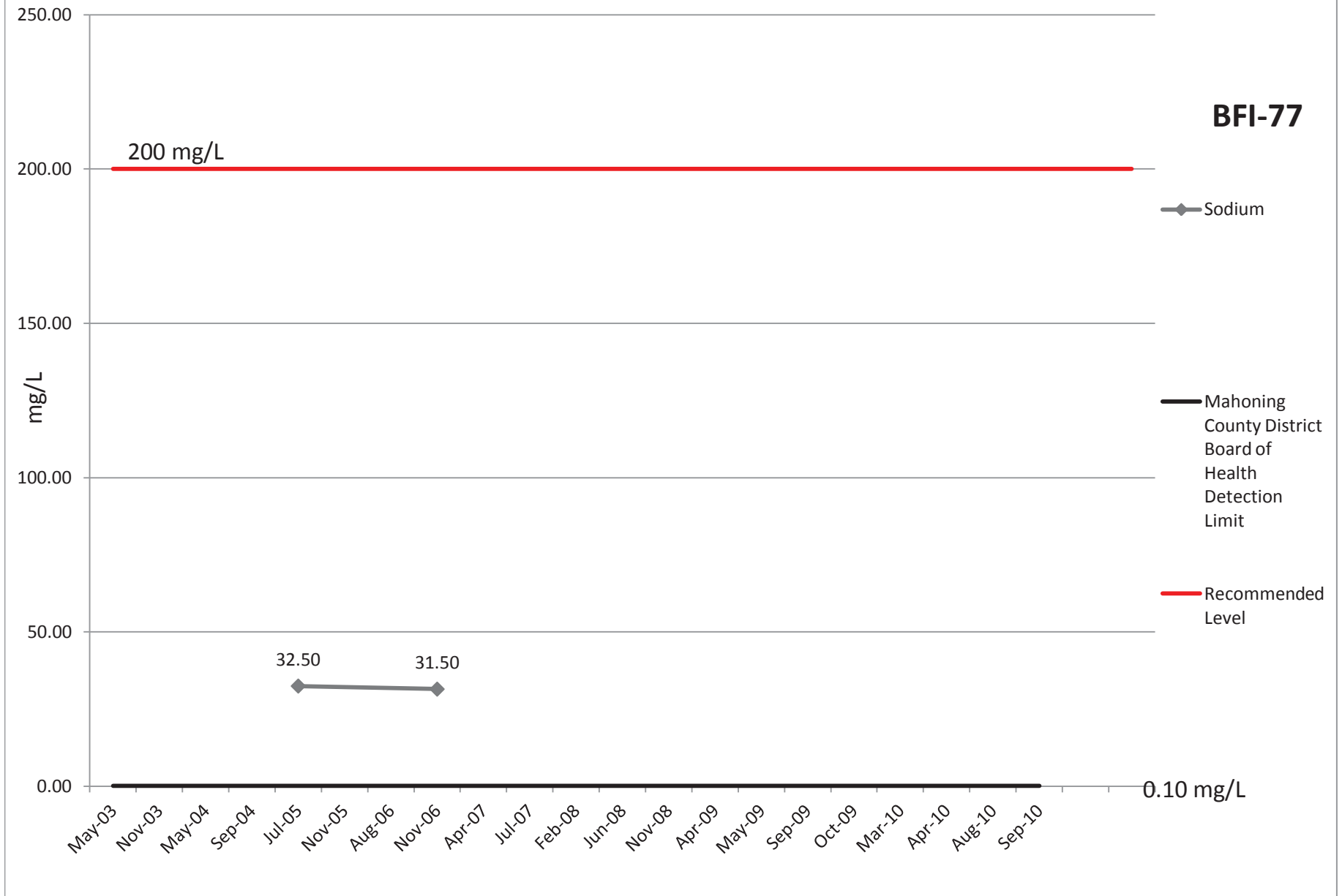




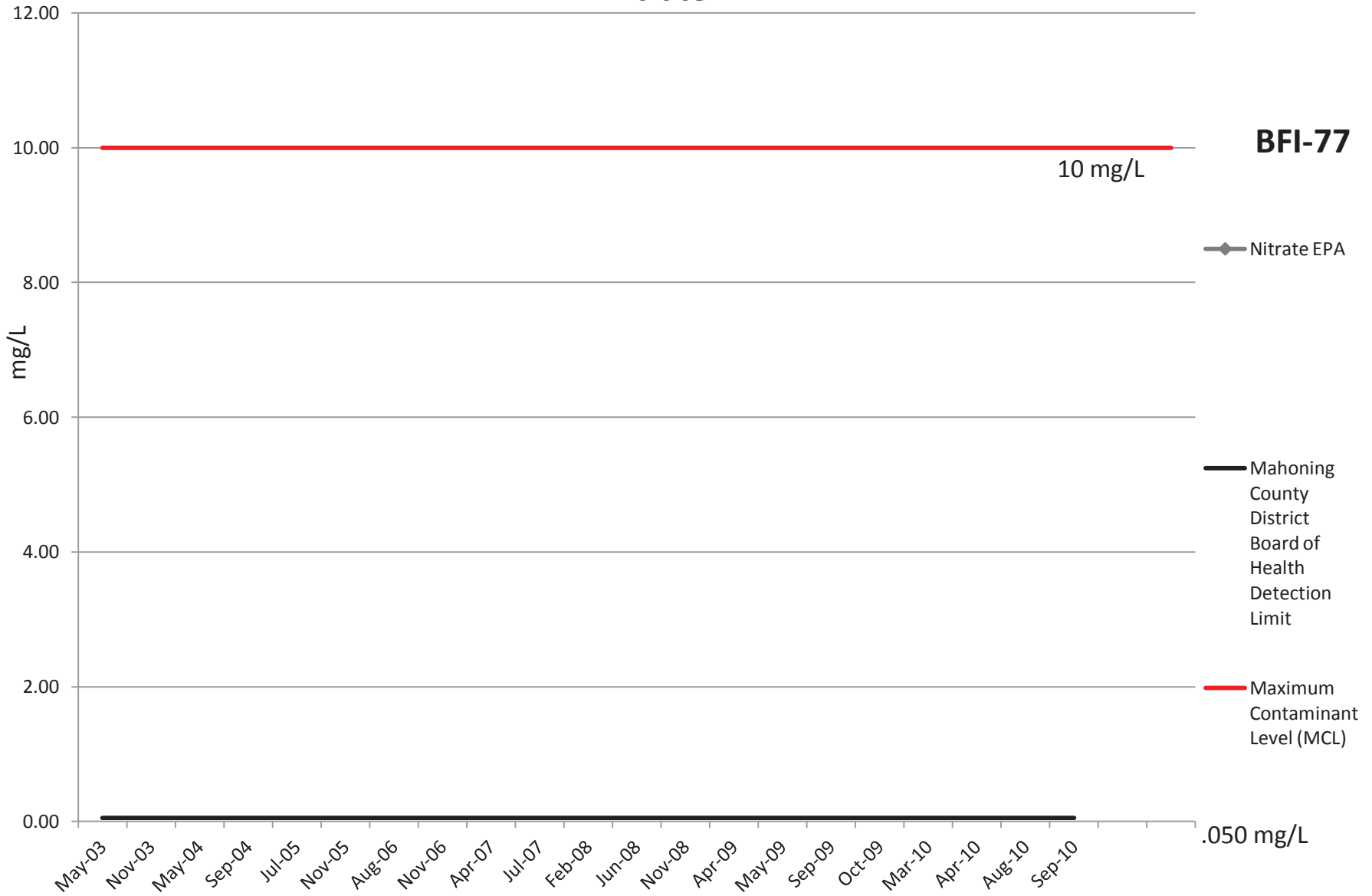
# Potassium



# Sodium



# Nitrate EPA



# COD

**BFI-77**

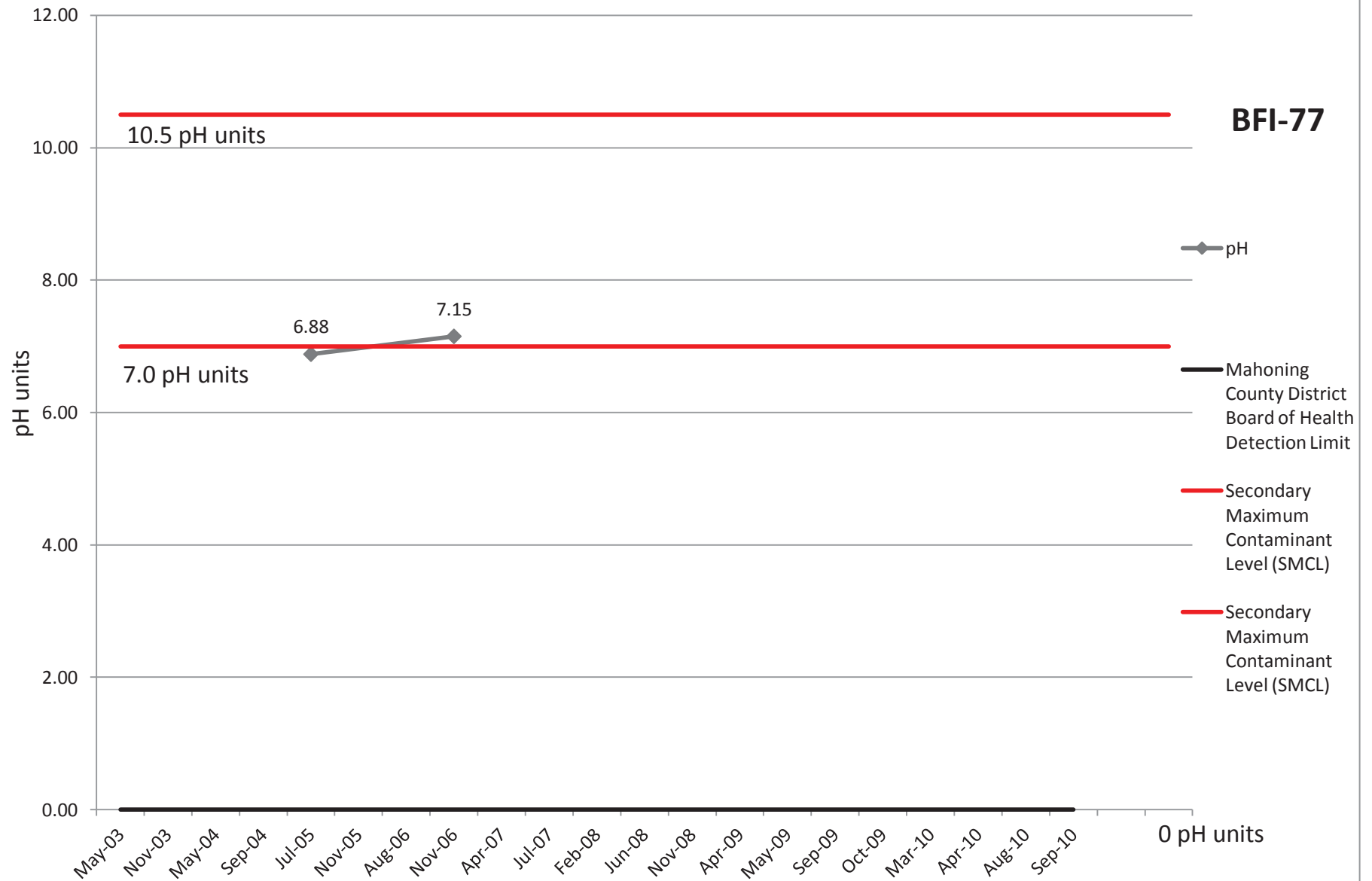
10 mg/L

◆ COD

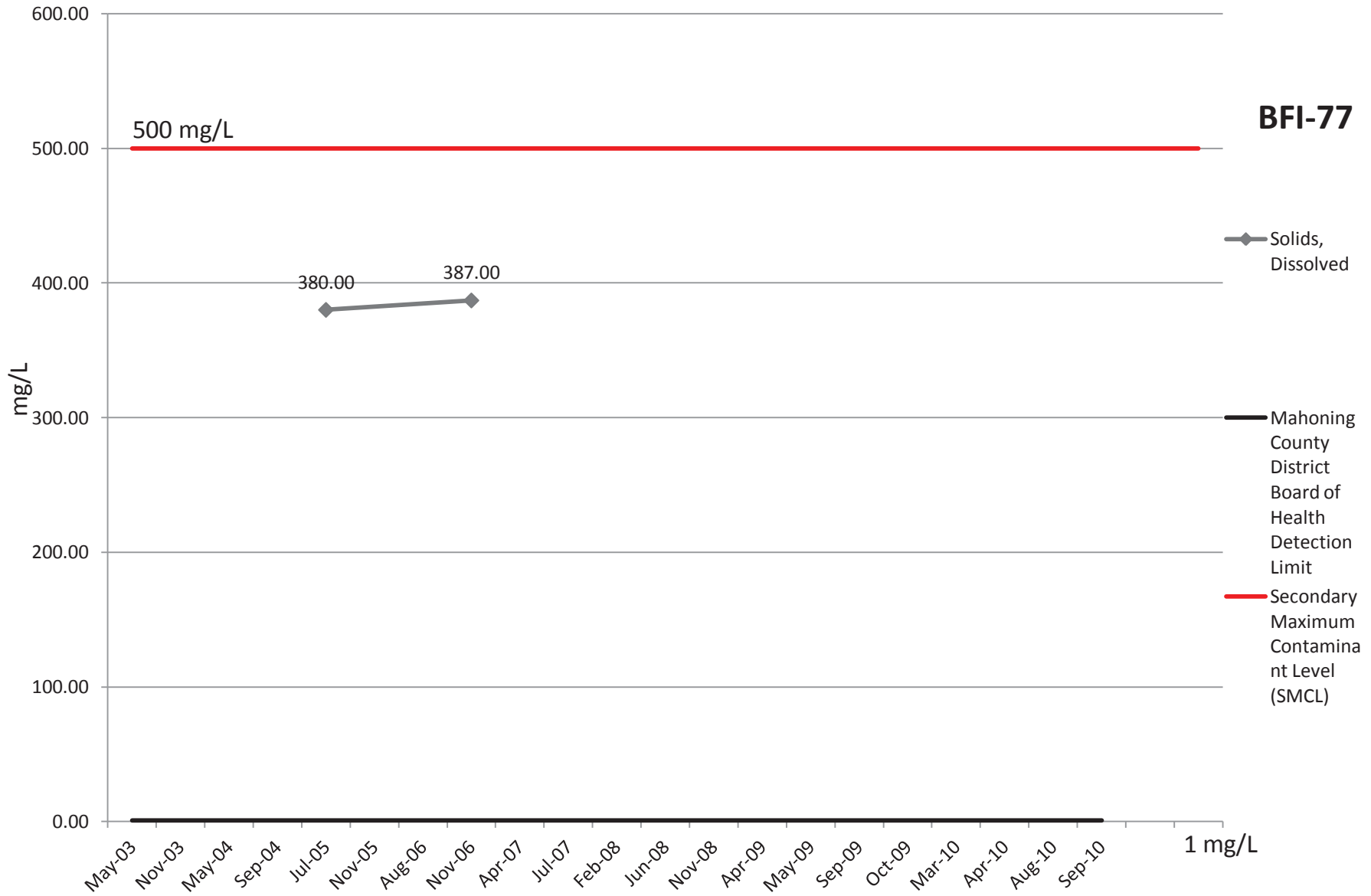
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit



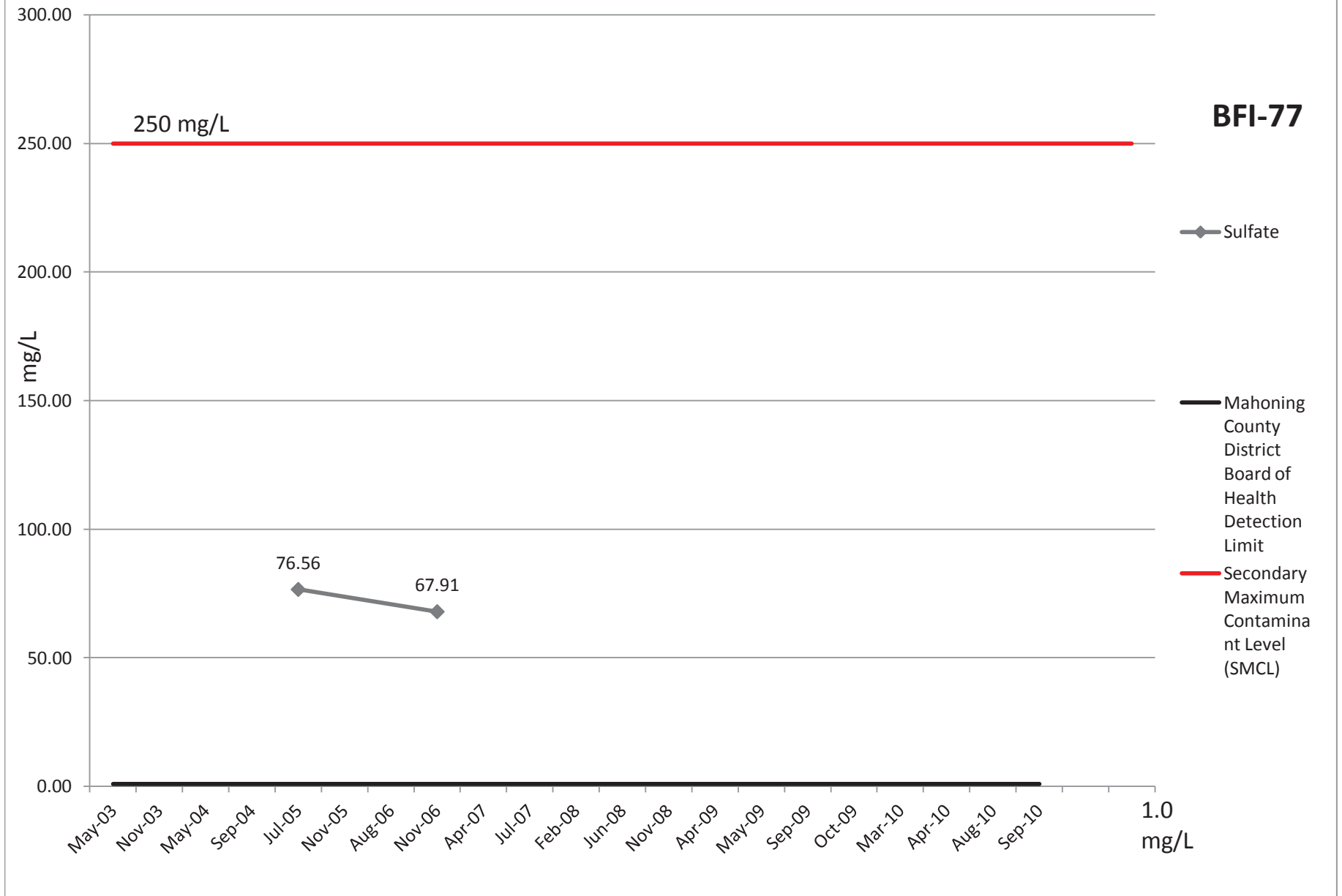
# pH



# Solids, Dissolved



# Sulfate



# Bacteria

positive (1)

**BFI-77**

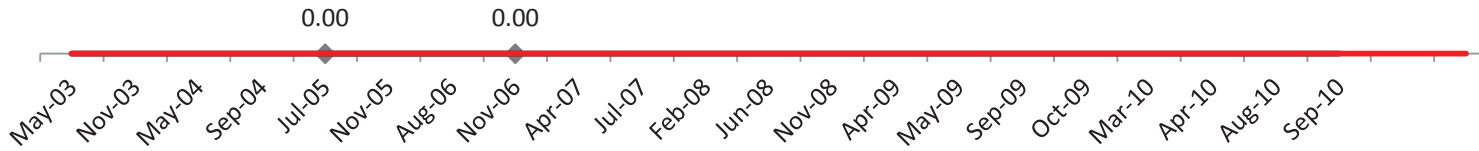
Positive/Negative

◆ Bacteria

— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

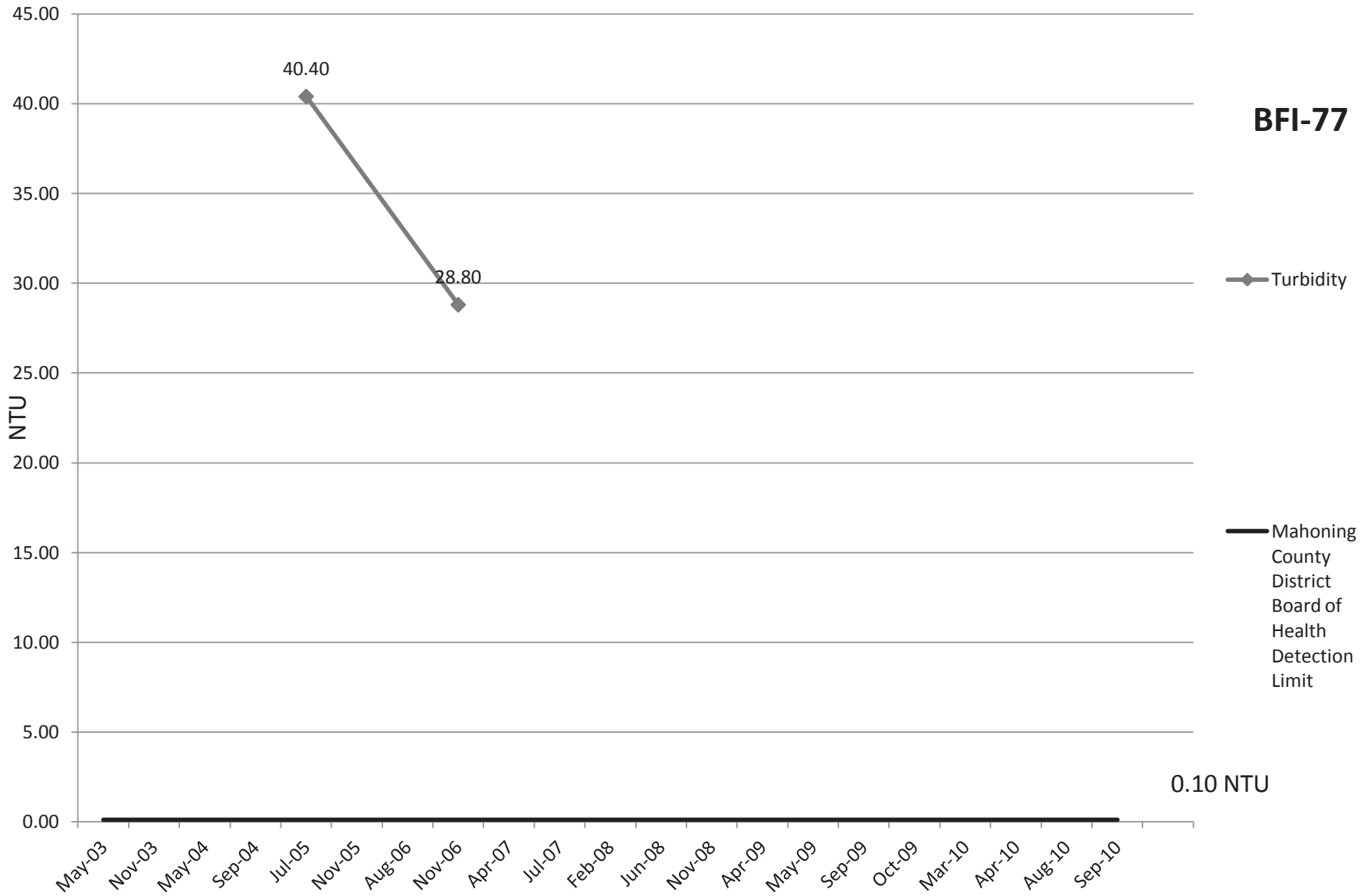
— Maximum  
Contaminant  
Level (MCL)

negative (0)

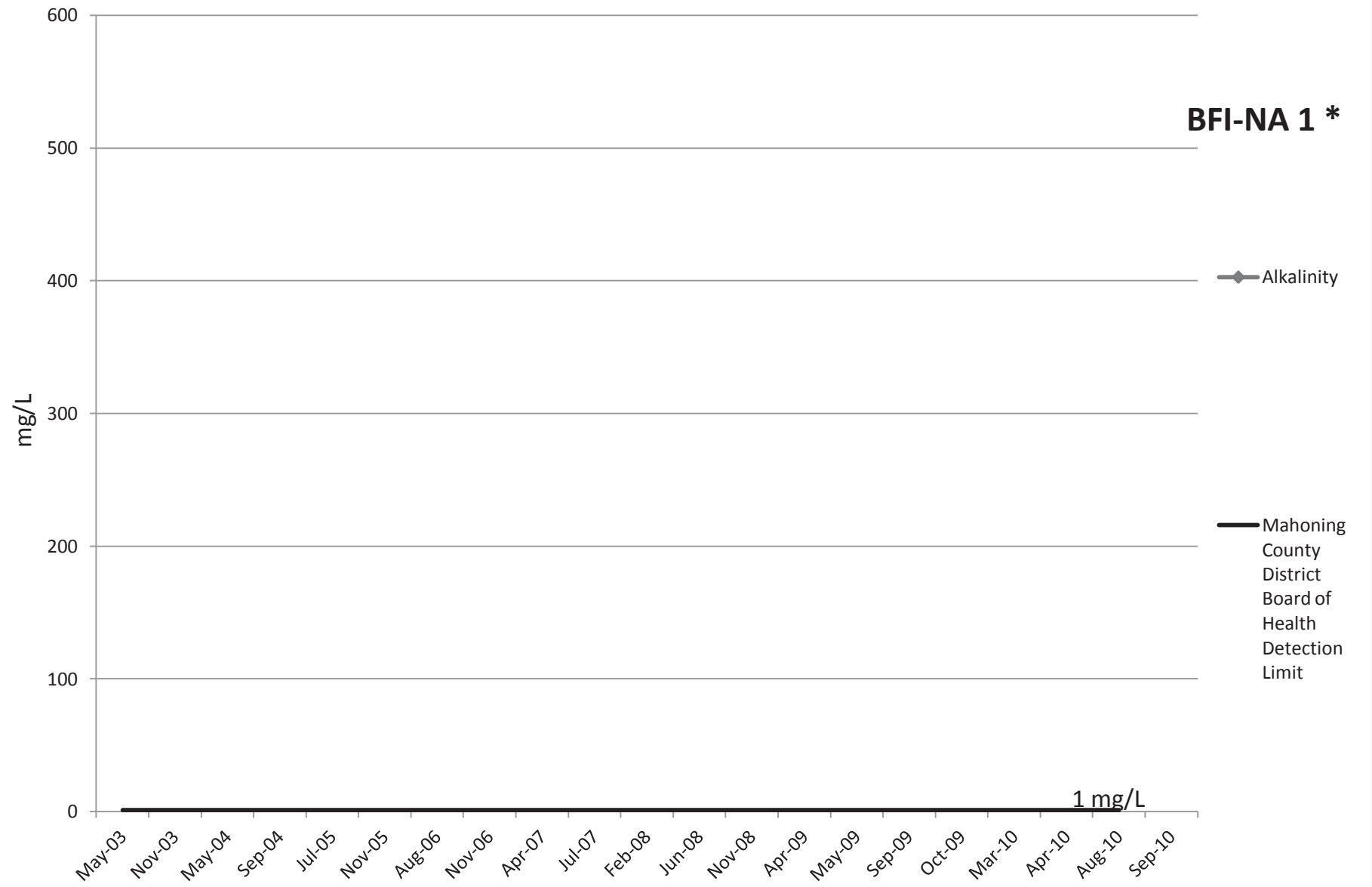




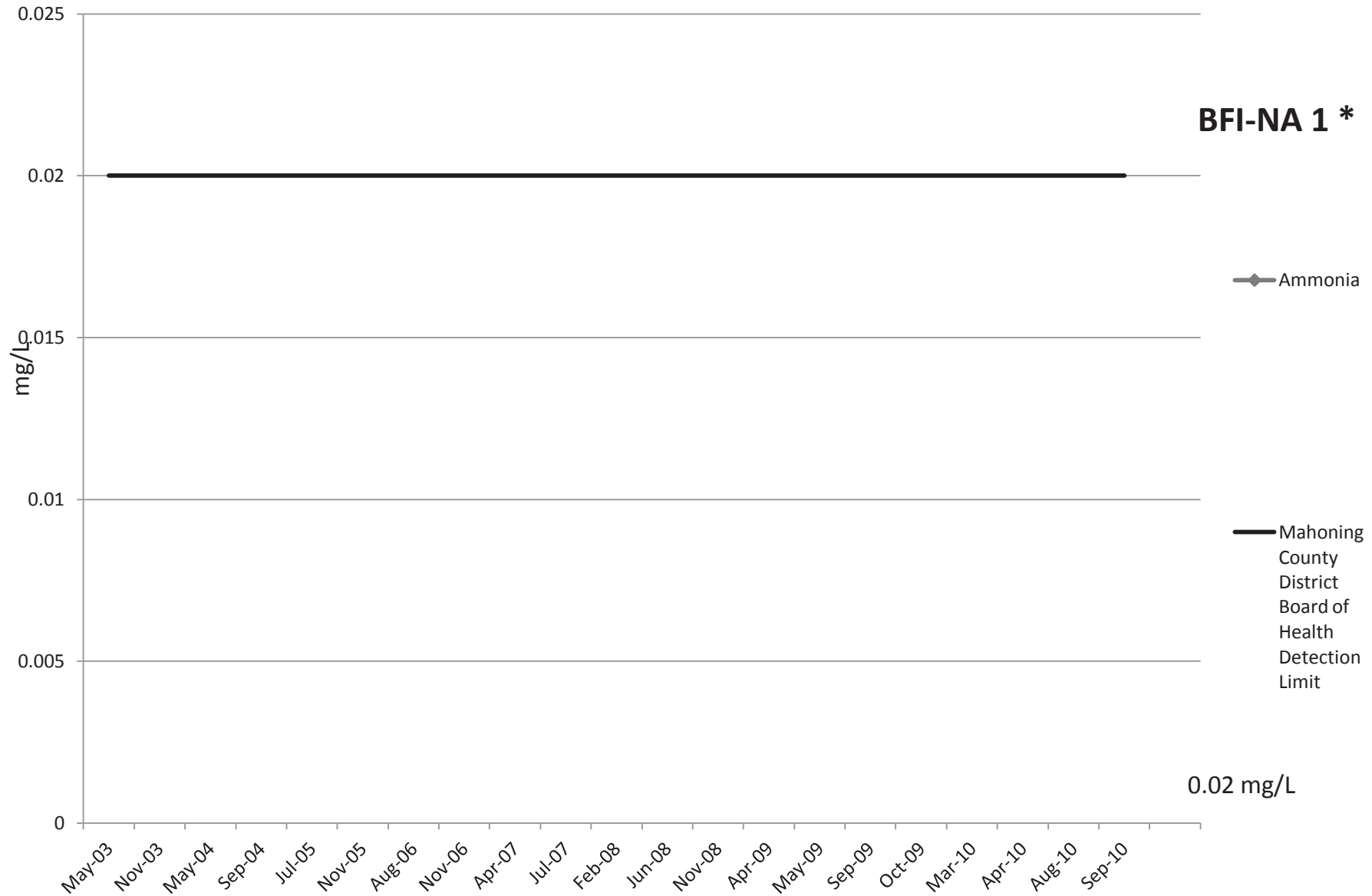
# Turbidity



# Alkalinity

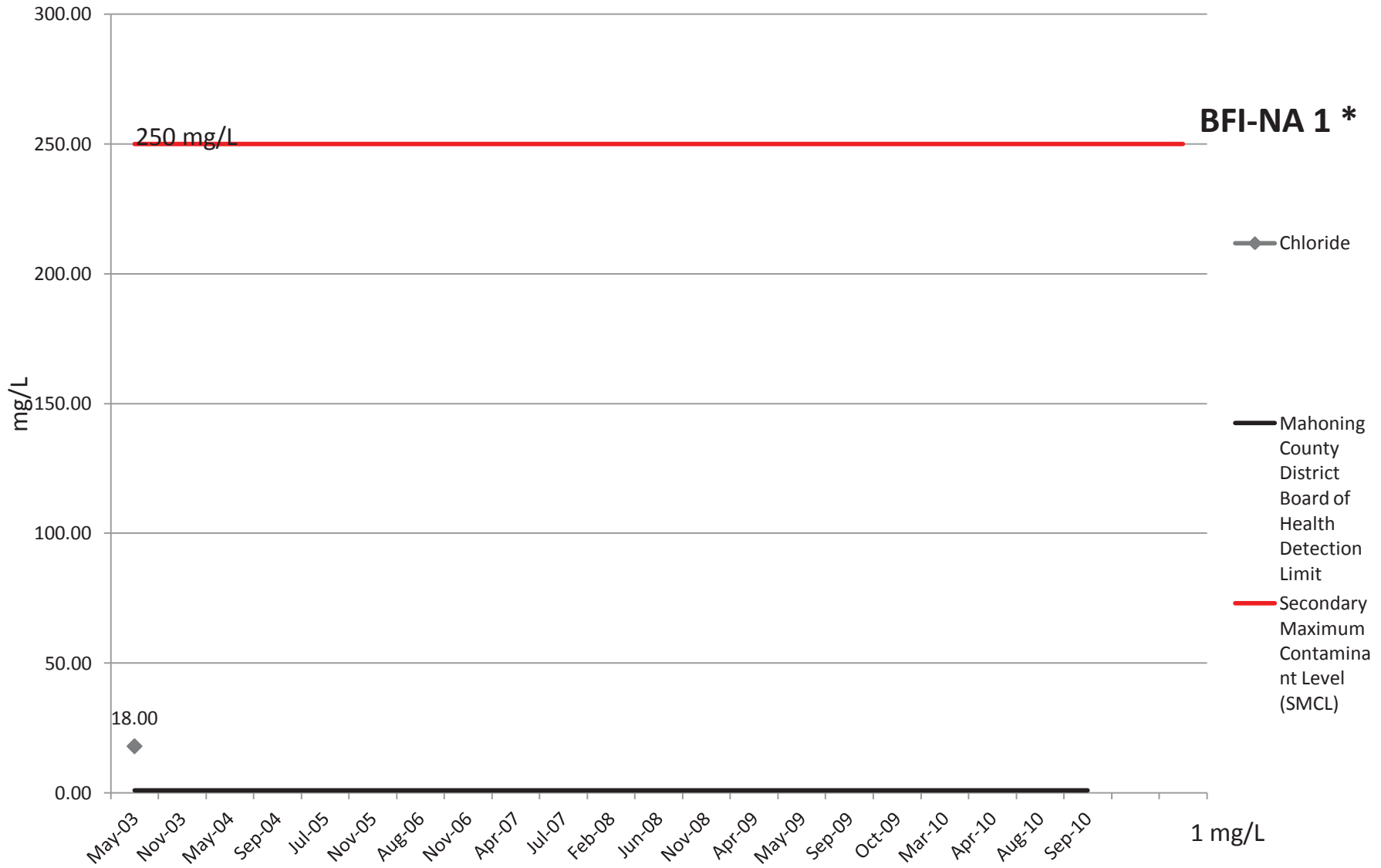


# Ammonia

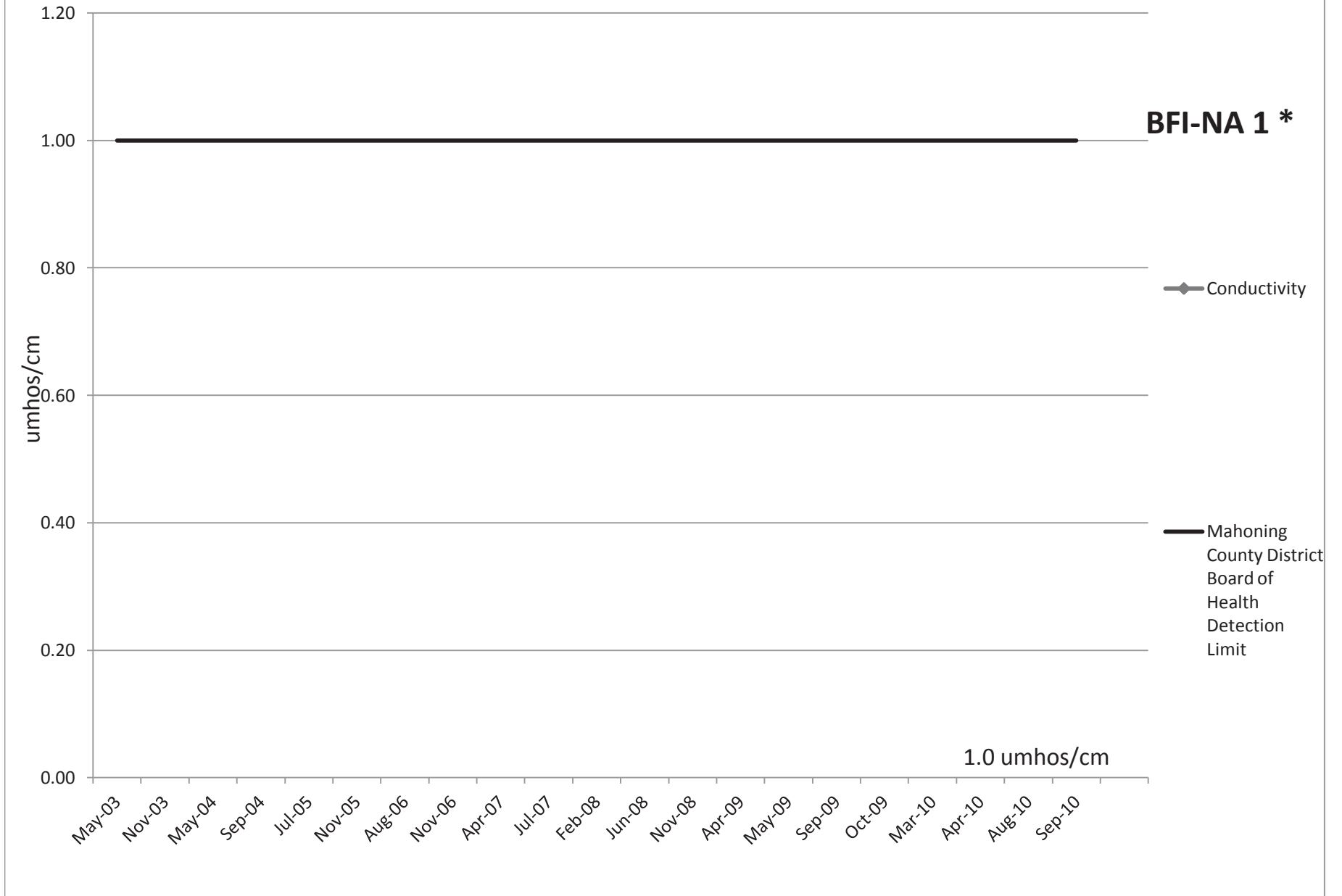


0.02 mg/L

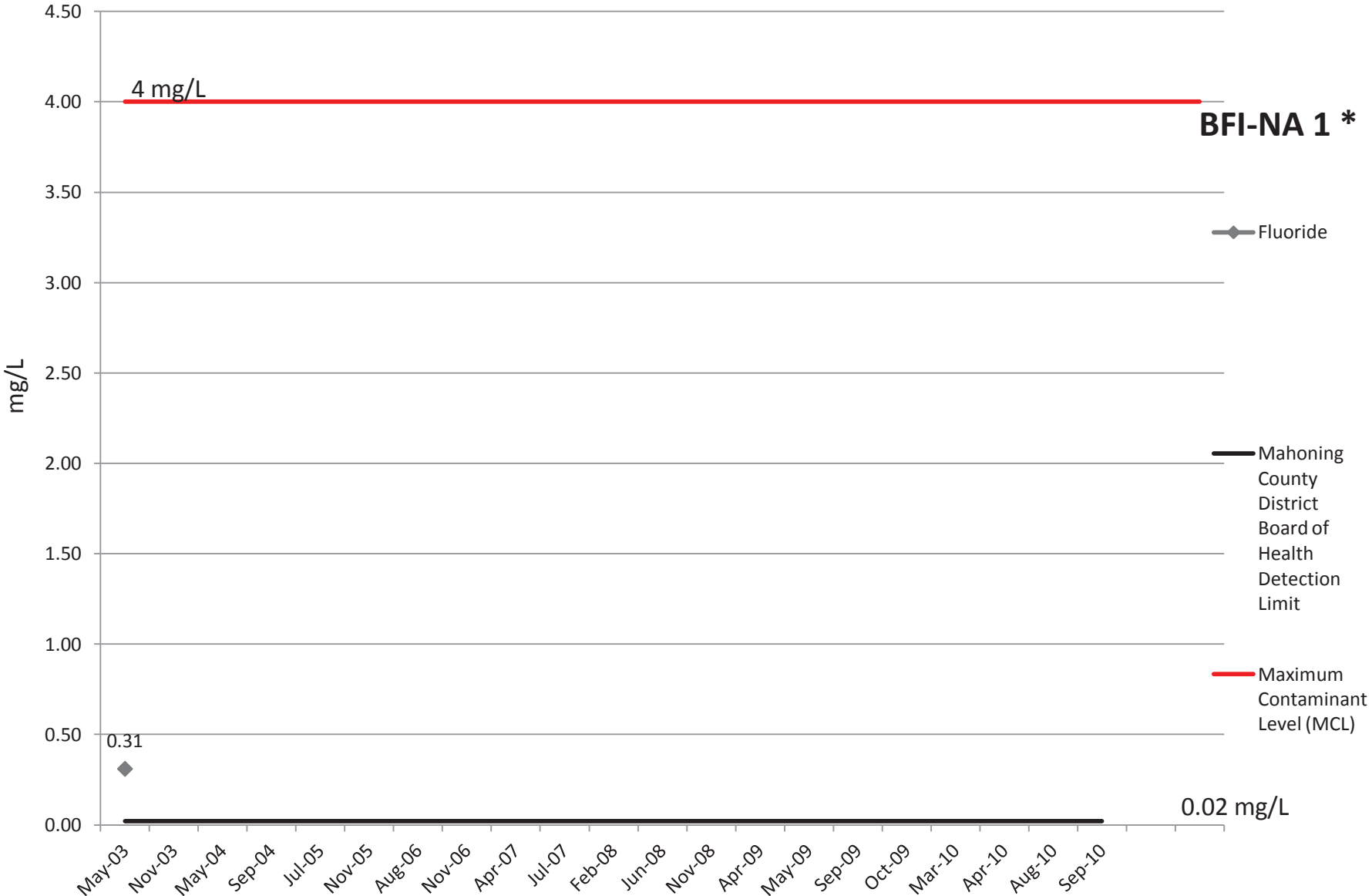
# Chloride



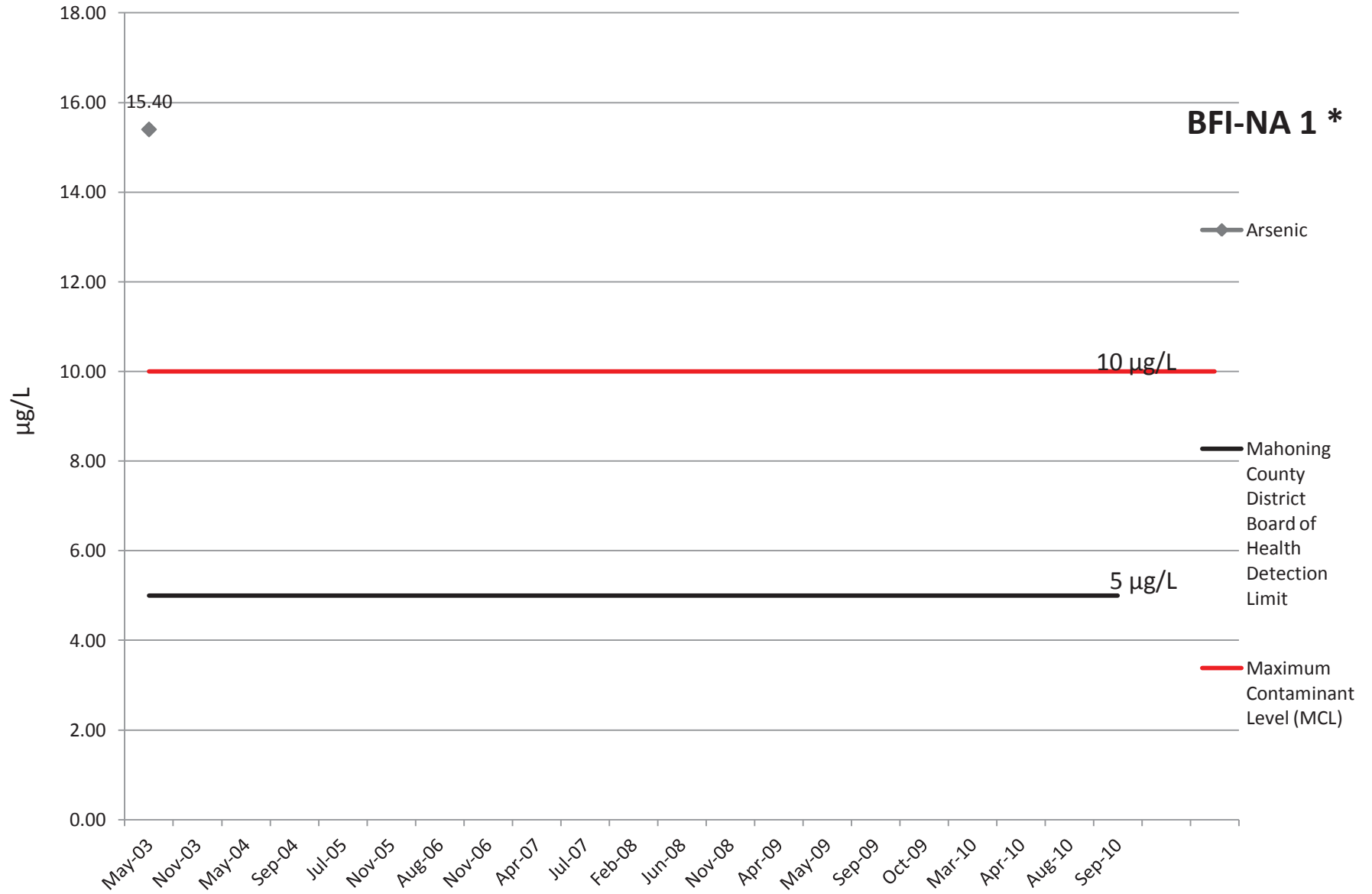
# Conductivity



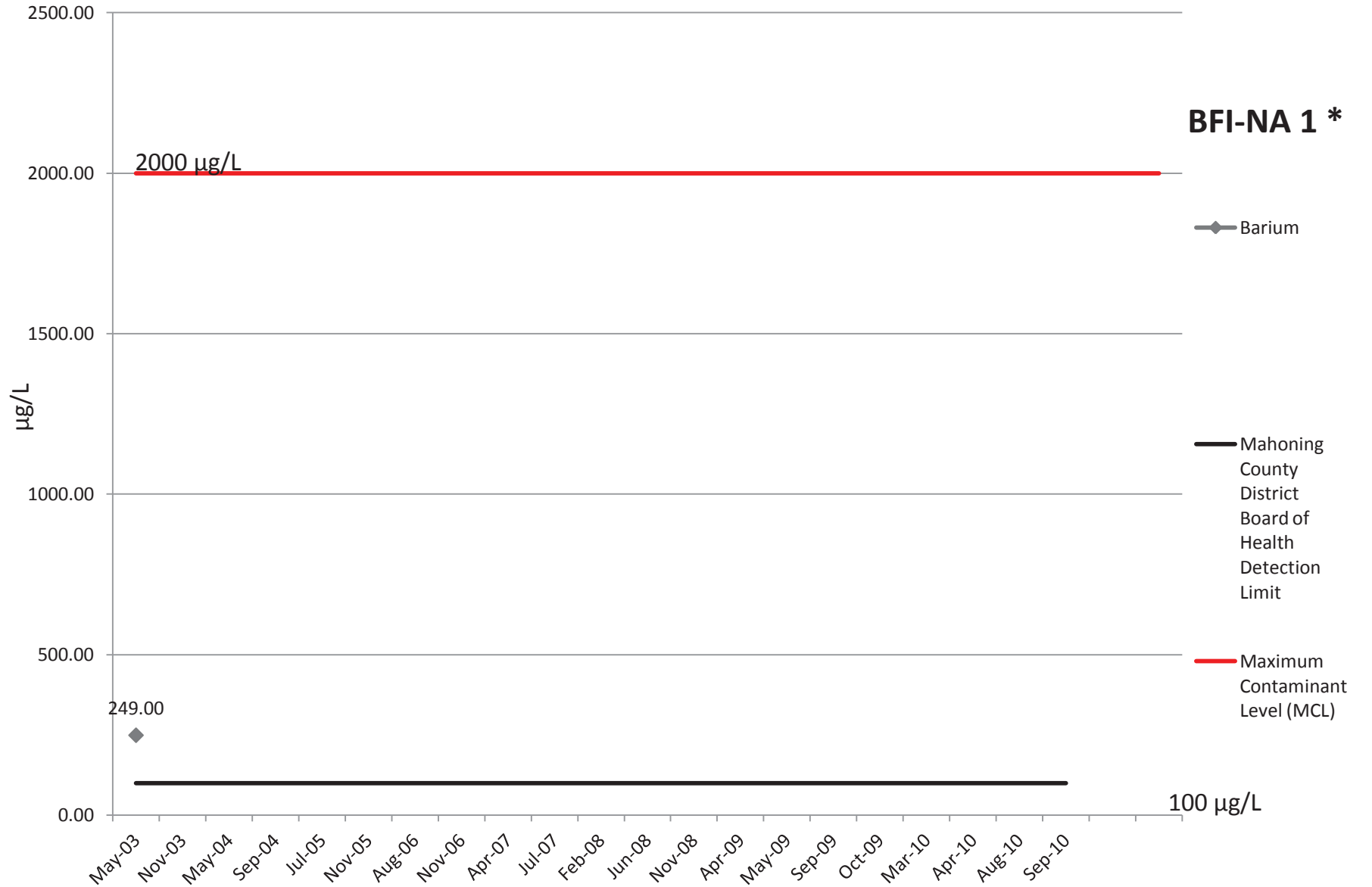
# Fluoride



# Arsenic

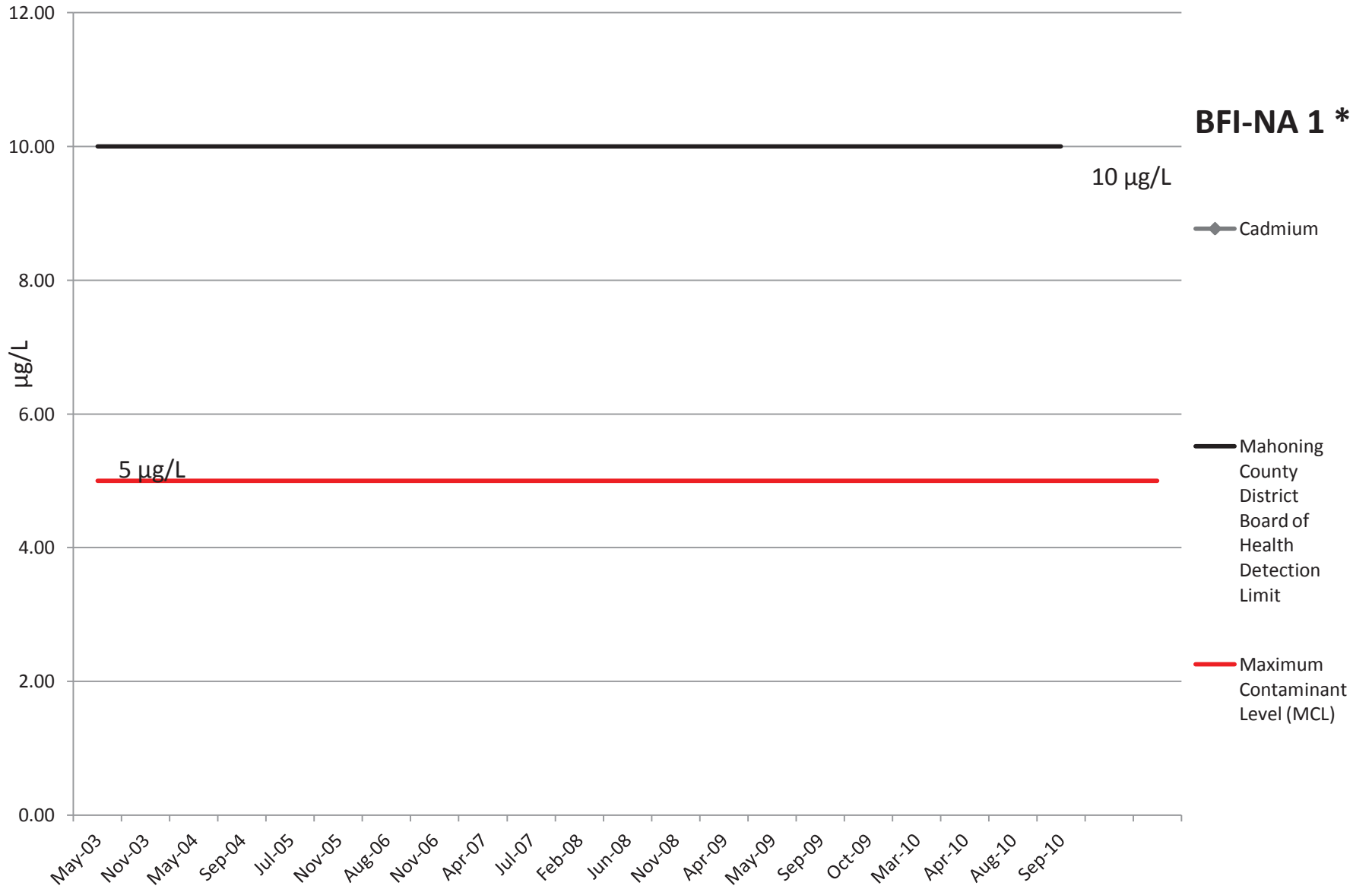


# Barium

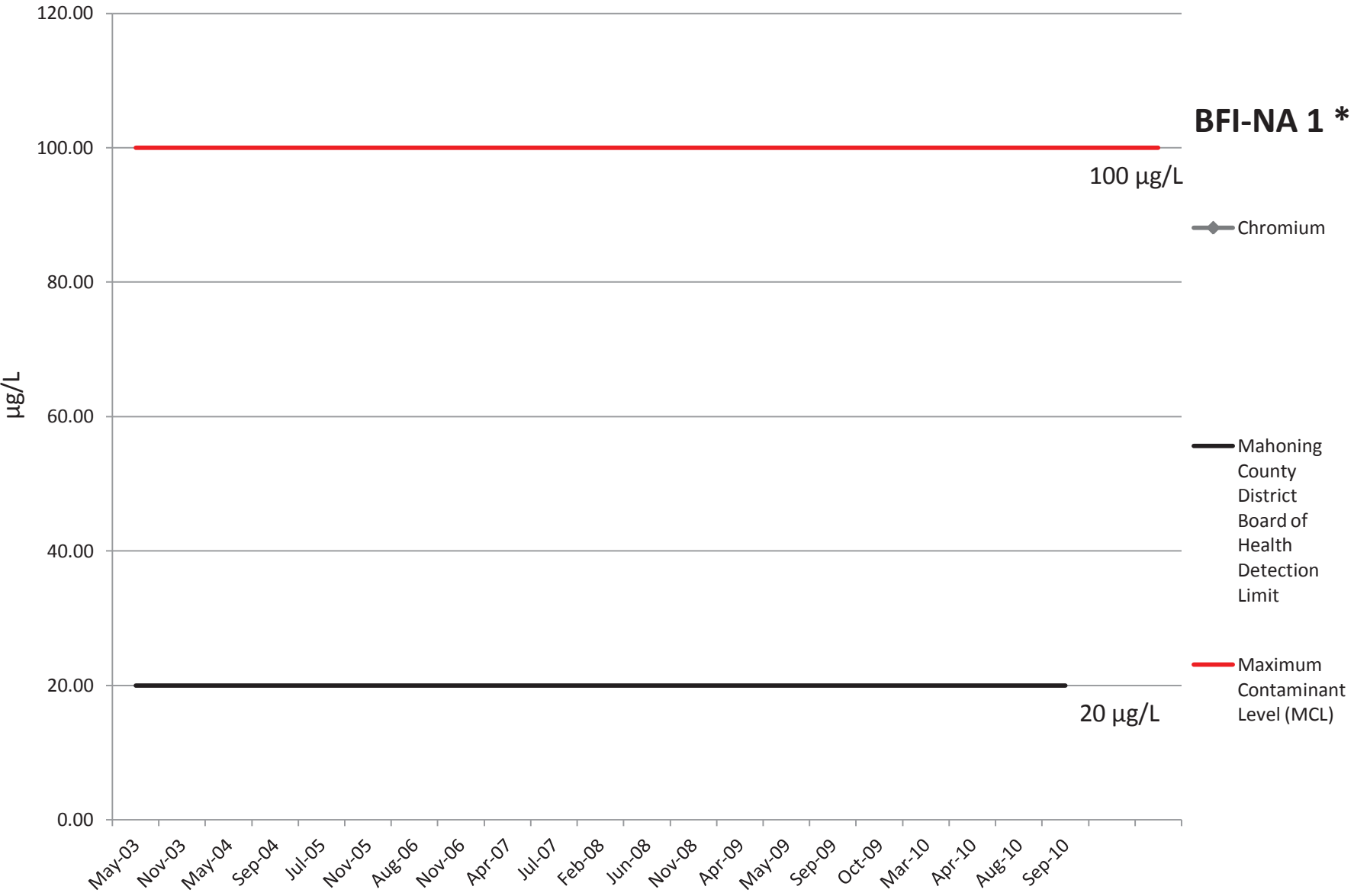




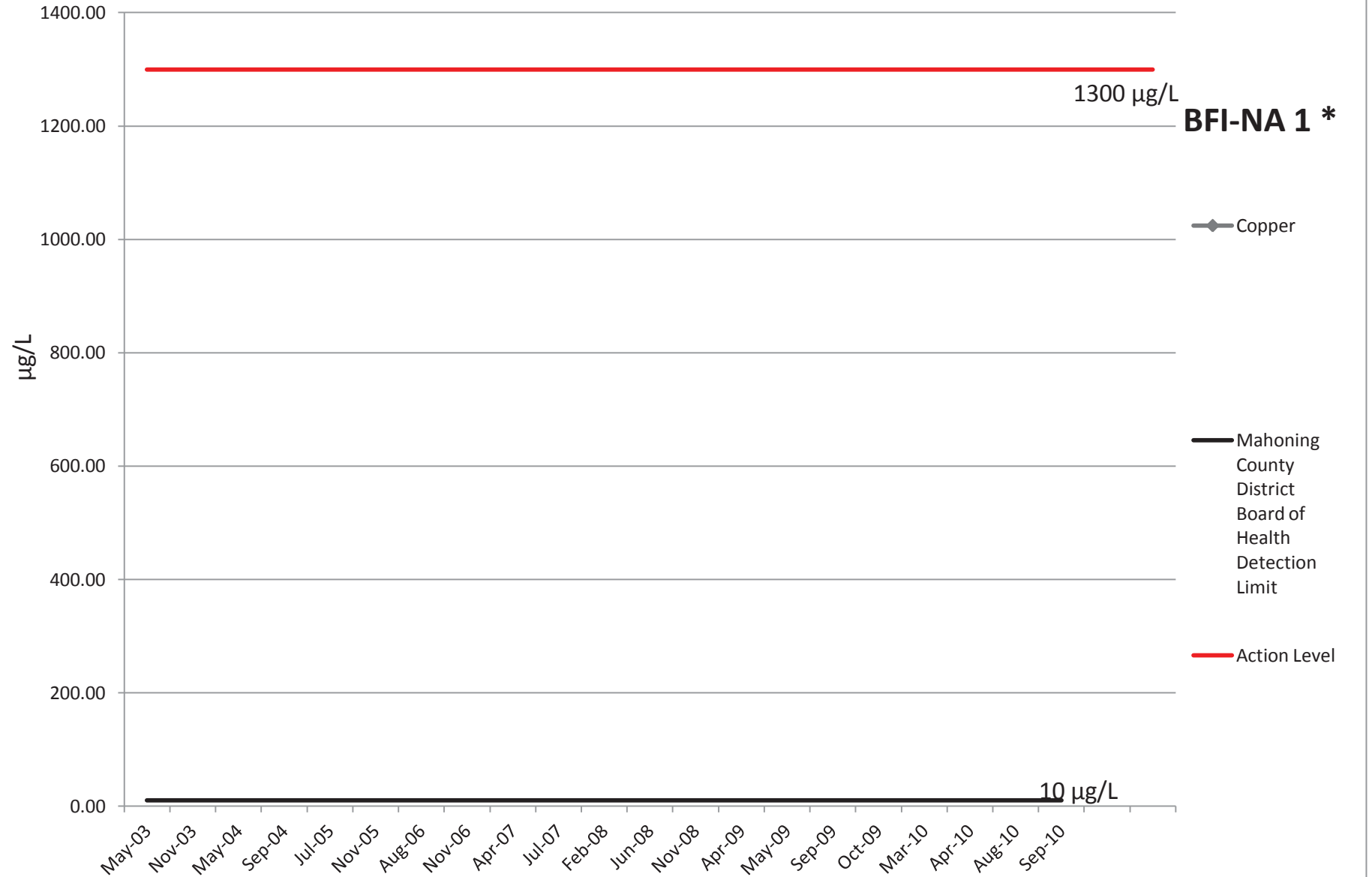
# Cadmium



# Chromium



# Copper



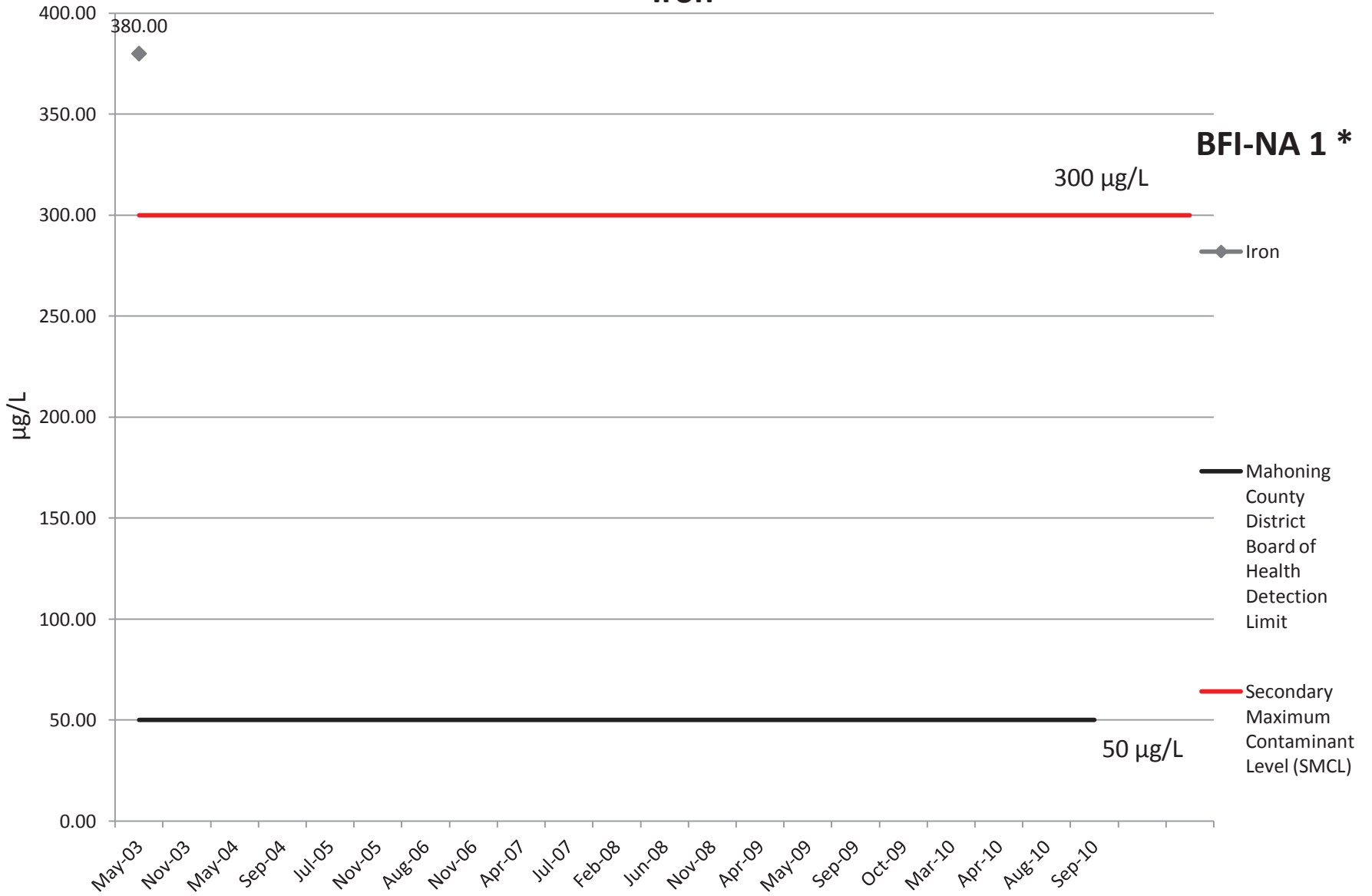
**BFI-NA 1 \***

◆ Copper

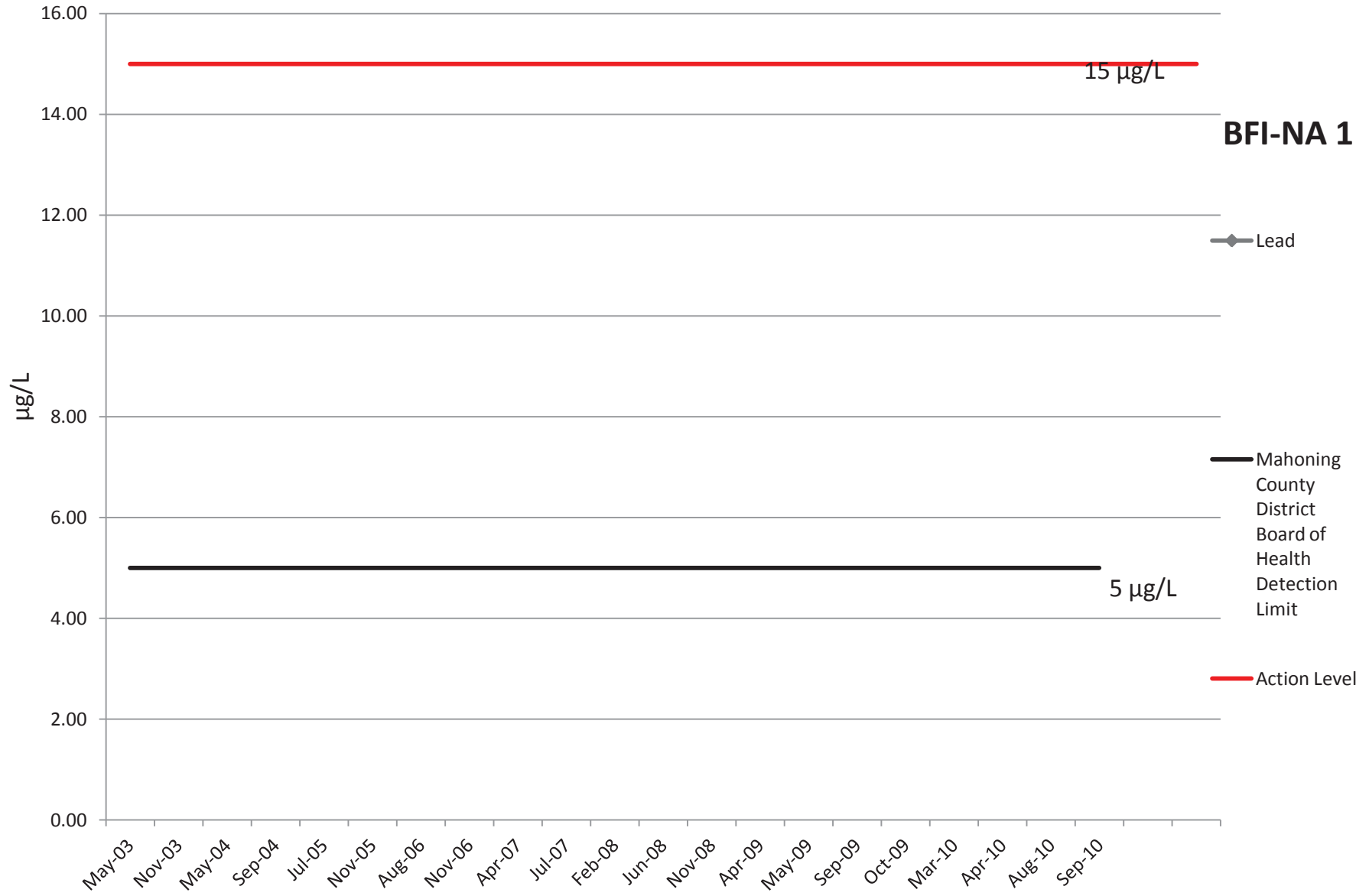
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Action Level

# Iron



# Lead



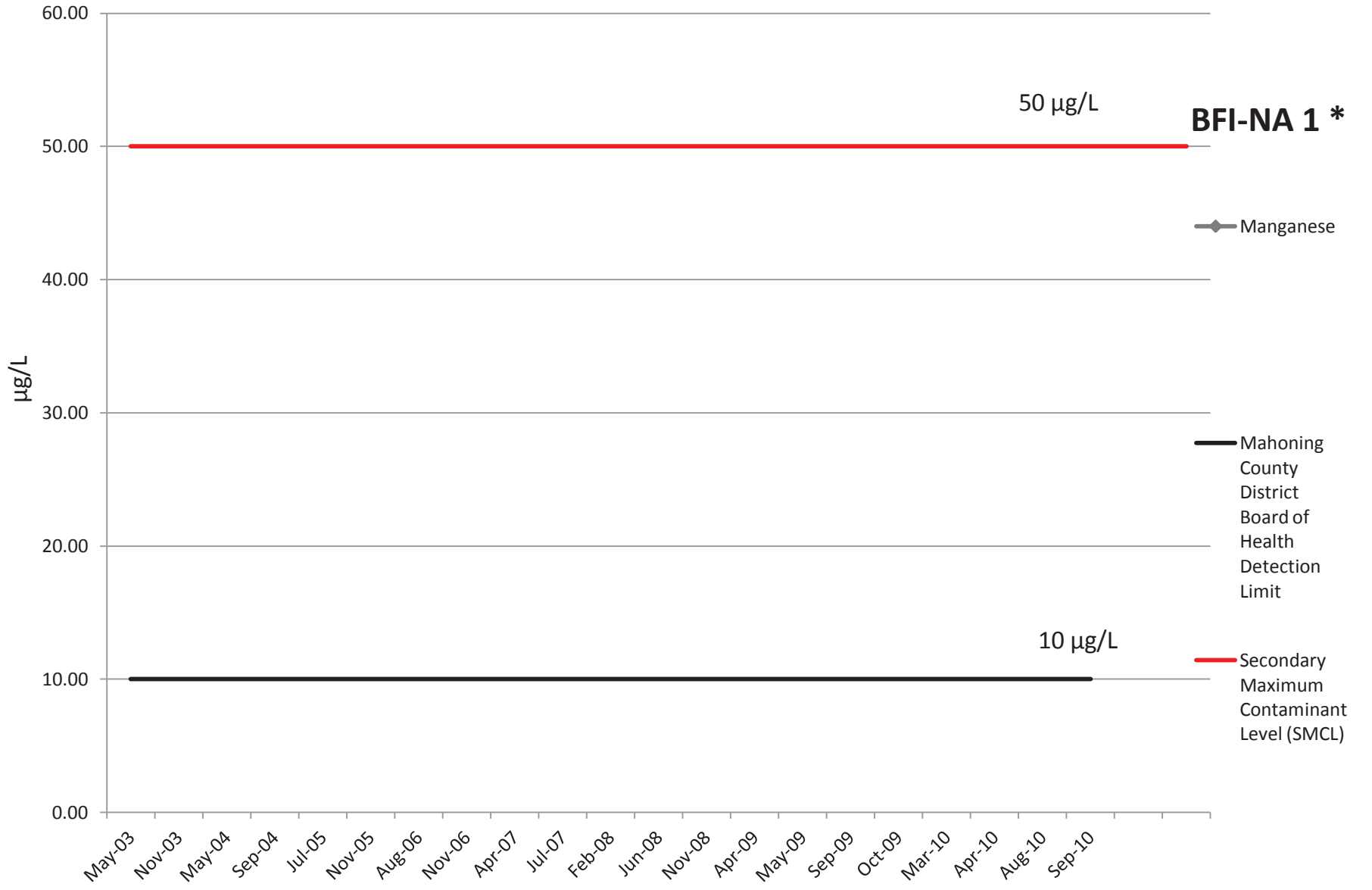
**BFI-NA 1**

◆ Lead

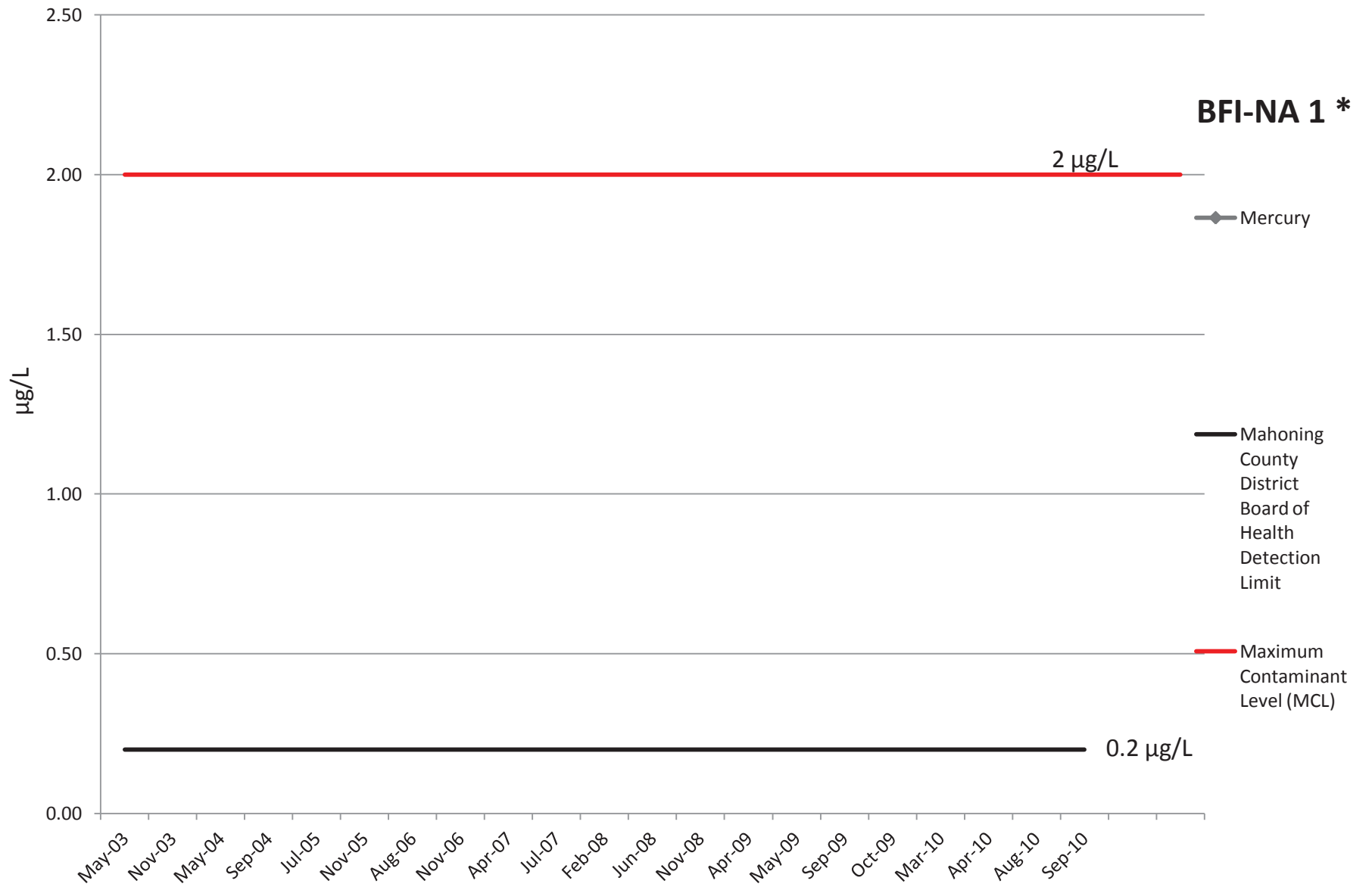
— Mahoning County District Board of Health Detection Limit

— Action Level

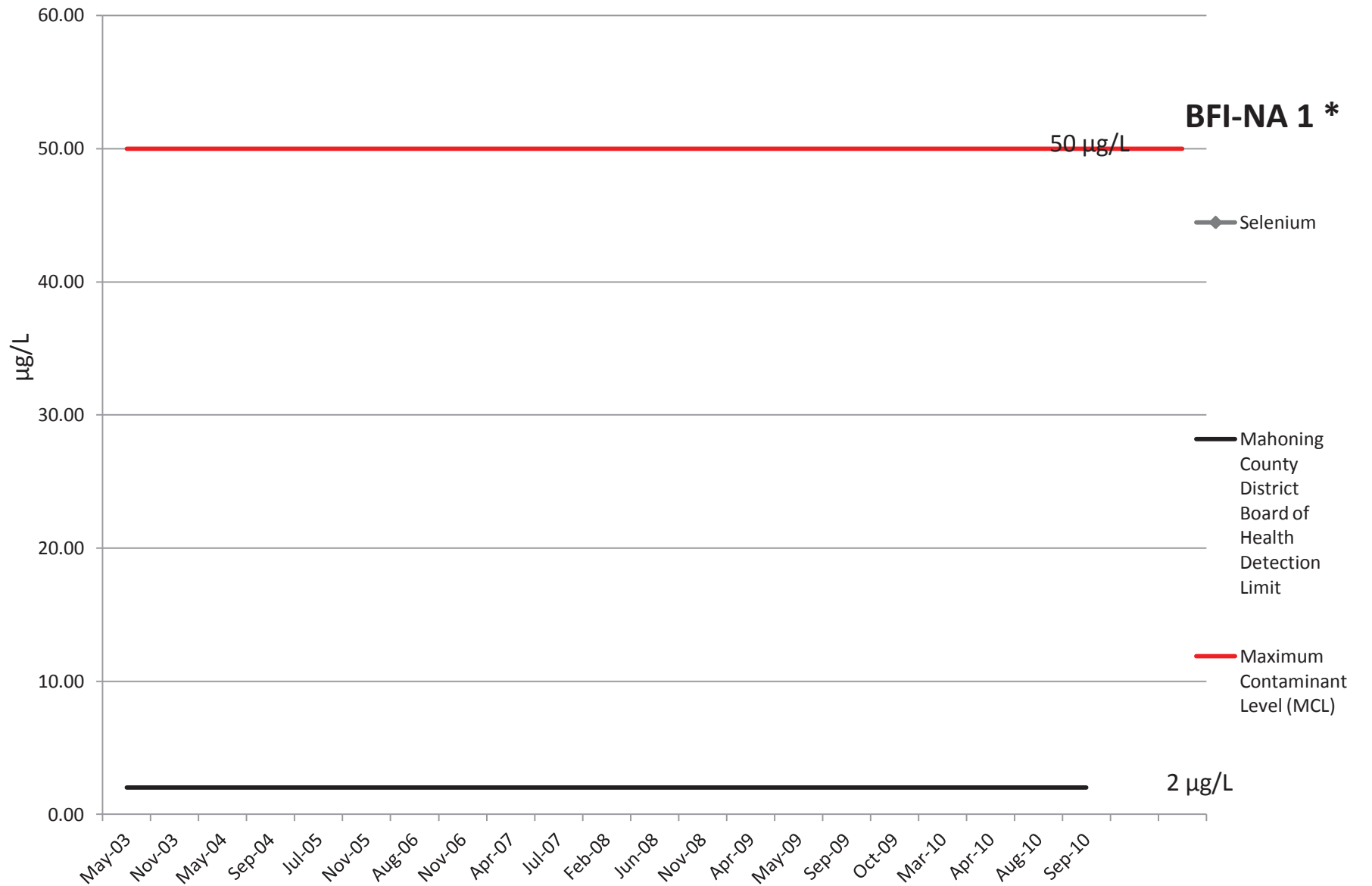
# Manganese



# Mercury

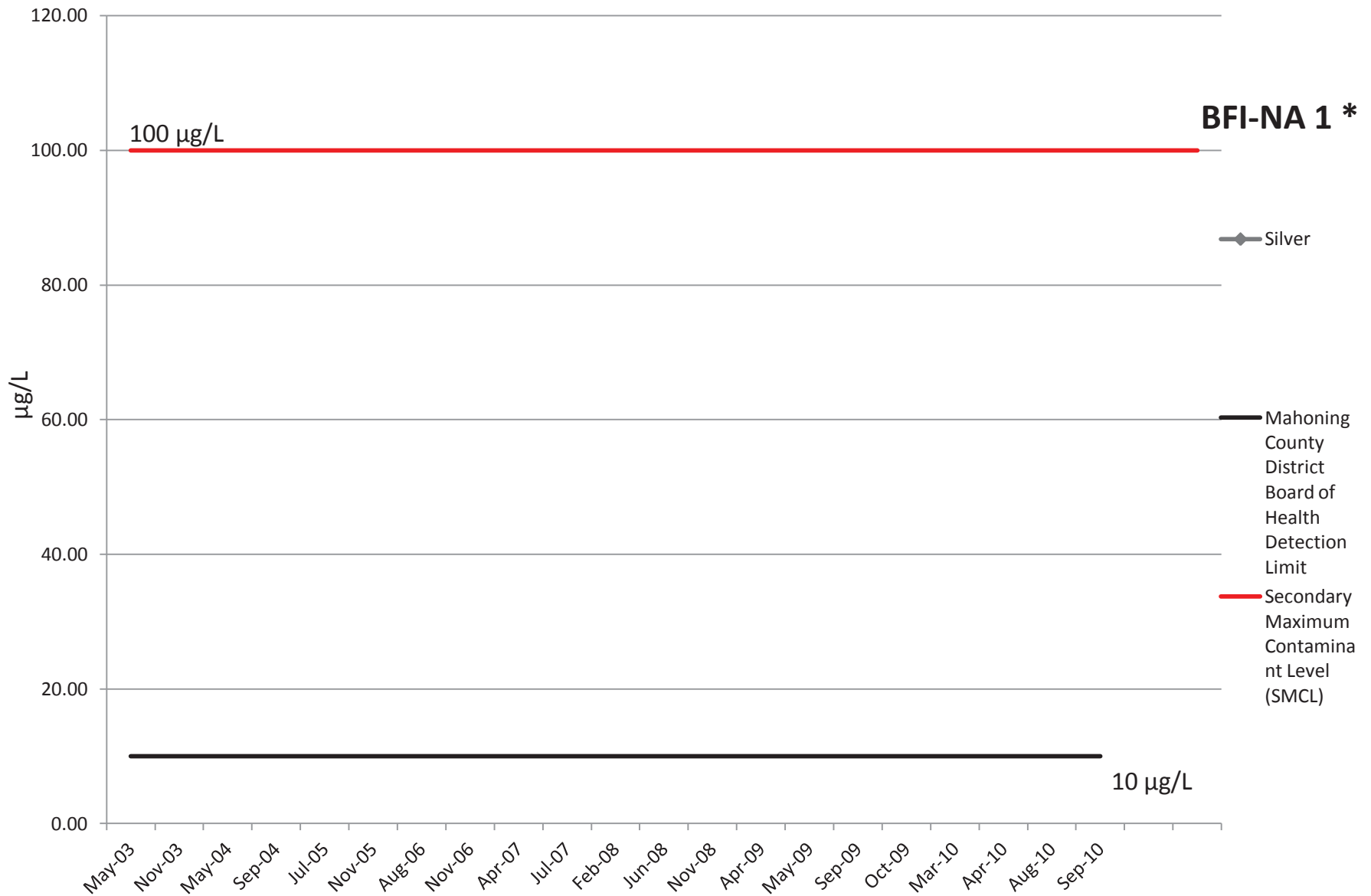


# Selenium

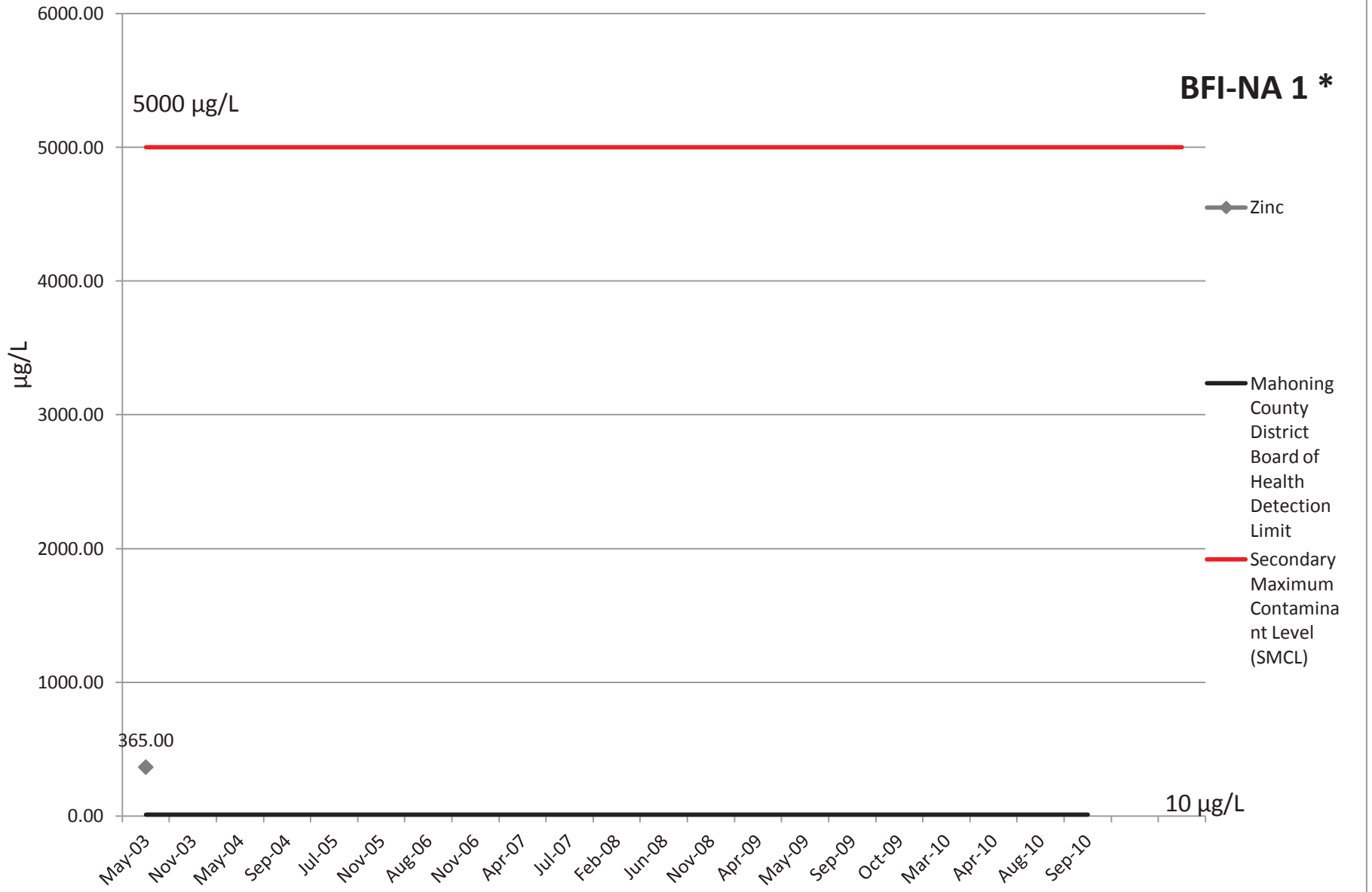




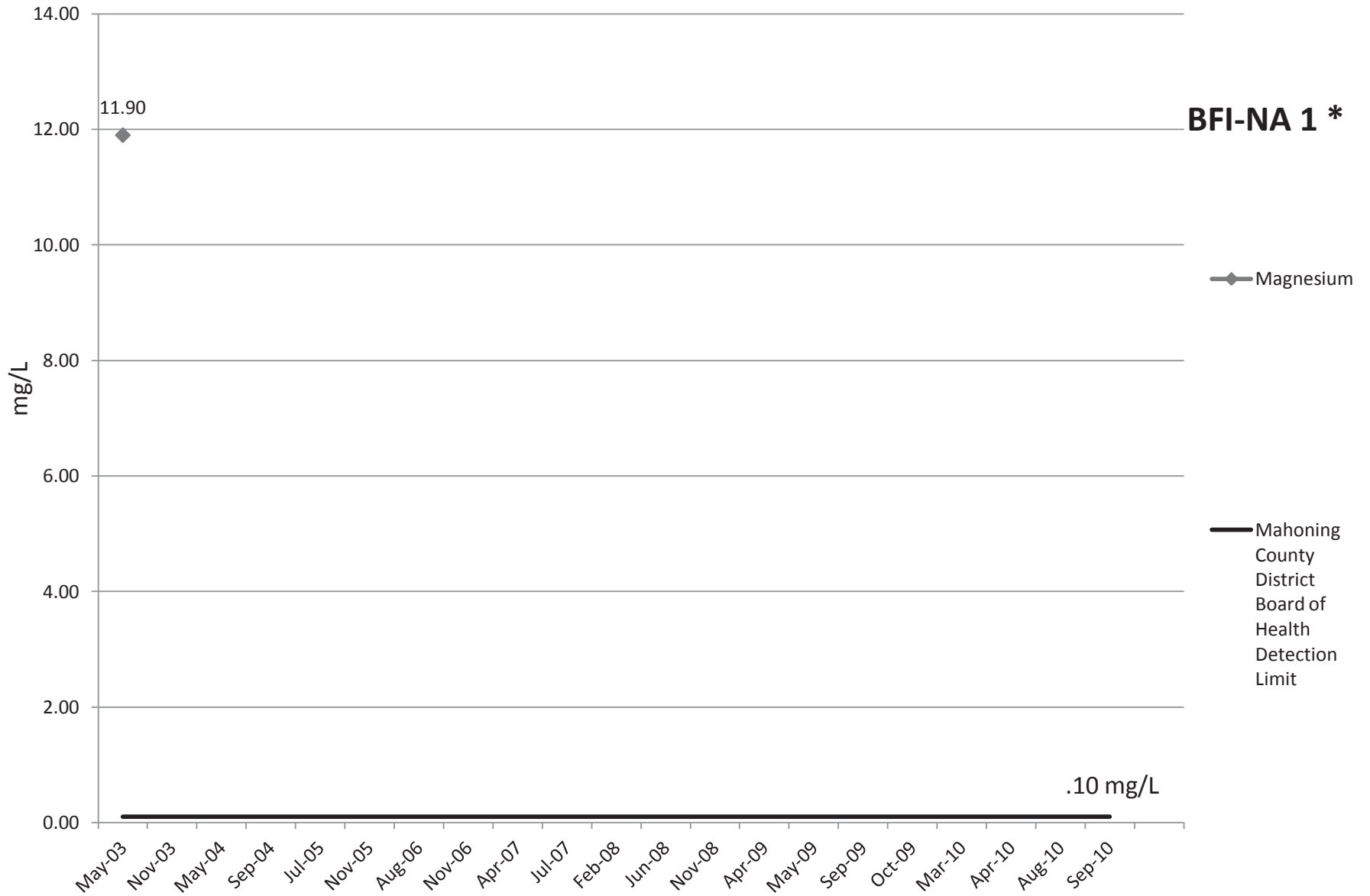
# Silver



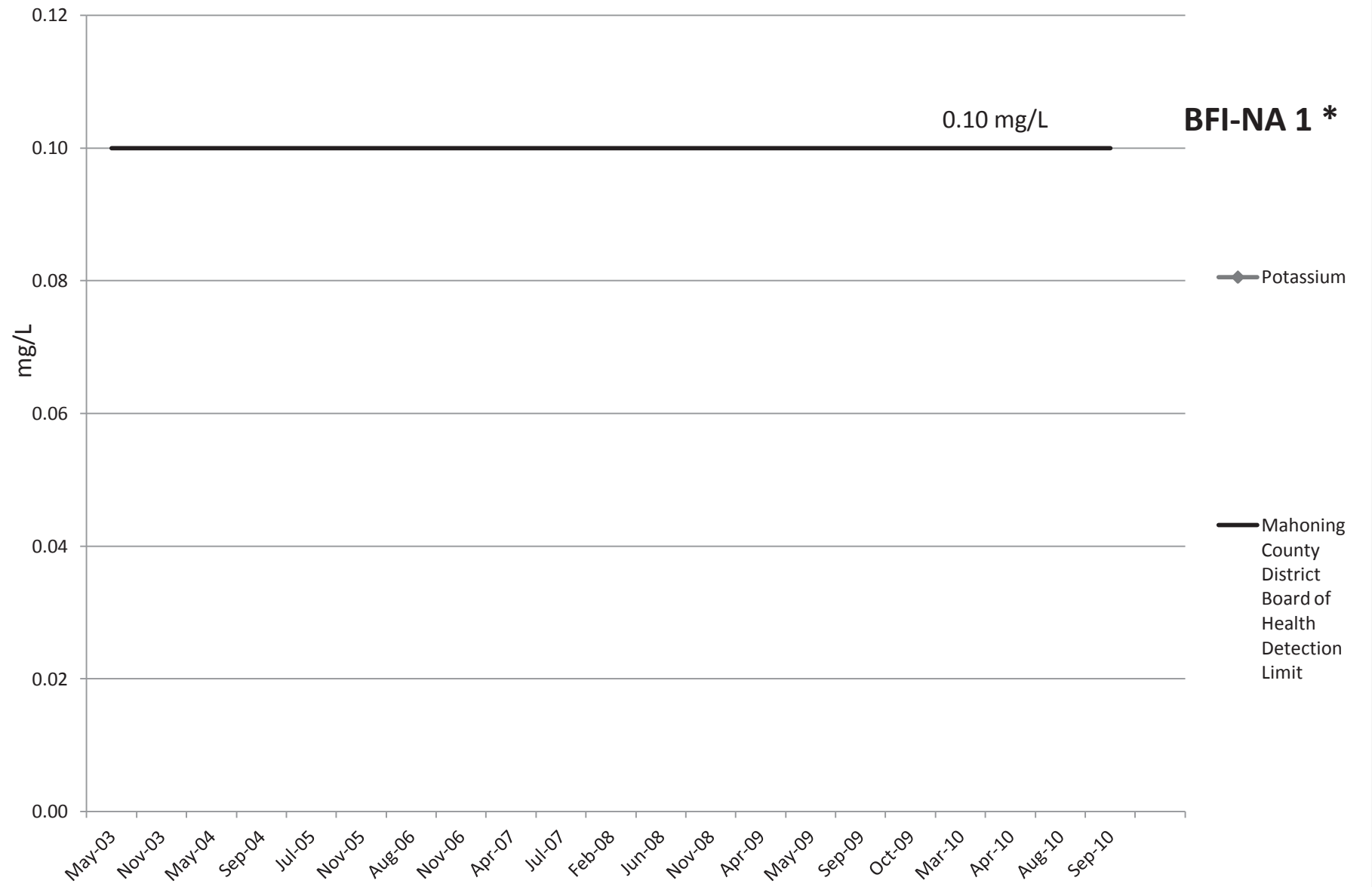
# Zinc



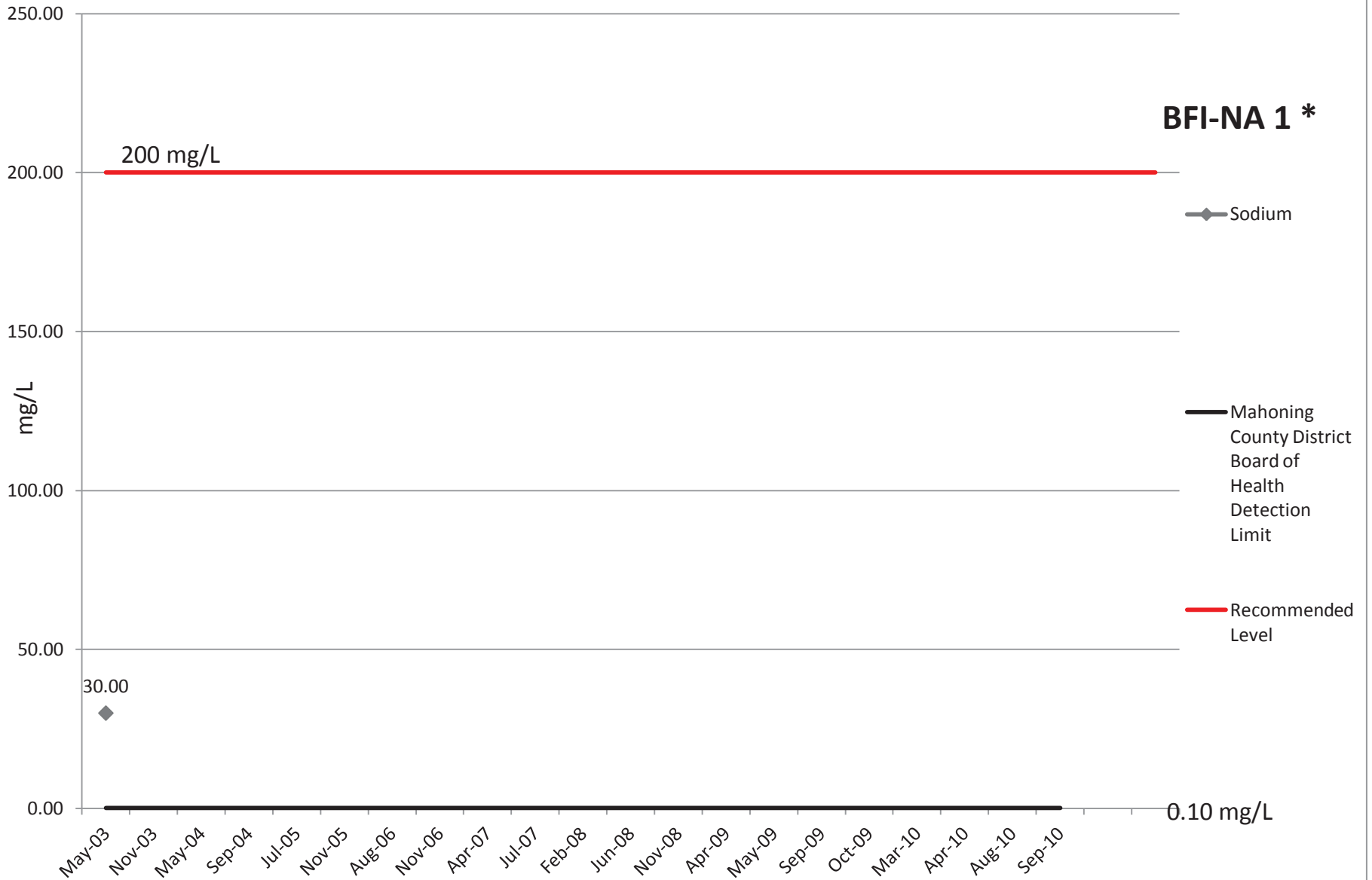
# Magnesium



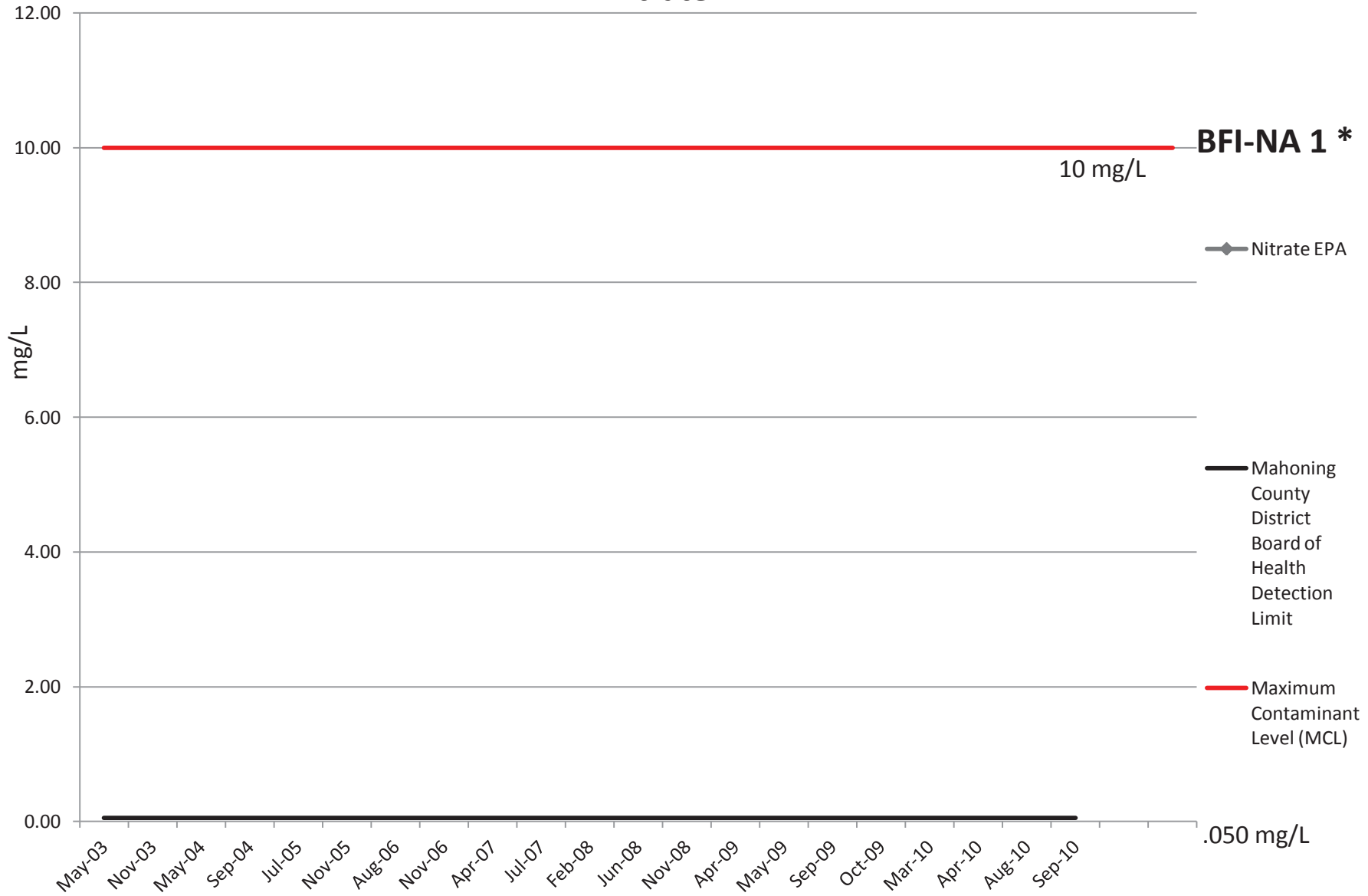
# Potassium



# Sodium



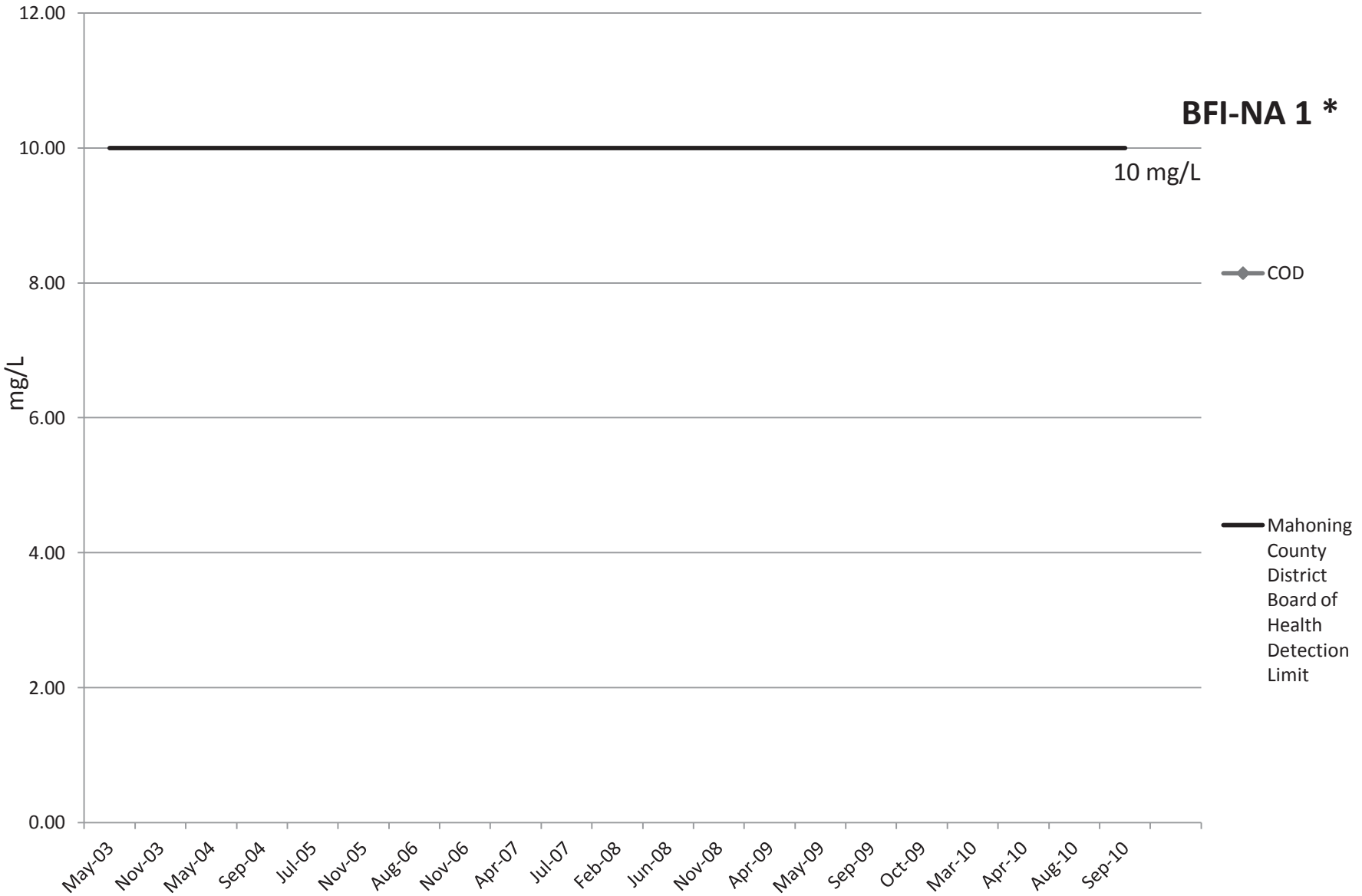
# Nitrate EPA



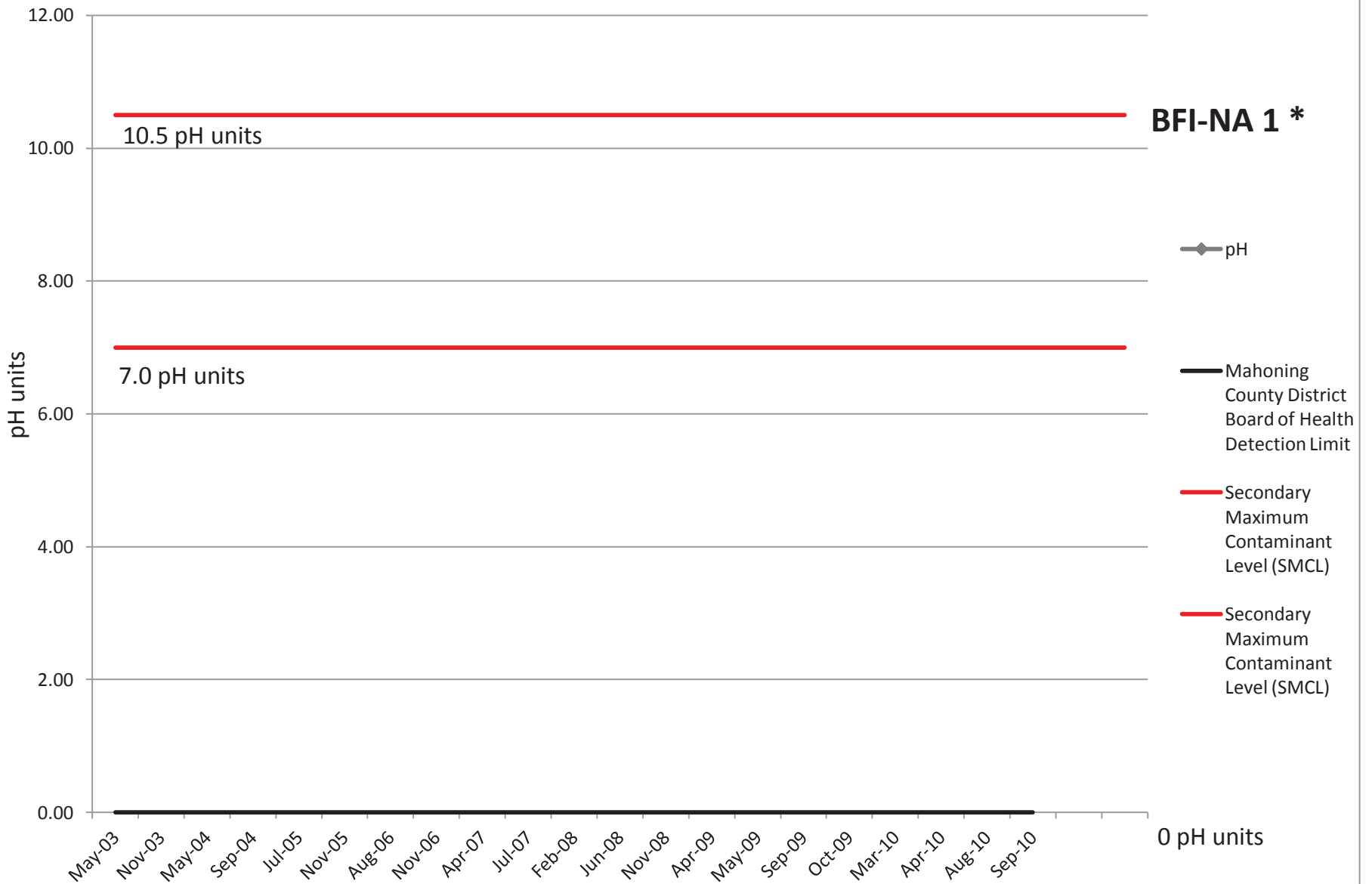
# COD

**BFI-NA 1 \***

10 mg/L

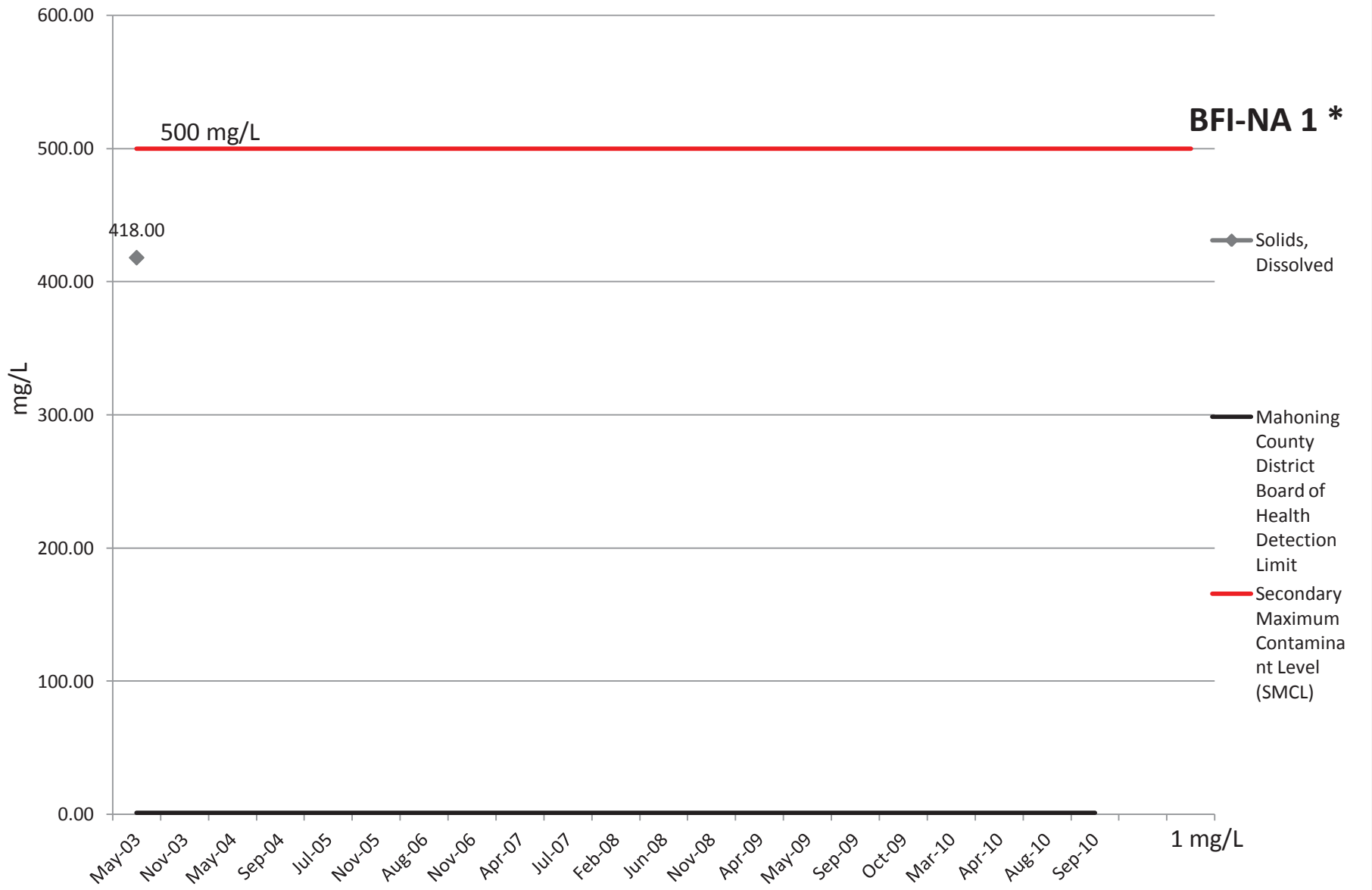


# pH

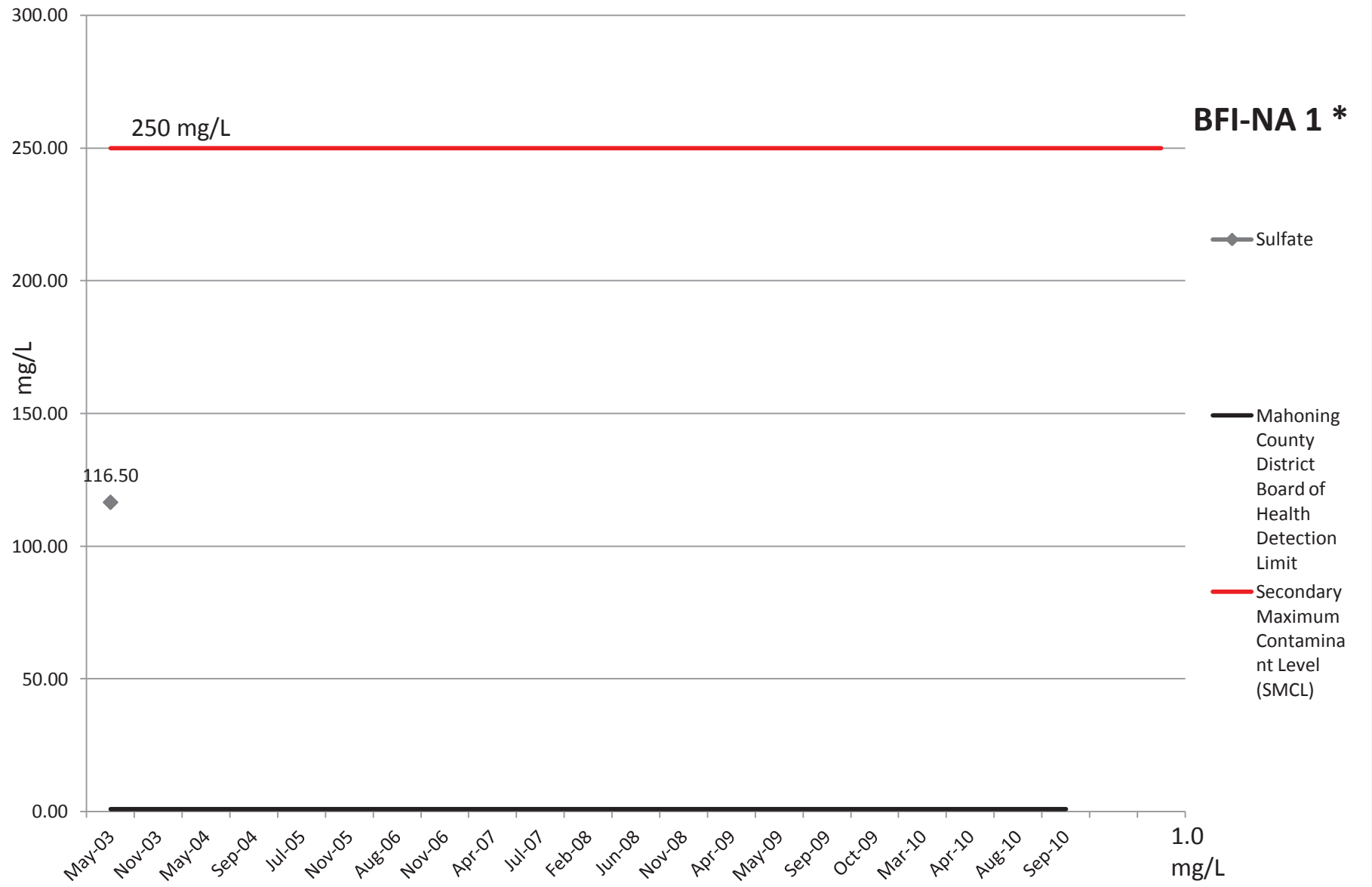




# Solids, Dissolved



# Sulfate



# Bacteria

**BFI-NA 1 \***

Positive/Negative

1.00

positive (1)

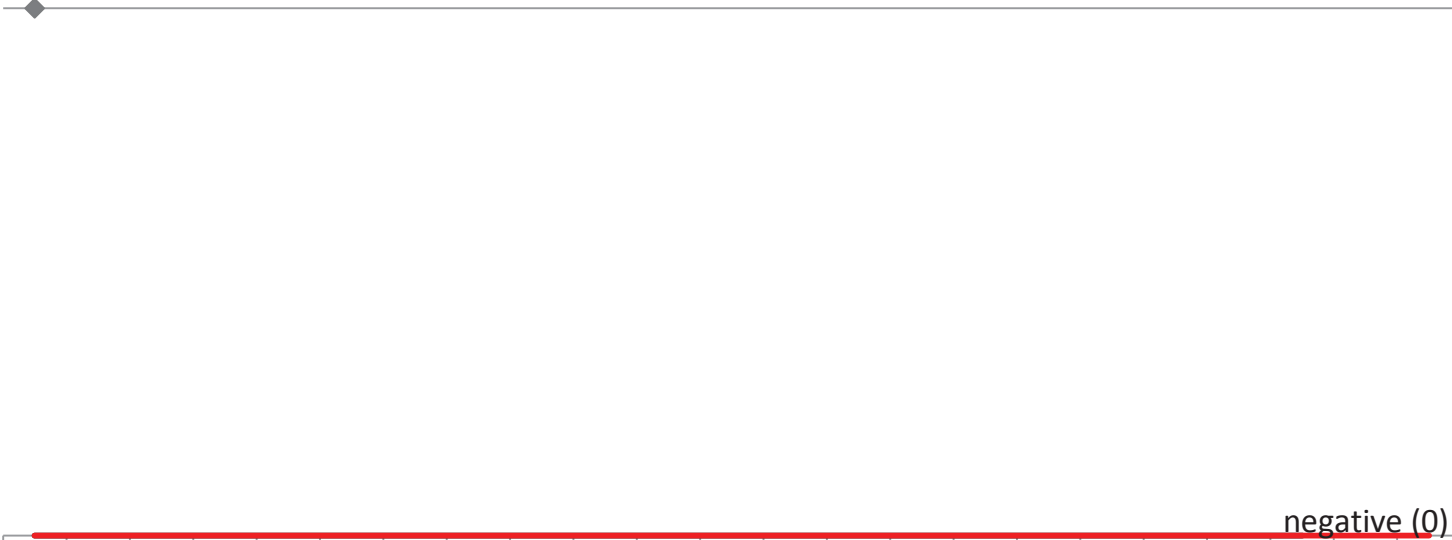
negative (0)

◆ Bacteria

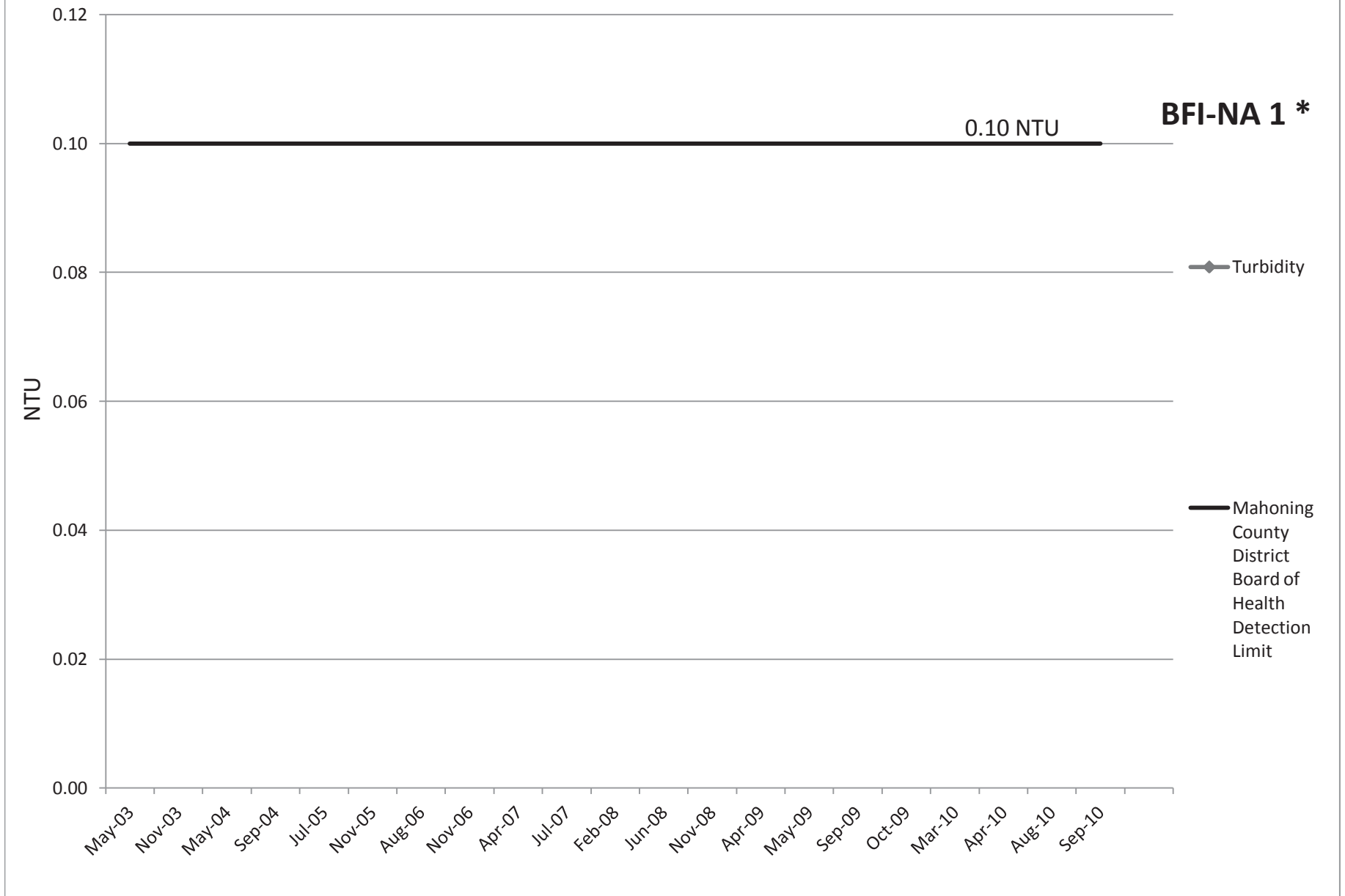
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

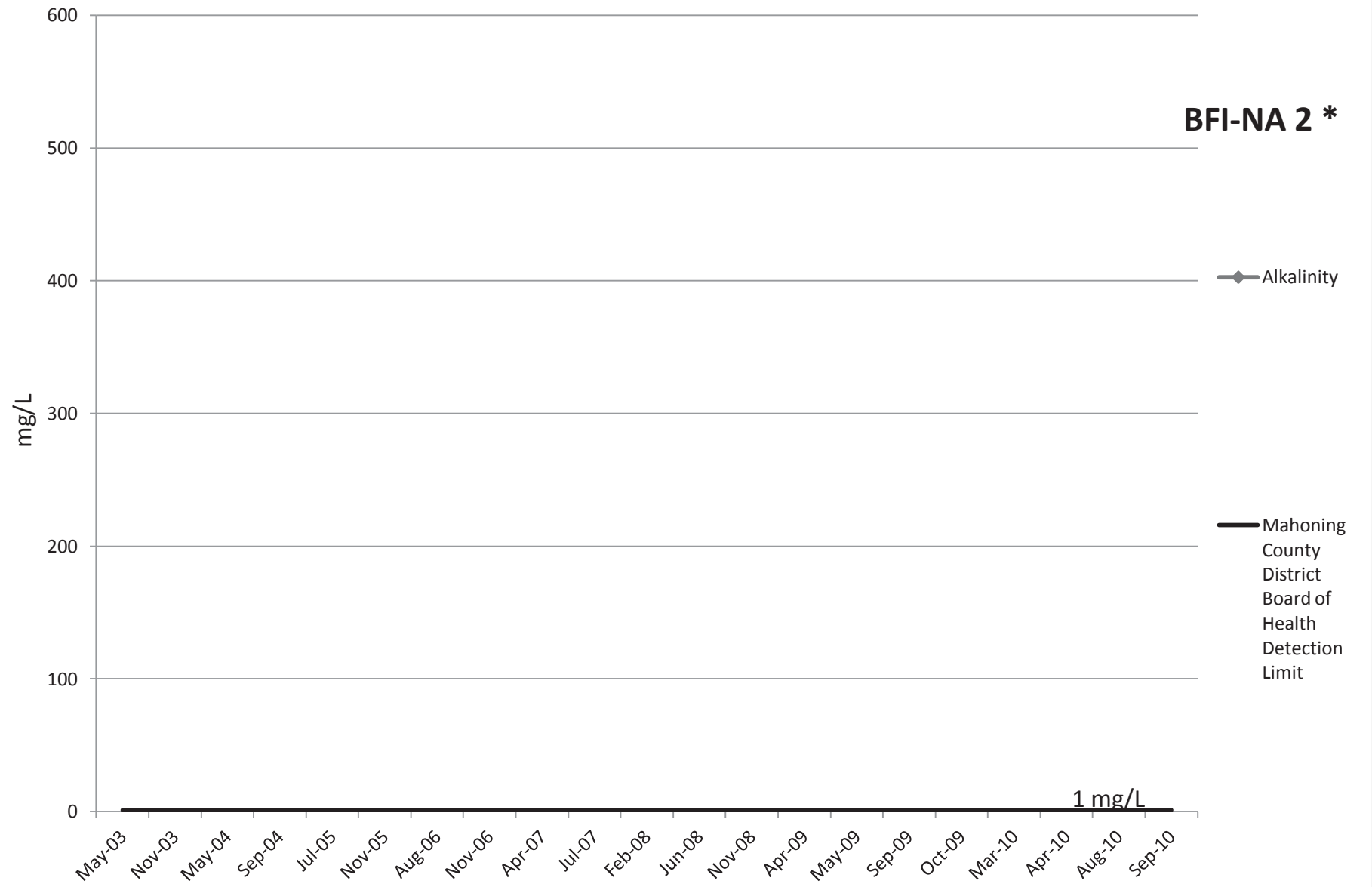
May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10



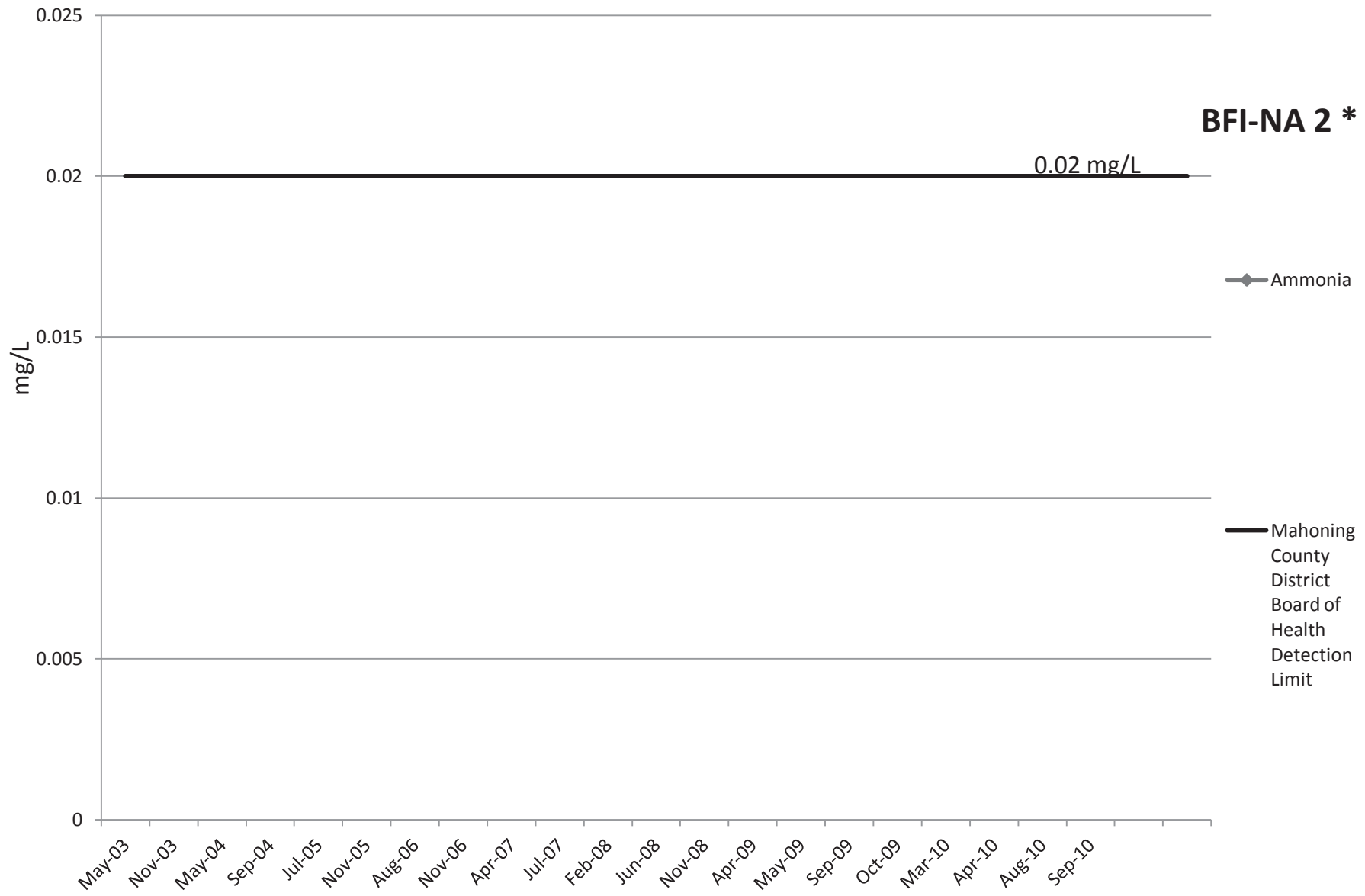
# Turbidity



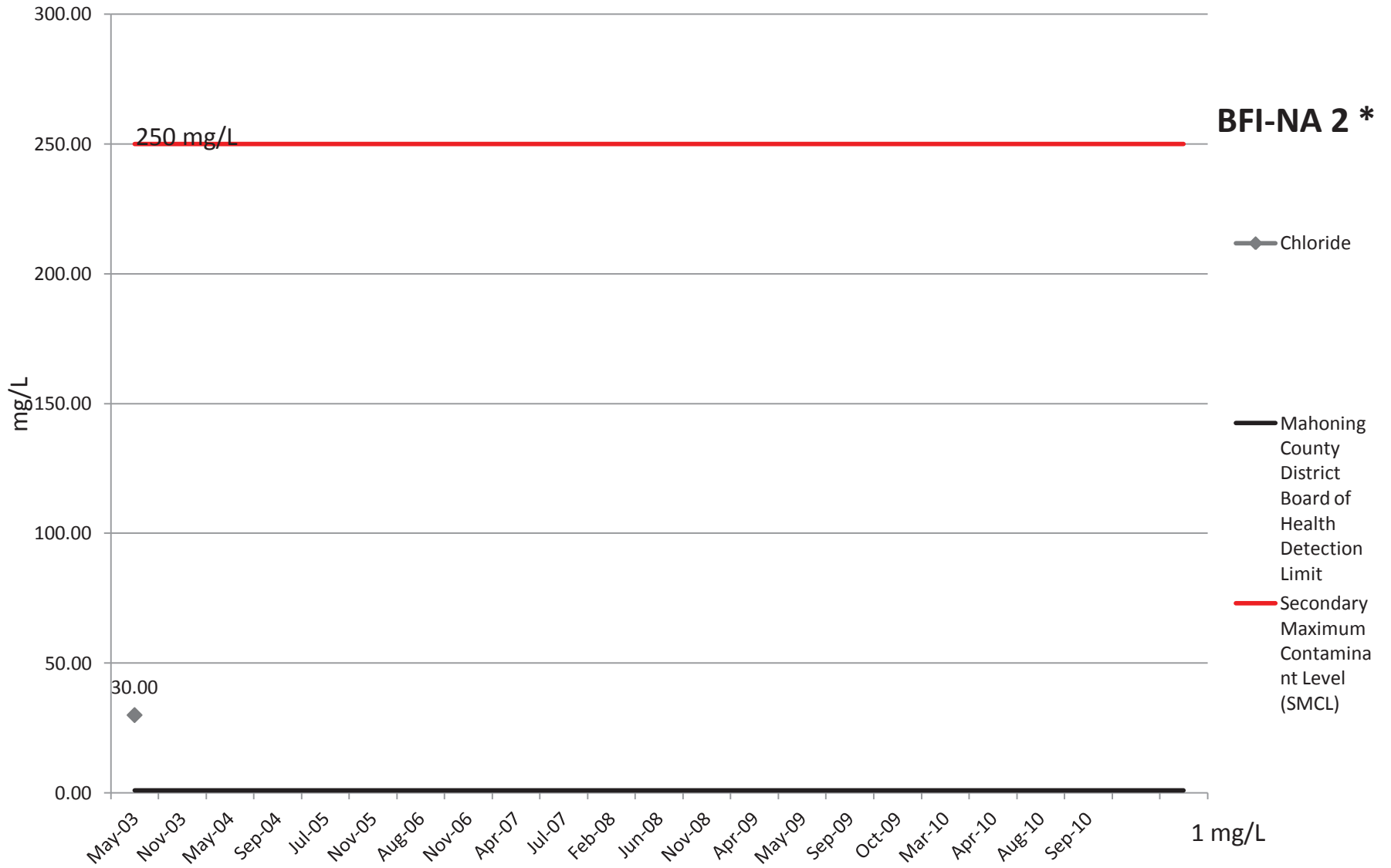
# Alkalinity



# Ammonia



# Chloride



# Conductivity

1.0 umhos/cm

**BFI-NA 2 \***

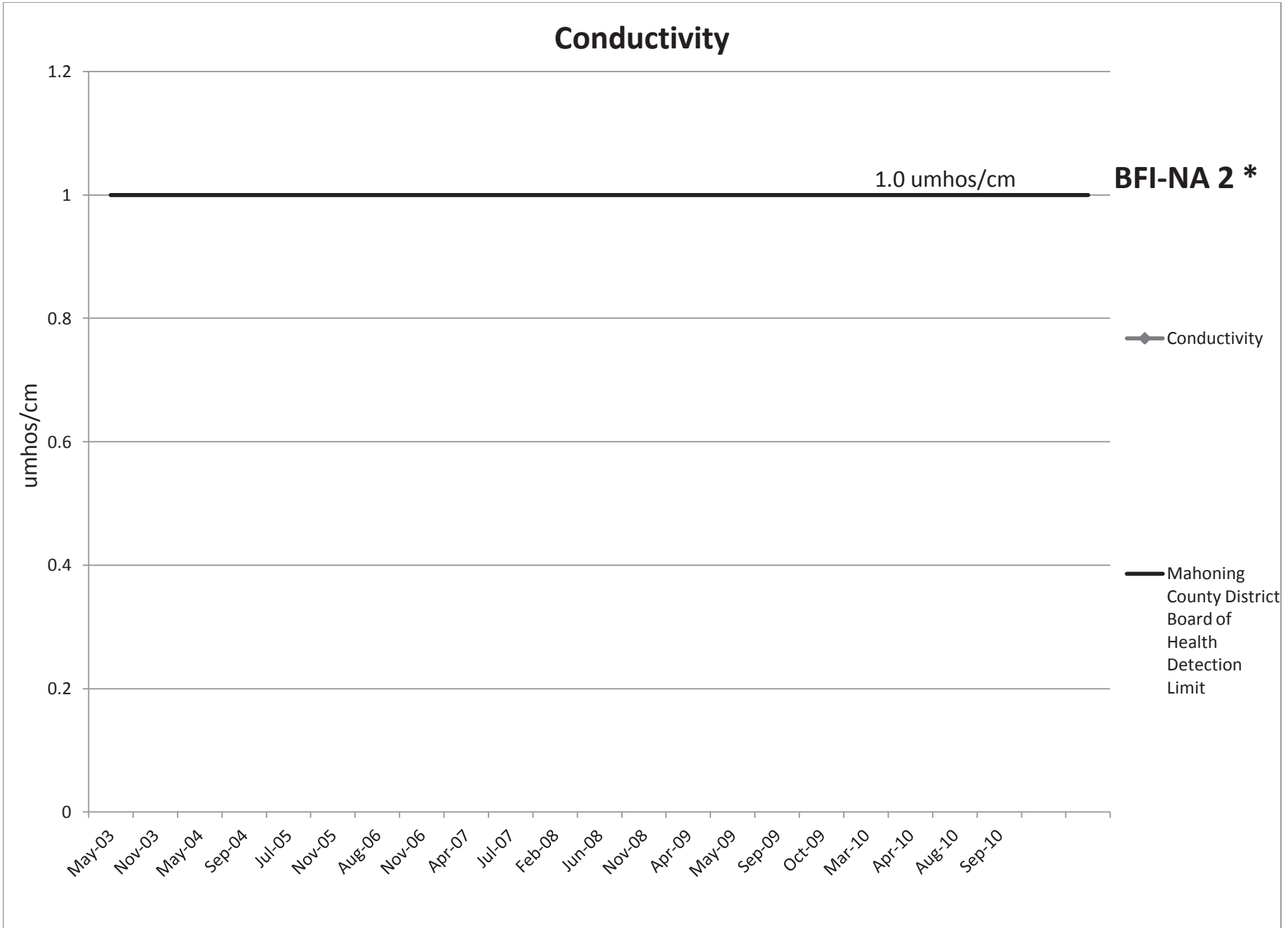
umhos/cm

◆ Conductivity

— Mahoning  
County District  
Board of  
Health  
Detection  
Limit

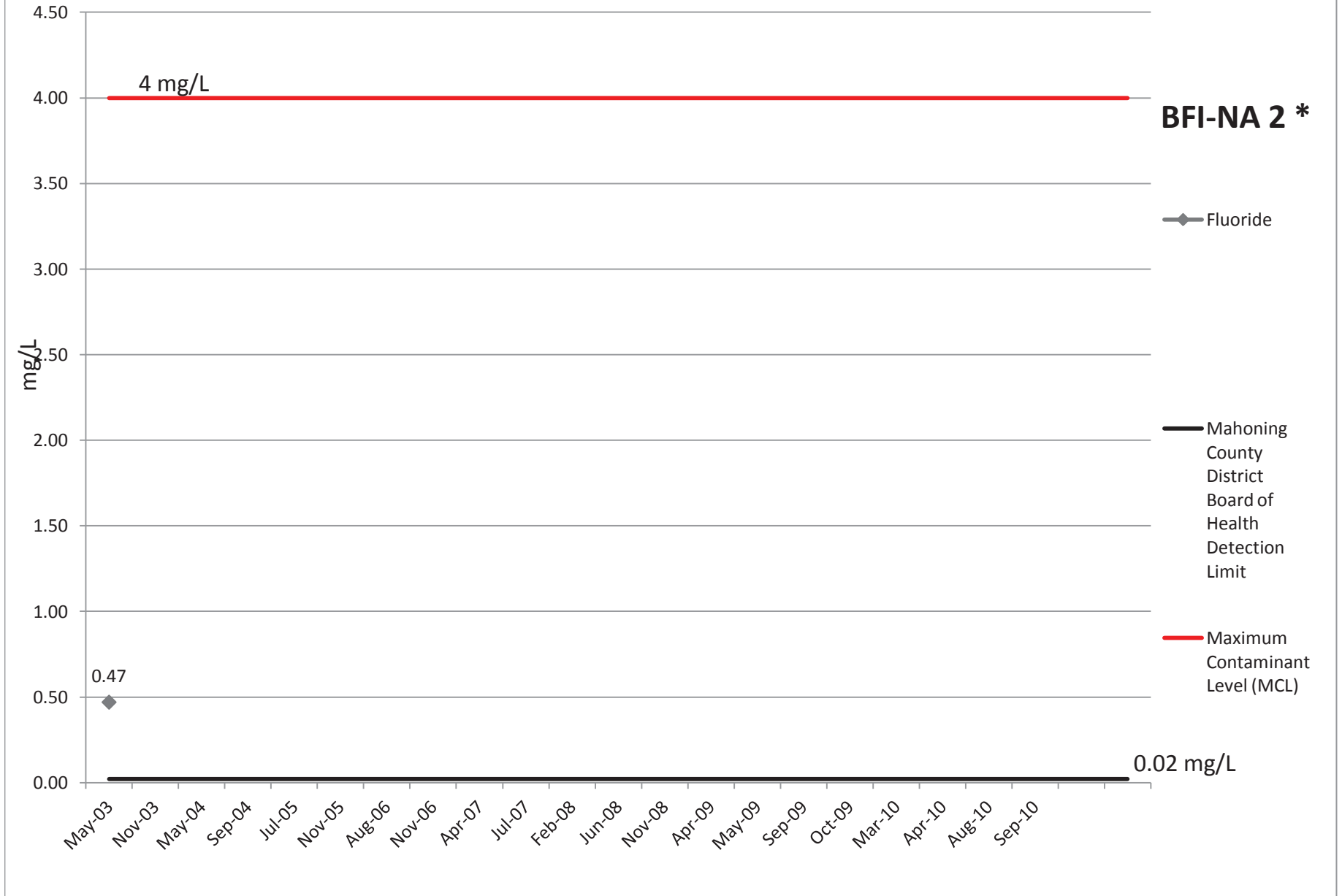
1.2  
1.0  
0.8  
0.6  
0.4  
0.2  
0

May-03 Nov-03 May-04 Sep-04 Jul-05 Nov-05 Aug-06 Nov-06 Apr-07 Jul-07 Feb-08 Jun-08 Nov-08 Apr-09 May-09 Sep-09 Oct-09 Mar-10 Apr-10 Aug-10 Sep-10

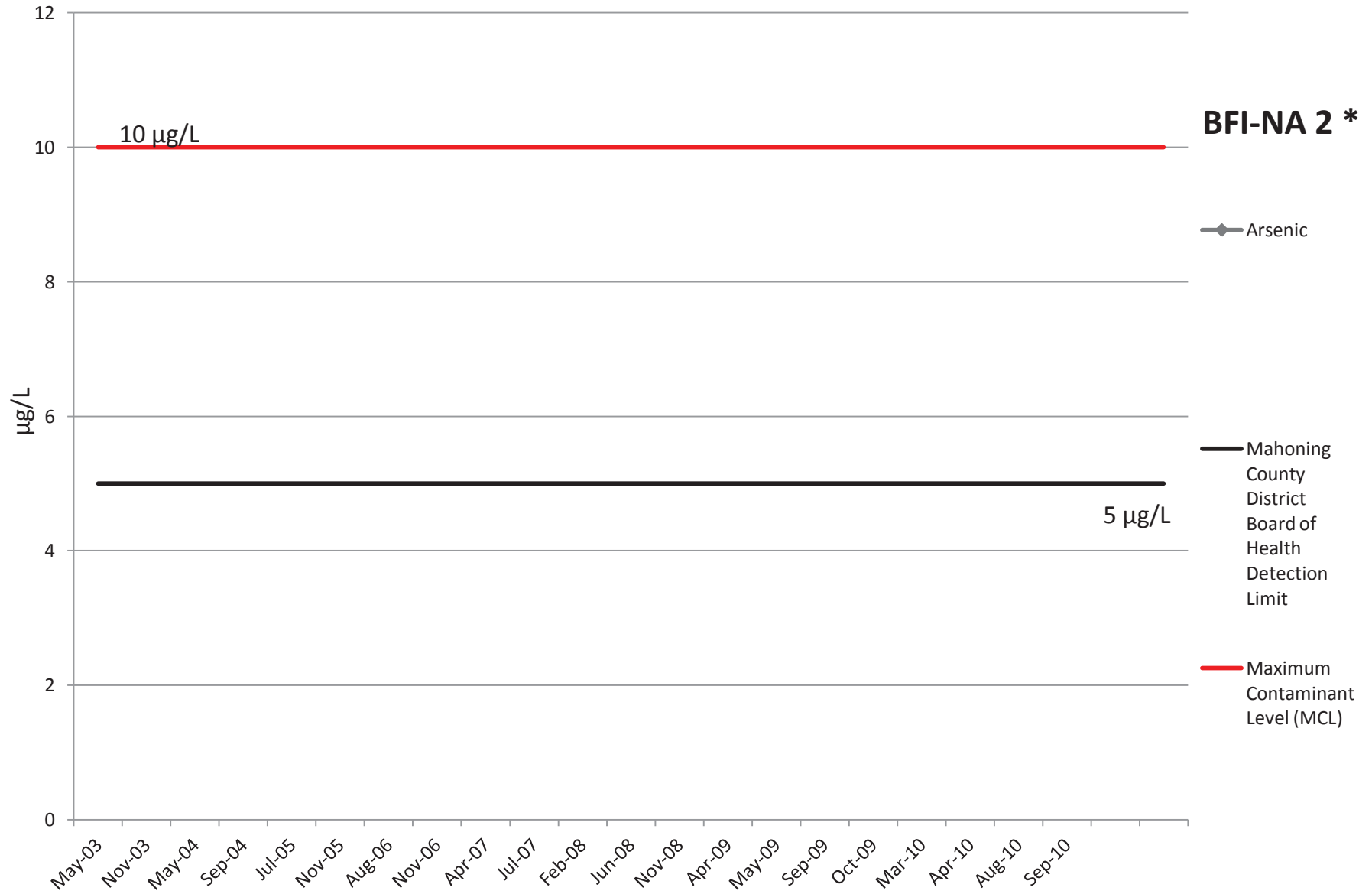




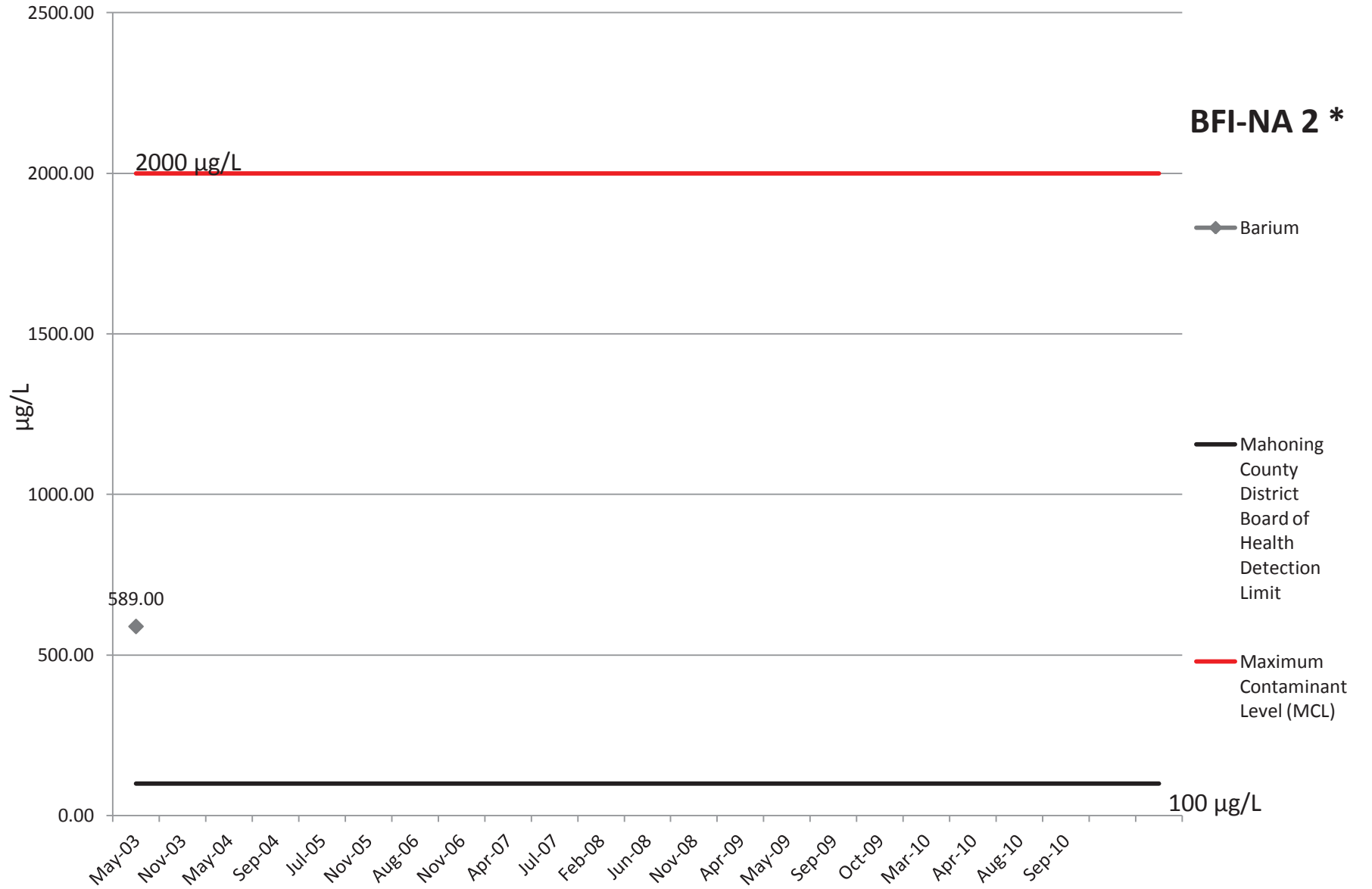
# Fluoride



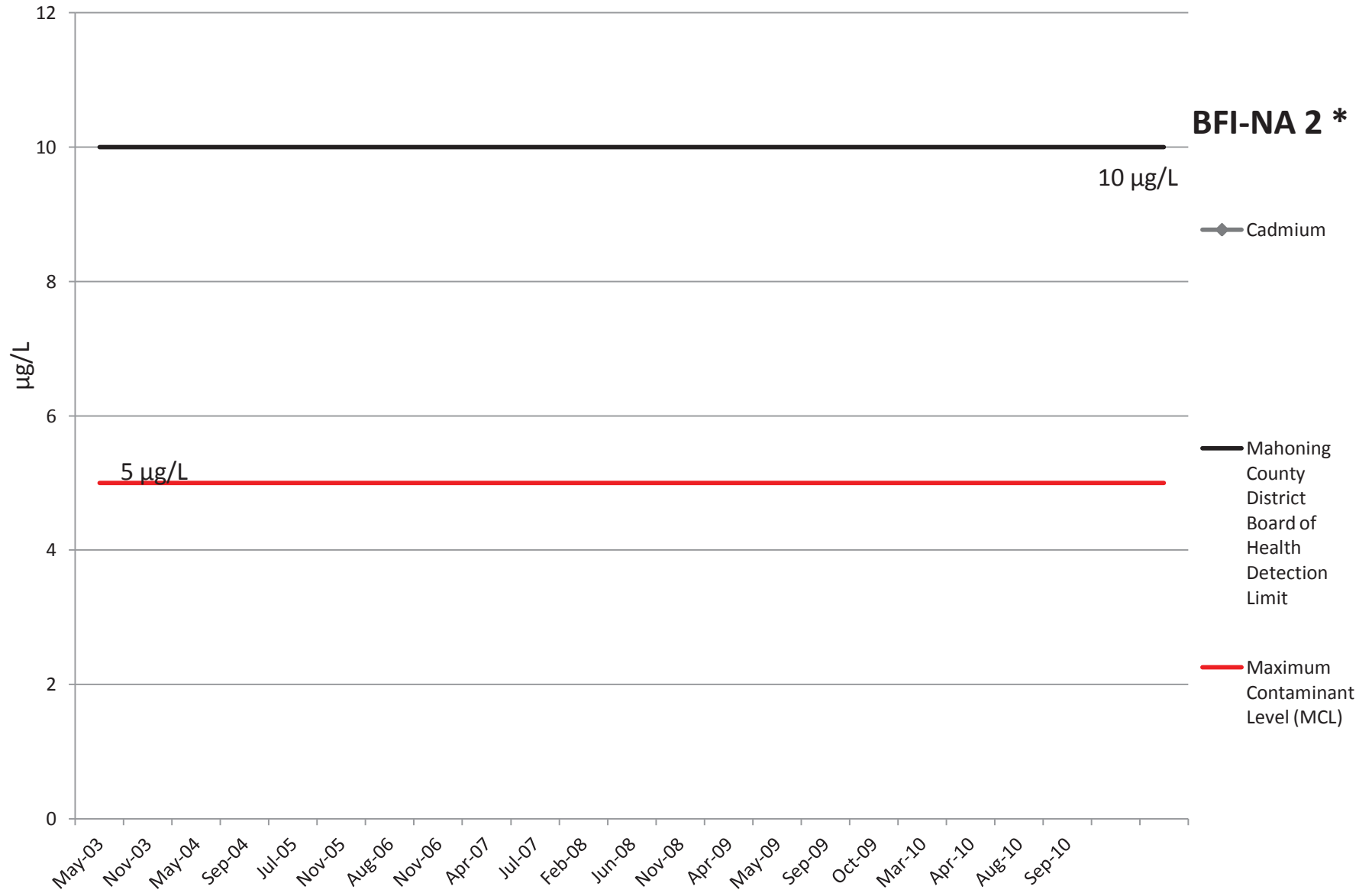
# Arsenic



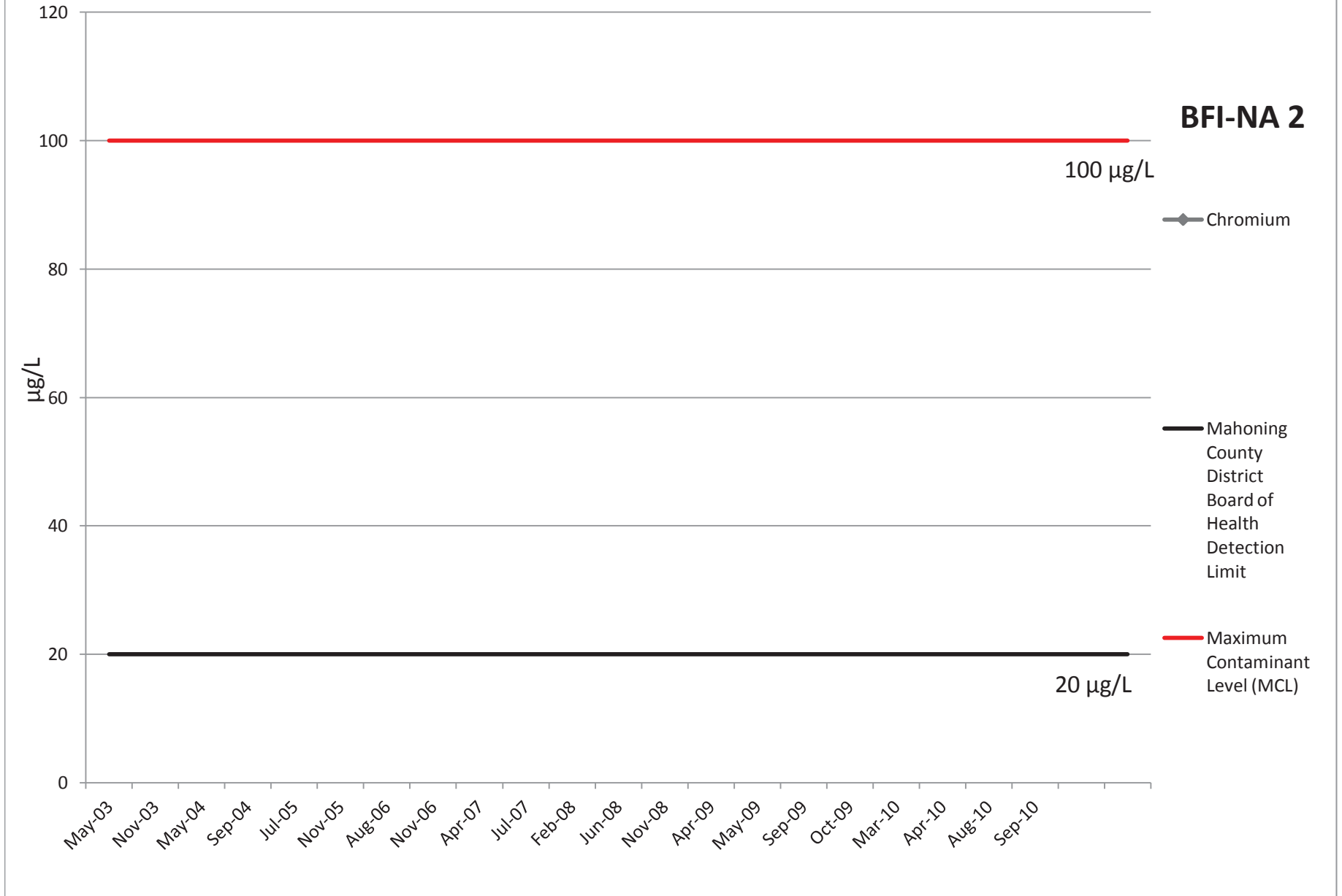
# Barium



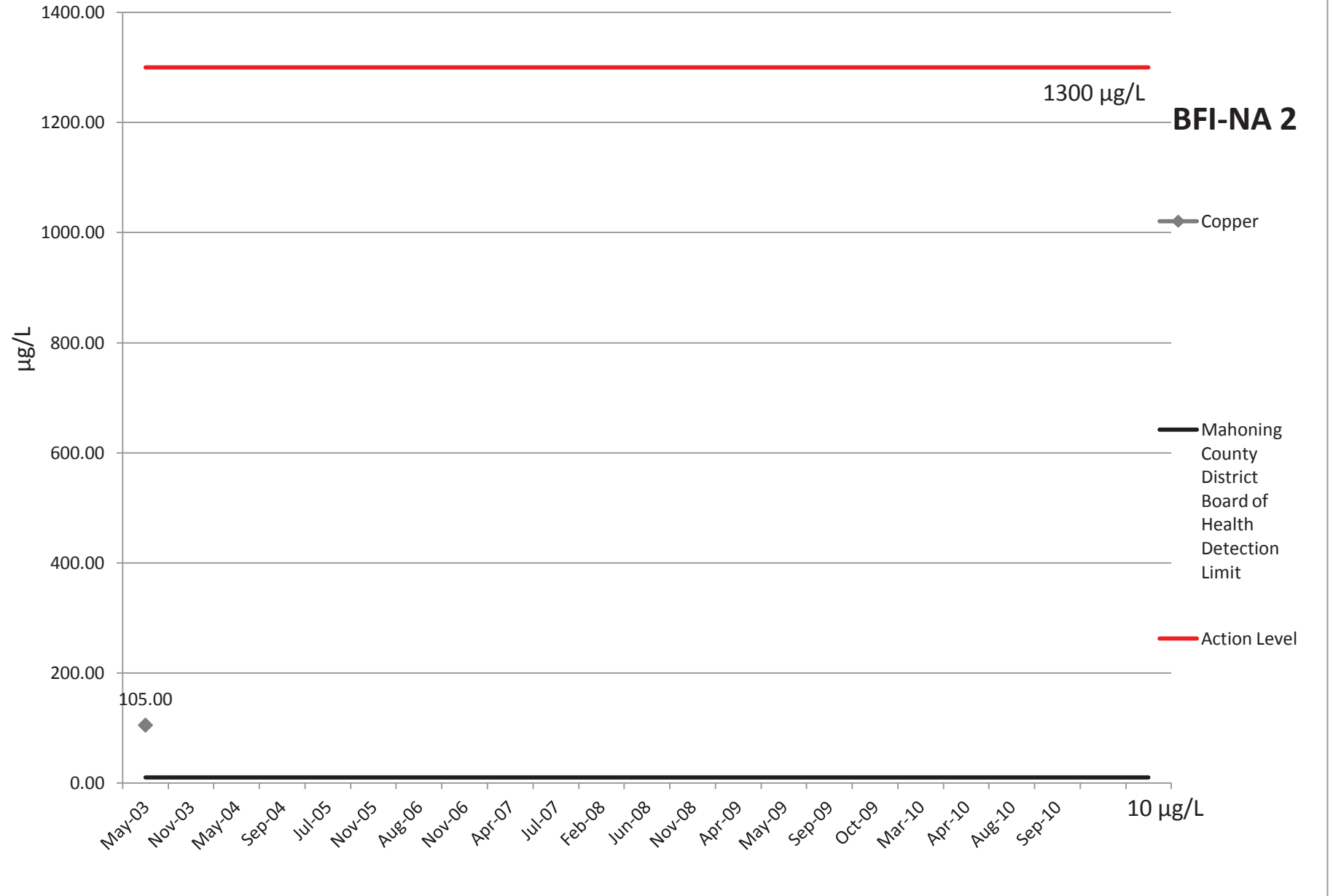
# Cadmium



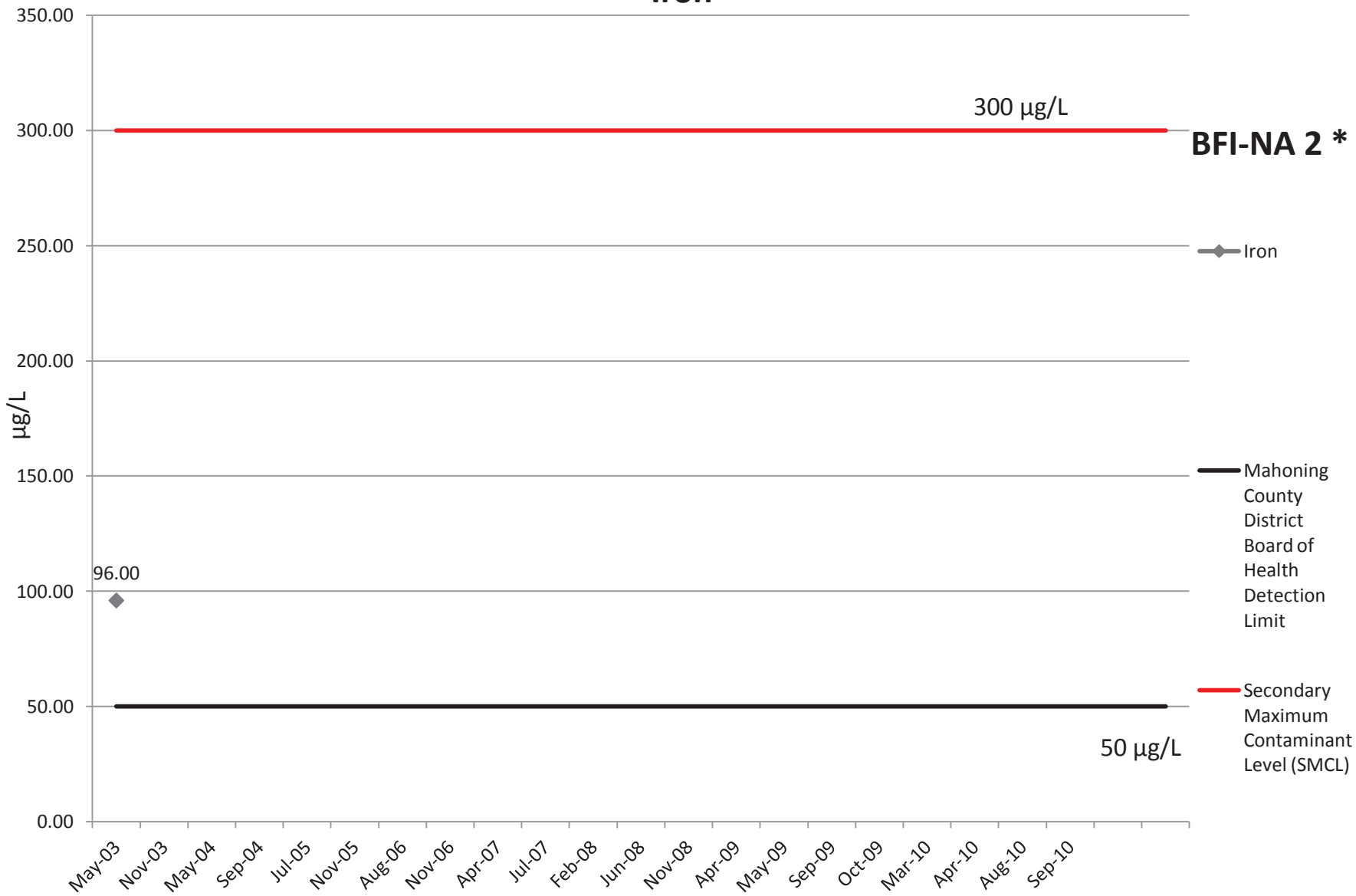
# Chromium



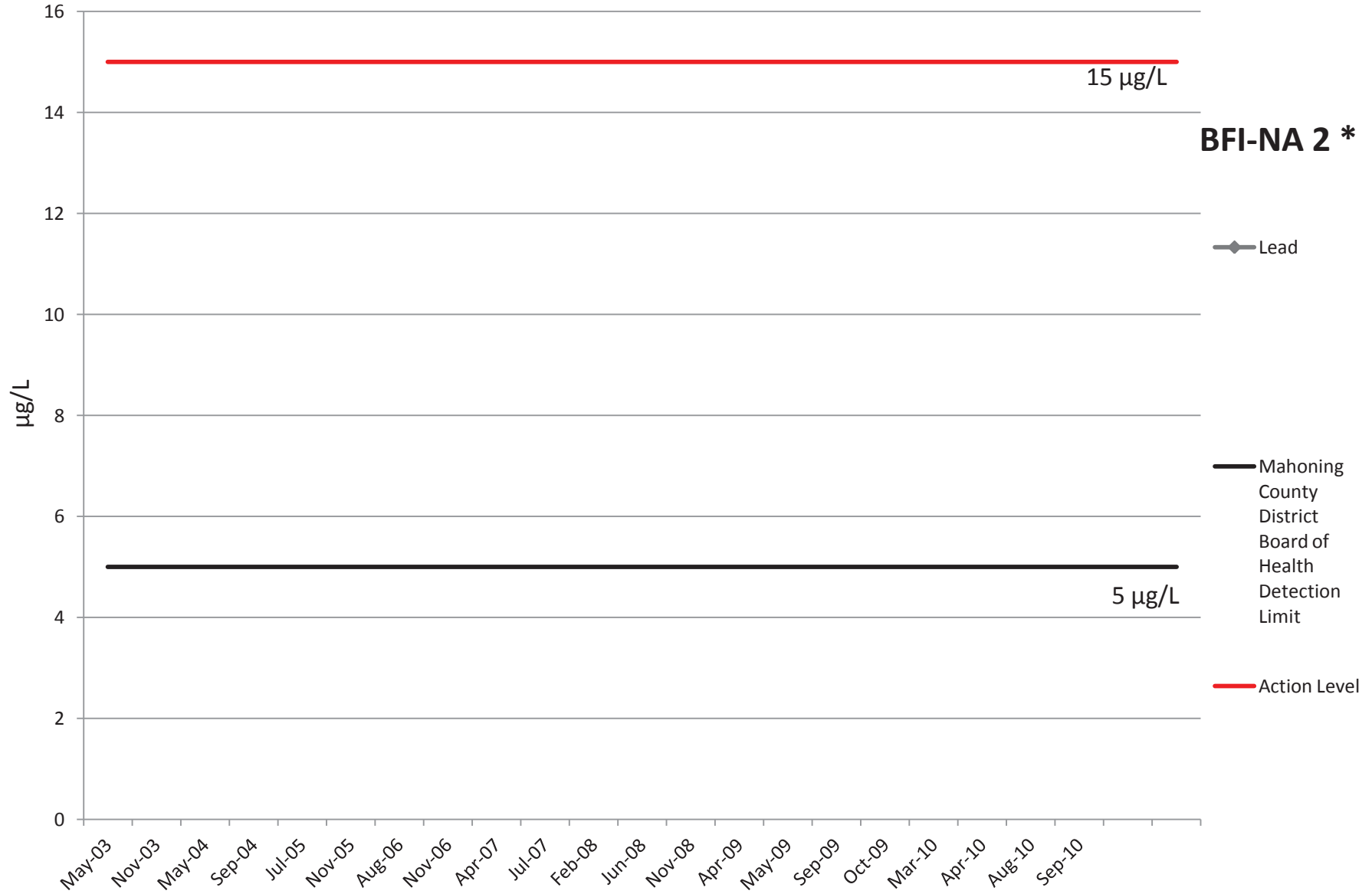
# Copper



# Iron

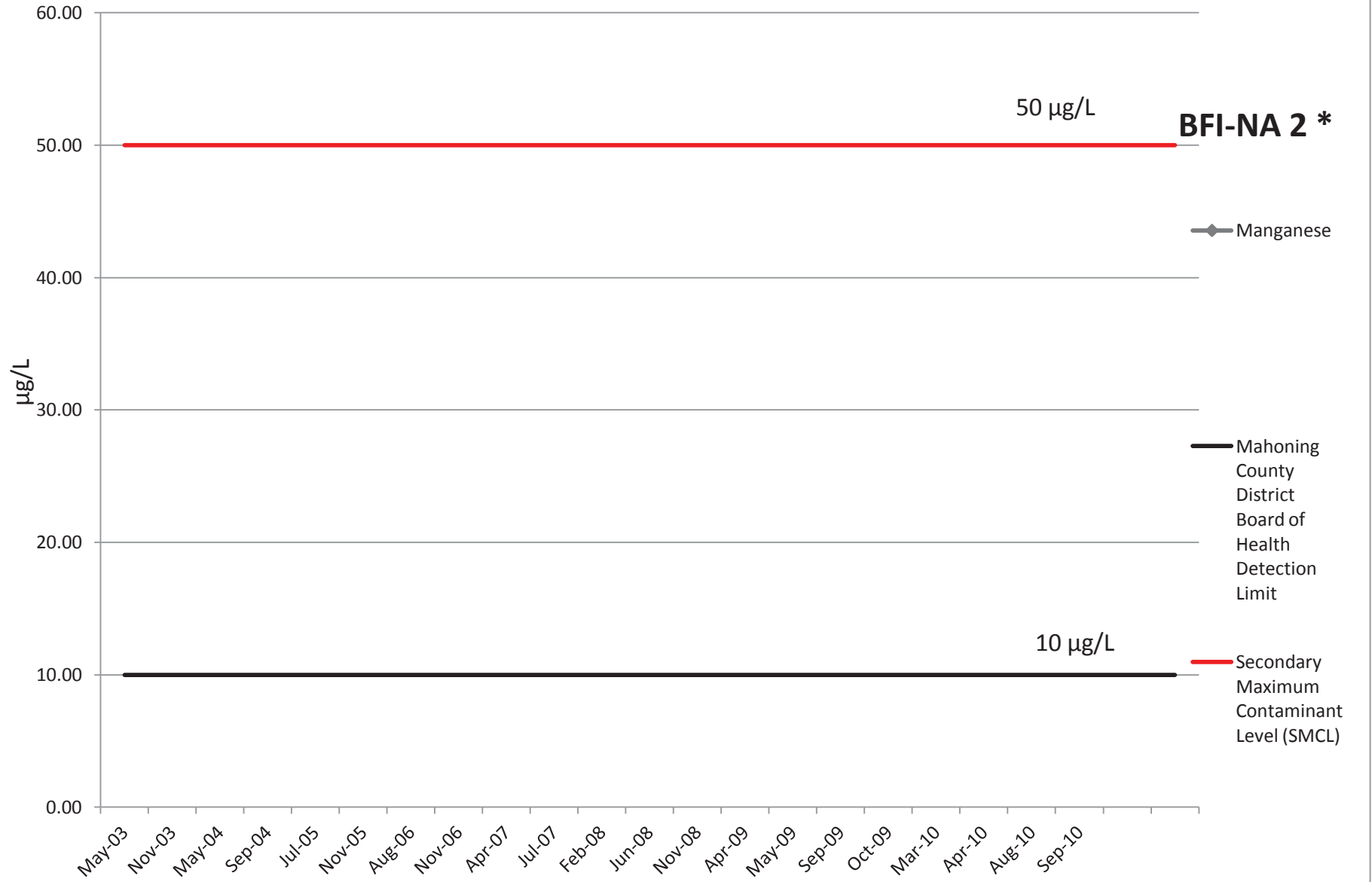


# Lead

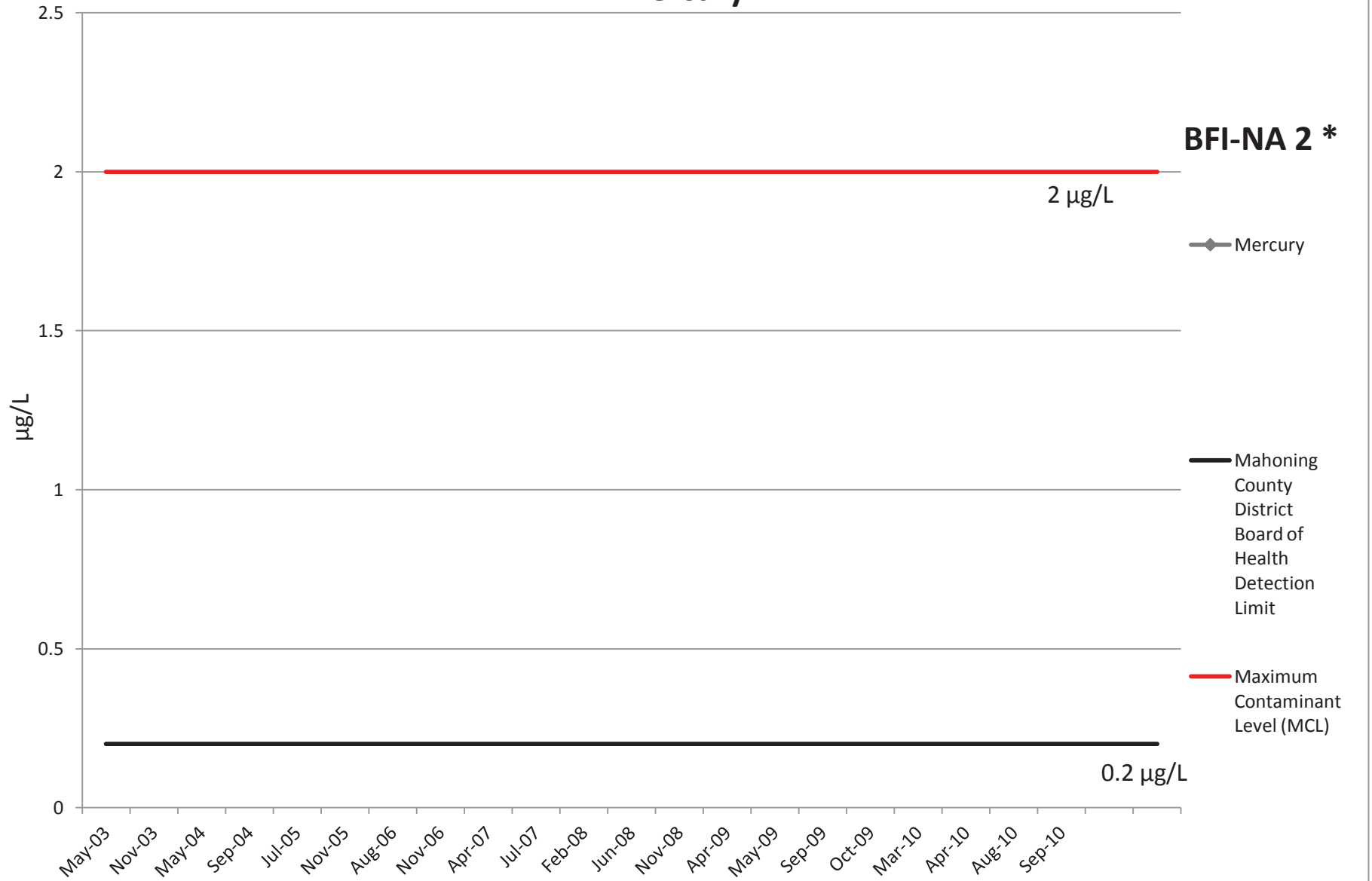




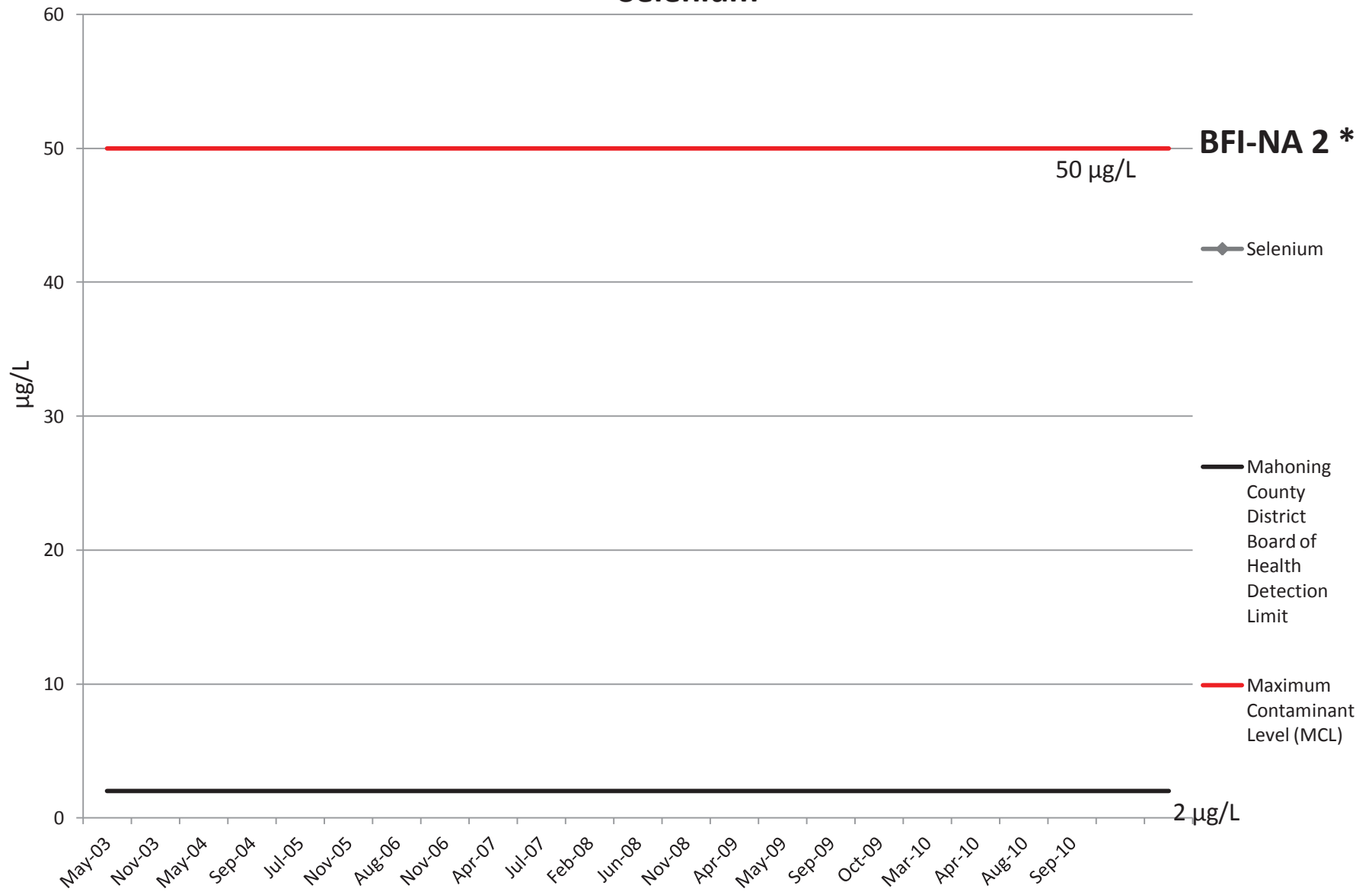
# Manganese



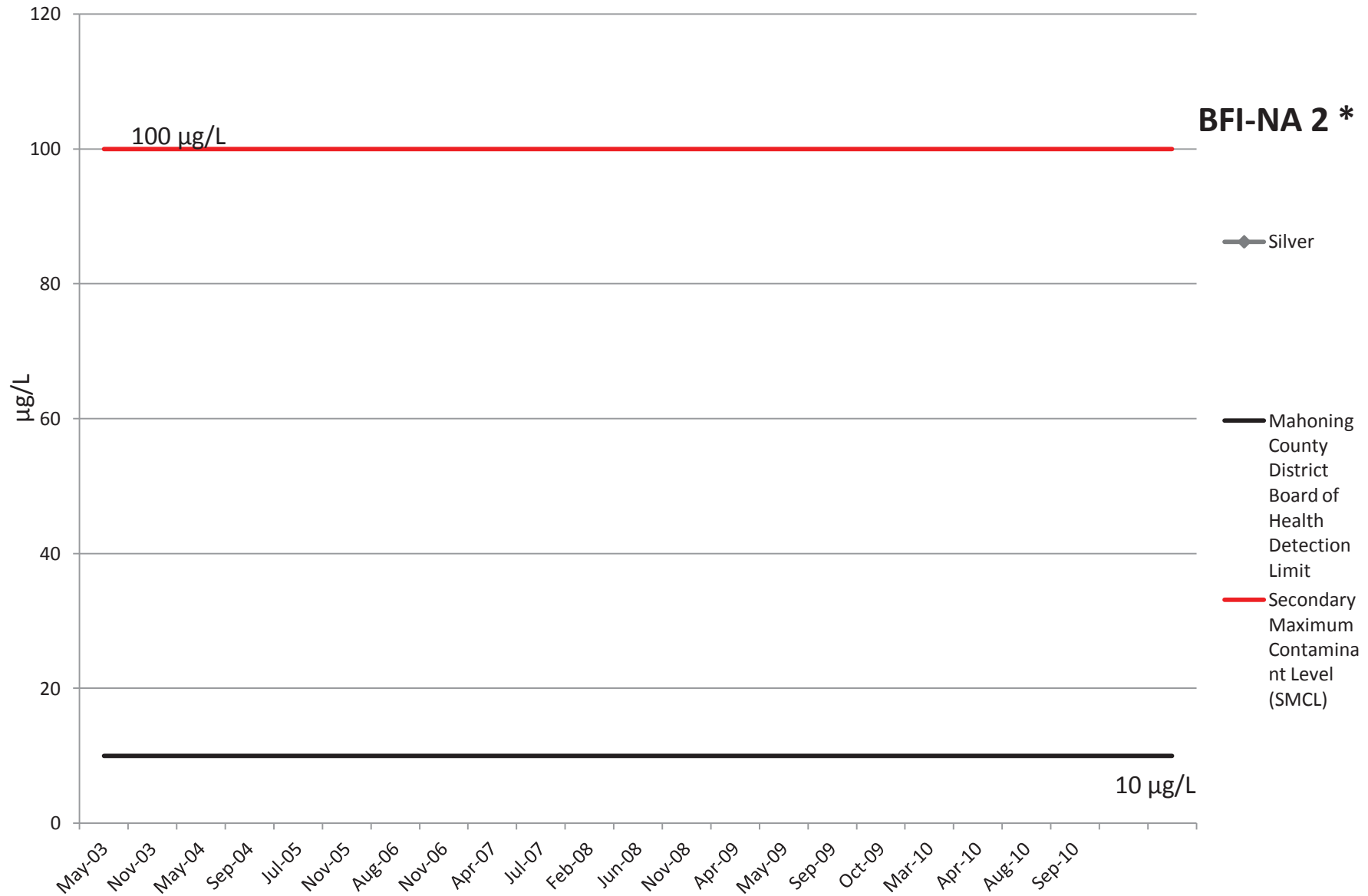
# Mercury



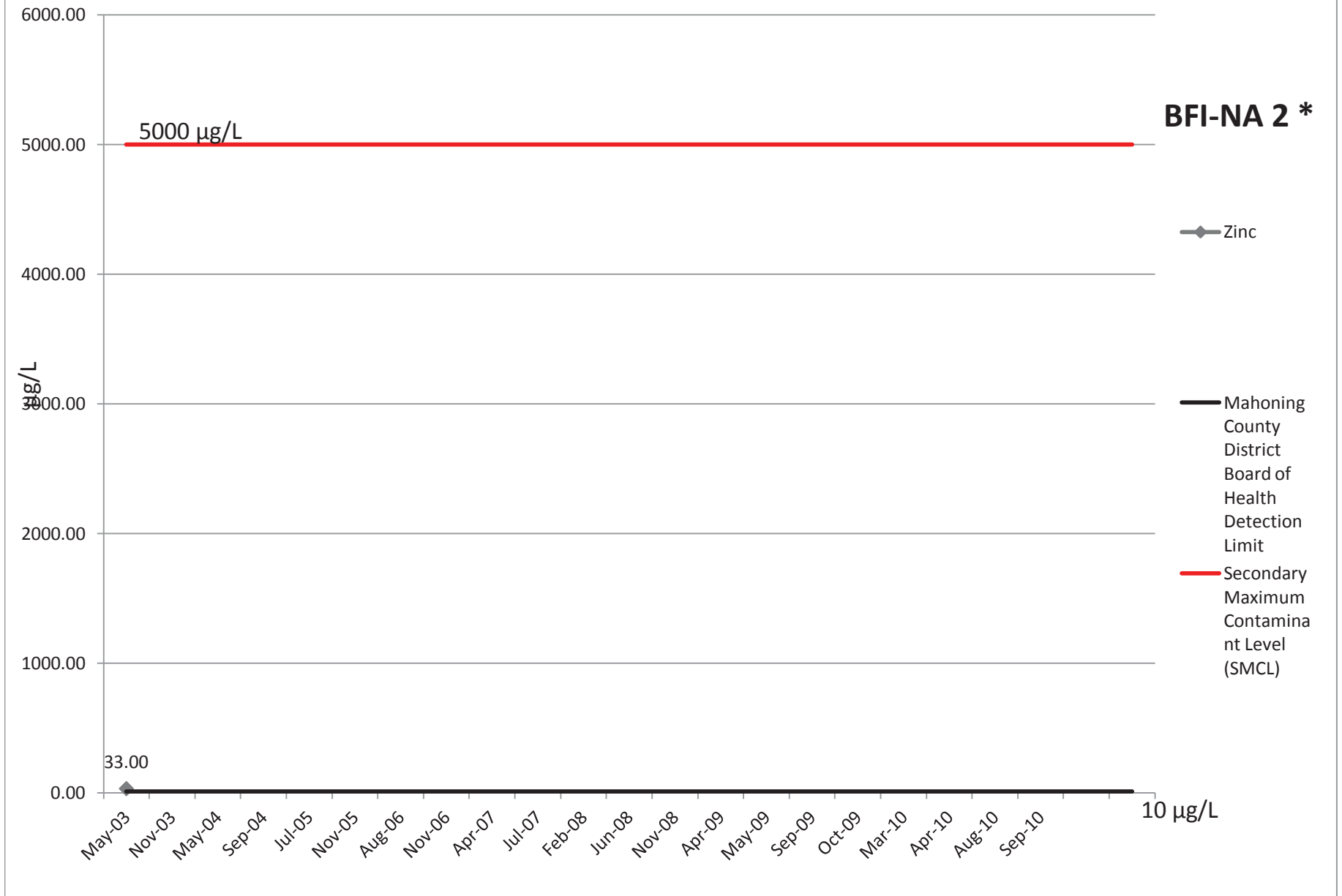
# Selenium



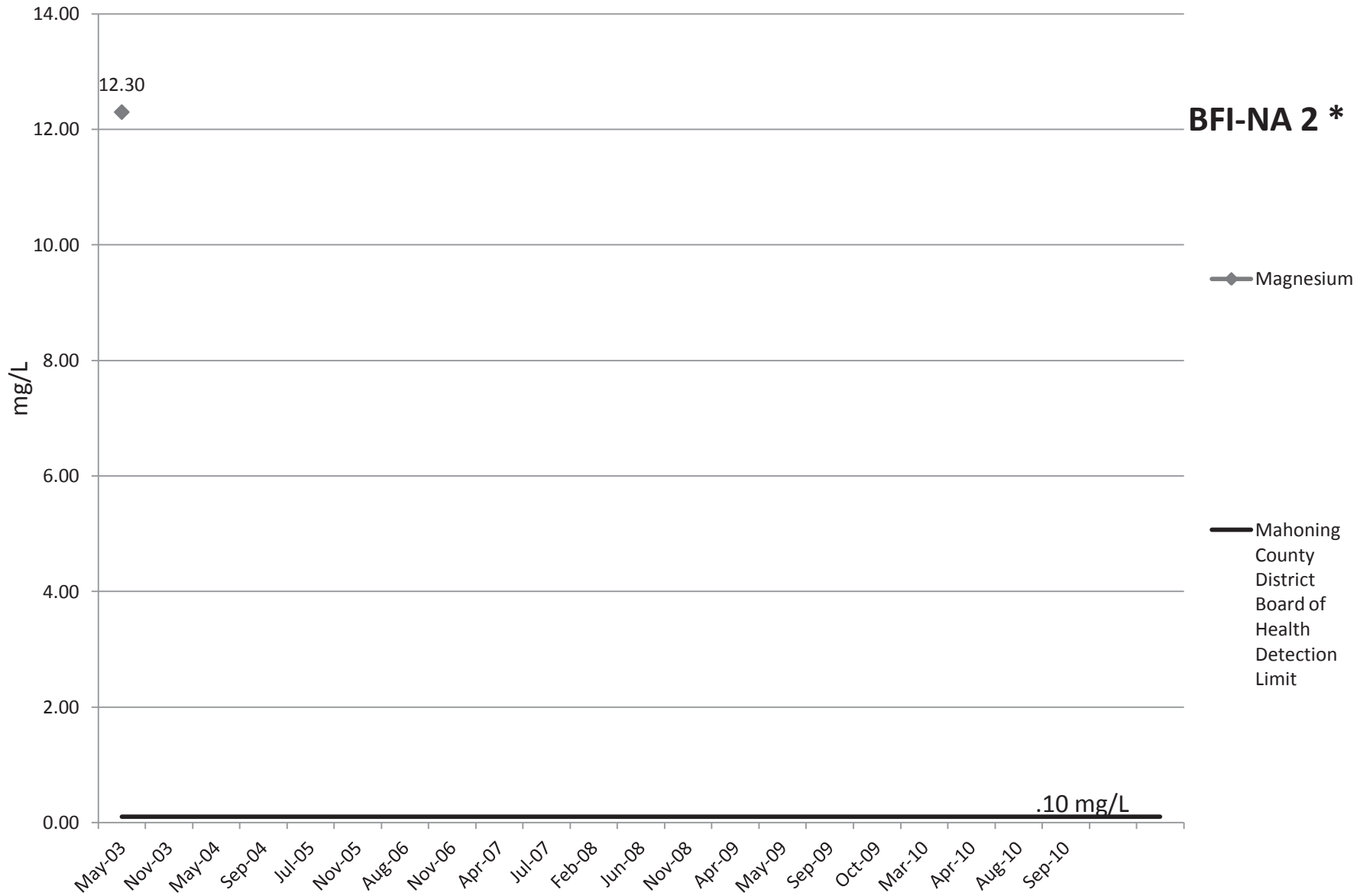
# Silver



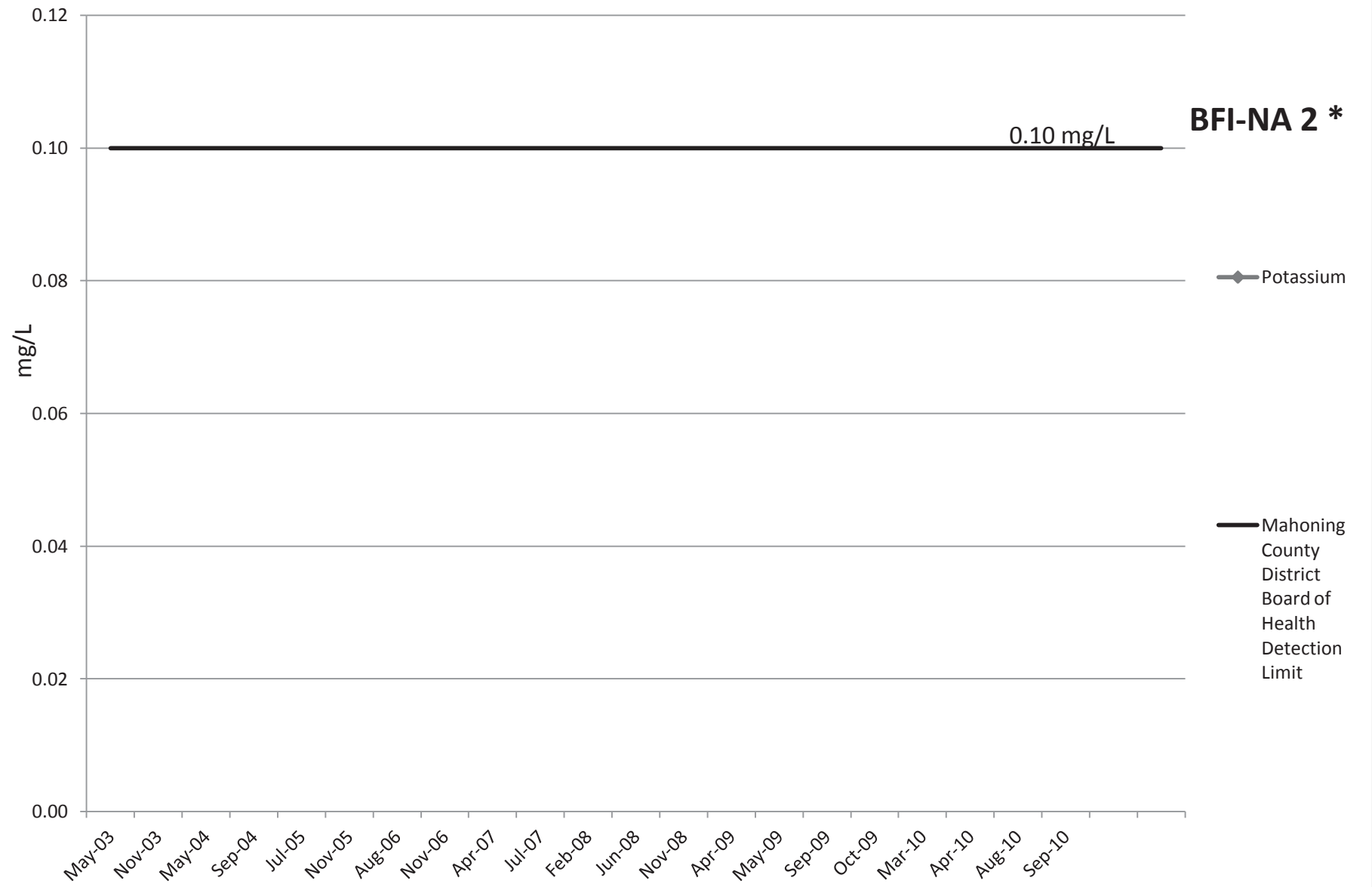
# Zinc



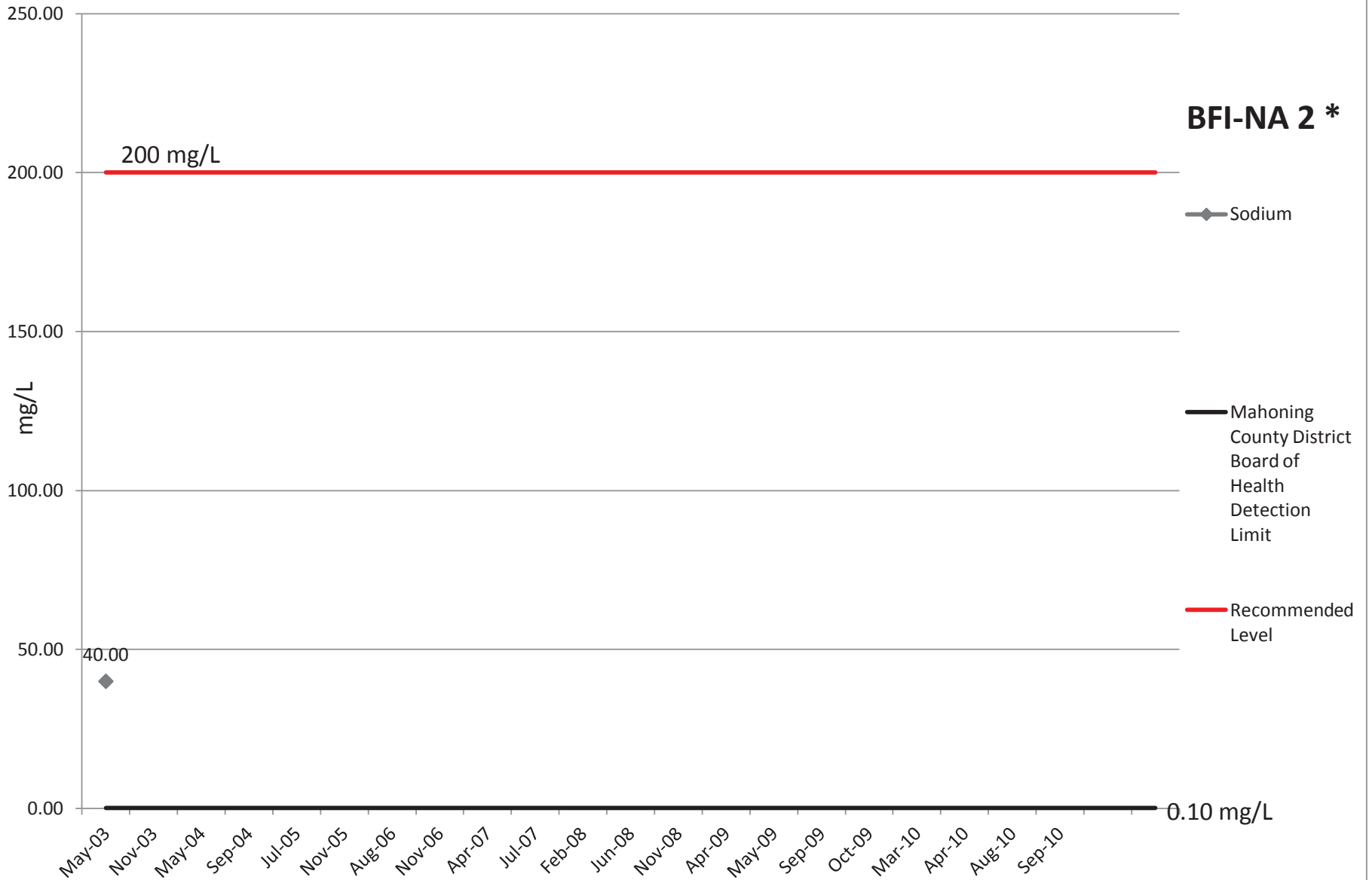
# Magnesium



# Potassium

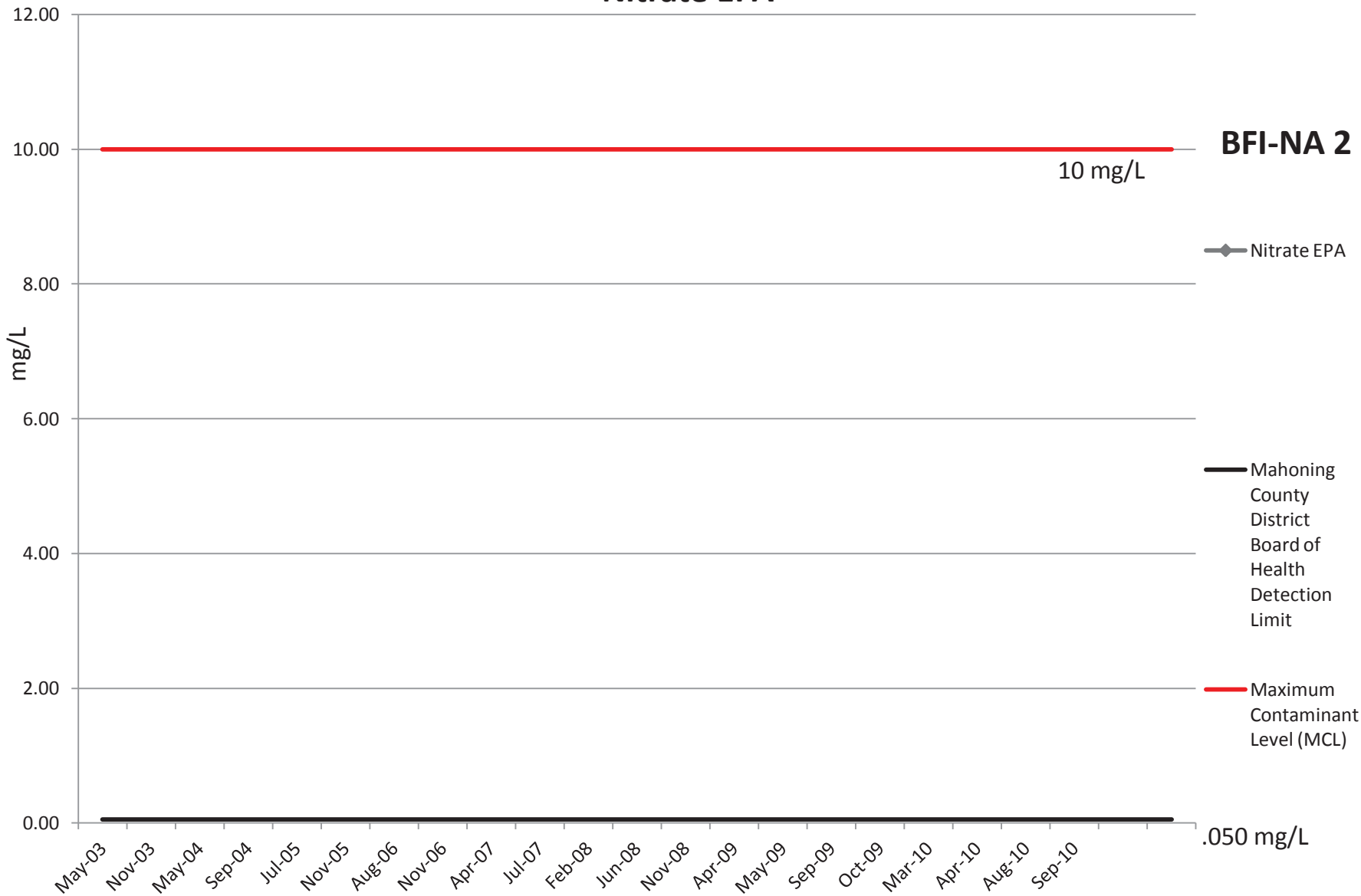


# Sodium

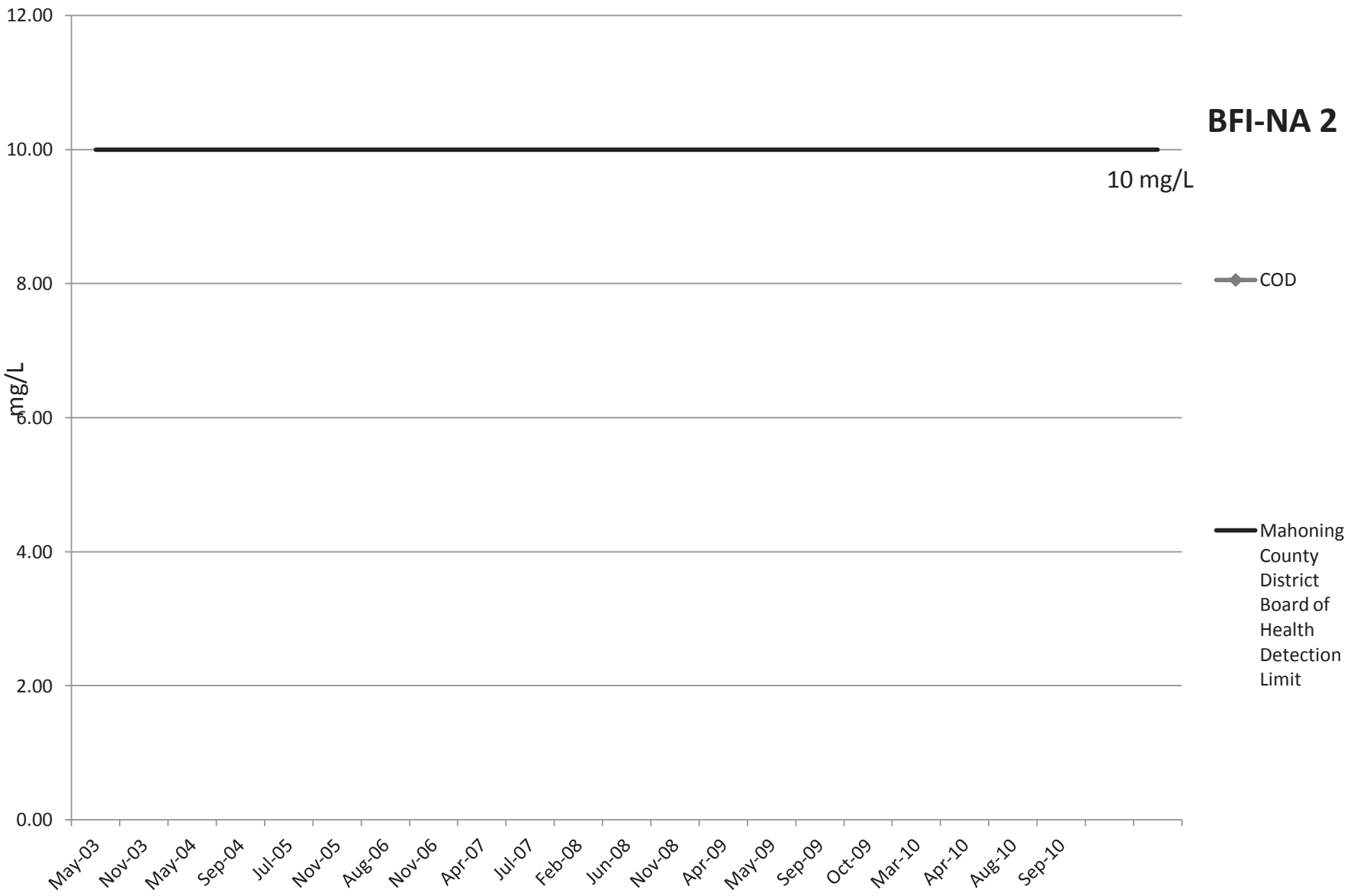




# Nitrate EPA



# COD



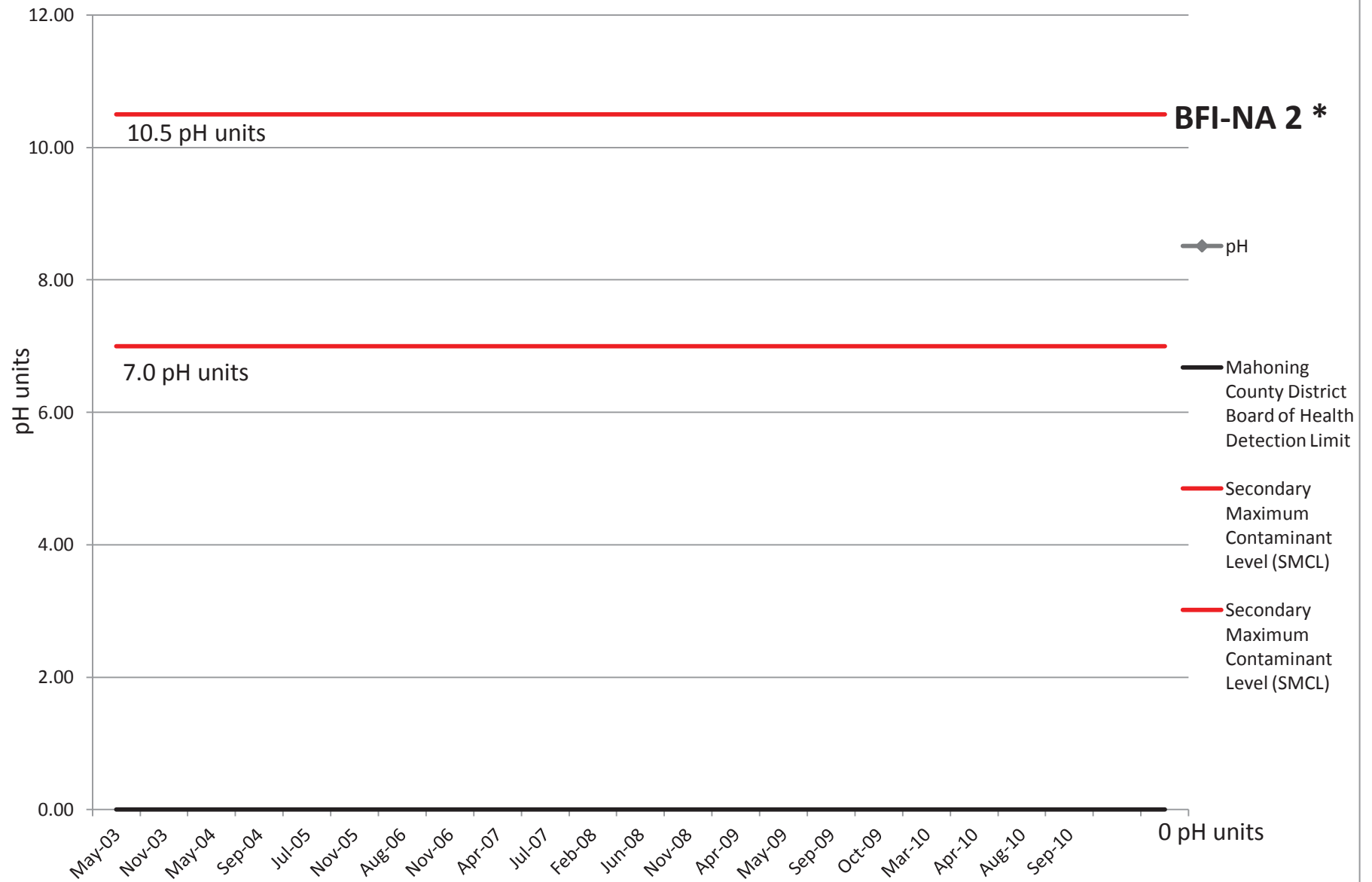
**BFI-NA 2**

10 mg/L

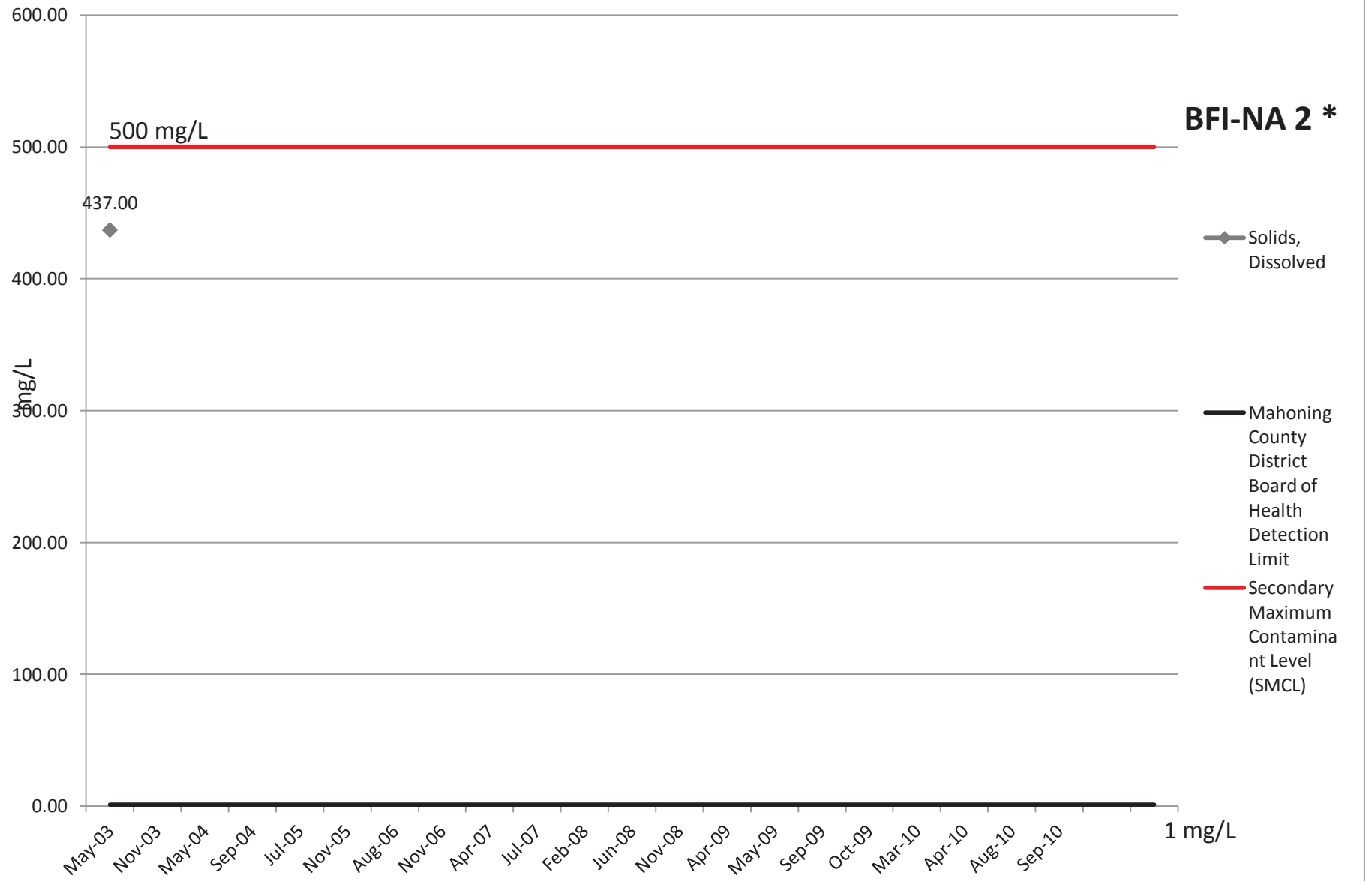
◆ COD

— Mahoning County District Board of Health Detection Limit

# pH



# Solids, Dissolved



**BFI-NA 2 \***

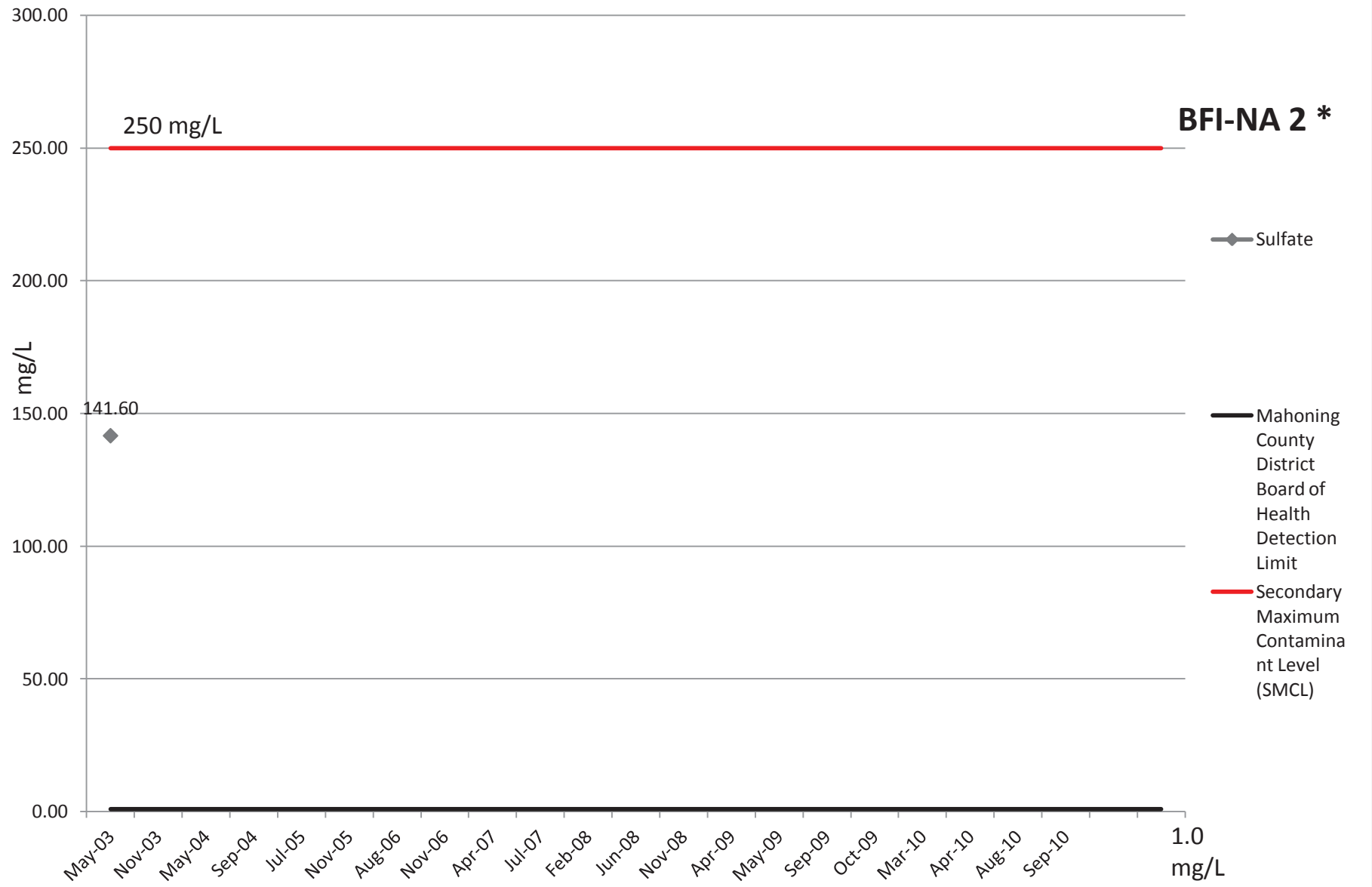
◆ Solids, Dissolved

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

1 mg/L

# Sulfate



◆ Sulfate

— Mahoning County District Board of Health Detection Limit

— Secondary Maximum Contaminant Level (SMCL)

250 mg/L

**BFI-NA 2 \***

141.60

1.0 mg/L

# Bacteria

positive (1)

**BFI-NA 2 \***

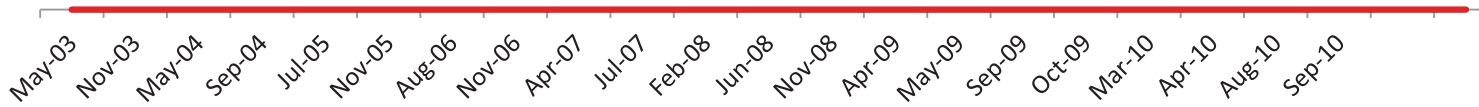
Positive/Negative

—◆— Bacteria

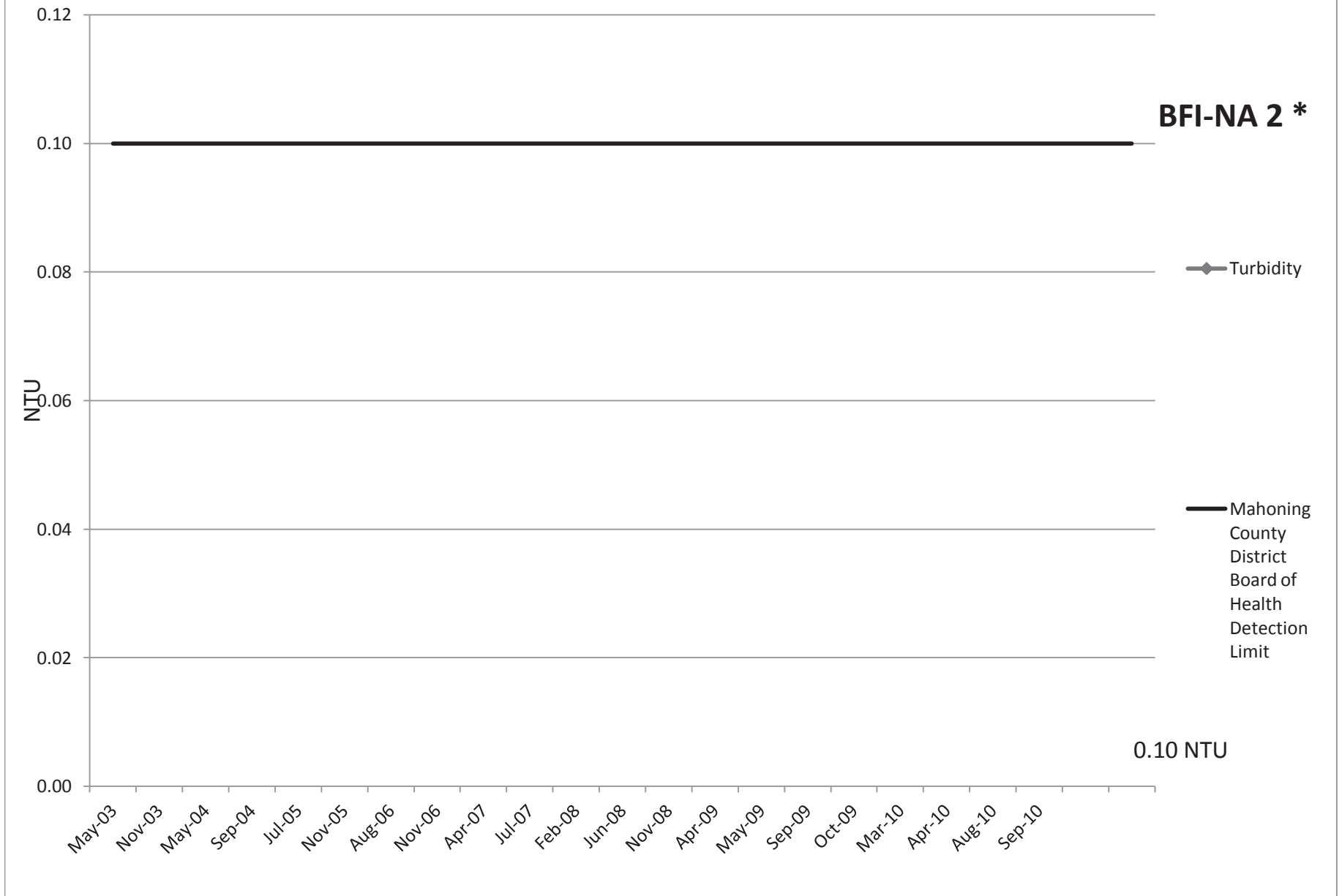
— Mahoning  
County  
District  
Board of  
Health  
Detection  
Limit

— Maximum  
Contaminant  
Level (MCL)

negative (0)

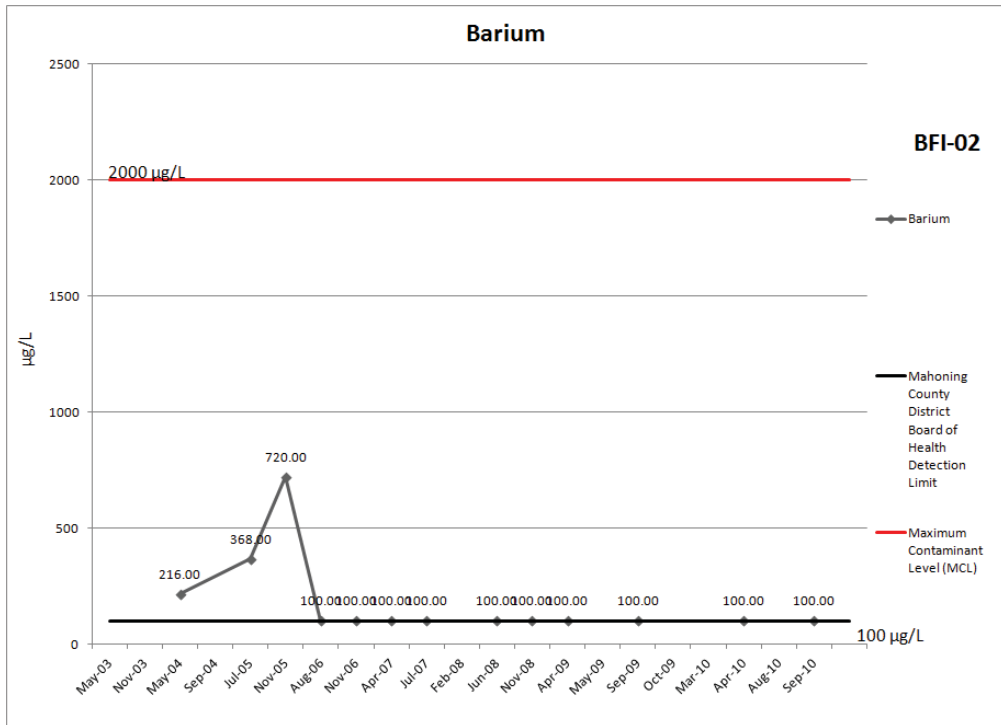
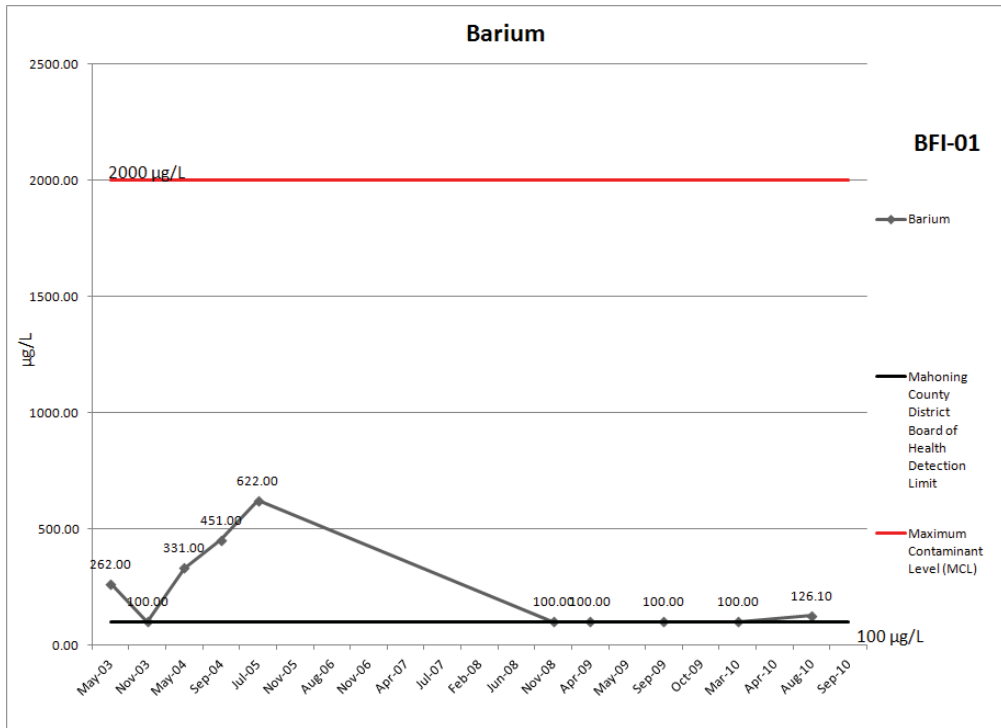


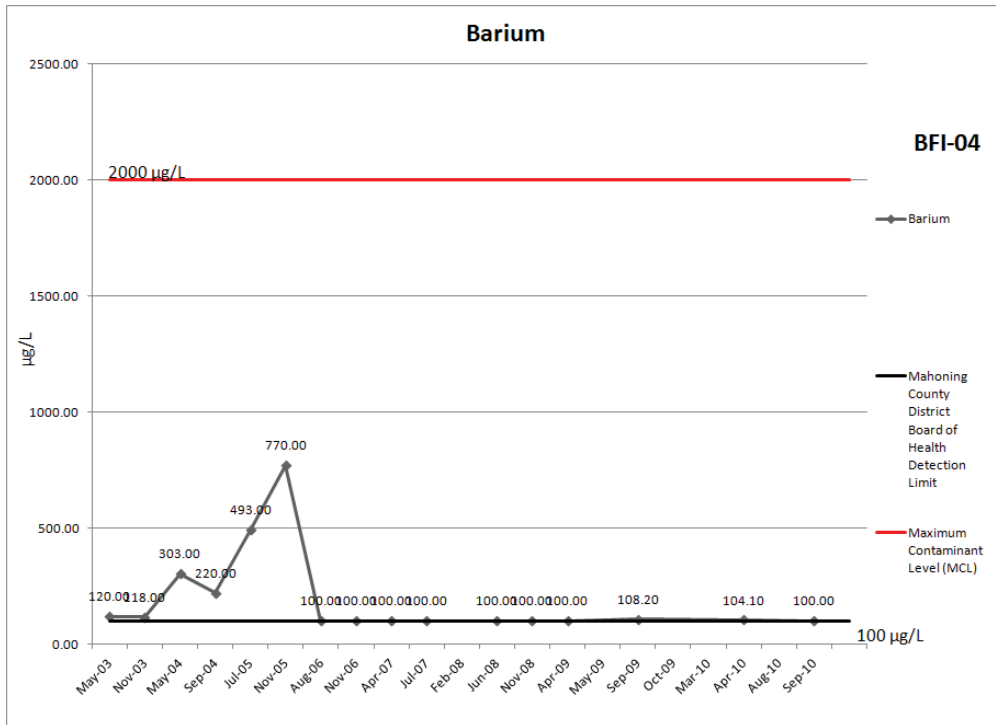
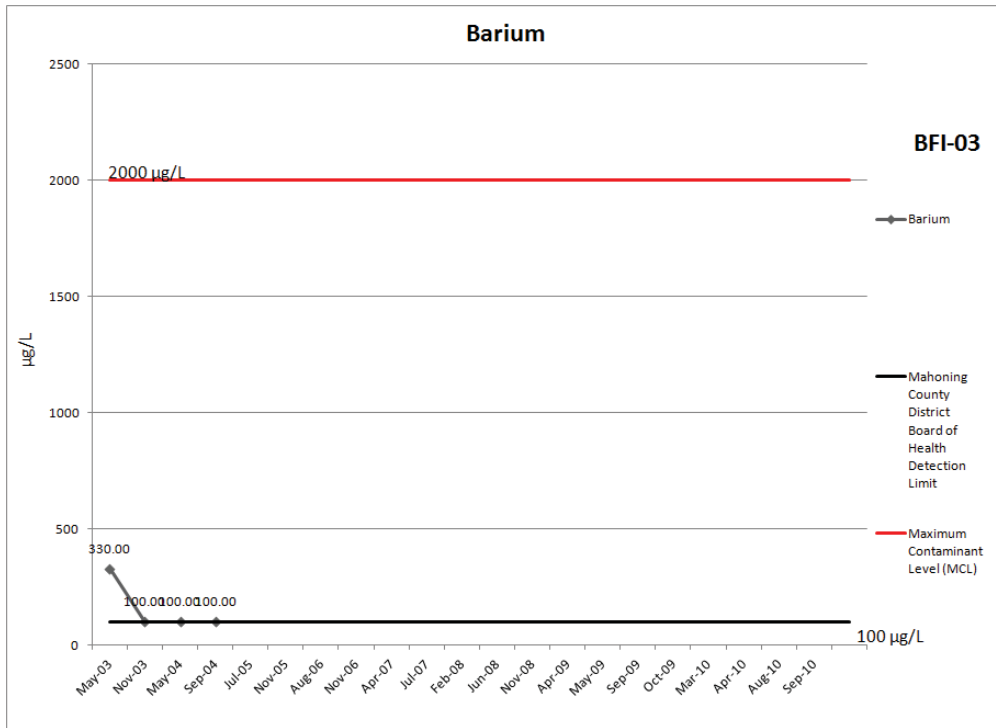
# Turbidity

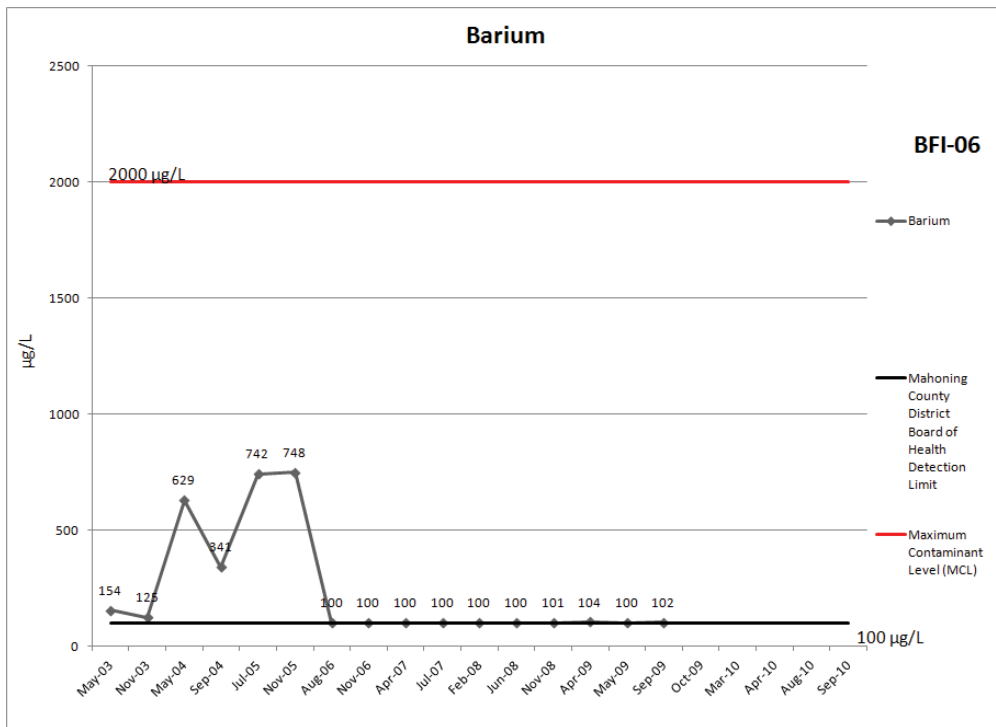
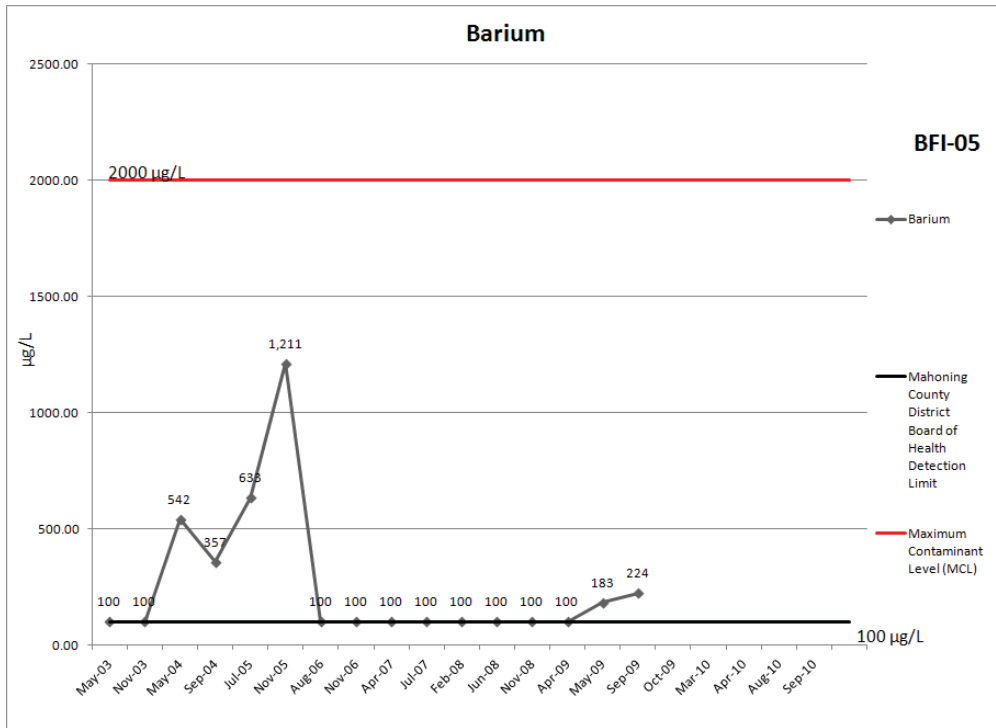


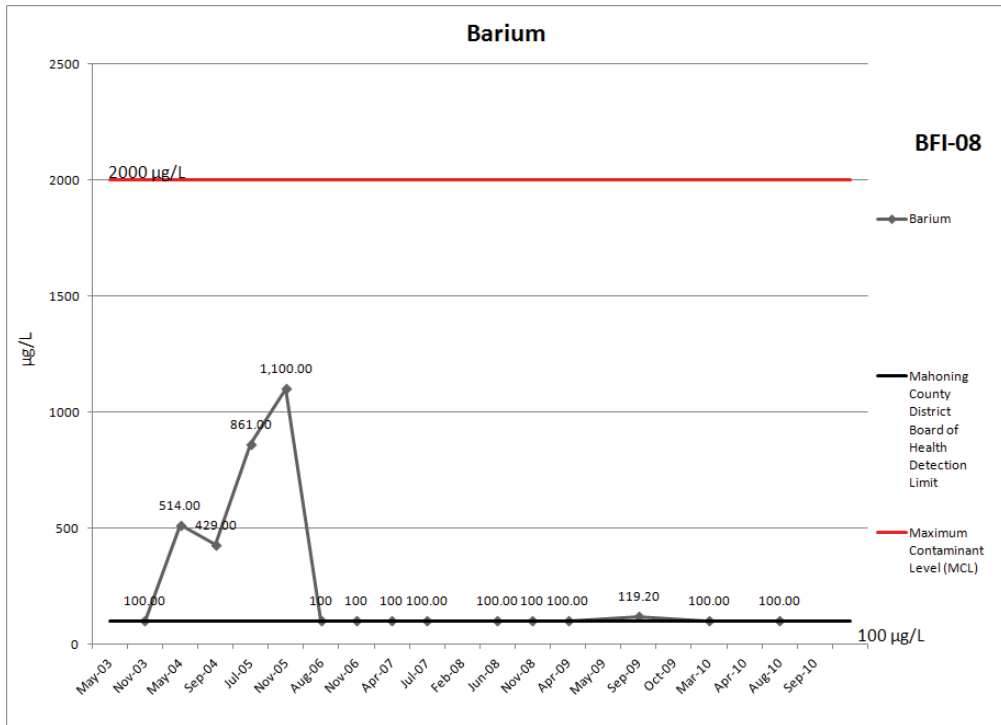
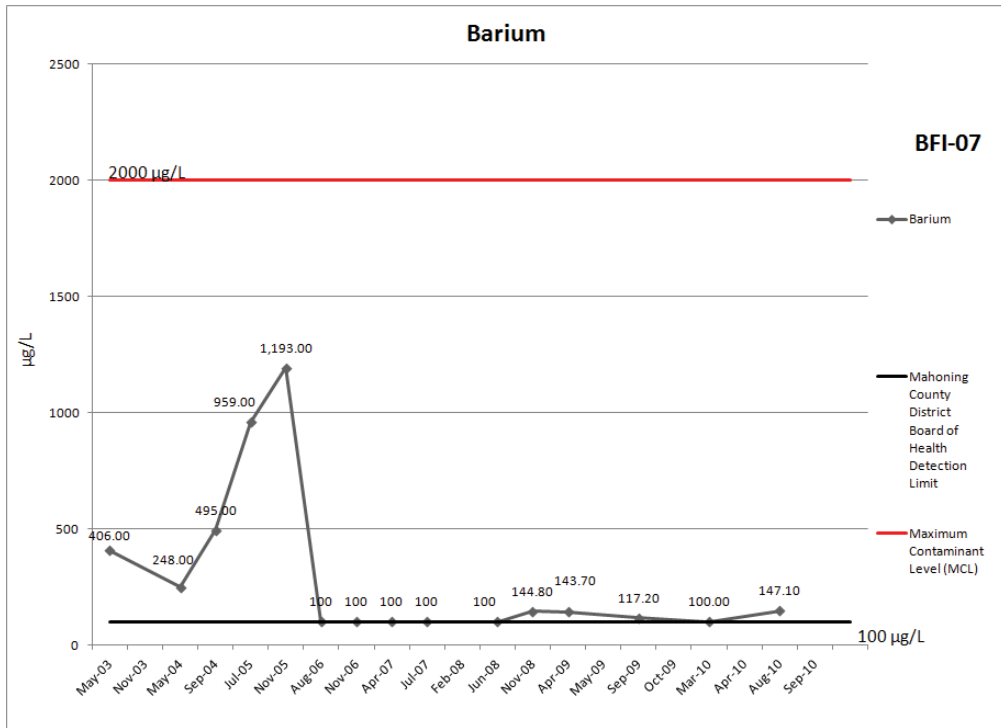
**APPENDIX E: Elevated Barium Time Series Charts**

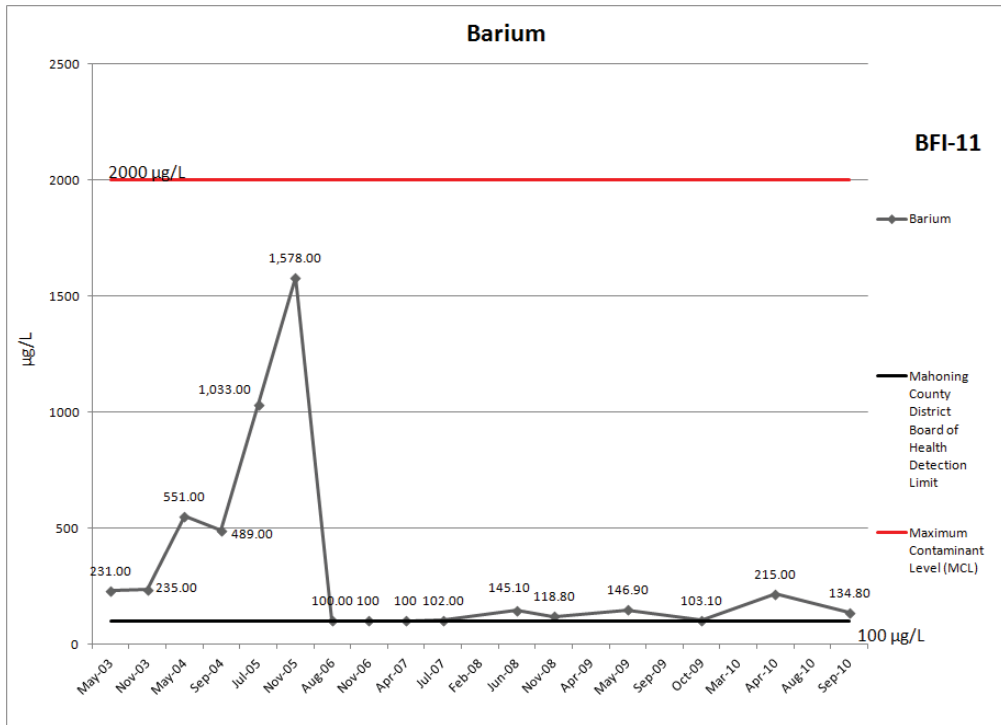
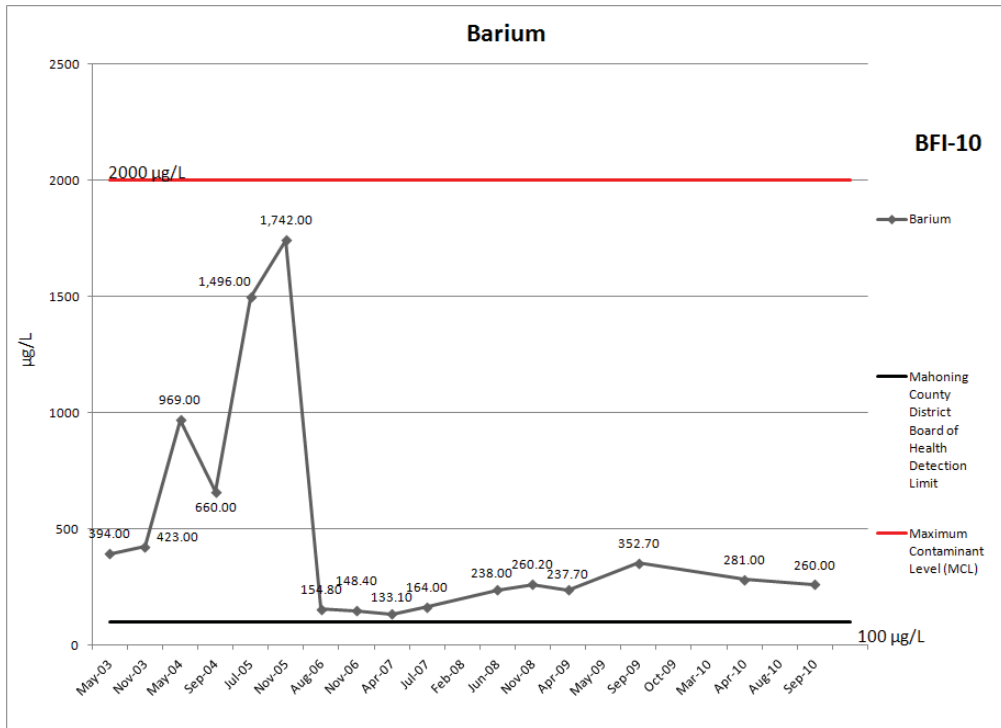


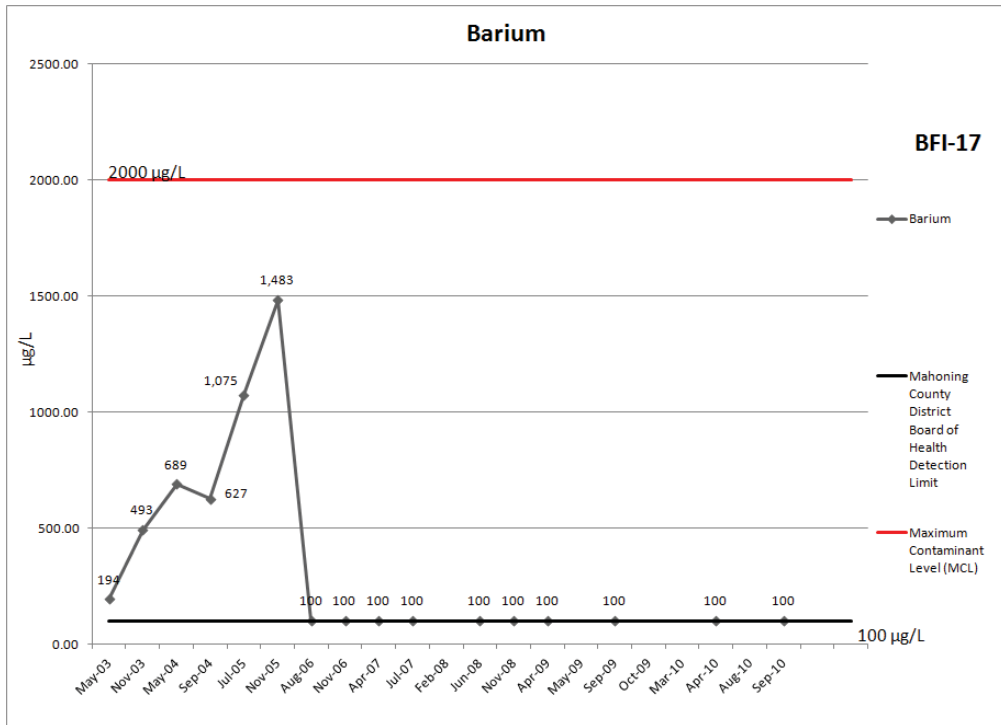
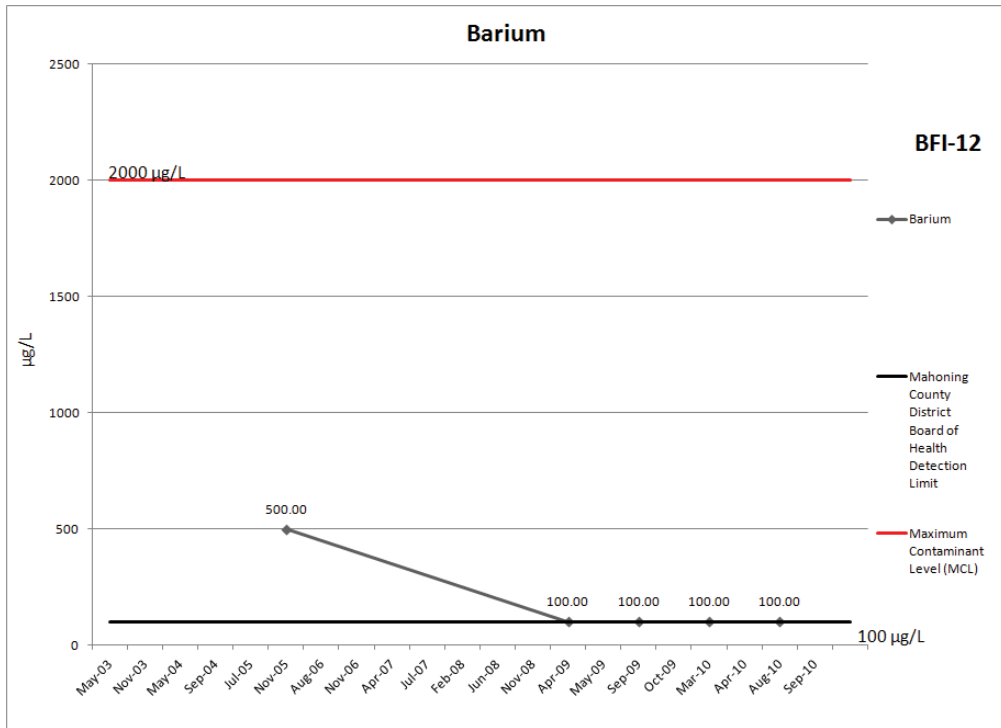


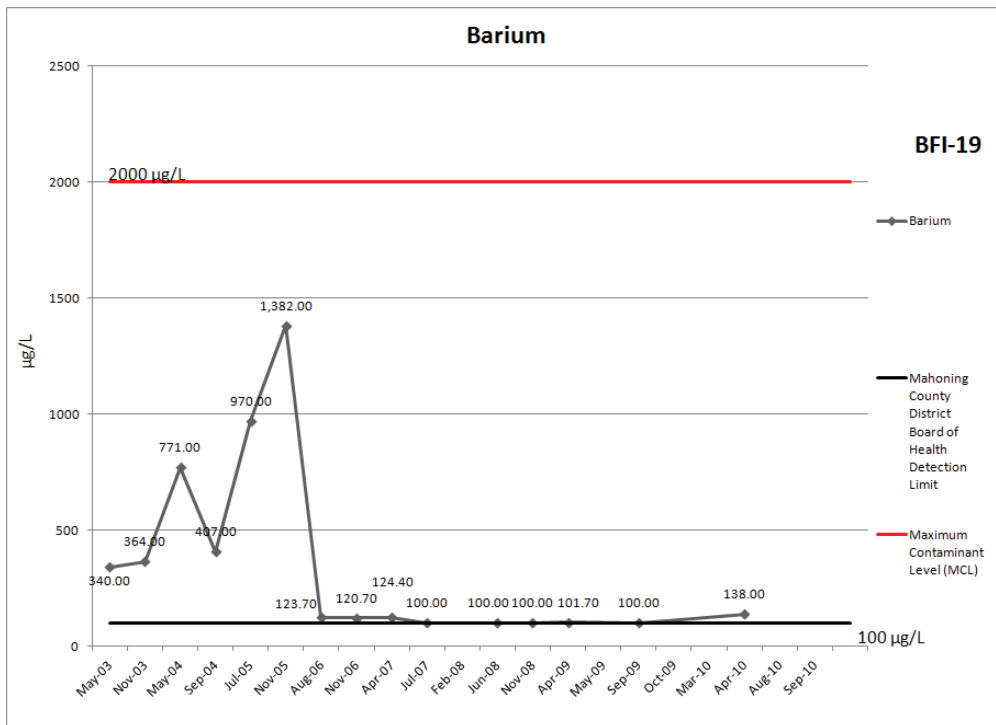
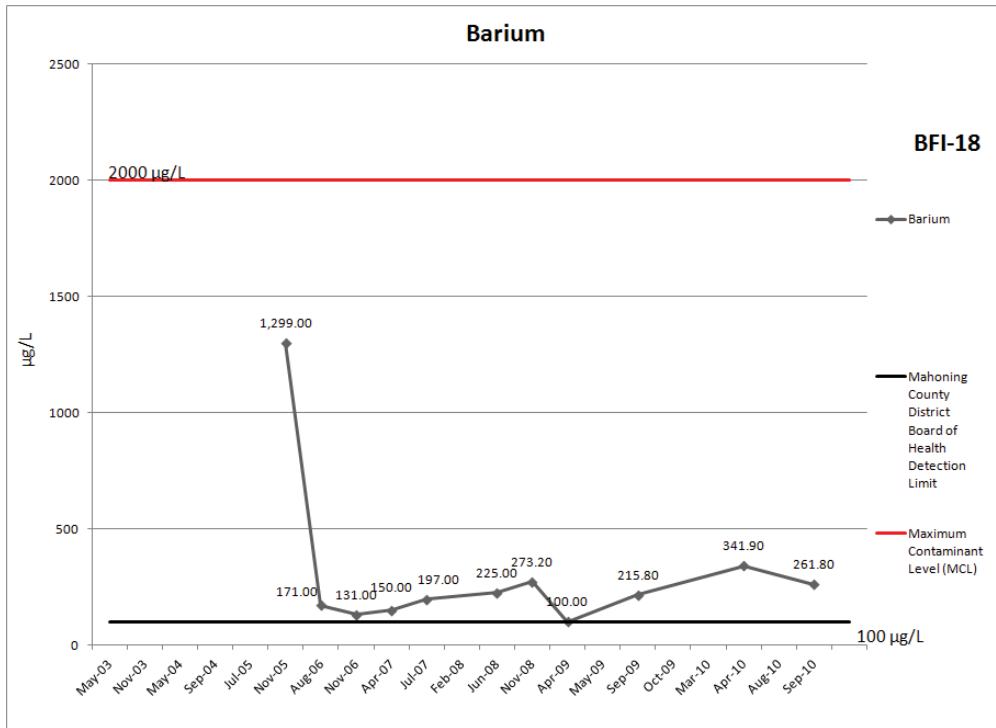


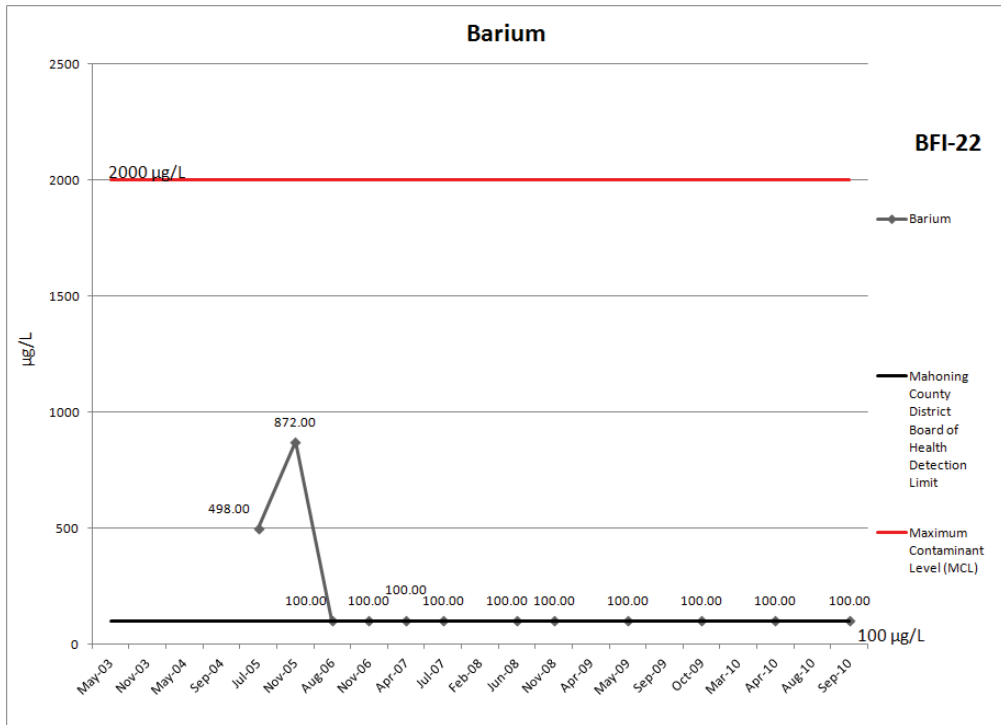
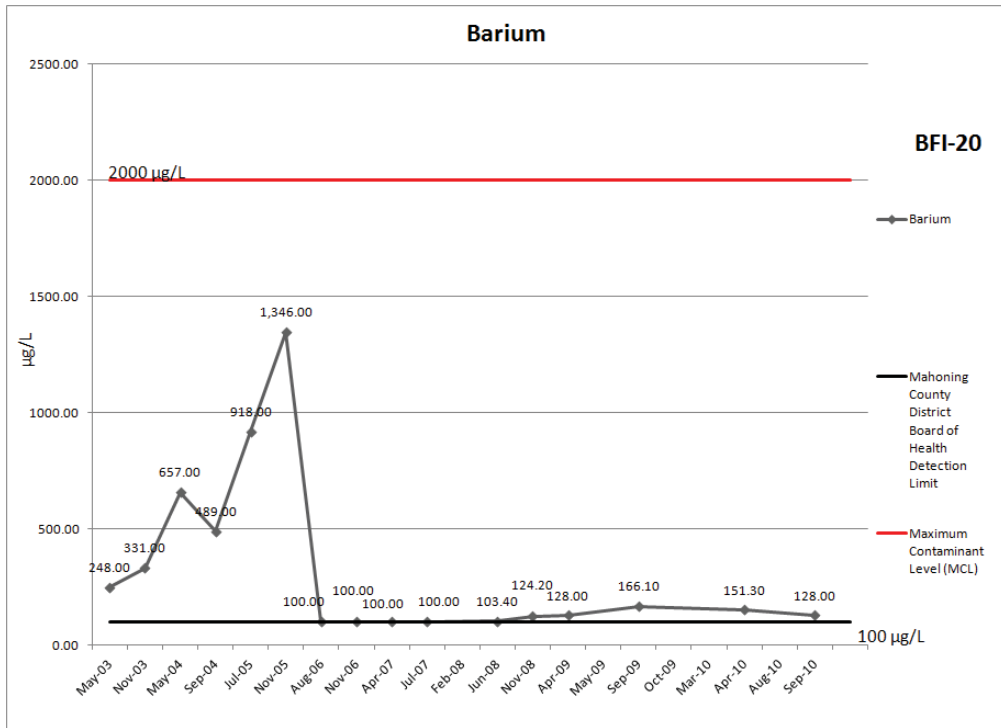




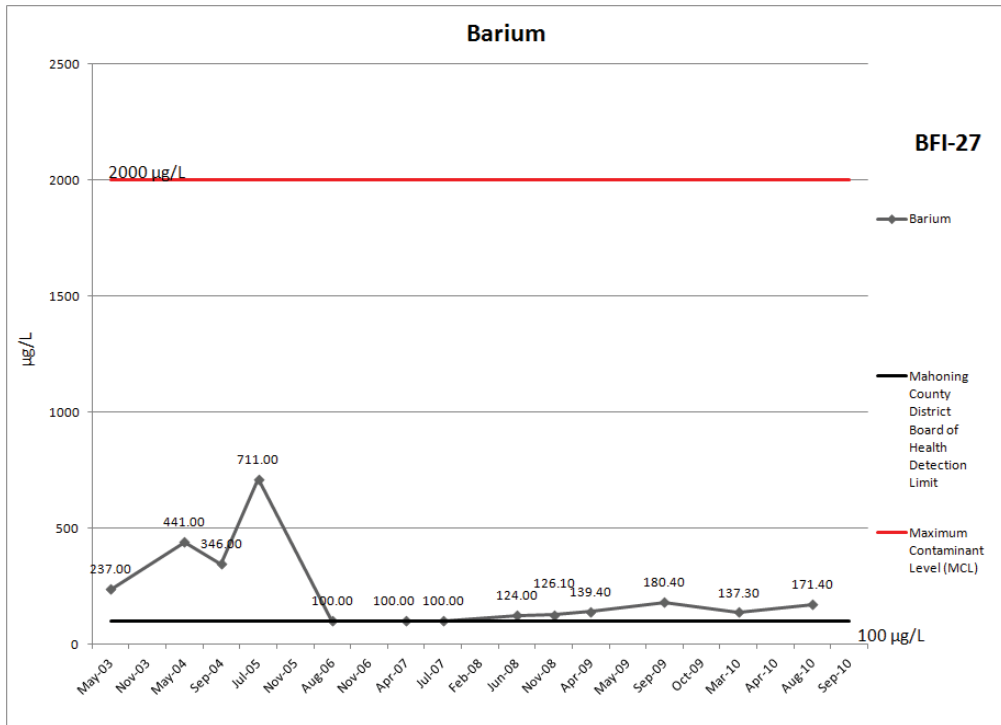
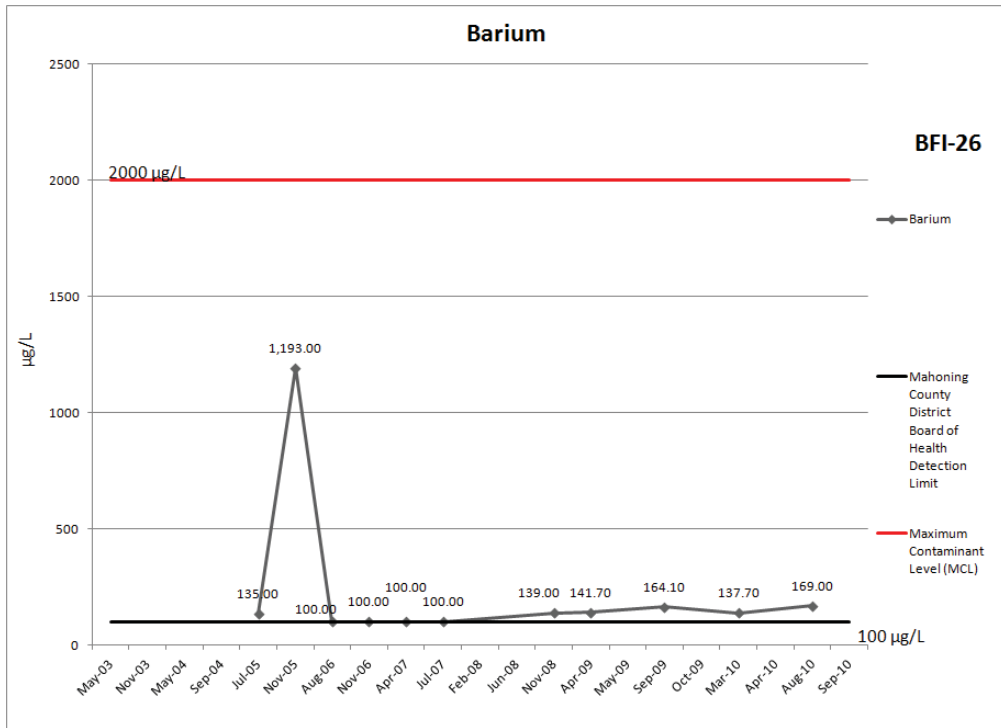


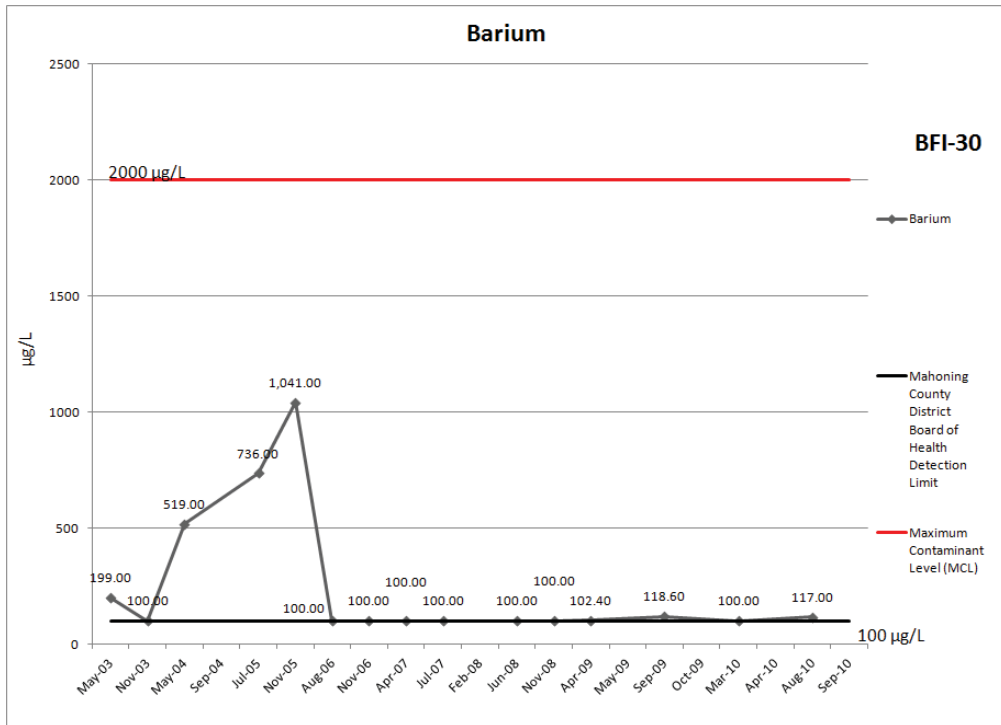
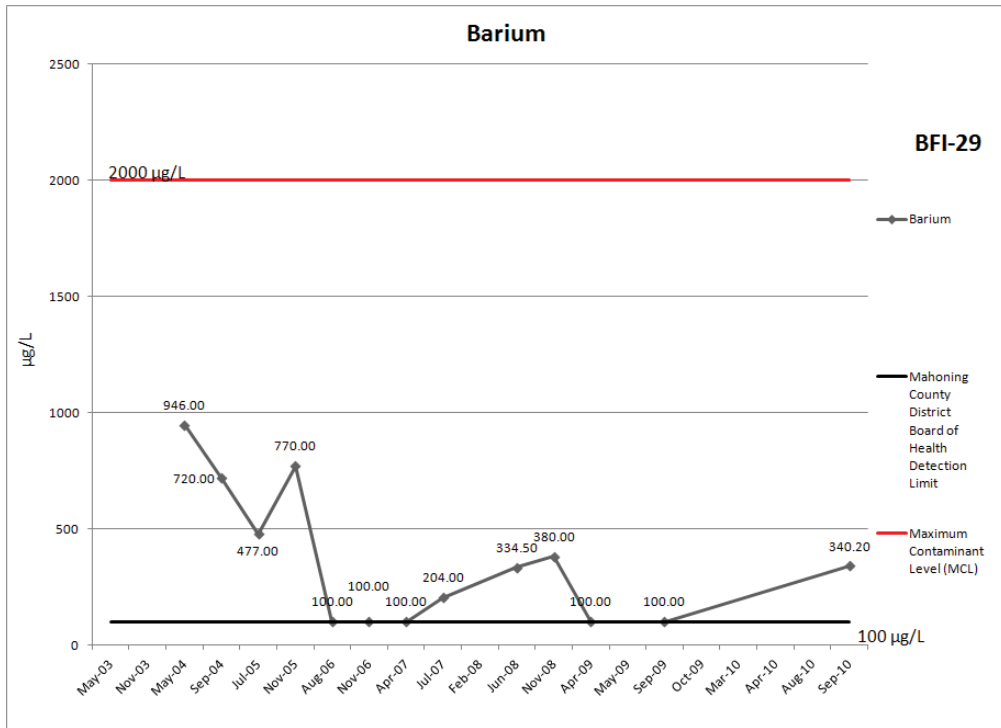


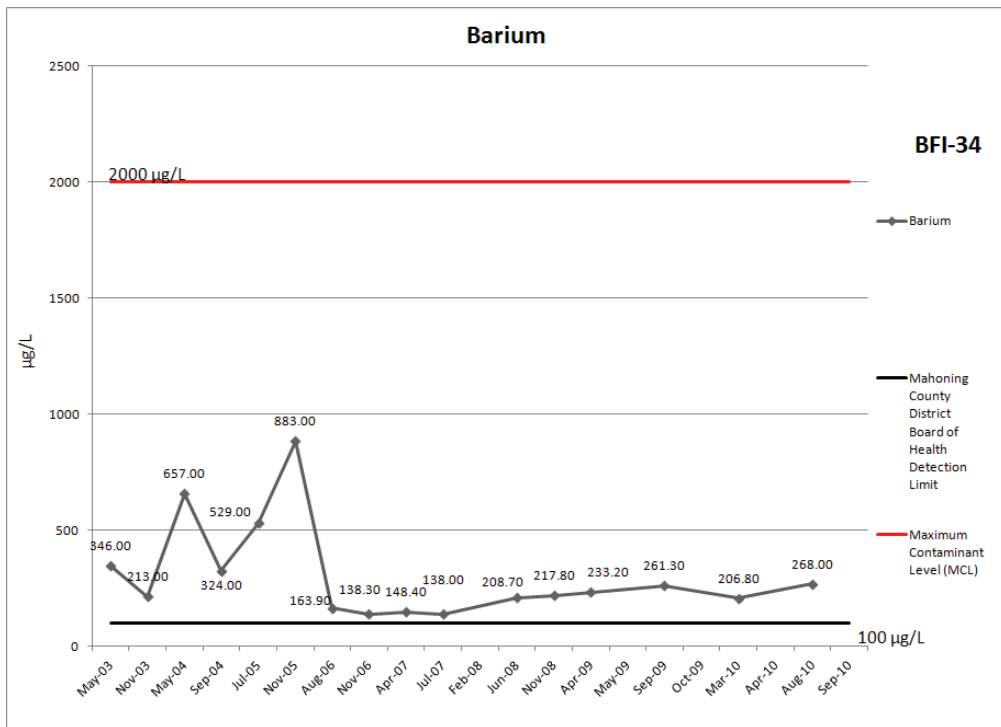
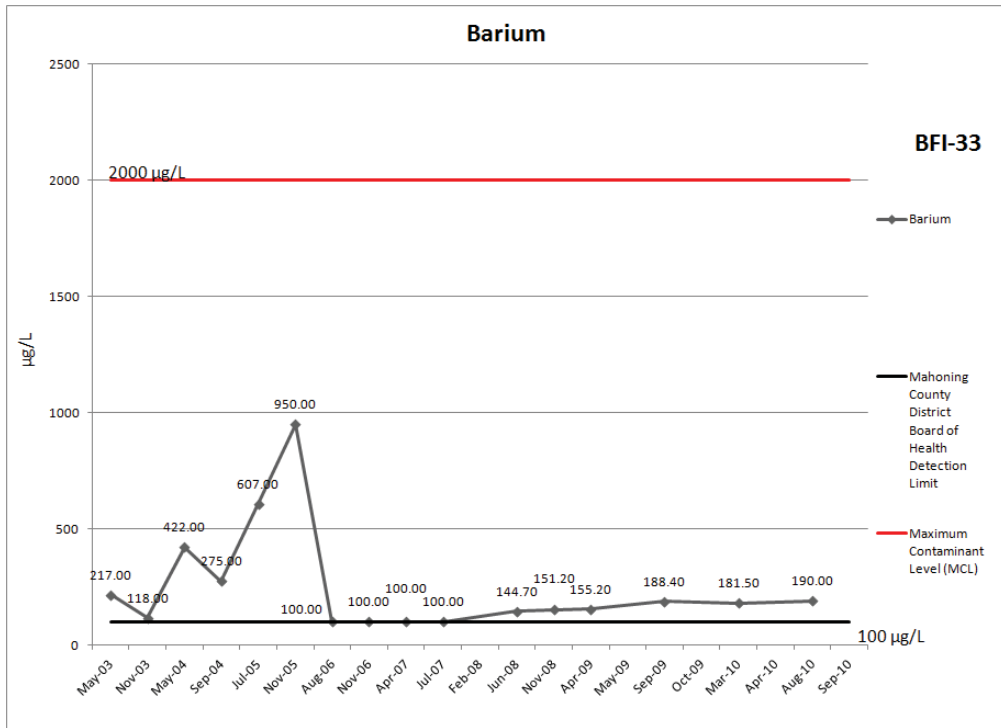


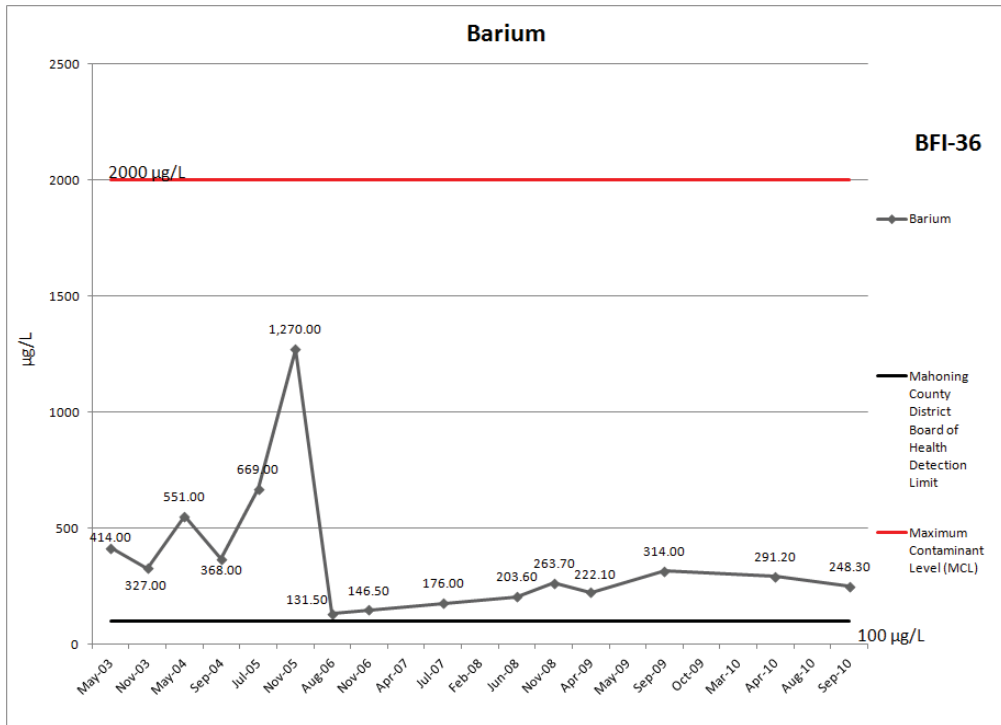
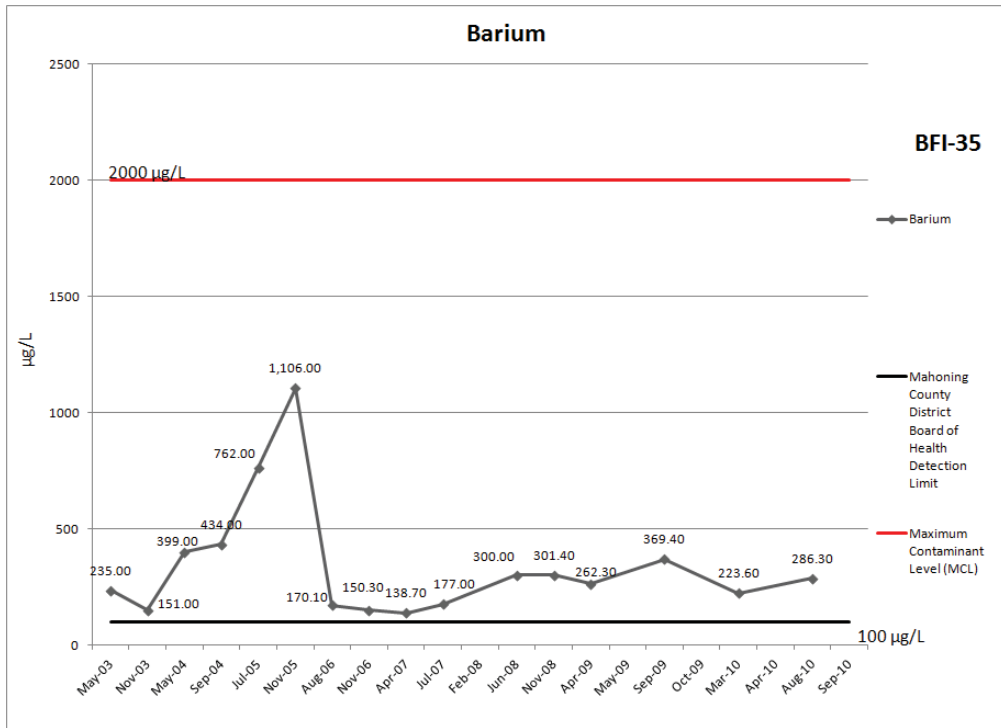


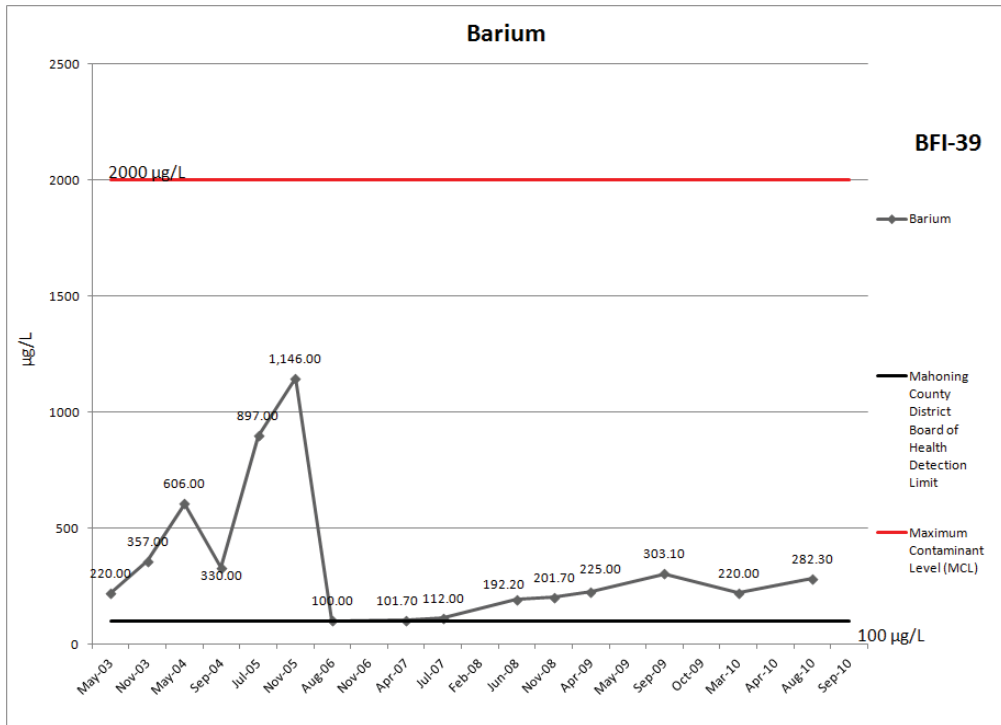
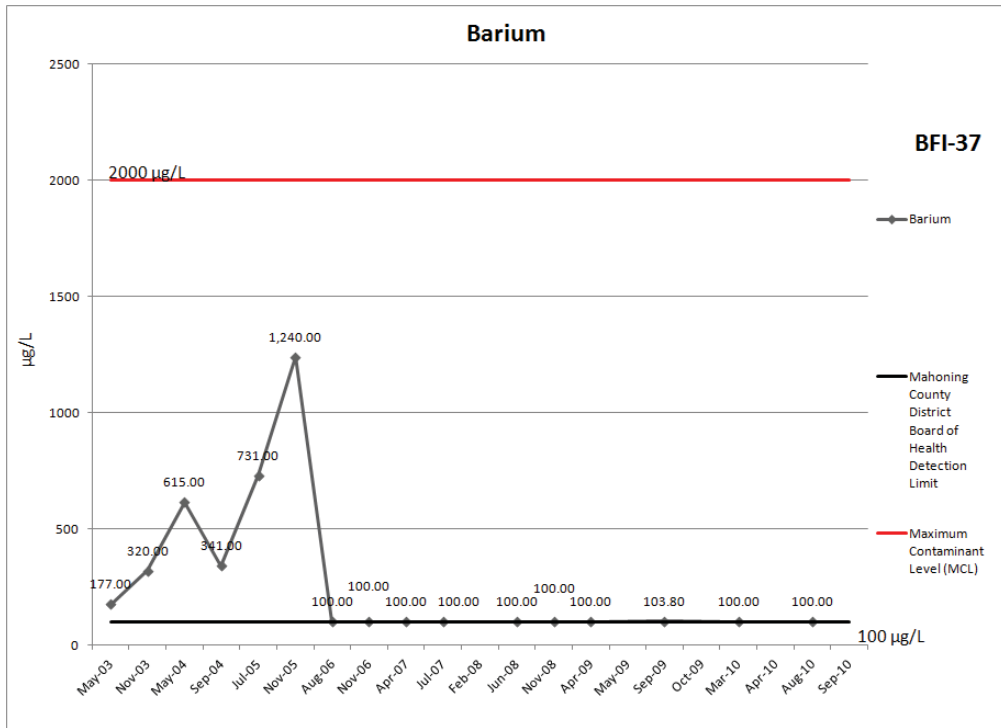


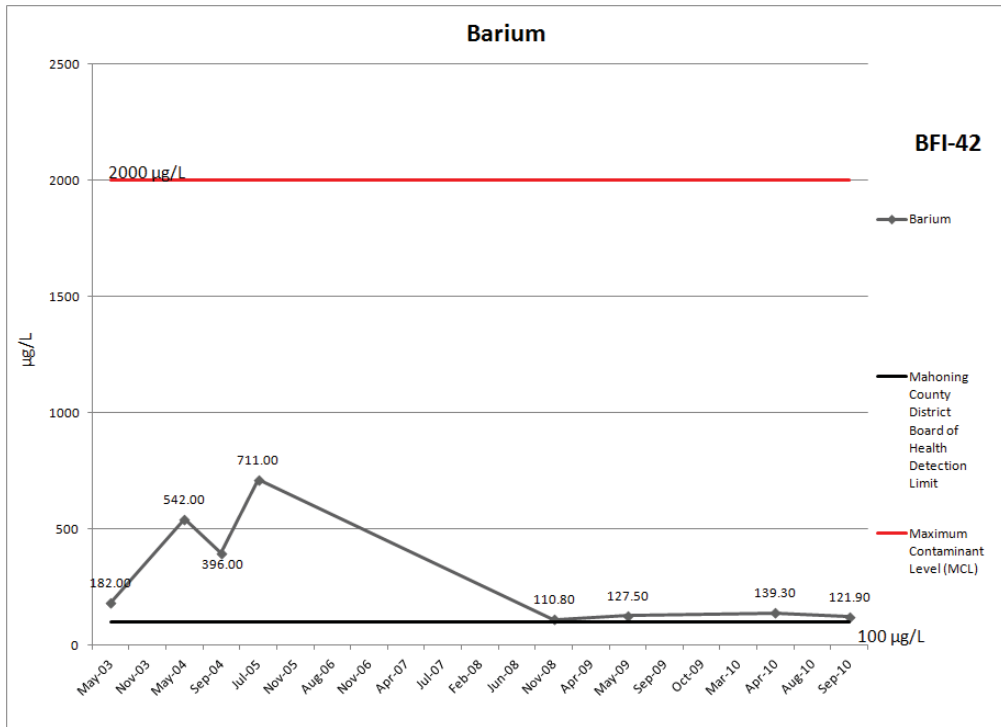
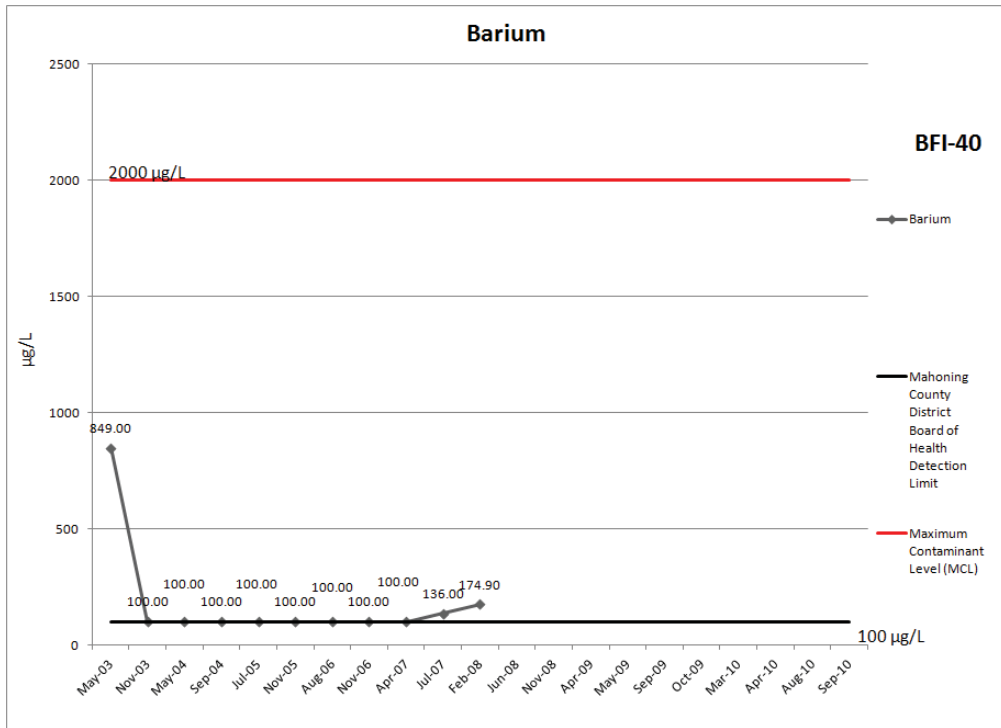


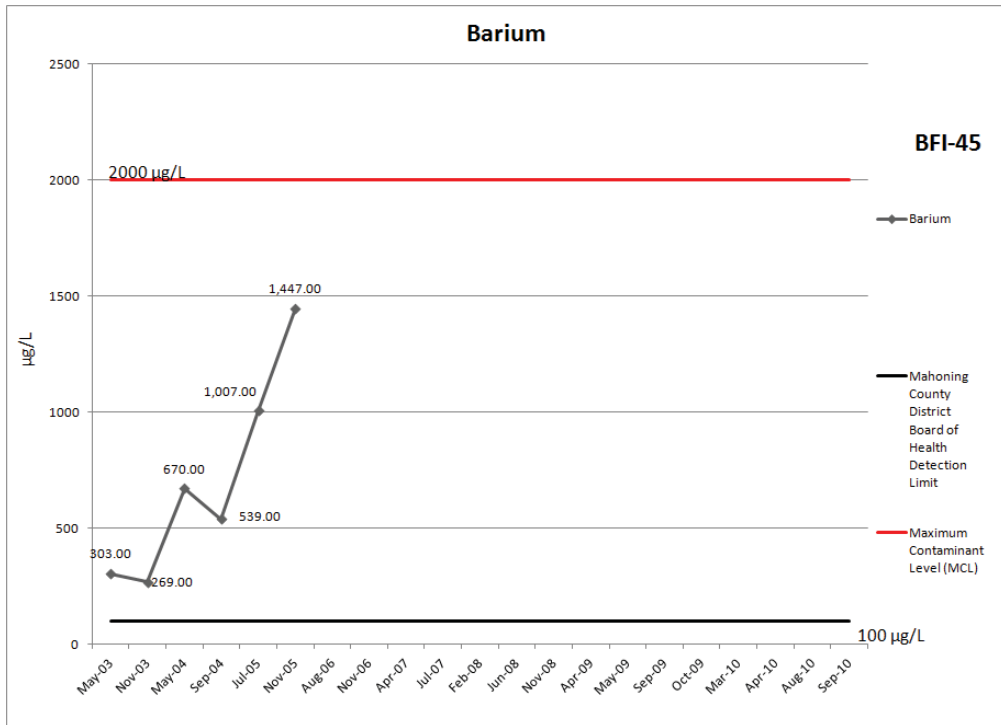
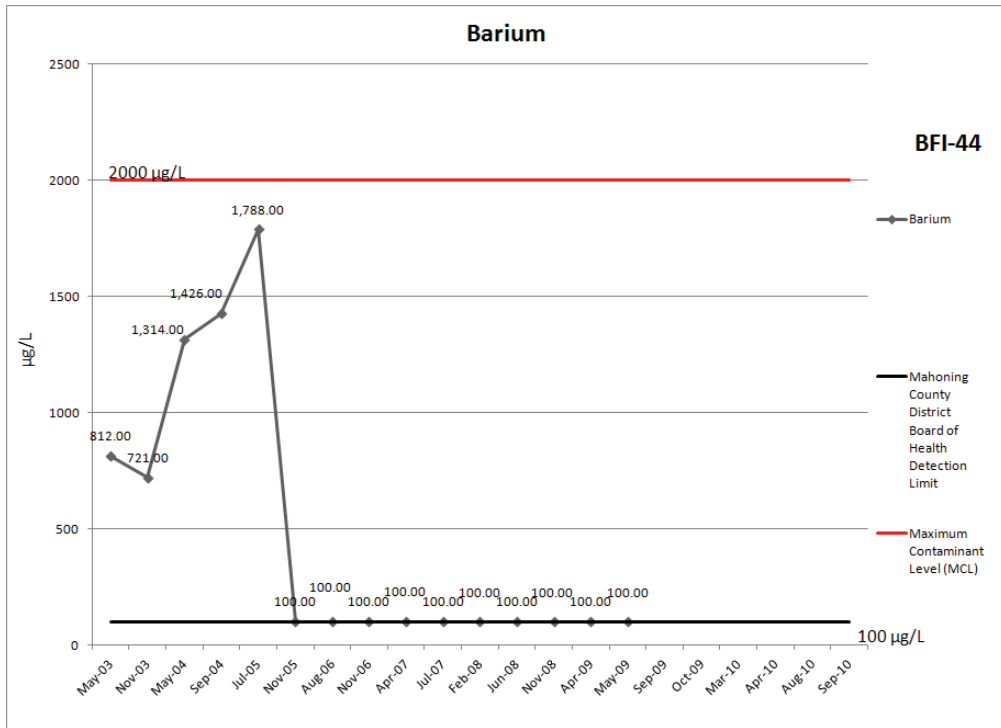


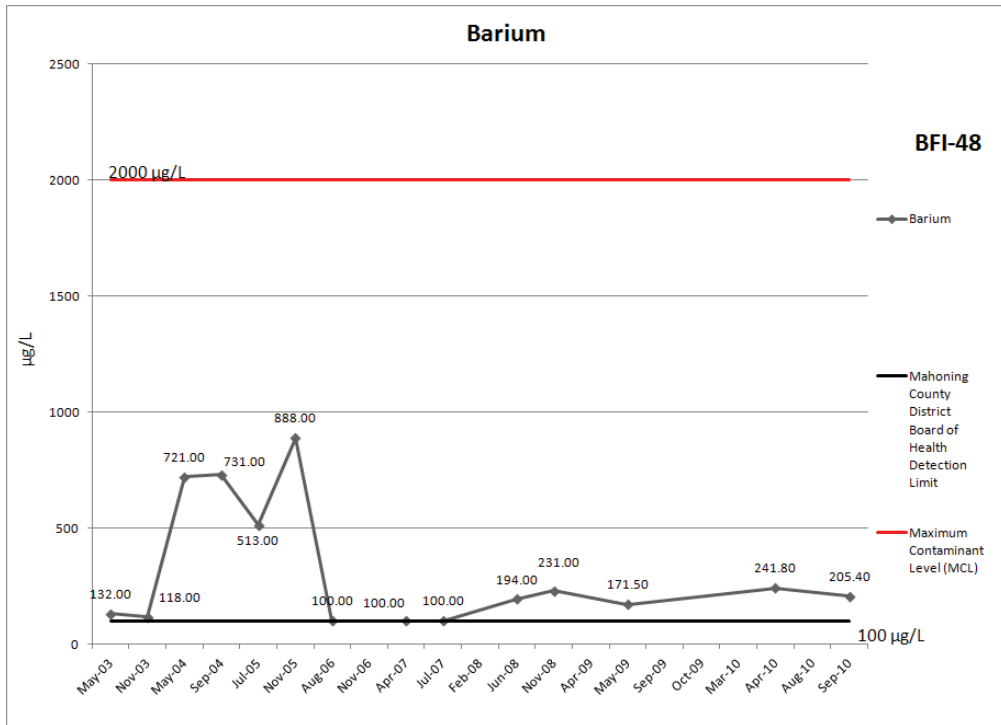
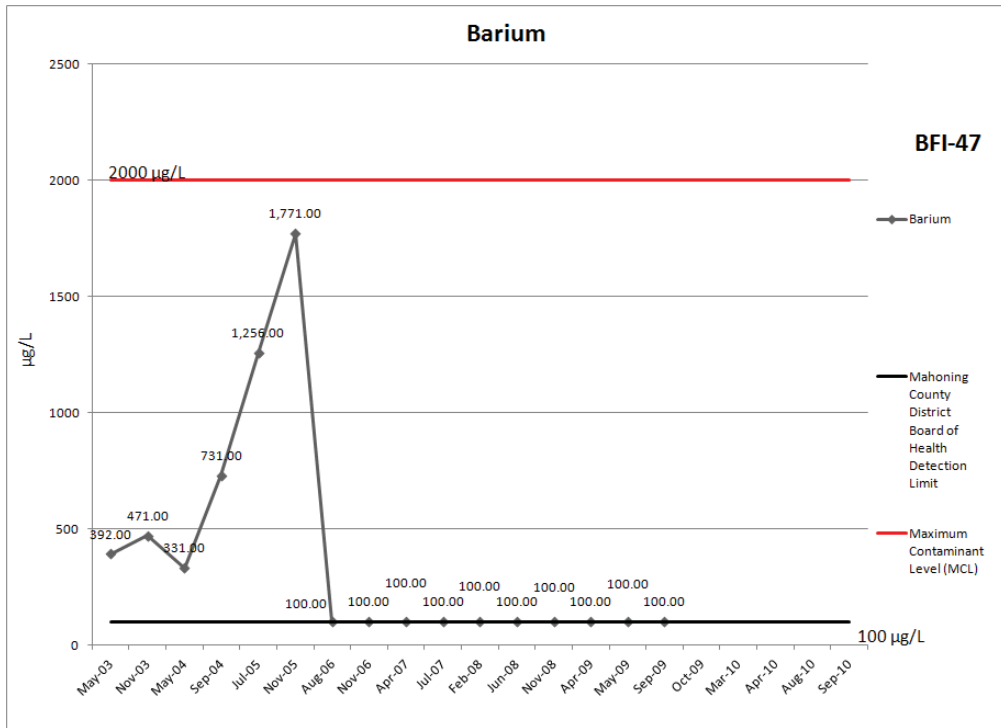




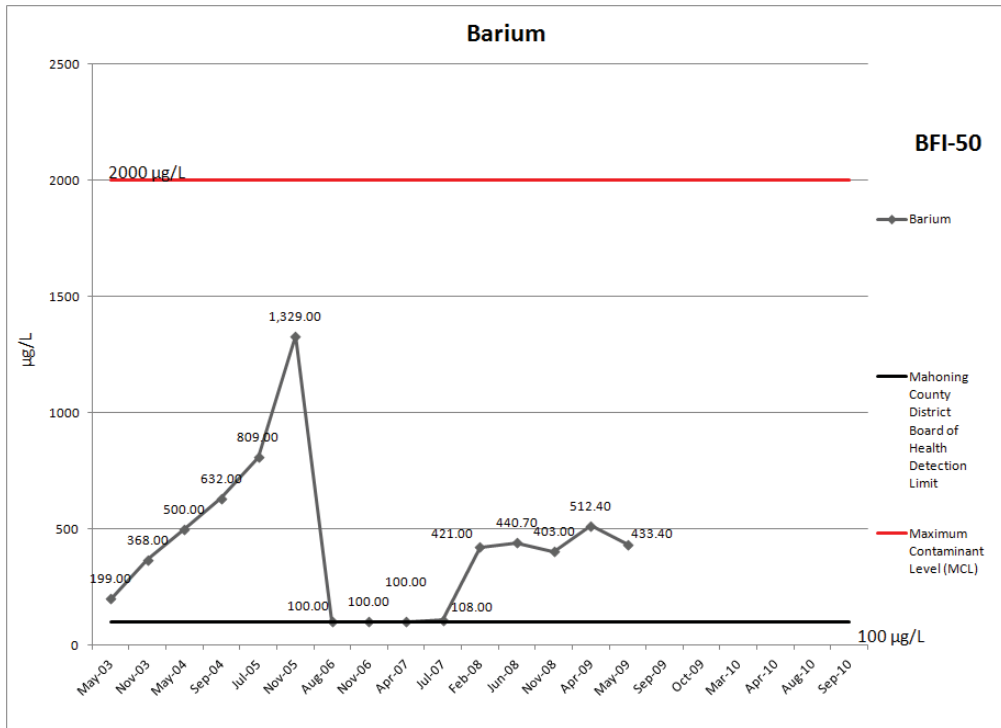




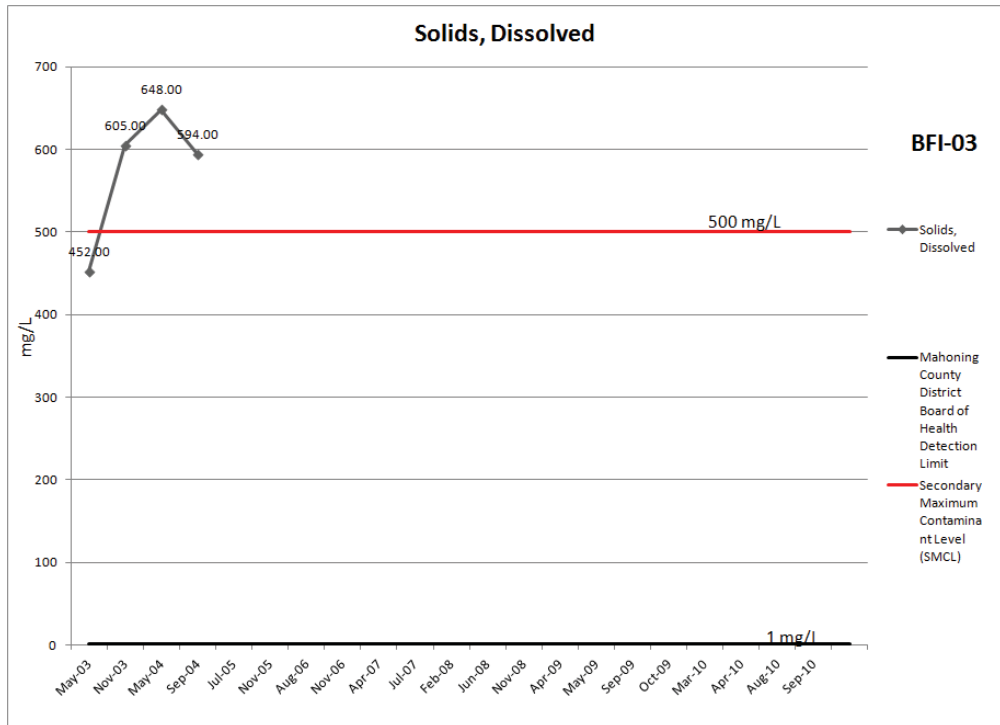
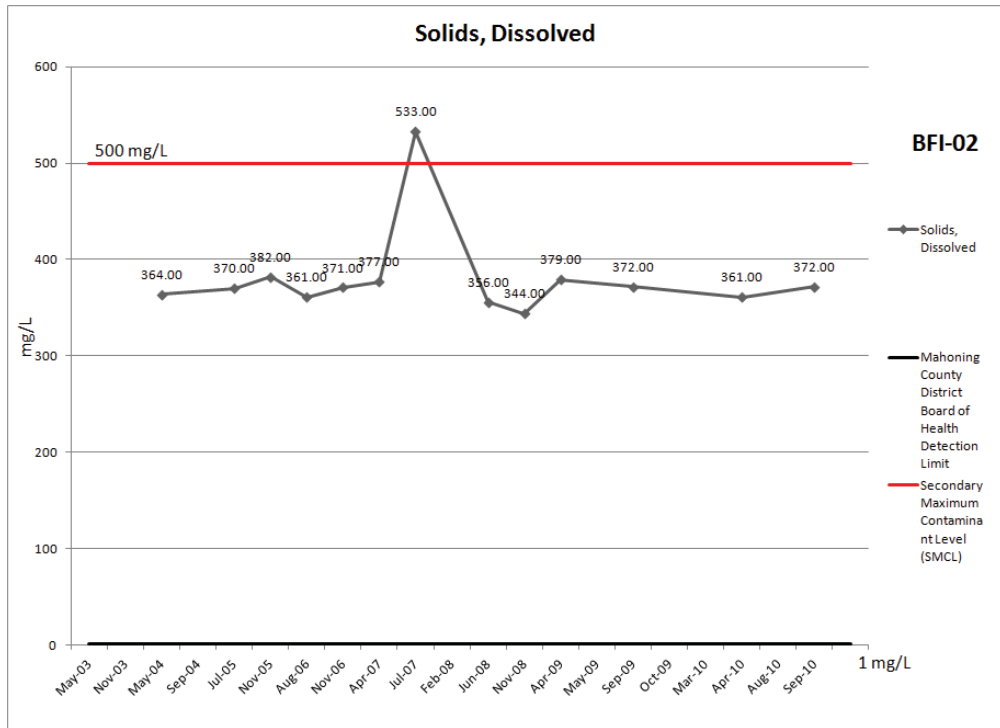


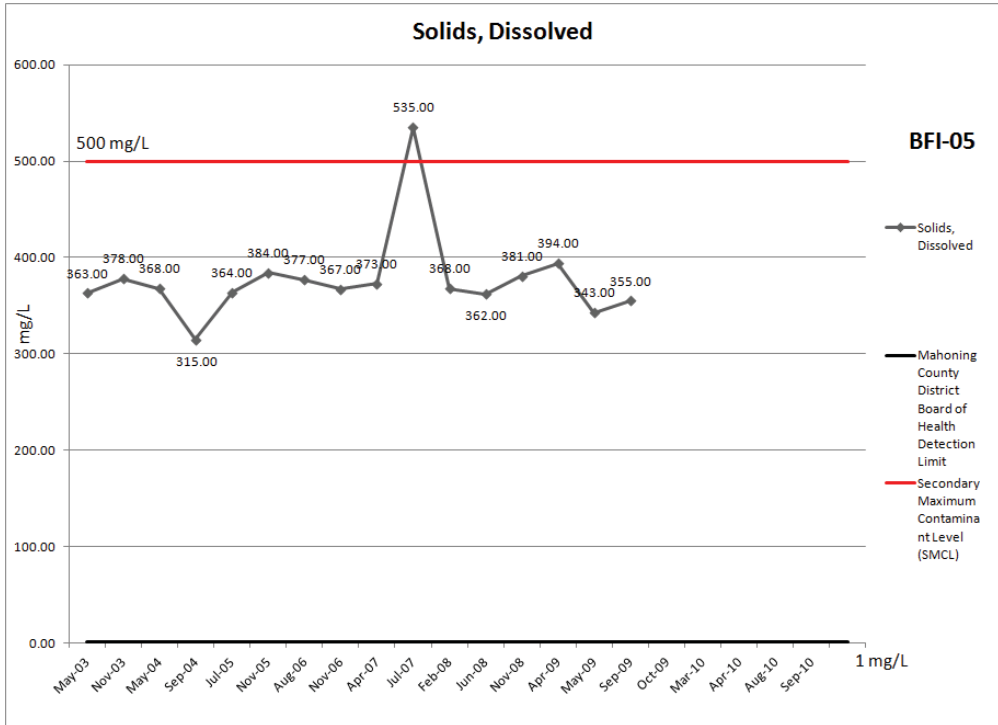
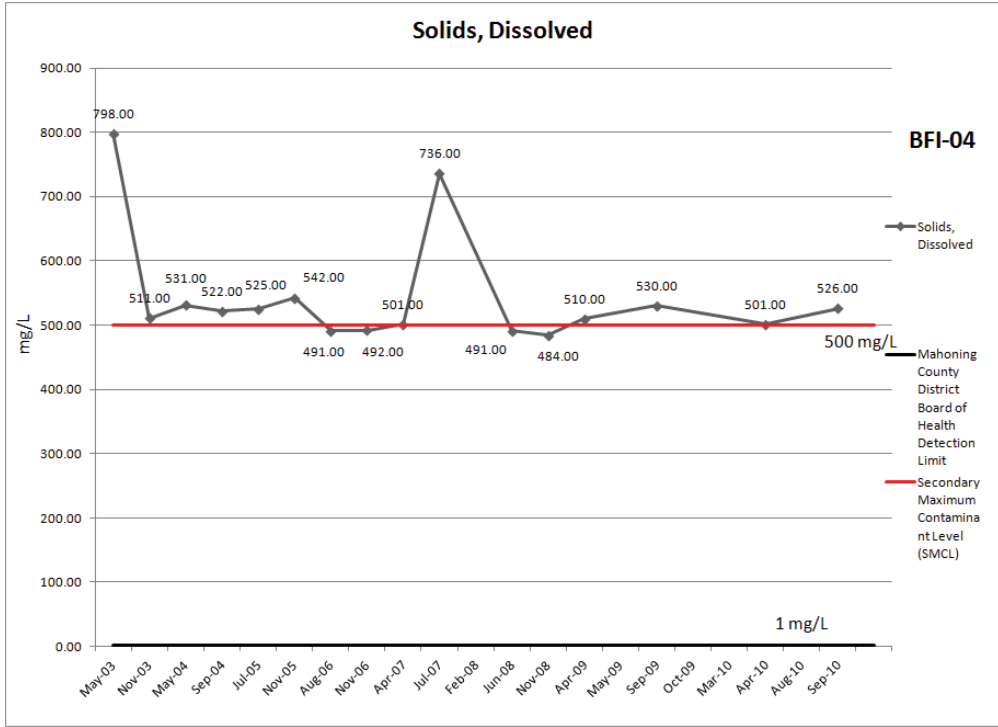


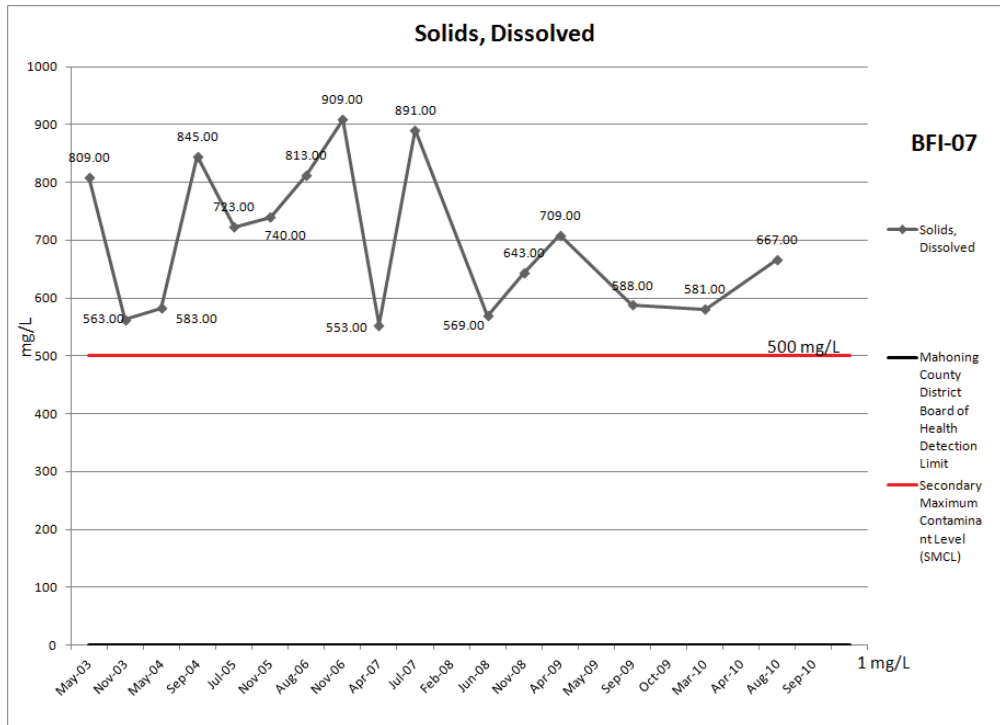
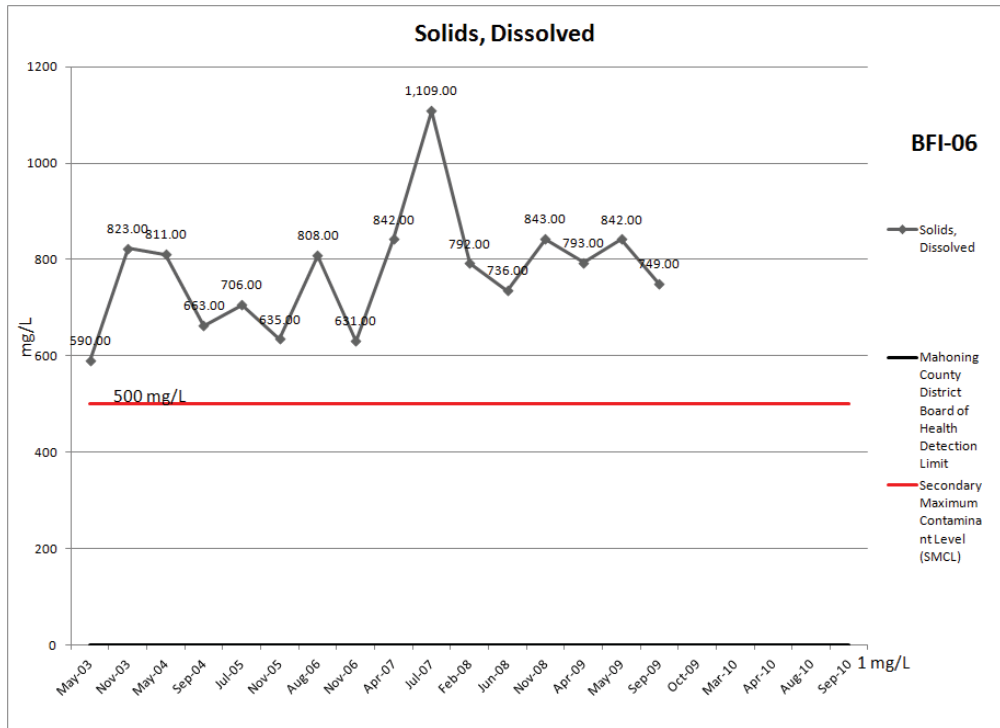


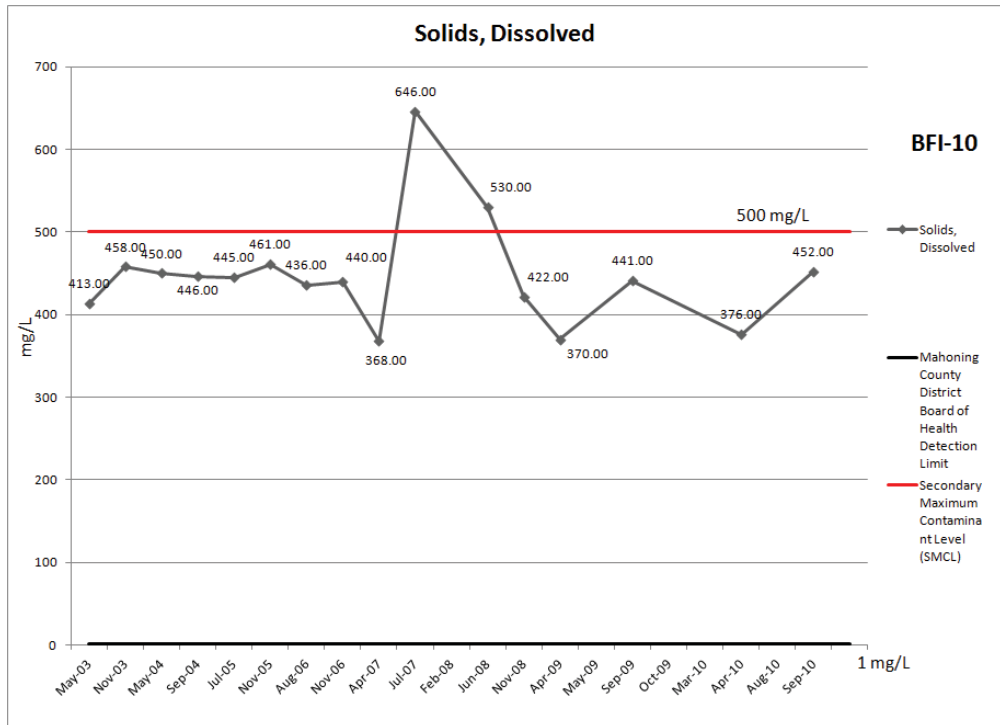
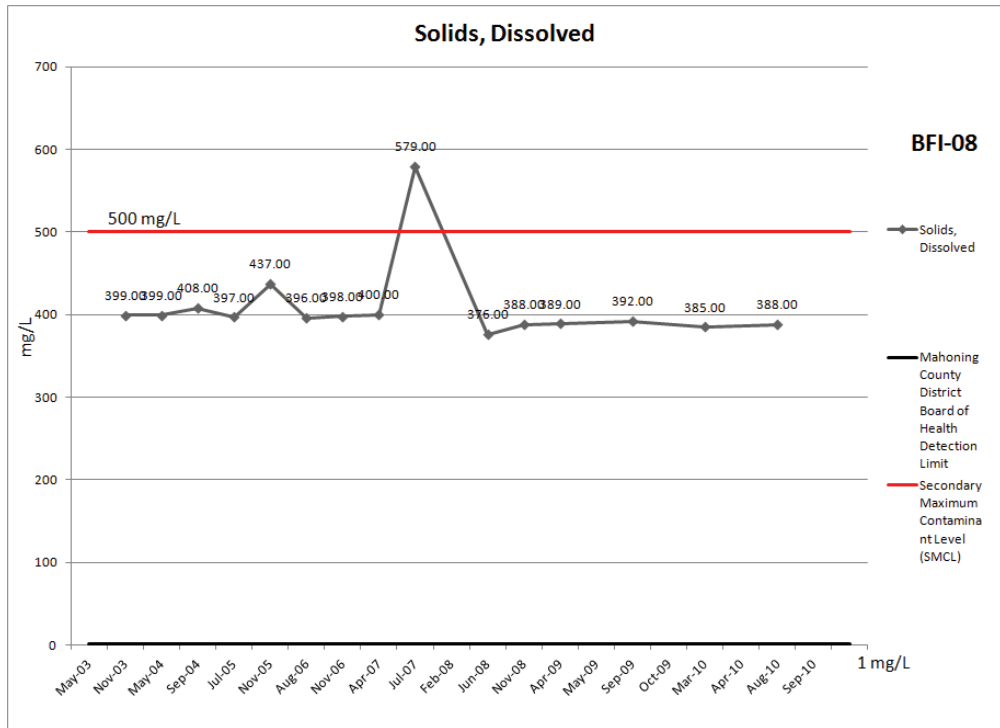


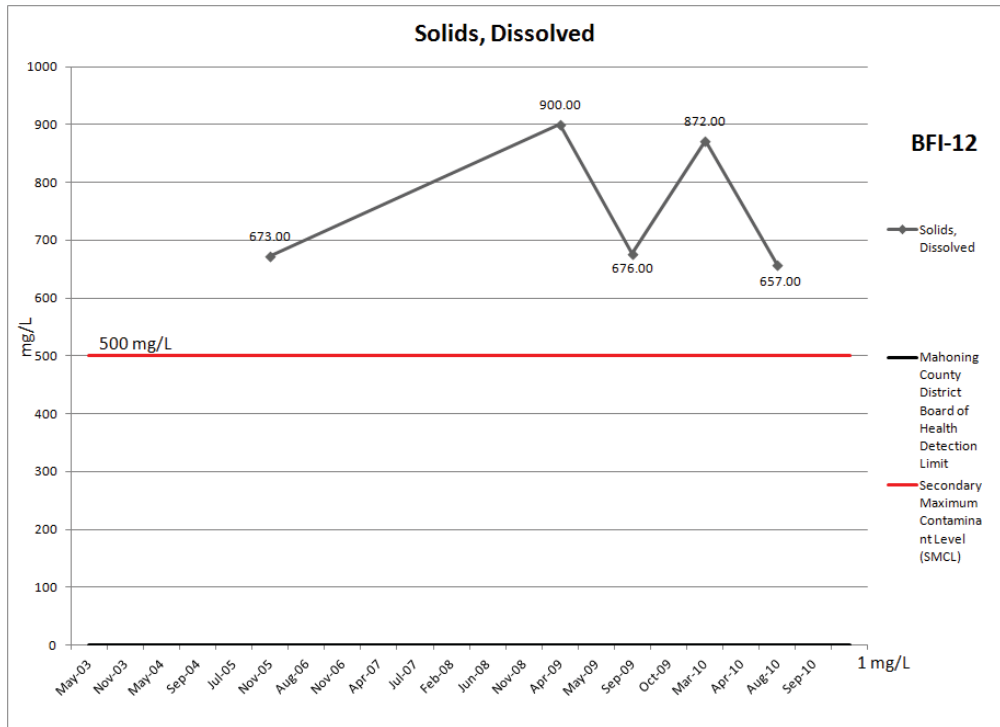
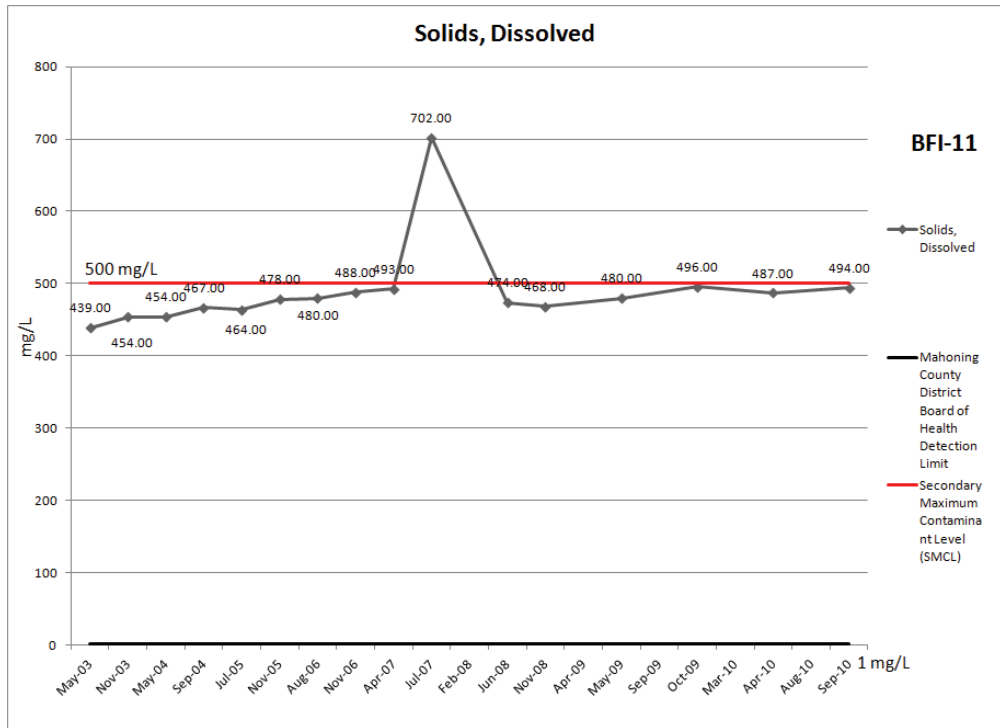
**APPENDIX F: Elevated Dissolved Solids Time Series Charts**

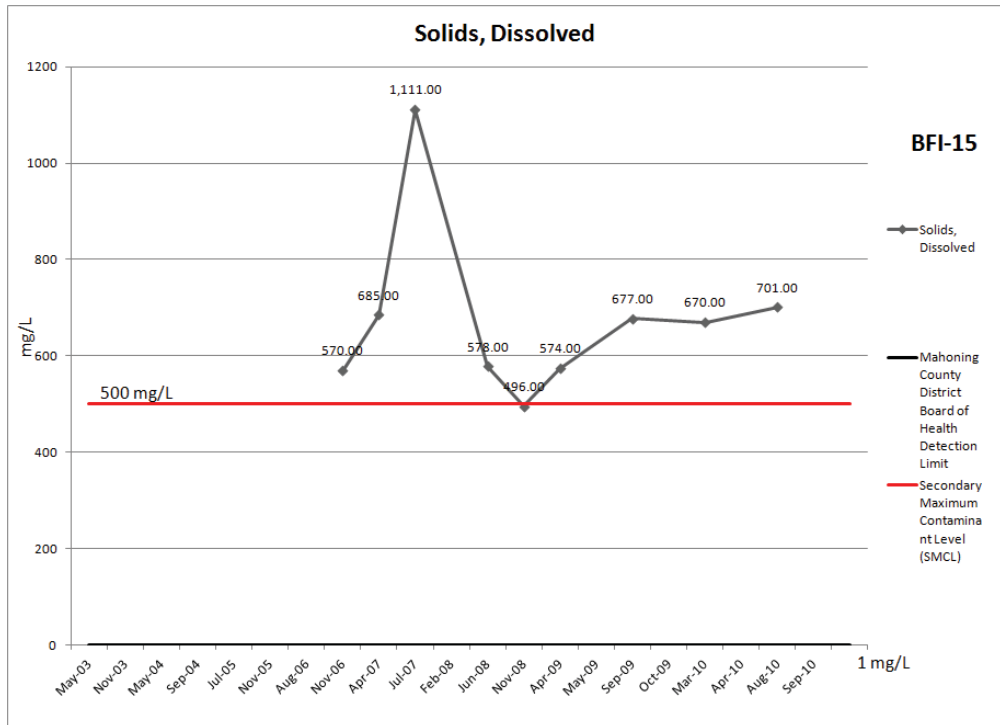
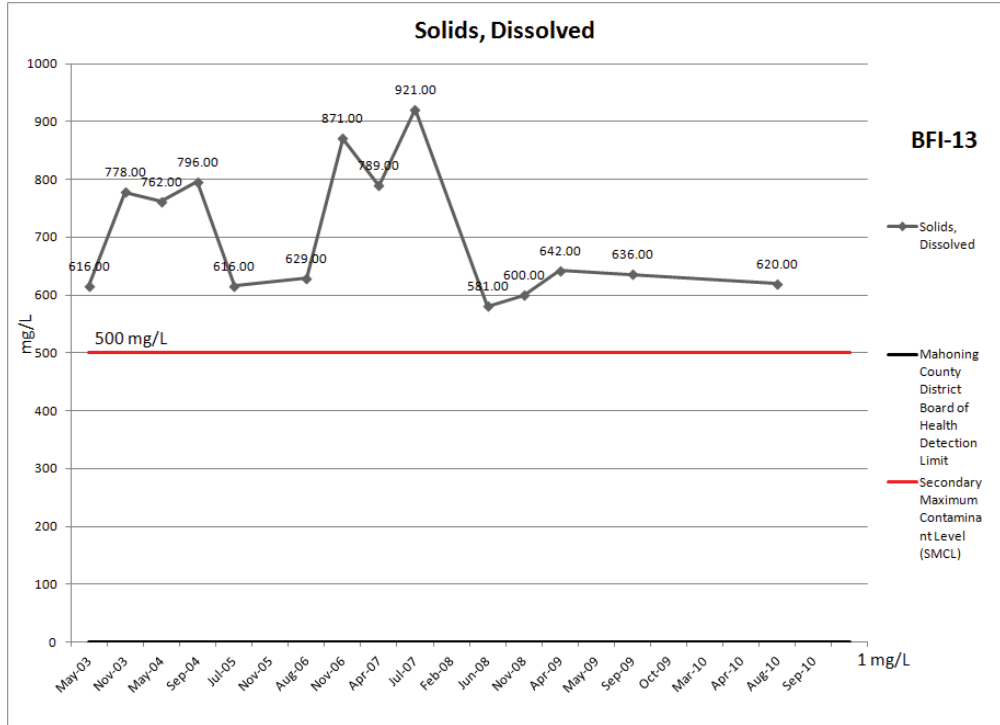




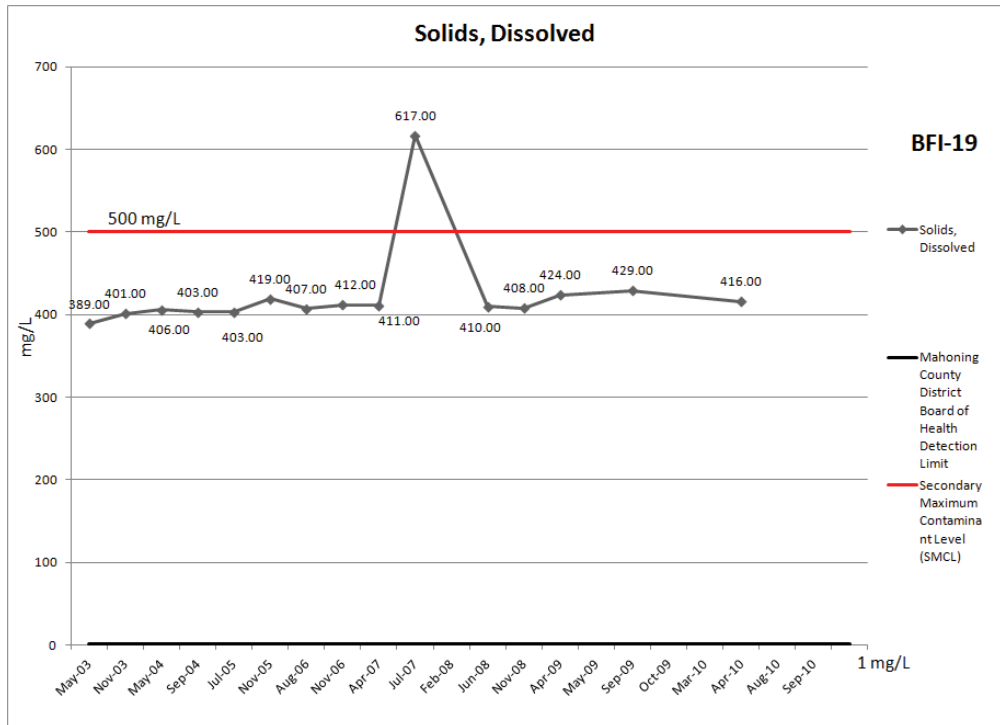
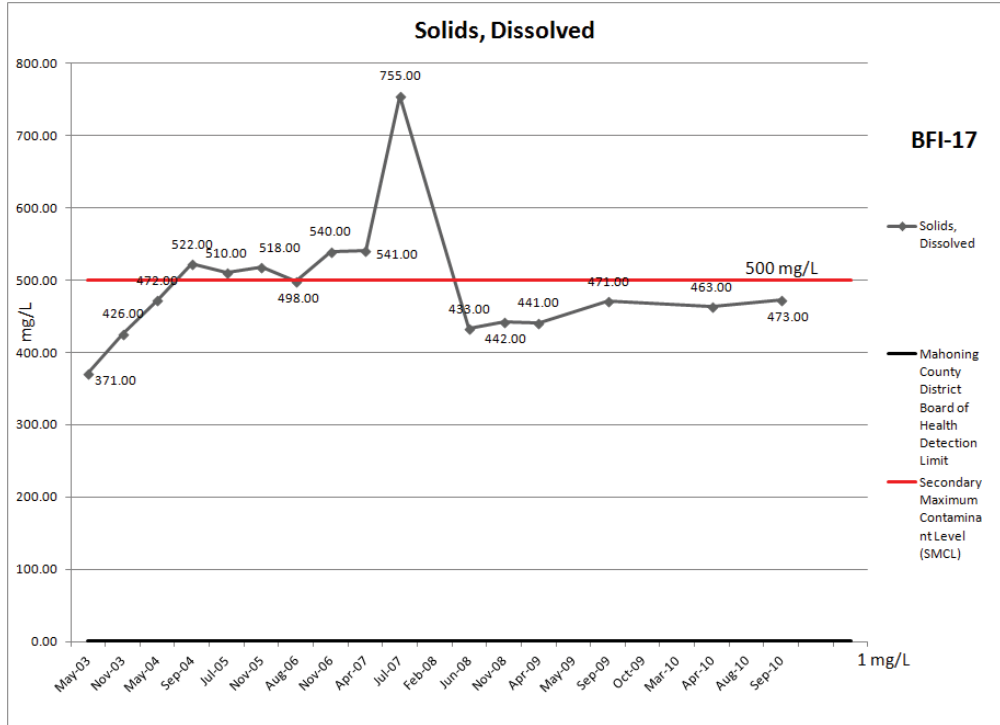


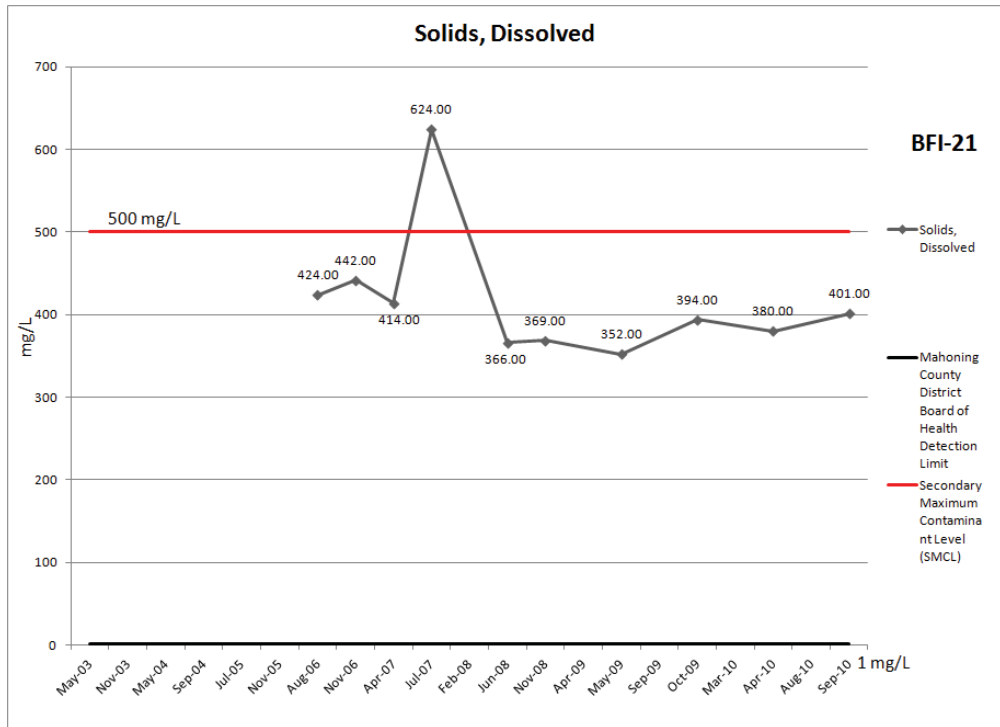
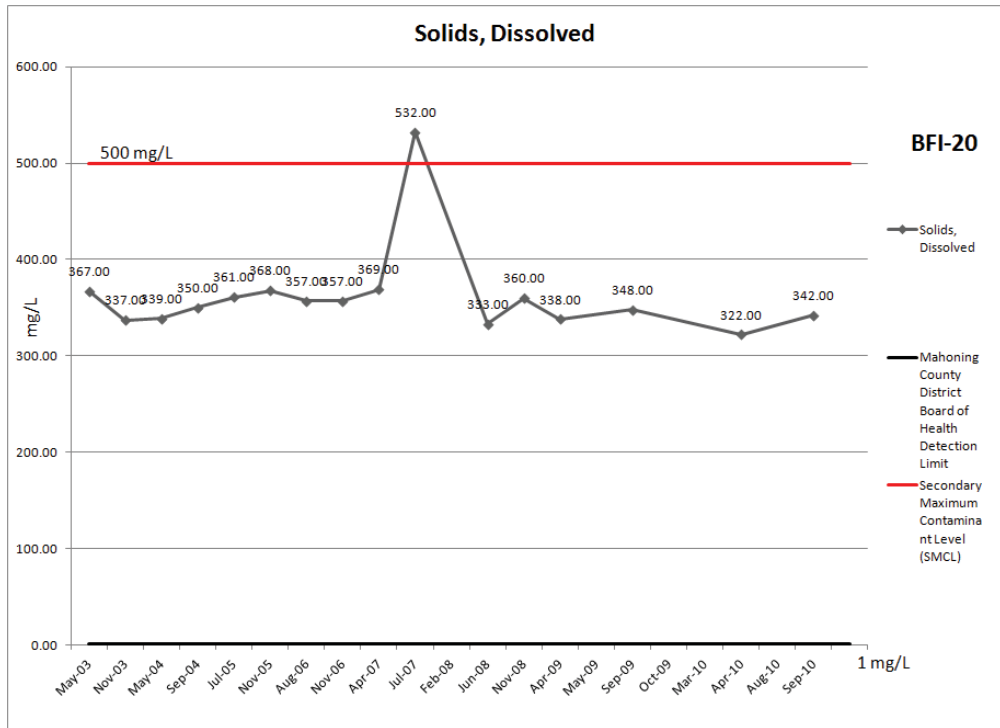


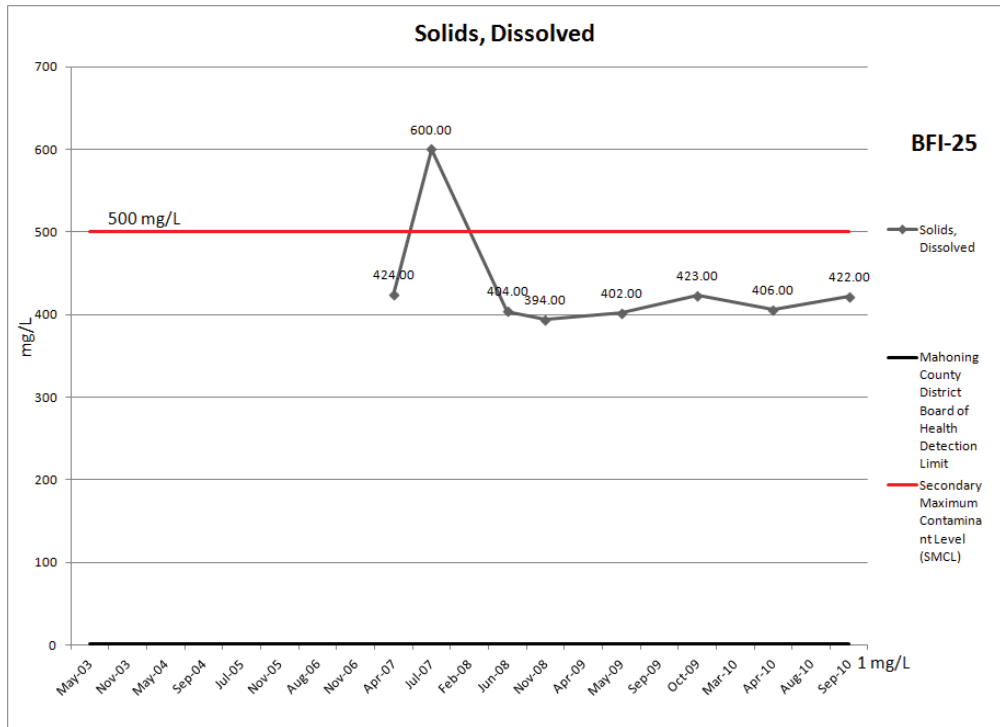
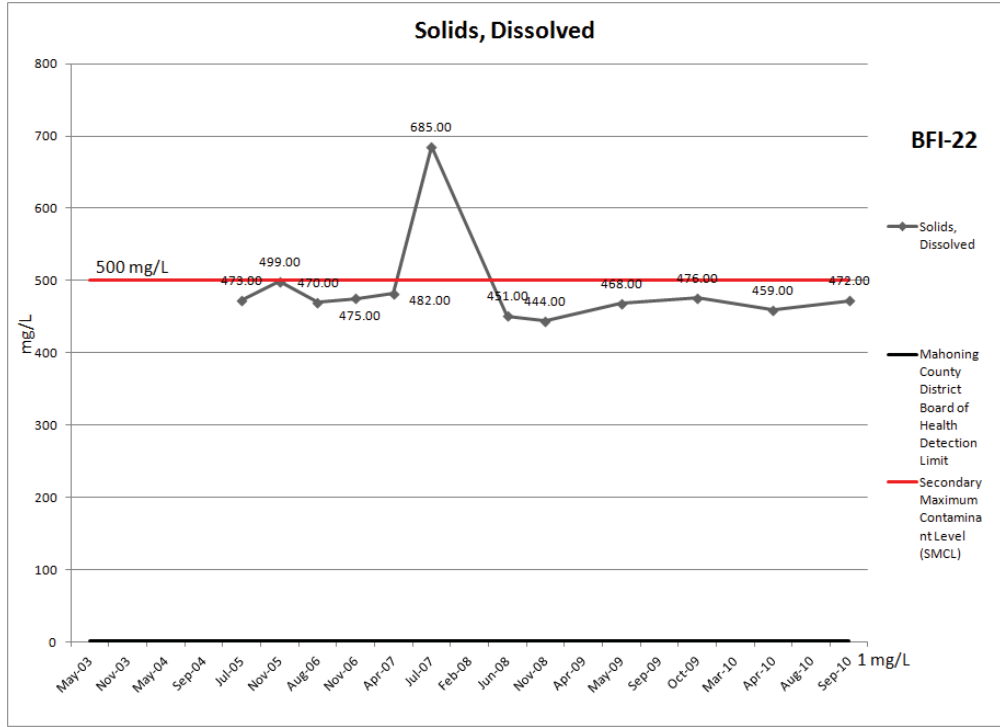


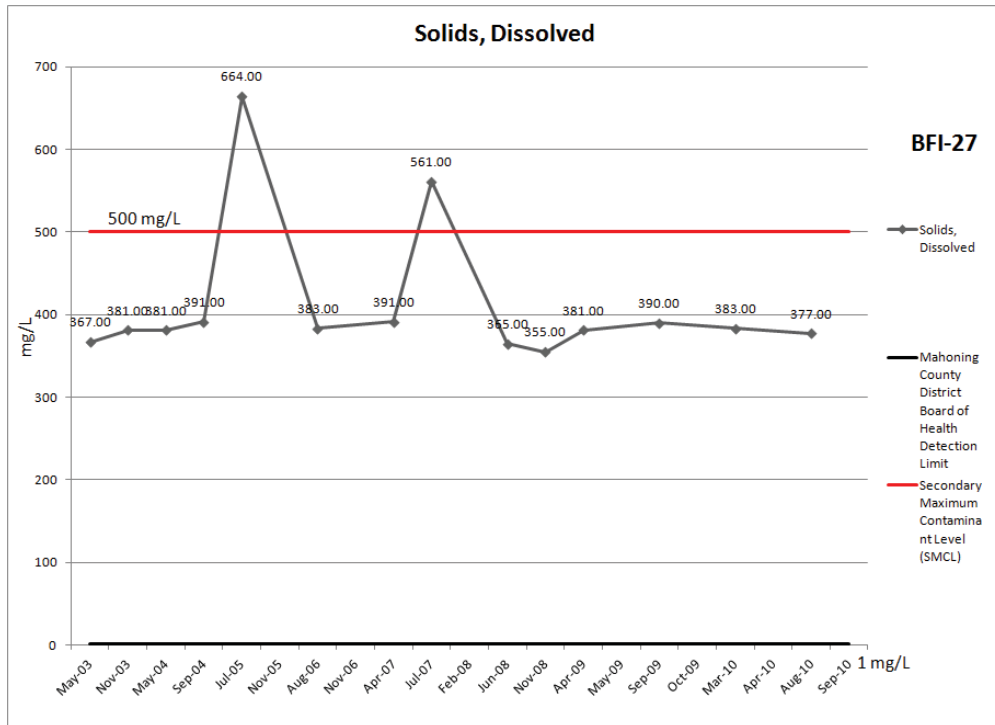
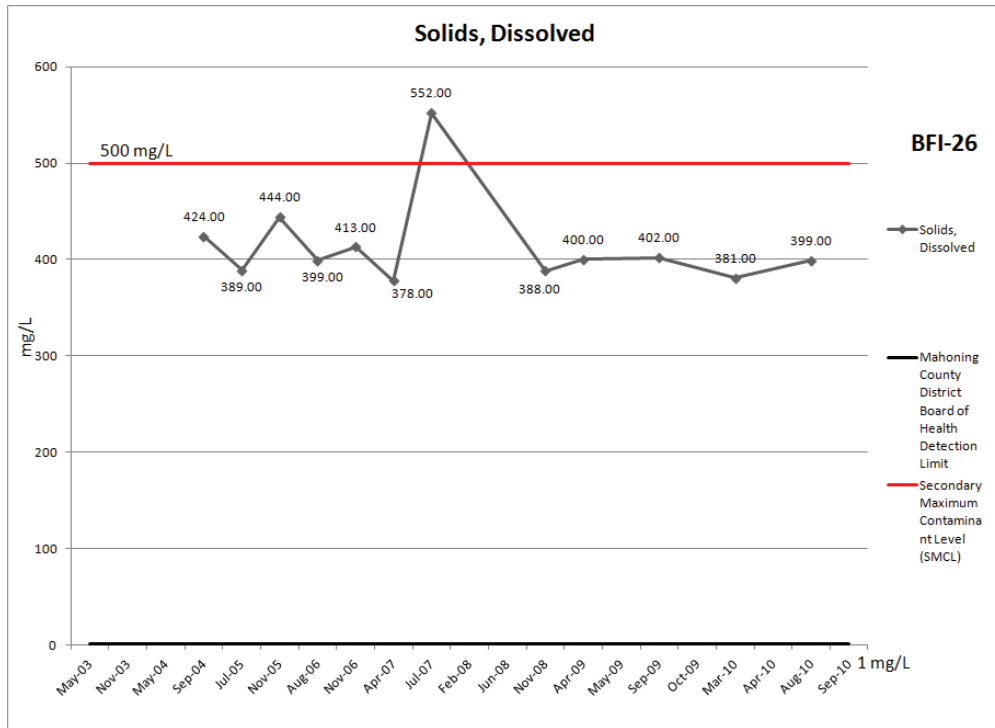


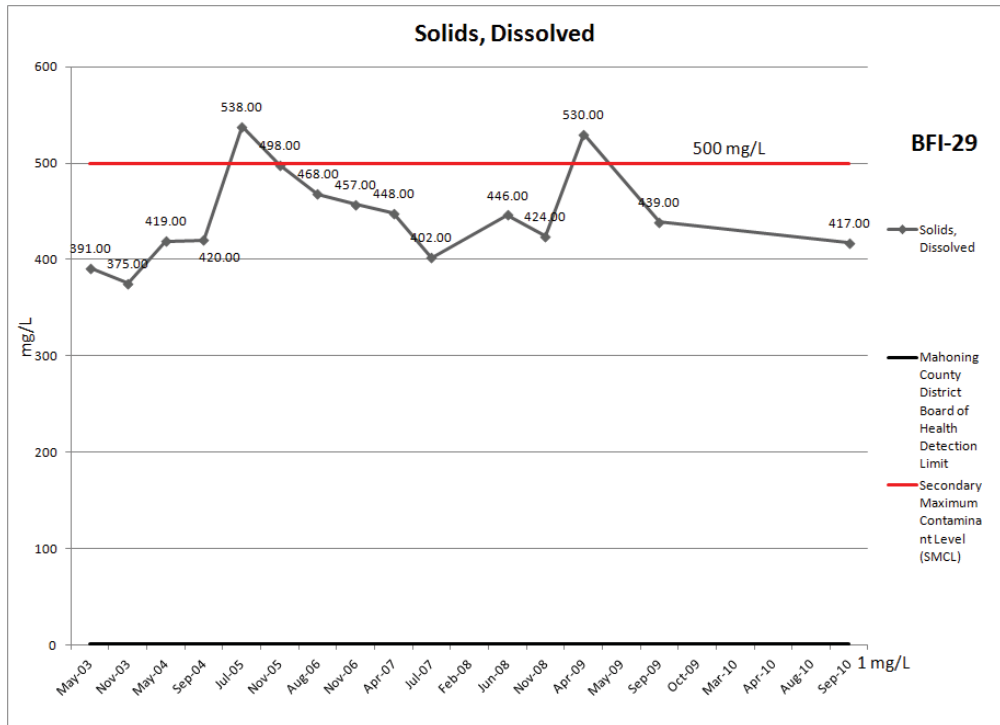
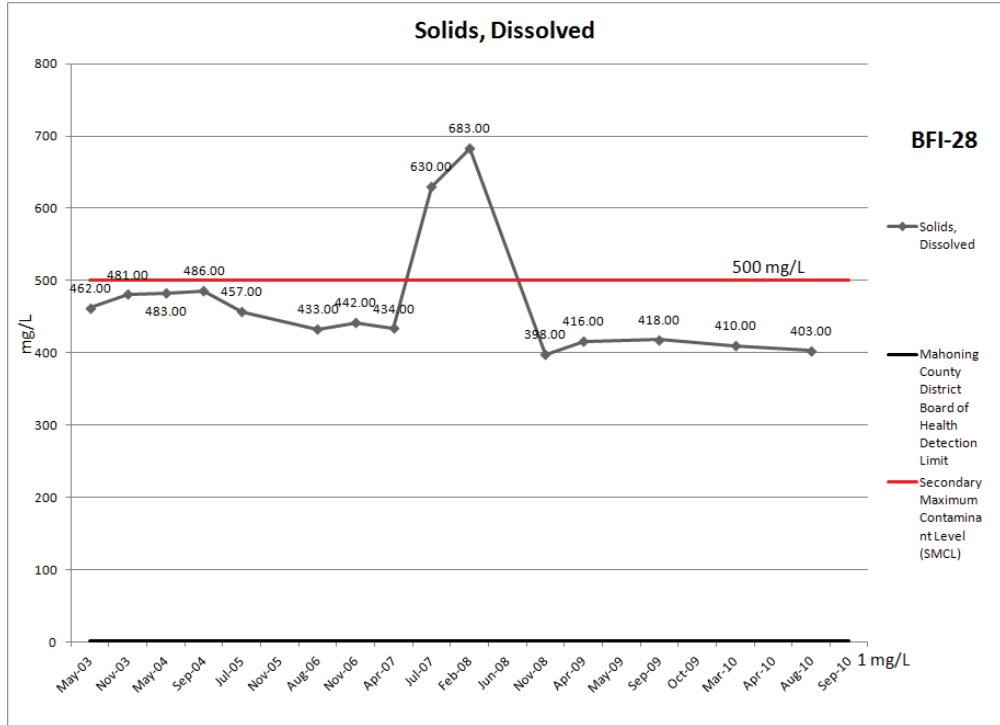


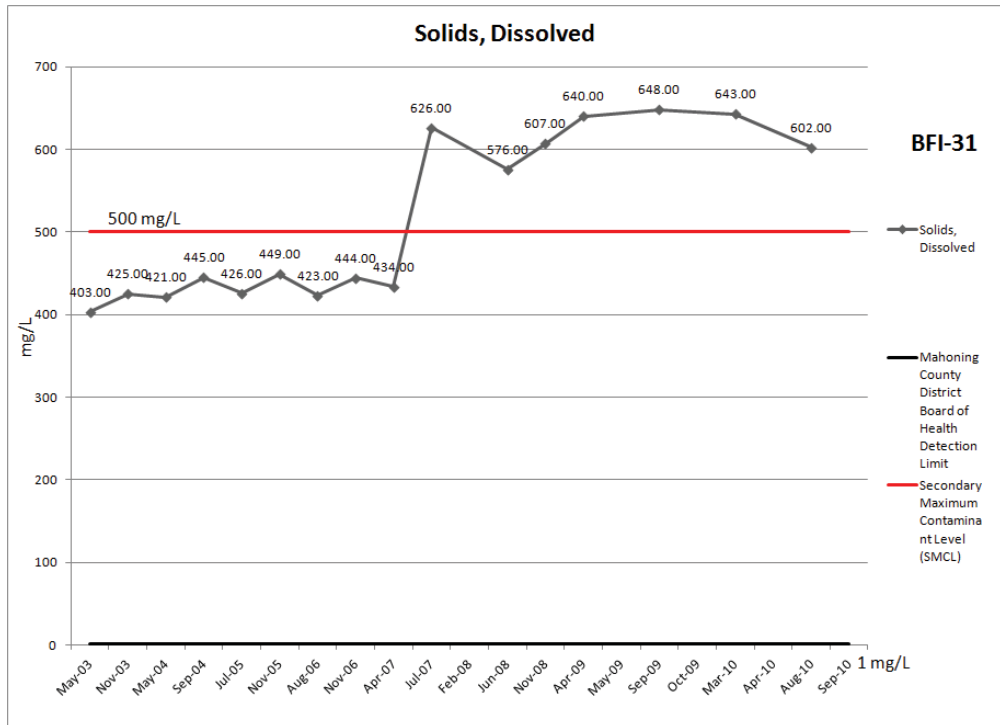
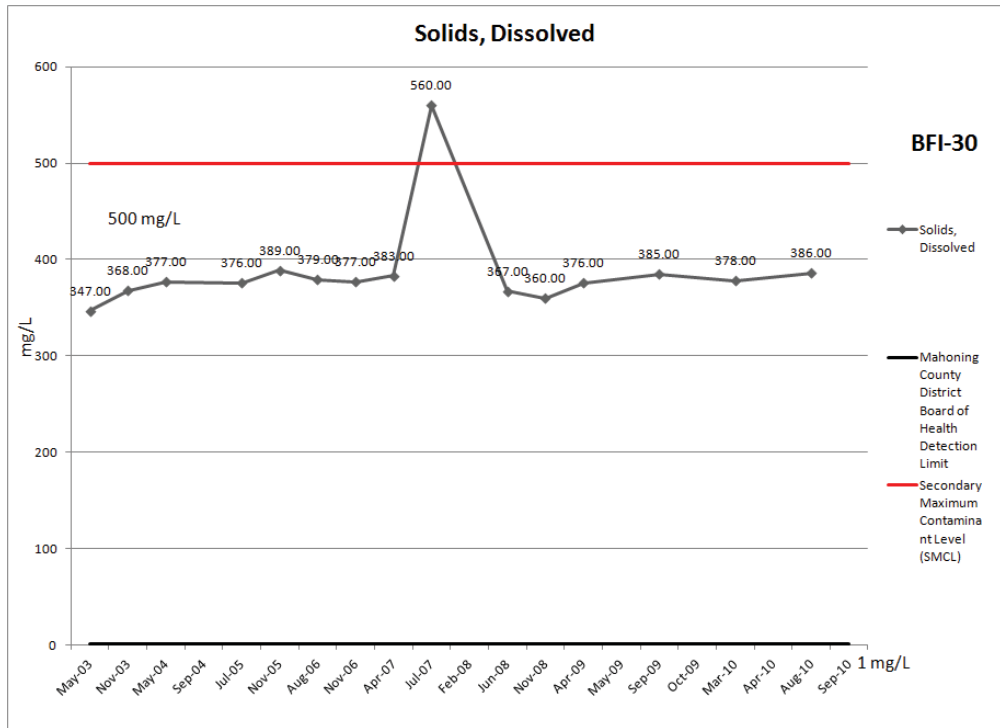


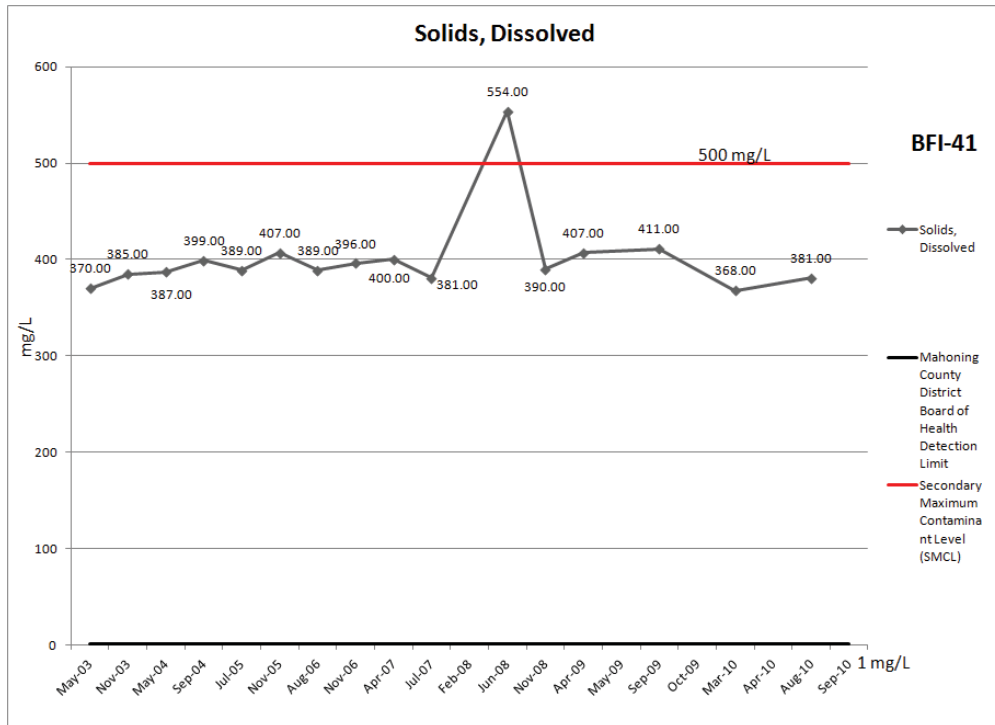
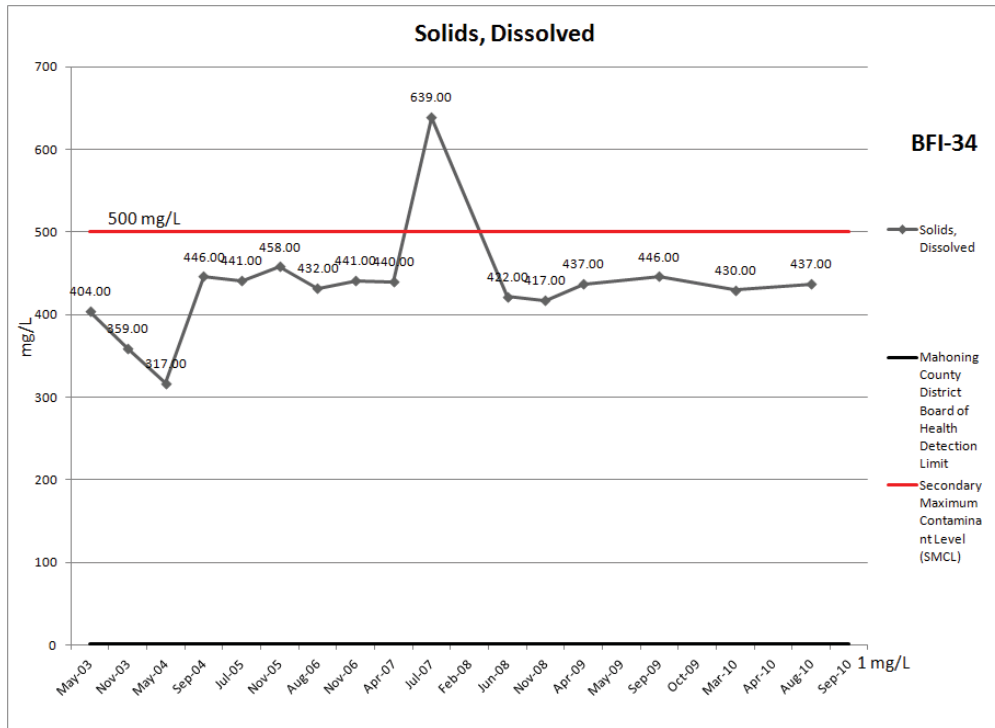


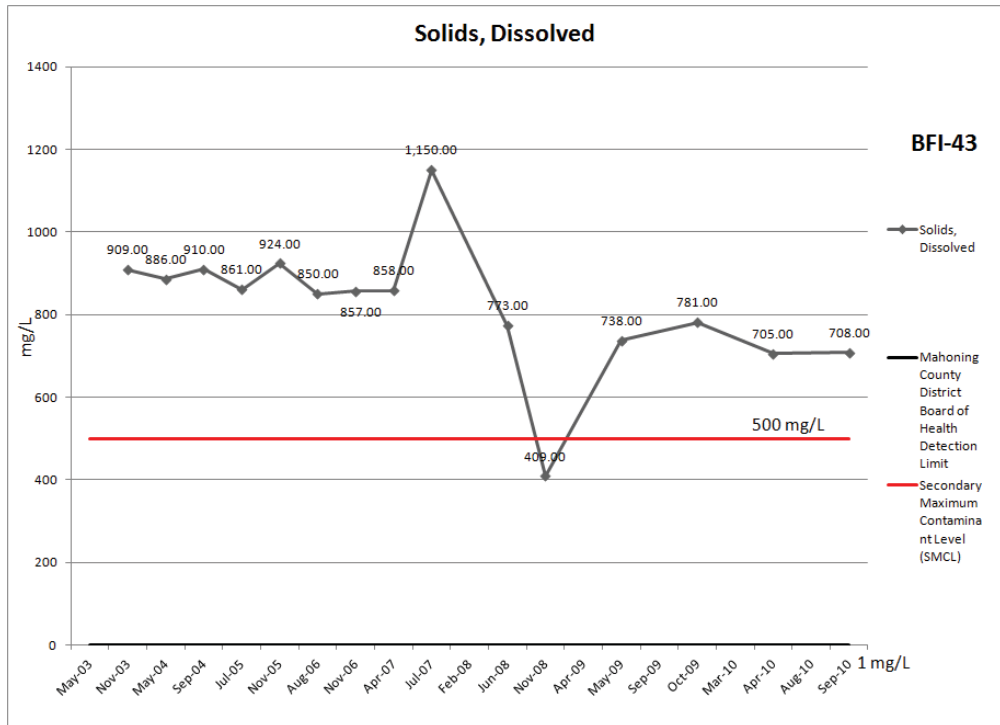
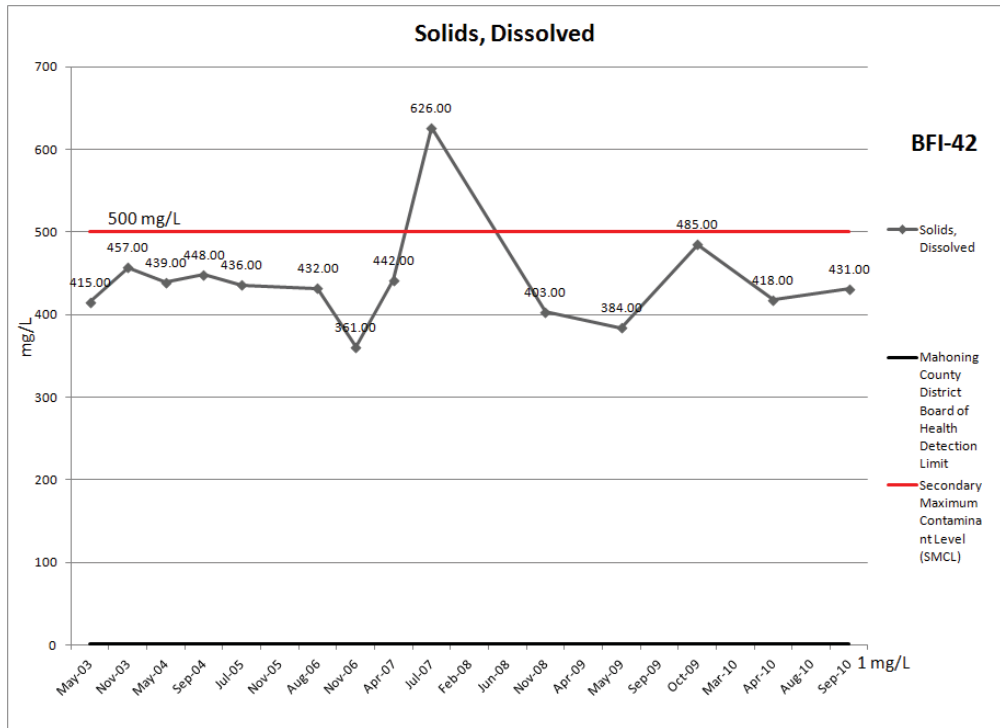




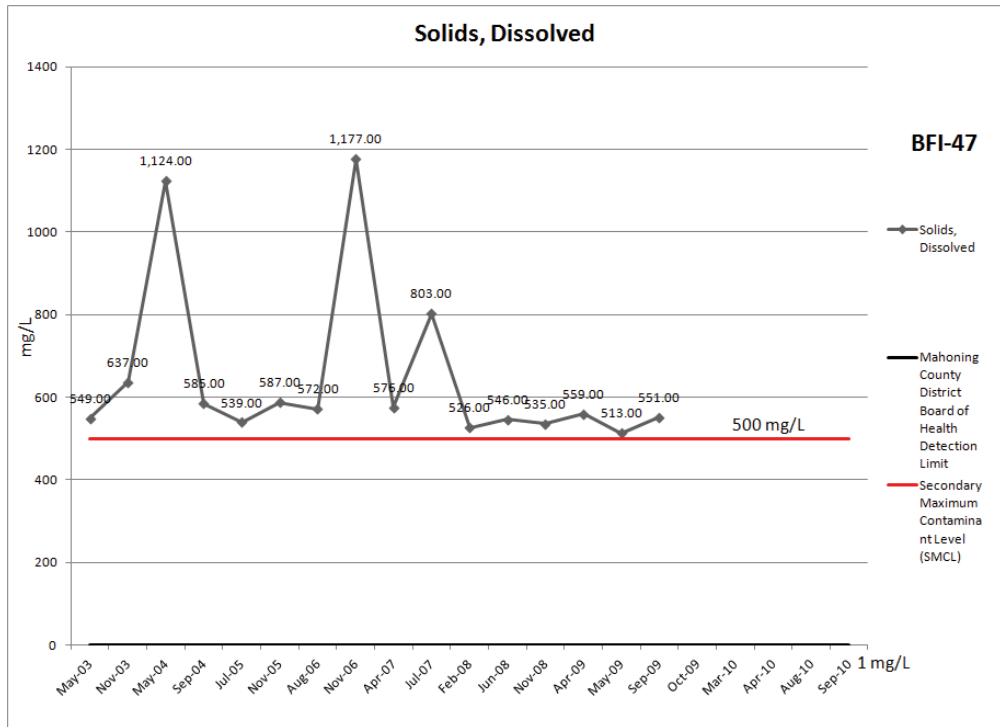
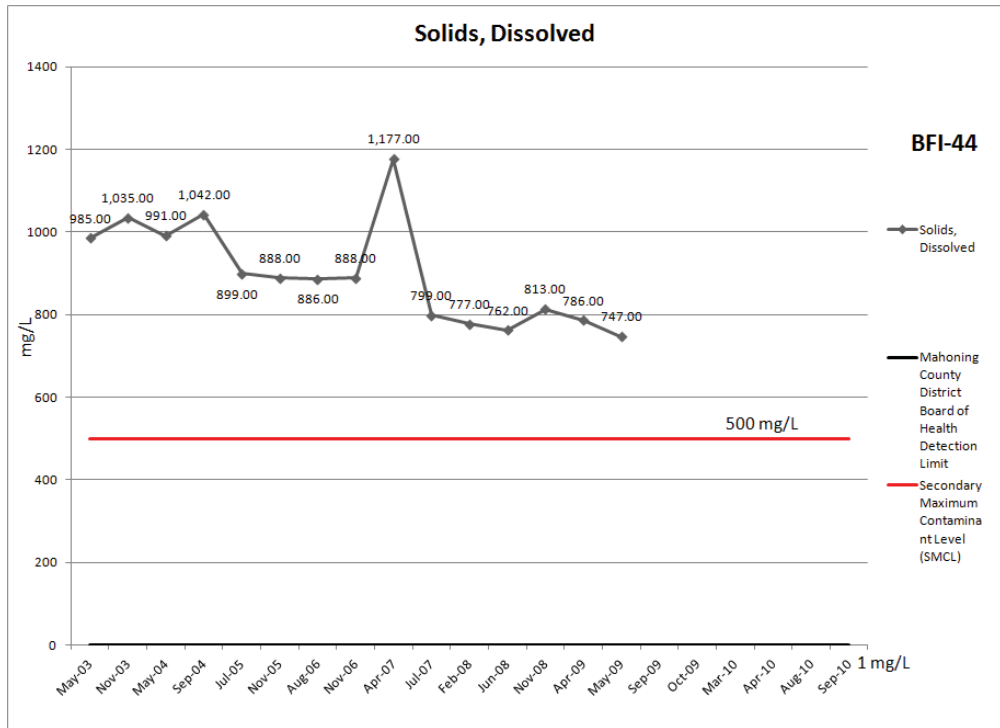


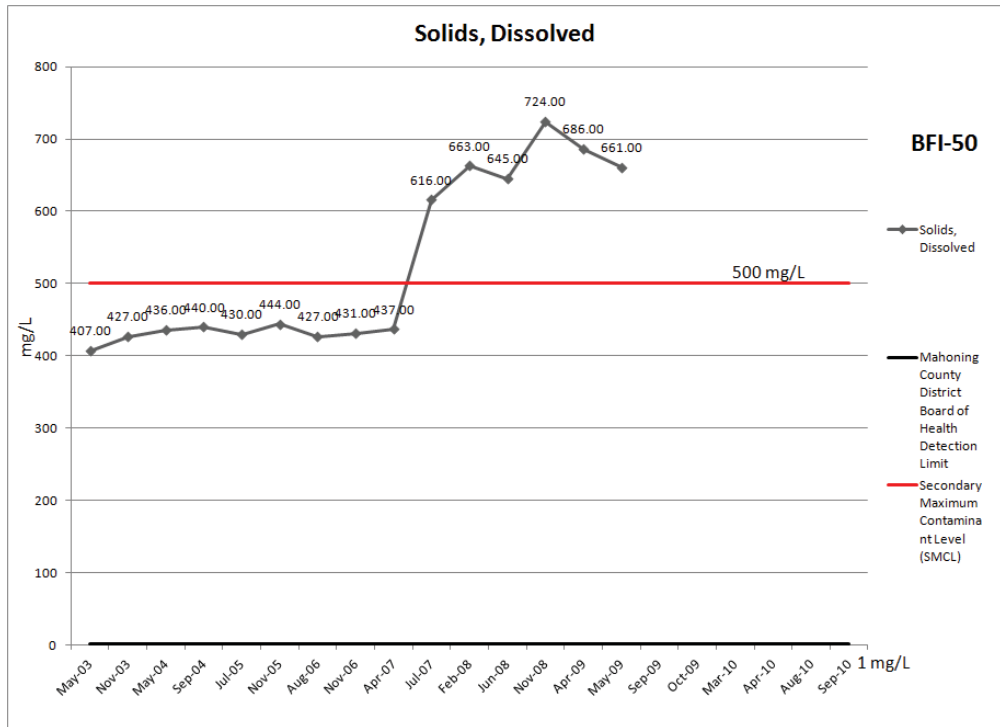
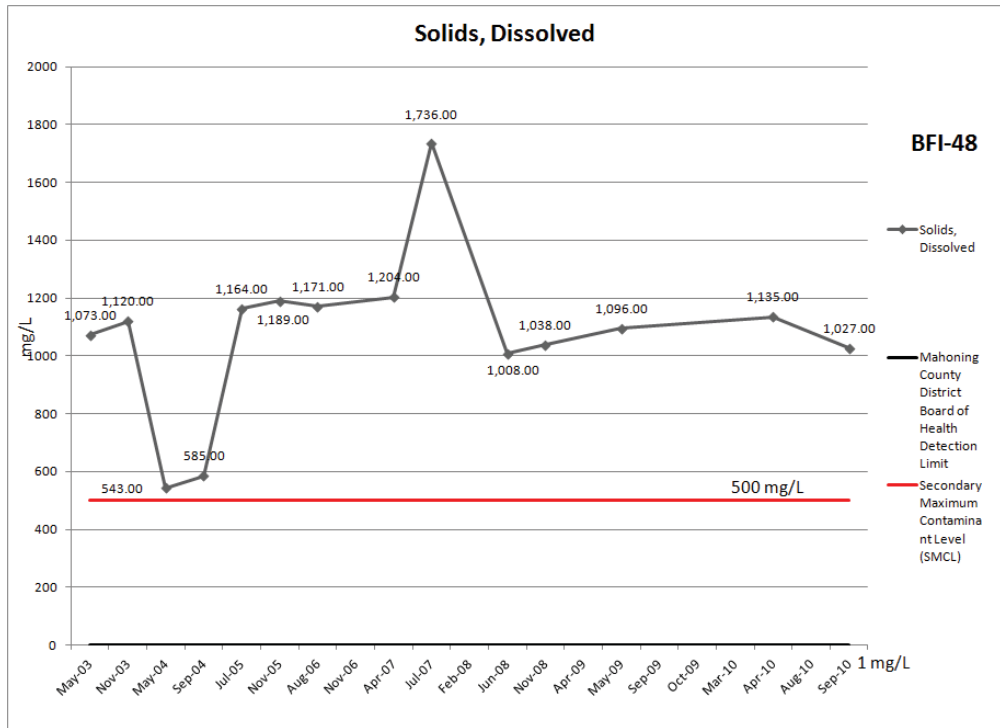


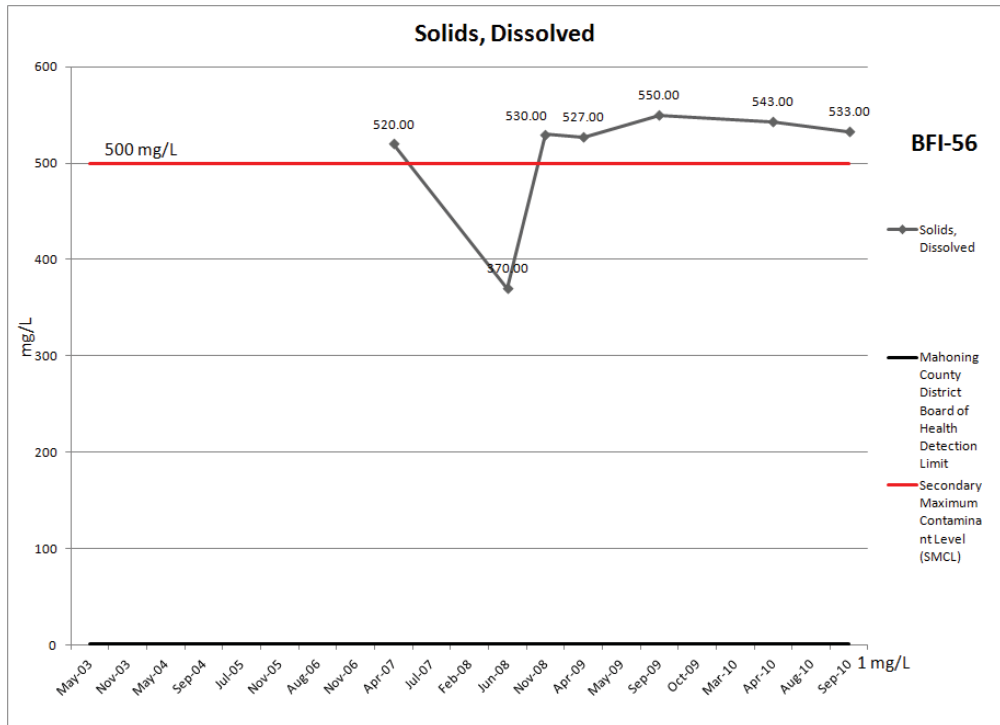
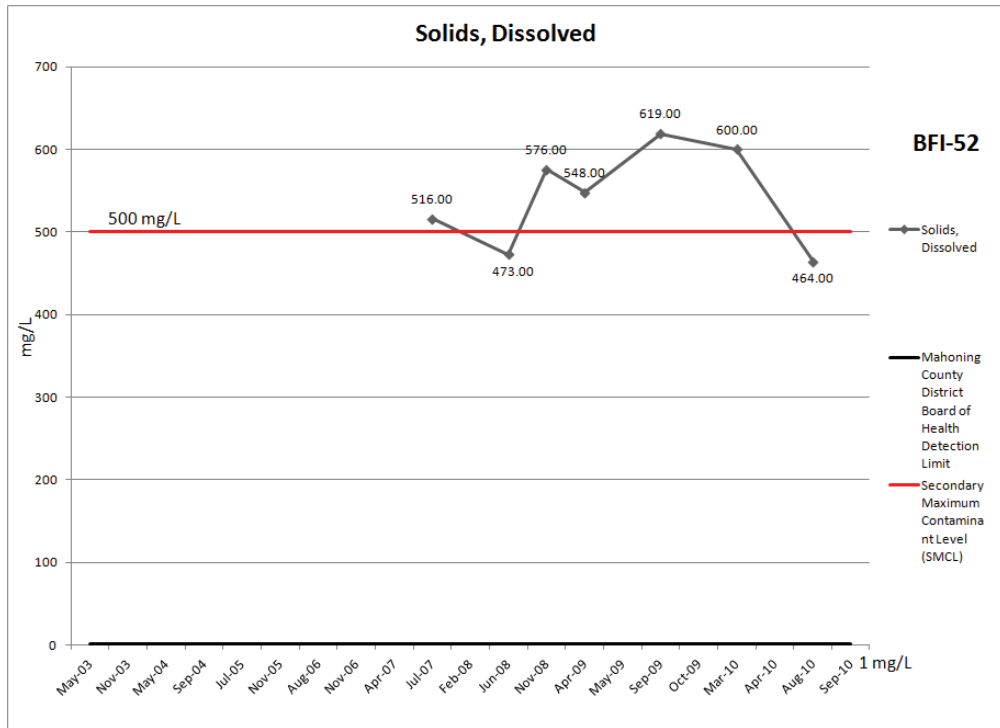


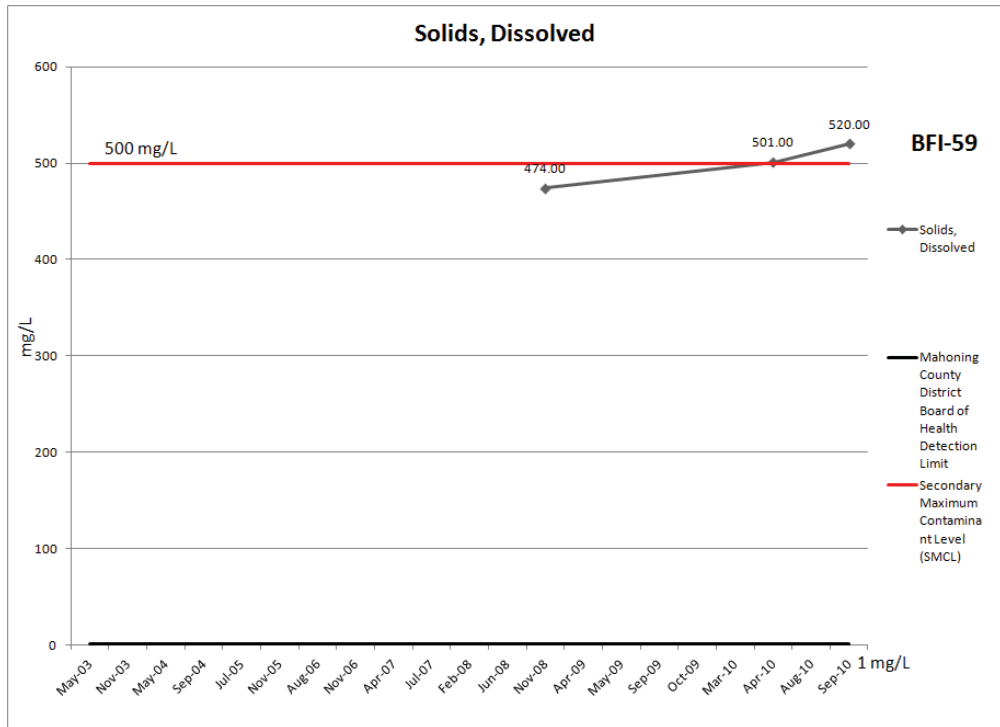
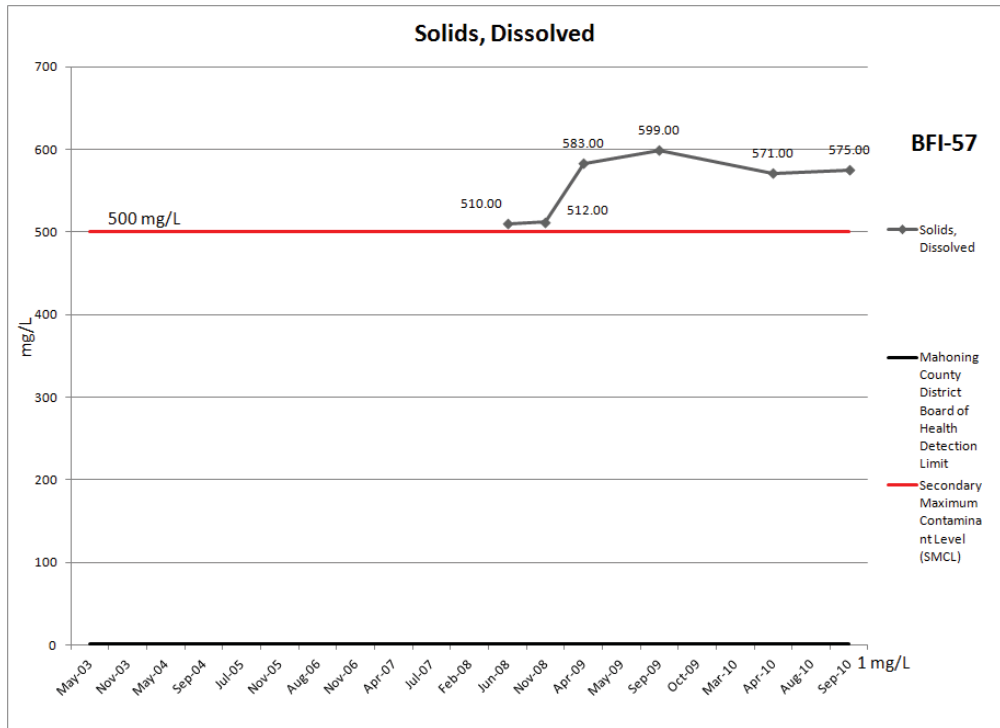


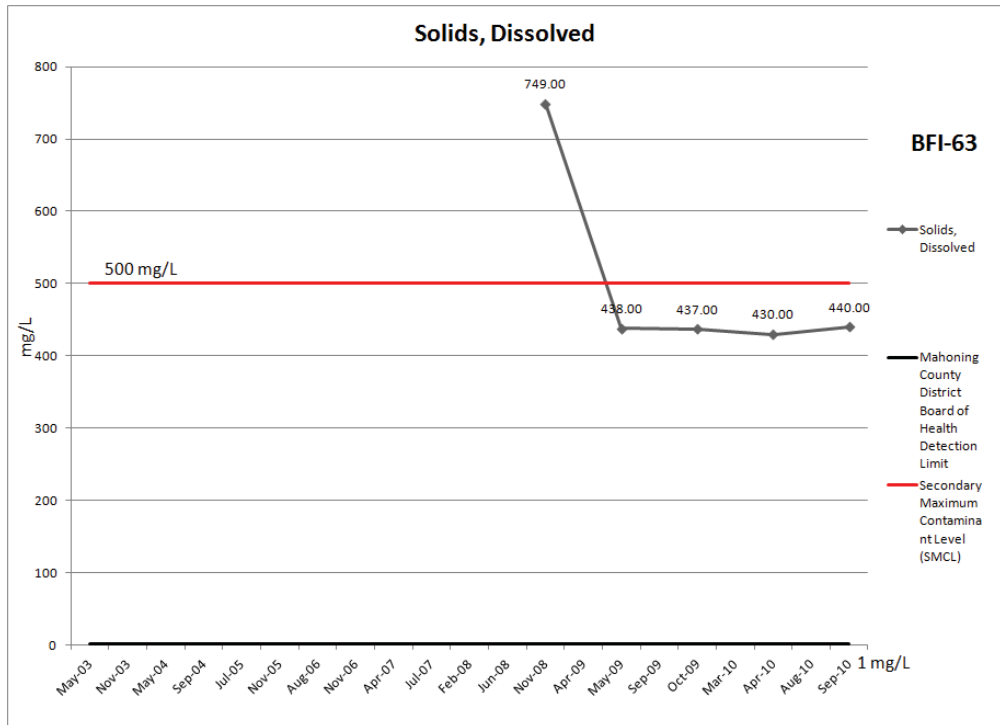
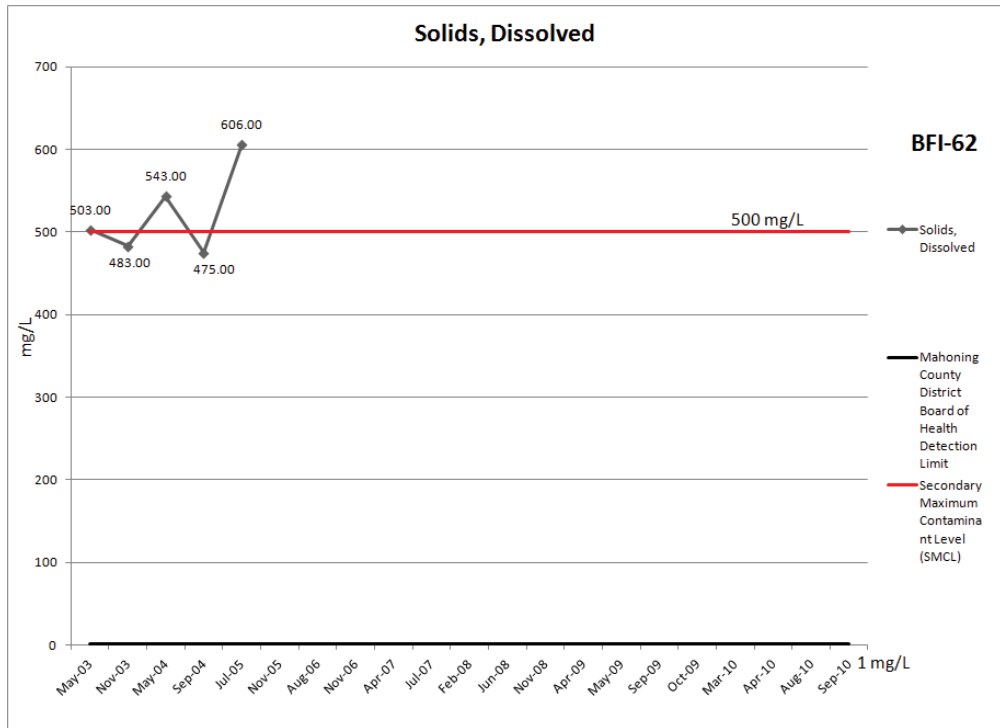


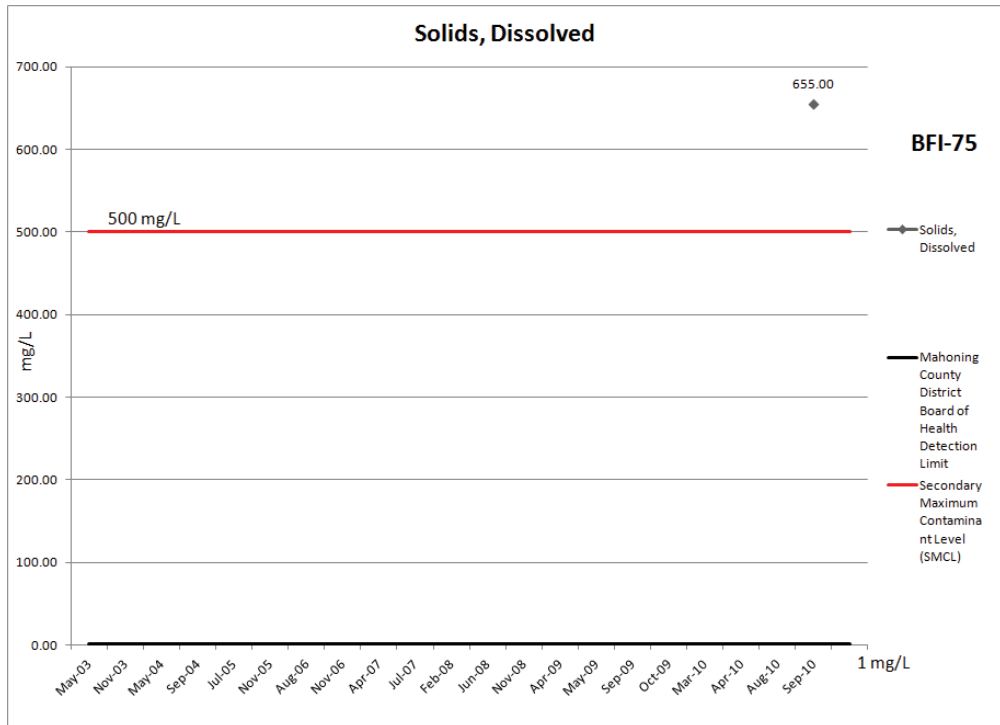
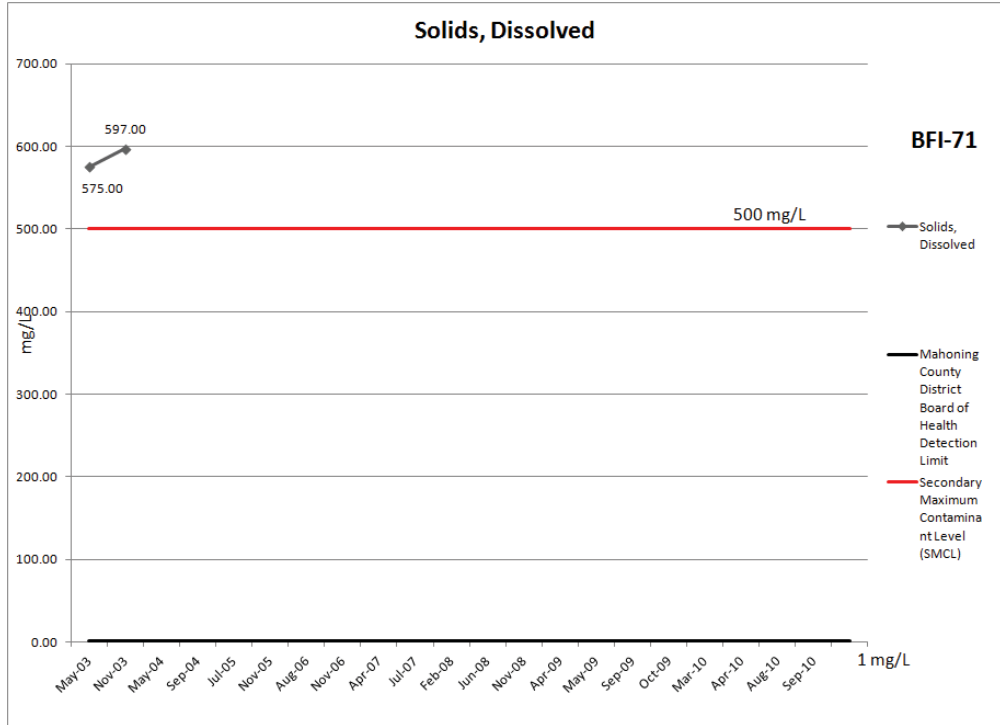




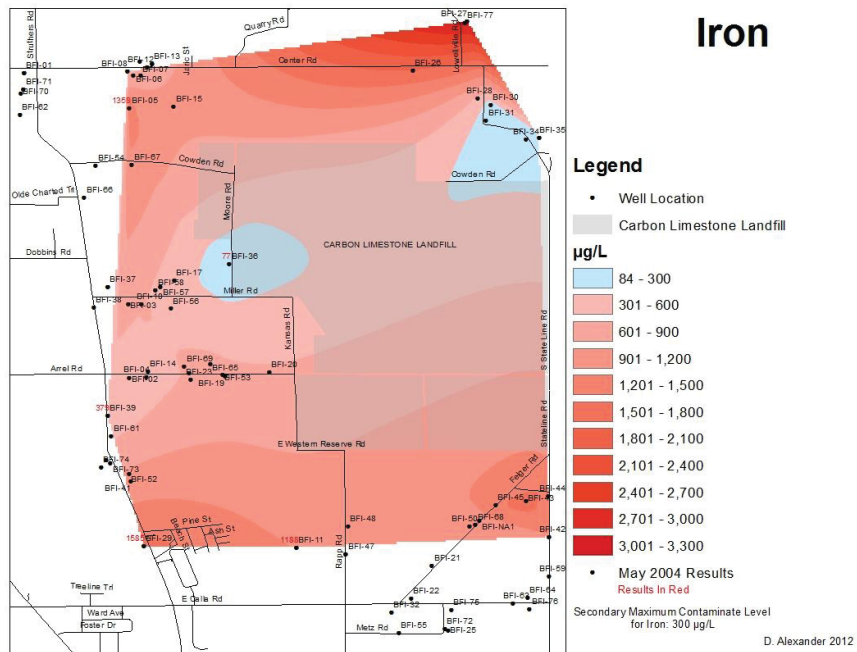
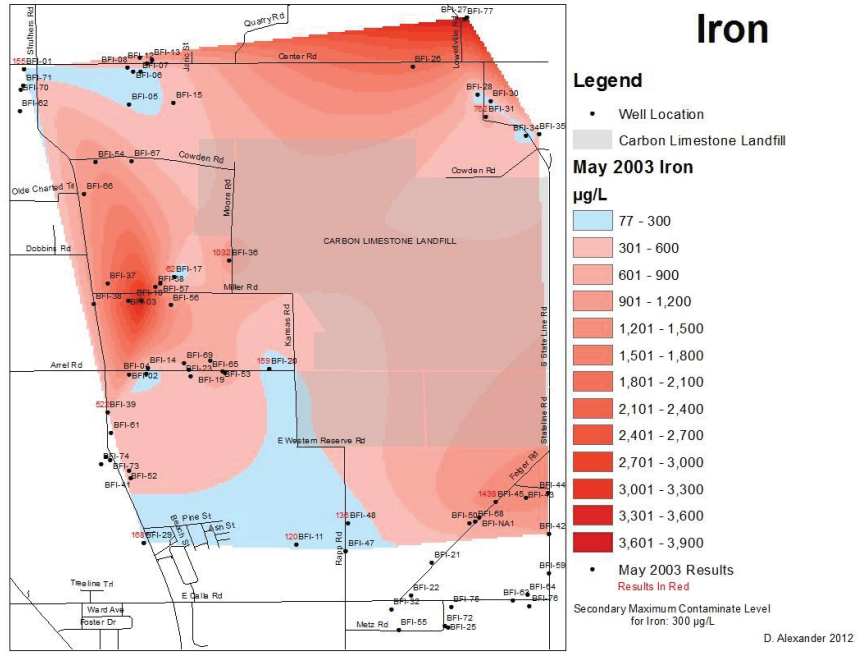




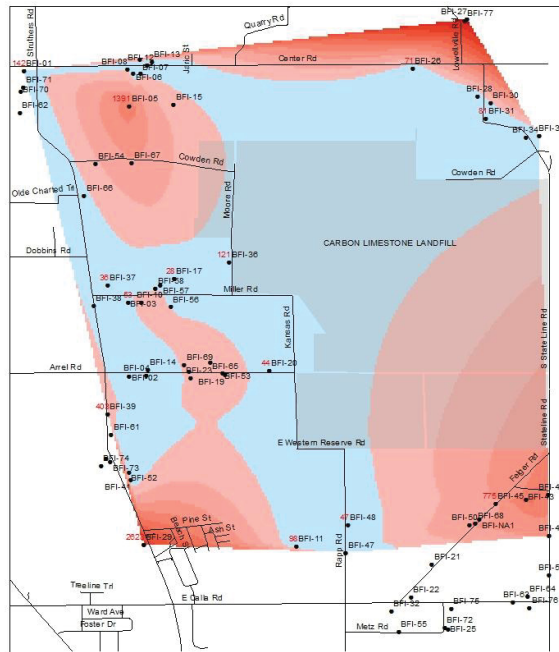




**APPENDIX G: Iron Concentration Maps**





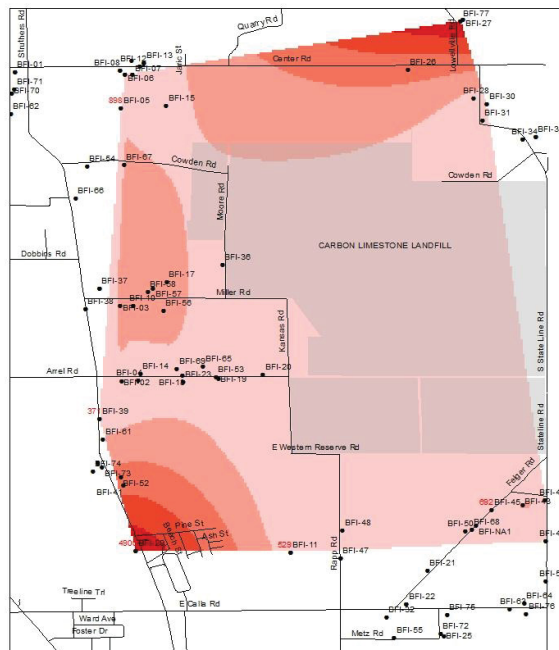


# Iron

## Legend

- Well Location
  - Carbon Limestone Landfill
- September 2004 Iron**  
µg/L
- 34 - 300
  - 301 - 600
  - 601 - 900
  - 901 - 1,200
  - 1,201 - 1,500
  - 1,501 - 1,800
  - 1,801 - 2,100
  - 2,101 - 2,400
  - 2,401 - 2,700
  - 2,701 - 3,000
  - 3,001 - 3,300
- September 2004 Results
  - Results In Red
- Secondary Maximum Contaminate Level for Iron: 300 µg/L

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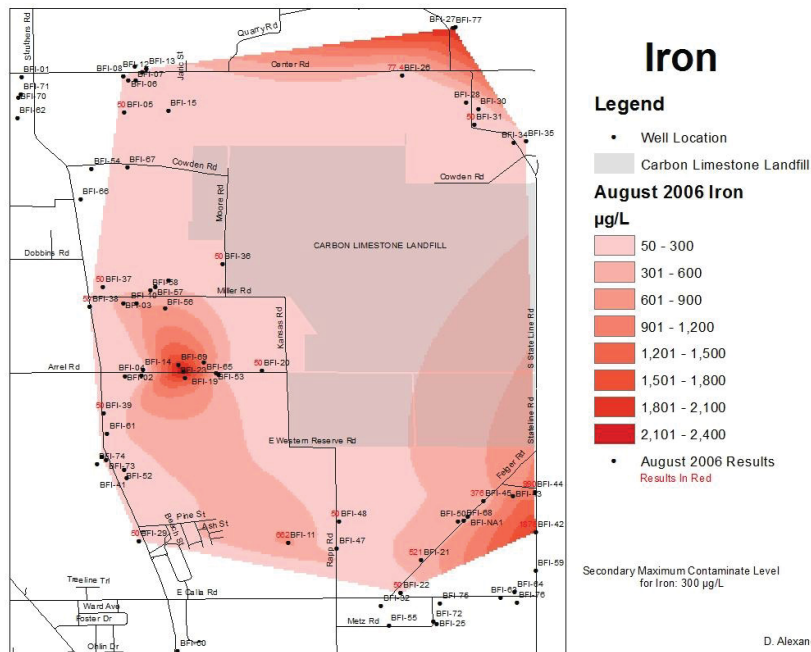
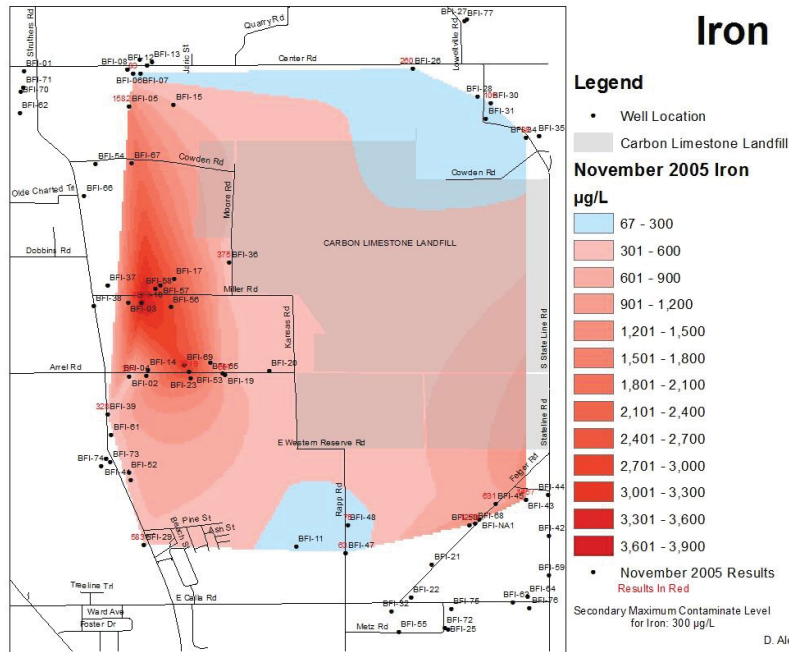


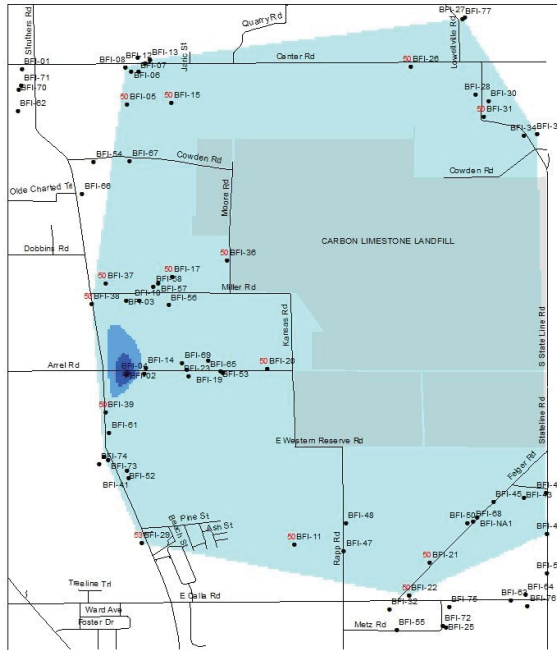
# Iron

## Legend

- Well Location
  - Carbon Limestone Landfill
- July 2005 Iron**  
µg/L
- 122 - 1,000
  - 1,001 - 2,000
  - 2,001 - 3,000
  - 3,001 - 4,000
  - 4,001 - 5,000
- July 2005 Results
  - Results In Red
- Secondary Maximum Contaminate Level for Iron: 300 µg/L

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# Iron

## Legend

- Well Location
- Carbon Limestone Landfill

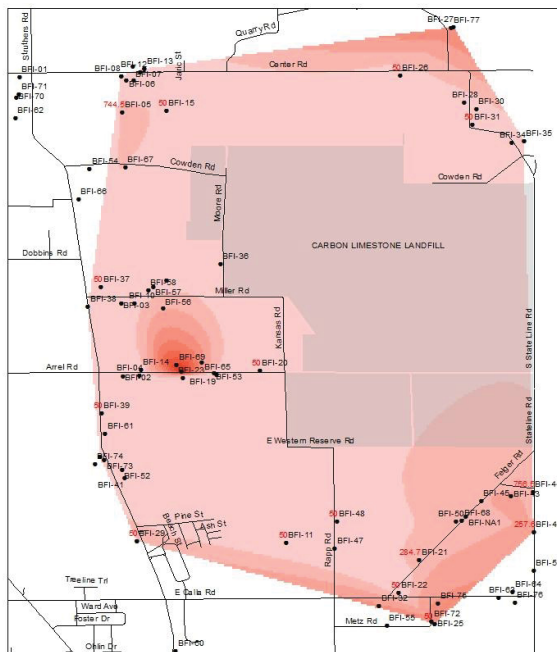
### November 2006 Iron µg/L

- 50 - 60
- 61 - 70
- 71 - 80
- 81 - 90

- November 2006 Results
- Results In Red

Secondary Maximum Contaminant Level  
for Iron: 300 µg/L

D. Alexander 2012



# Iron

## Legend

- Well Location
- Carbon Limestone Landfill

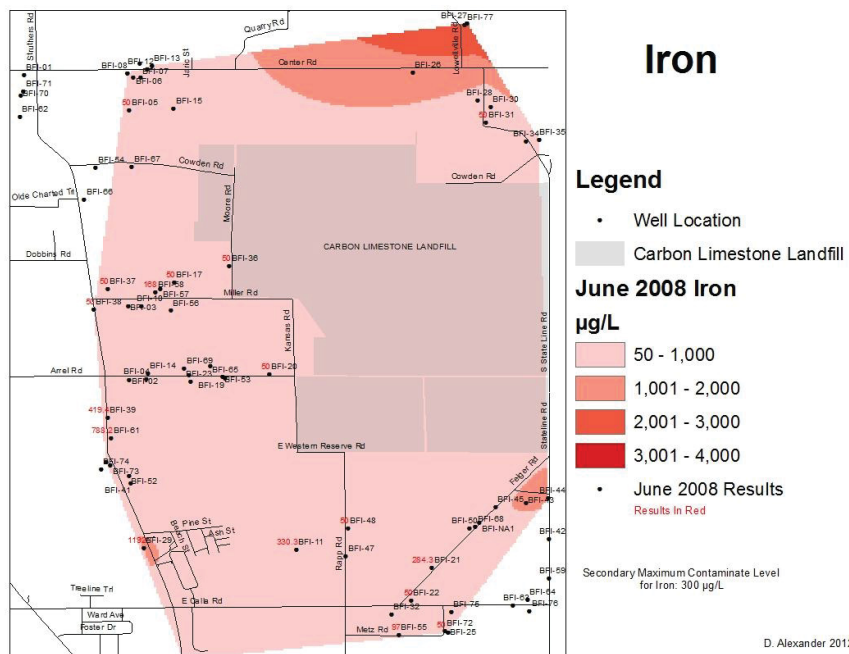
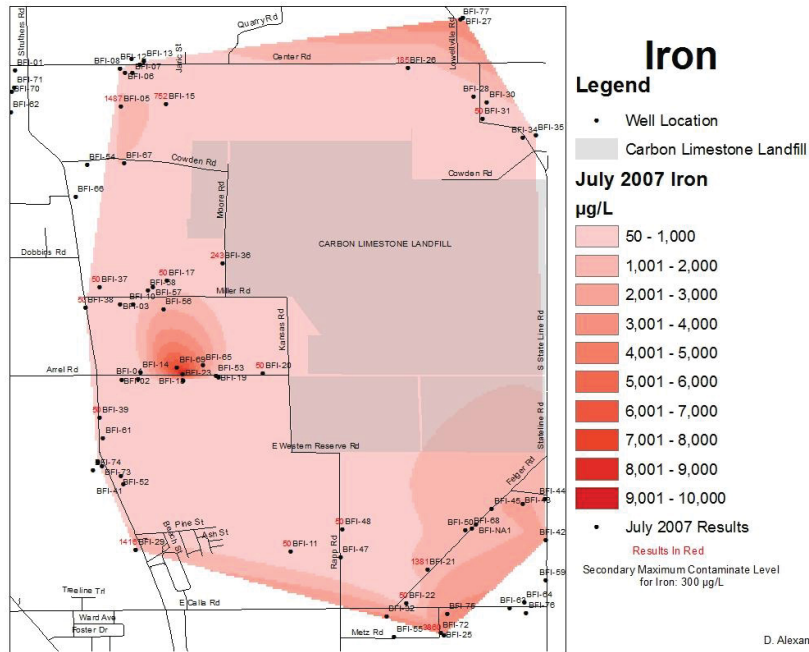
### April 2007 Iron µg/L

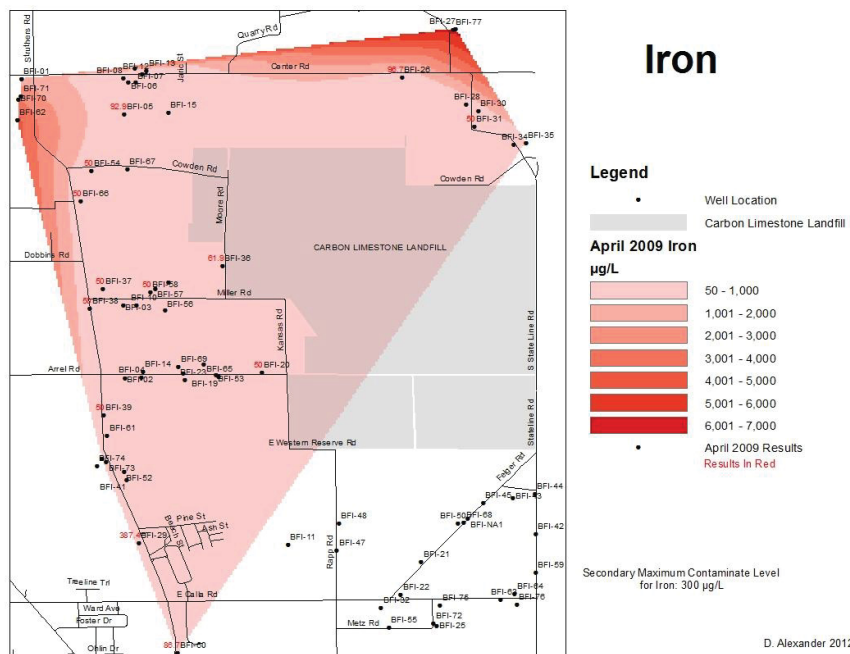
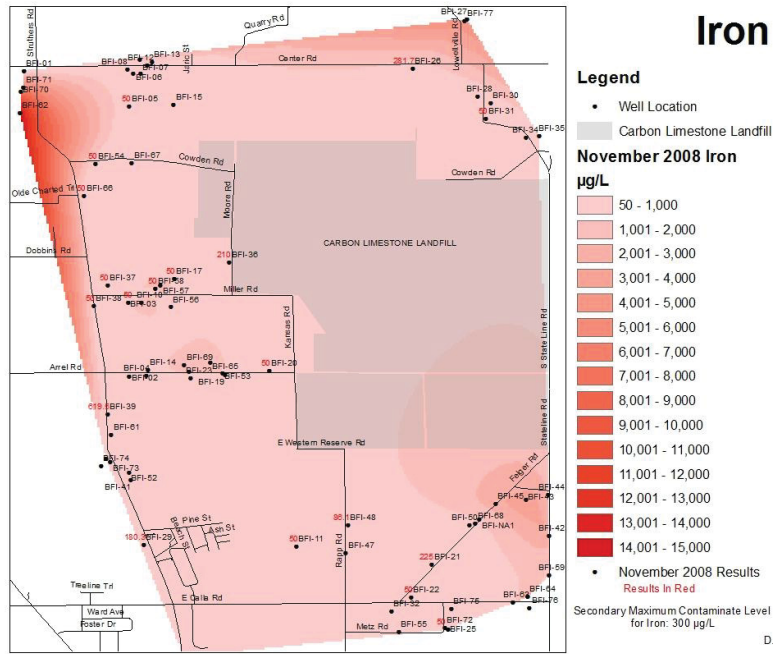
- 50 - 1,000
- 1,001 - 2,000
- 2,001 - 3,000
- 3,001 - 4,000
- 4,001 - 5,000
- 5,001 - 6,000
- 6,001 - 7,000
- 7,001 - 8,000
- 8,001 - 9,000
- 9,001 - 10,000

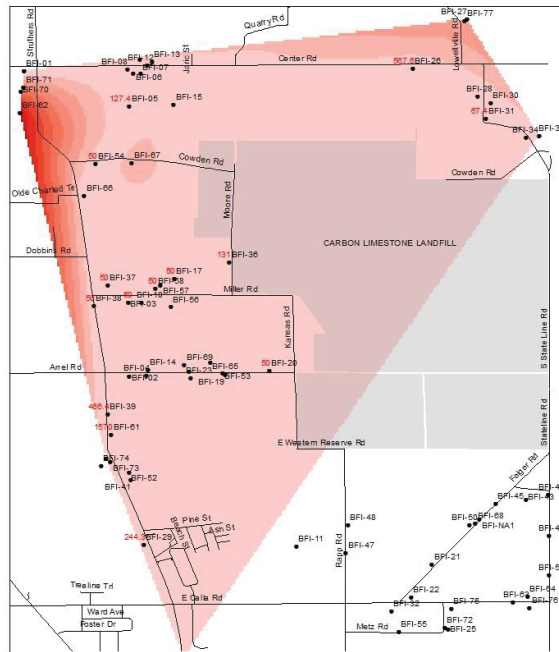
- April 2007 Results
- Results In Red

Secondary Maximum Contaminant Level  
for Iron: 300 µg/L

D. Alexander 2012







# Iron

**Legend**

- Well Location
- Carbon Limestone Landfill

**September 2009 Iron**

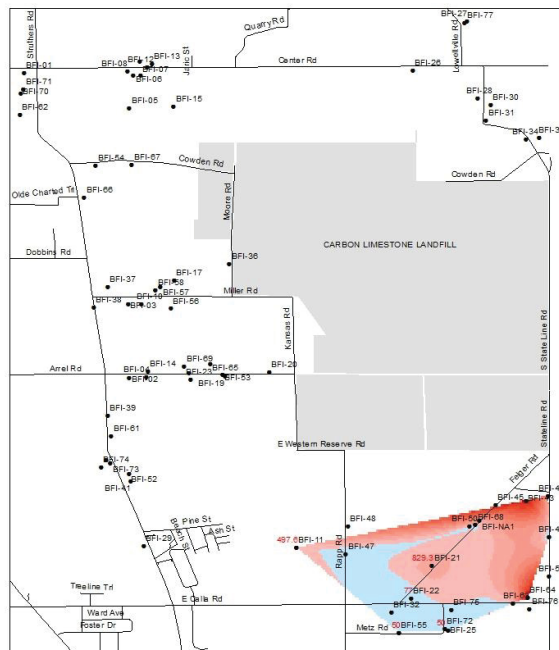
**µg/L**

- 50 - 2,000
- 2,001 - 4,000
- 4,001 - 6,000
- 6,001 - 8,000
- 8,001 - 10,000
- 10,001 - 12,000
- 12,001 - 14,000
- 14,001 - 16,000
- 16,001 - 18,000

- September 2009 Results
- Results In Red

Secondary Maximum Contaminate Level for Iron: 300 µg/L

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# Iron

**Legend**

- Well Location
- Carbon Limestone Landfill

**October 2009 Iron**

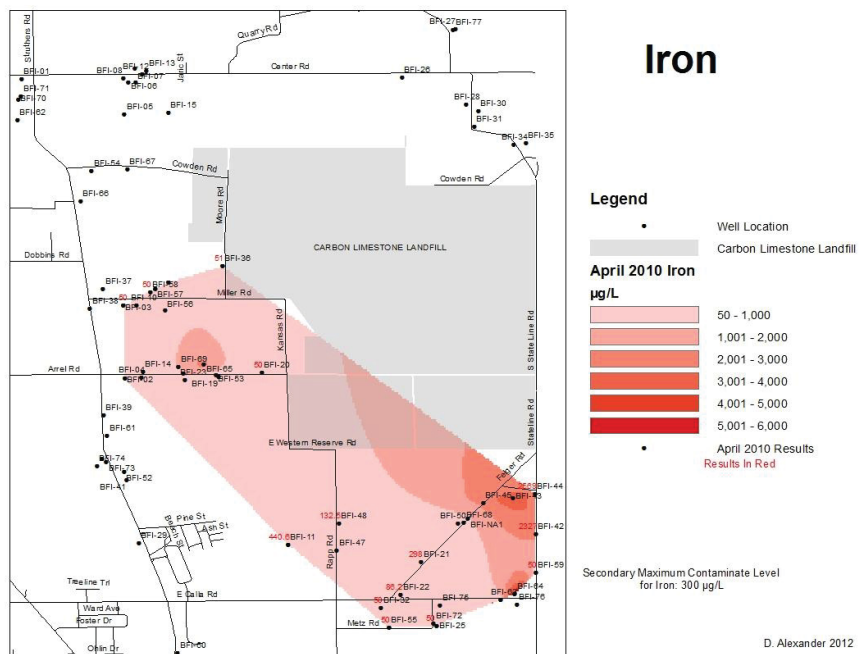
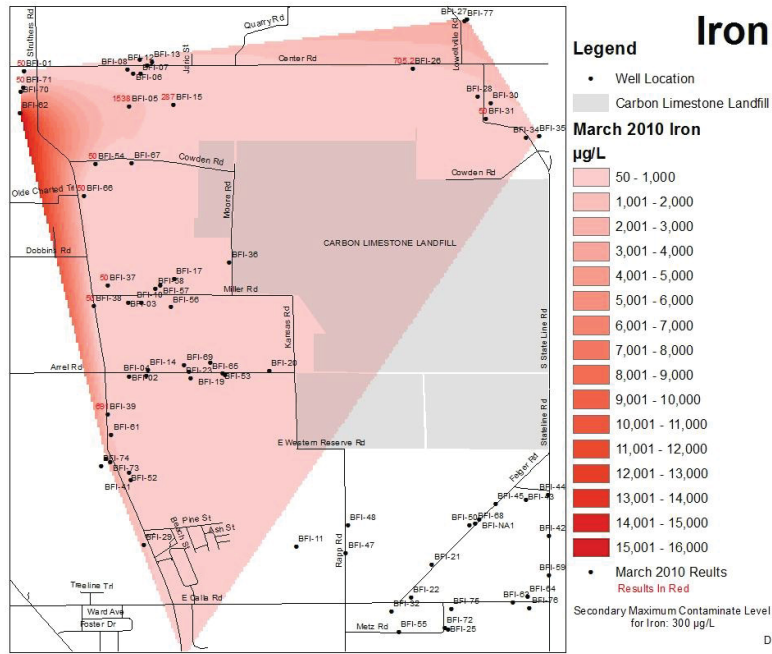
**µg/L**

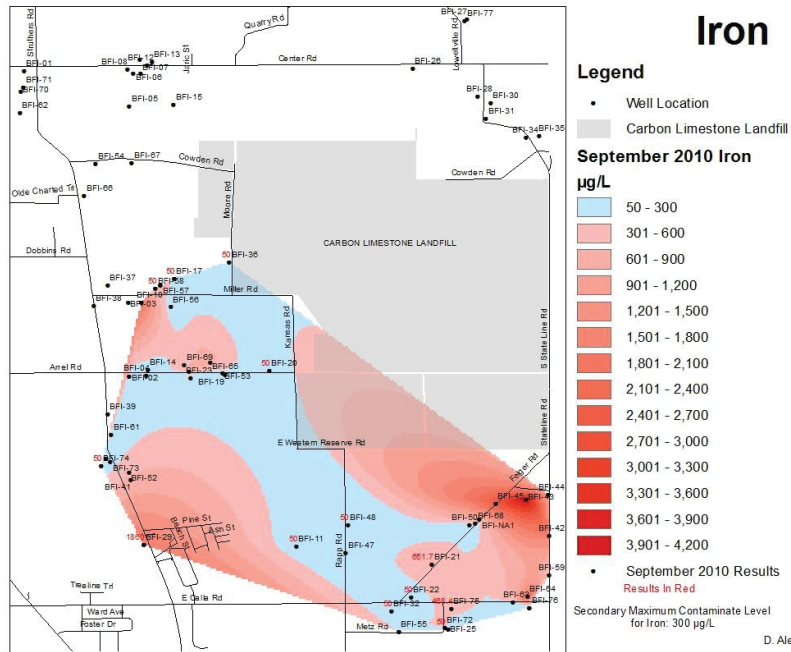
- 50 - 300
- 301 - 600
- 601 - 900
- 901 - 1,200
- 1,201 - 1,500
- 1,501 - 1,800
- 1,801 - 2,100
- 2,101 - 2,400
- 2,401 - 2,700
- 2,701 - 3,000
- 3,001 - 3,300
- 3,301 - 3,600

- October 2009 Results
- Results In Red

Secondary Maximum Contaminate Level for Iron: 300 µg/L

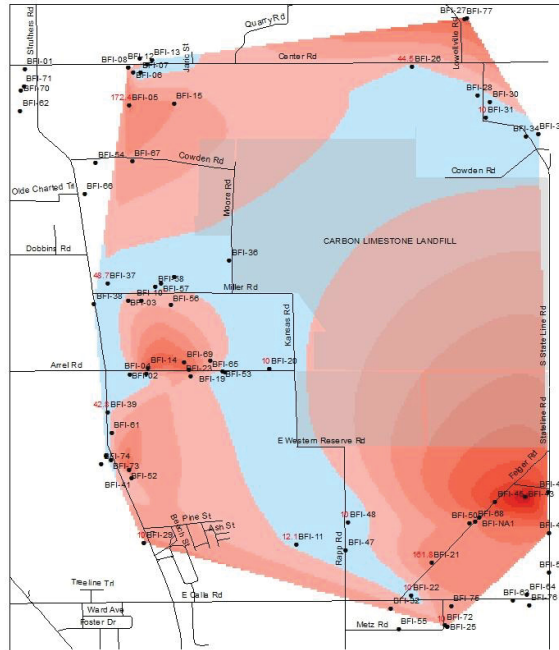
D. Alexander 2012







**APPENDIX H: Manganese Concentration Maps**



# Manganese

## Legend

- Well Location
- Carbon Limestone Landfill

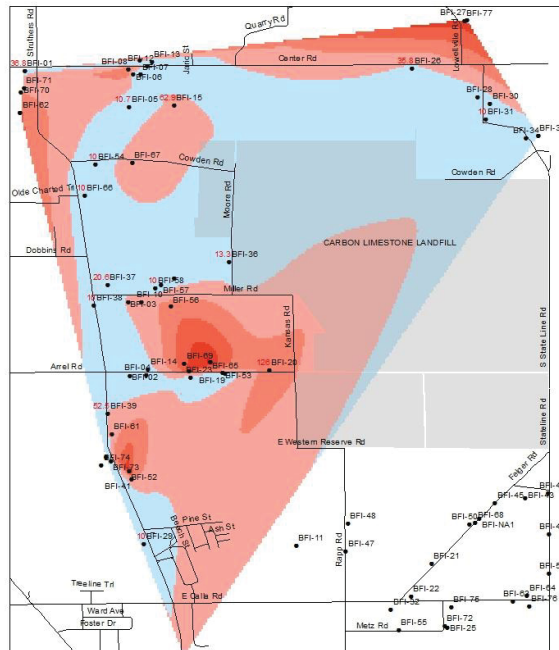
### April 2007 Manganese µg/L

- 10 - 50
- 51 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300
- 301 - 350
- 351 - 400
- 401 - 450
- 451 - 500

- April 2007 Results
- Results In Red

Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012



# Manganese

## Legend

- Well Location
- Carbon Limestone Landfill

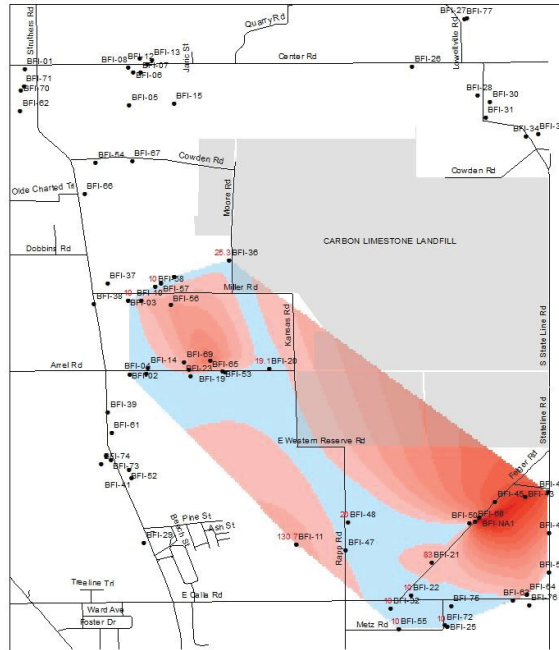
### April 2009 Manganese µg/L

- 10 - 50
- 51 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300

- April 2009 Results
- Results In Red

Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012



# Manganese

## Legend

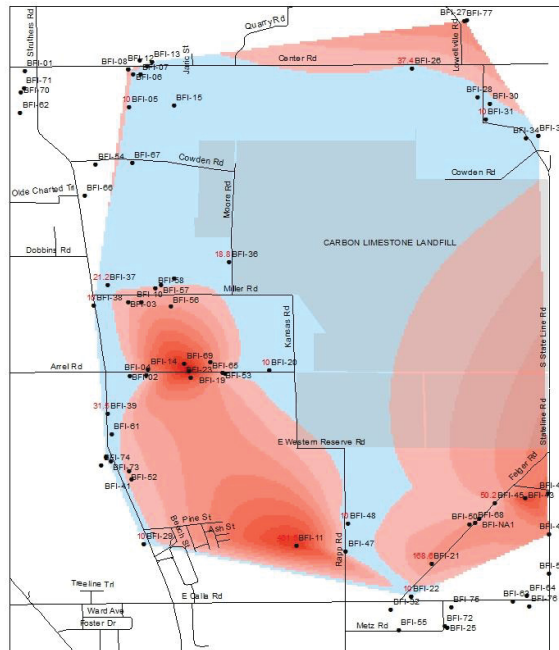
- Well Location
- Carbon Limestone Landfill

### April 2010 Manganese µg/L

- 10 - 50
- 51 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300
- 301 - 350
- 351 - 400
- 401 - 450
- 451 - 500
- 501 - 550
- 551 - 600
- 601 - 650

- April 2010 Results  
Results in Red
- Secondary Maximum Contaminate Level  
for Manganese: 50 µg/L

D. Alexander 2012



# Manganese

## Legend

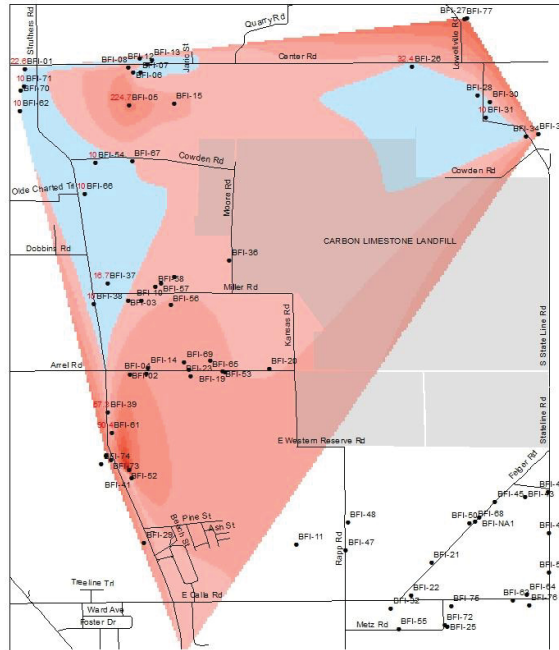
- Well Location
- Carbon Limestone Landfill

### August 2006 Manganese µg/L

- 10 - 50
- 51 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300
- 301 - 350
- 351 - 400
- 401 - 450
- 451 - 500
- 501 - 550

- August 2006 Results  
Results in Red
- Secondary Maximum Contaminate Level  
for Manganese: 50 µg/L

D. Alexander 2012



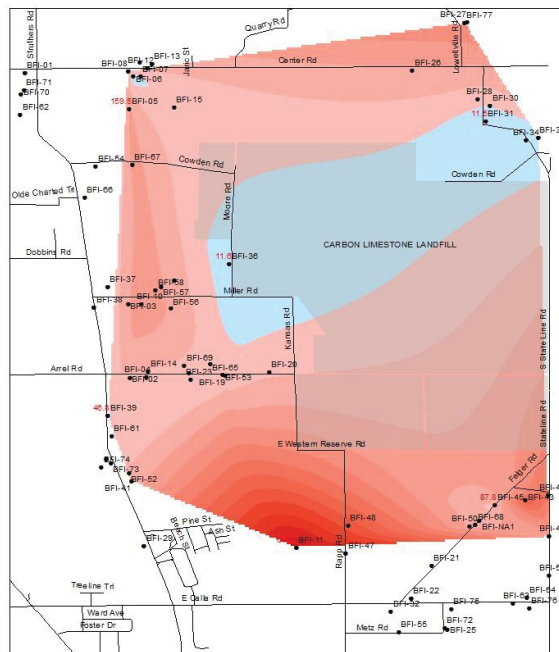
# Manganese

## Legend

- Well Location
  - Carbon Limestone Landfill
- August 2010 Manganese**  
µg/L
- 10 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
  - 501 - 550
- August 2010 Results
  - Results in Red

Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012



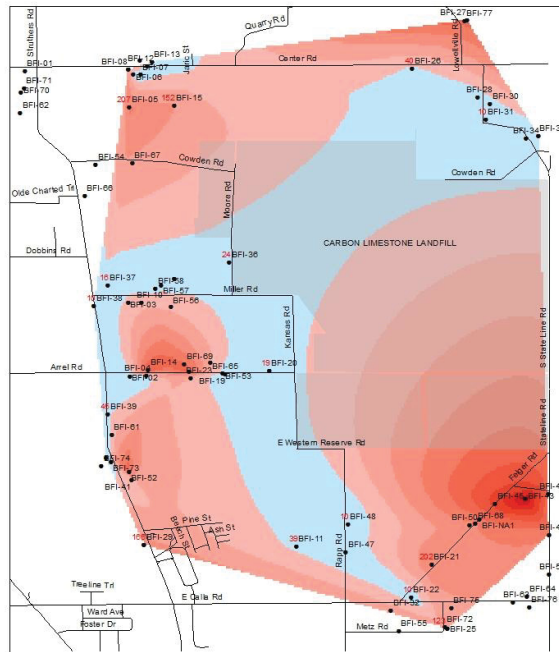
# Manganese

## Legend

- Well Location
  - Carbon Limestone Landfill
- July 2005 Results**  
µg/L
- 11.73635483 - 50
  - 50.00000001 - 100
  - 100.00000001 - 150
  - 150.00000001 - 200
  - 200.00000001 - 250
  - 250.00000001 - 300
  - 300.00000001 - 350
  - 350.00000001 - 400
  - 400.00000001 - 450
  - 450.00000001 - 500
  - 500.00000001 - 550
  - 550.00000001 - 600
  - 600.00000001 - 650
- July 2005 Results
  - Results in Red

Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012

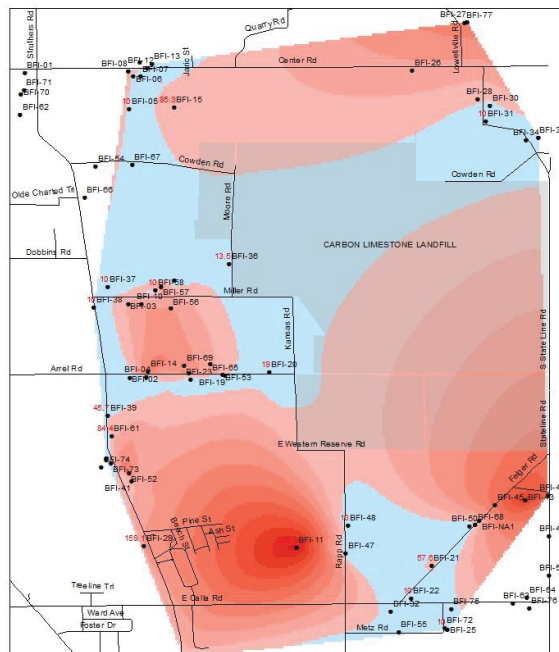


# Manganese

## Legend

- Well Location
  - Carbon Limestone Landfill
- July 2007 Manganese**  
µg/L
- 10 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
- July 2007 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012

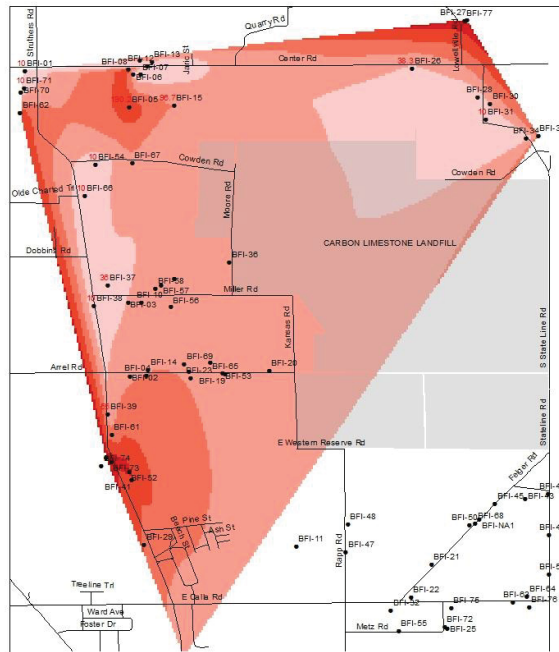


# Manganese

## Legend

- Well Location
  - Carbon Limestone Landfill
- June 2008 Manganese**  
µg/L
- 10 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
  - 501 - 550
- June 2008 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012

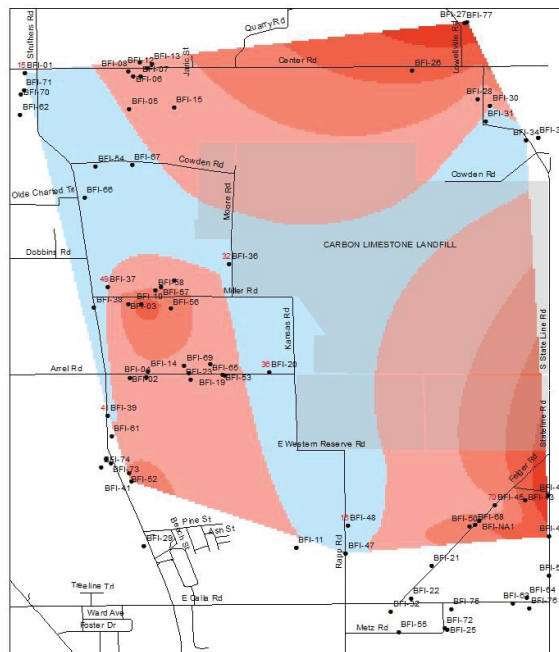


## Manganese

### Legend

- Well Location
  - Carbon Limestone Landfill
- March 2010 Manganese µg/L**
- 10 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
- March 2010 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012

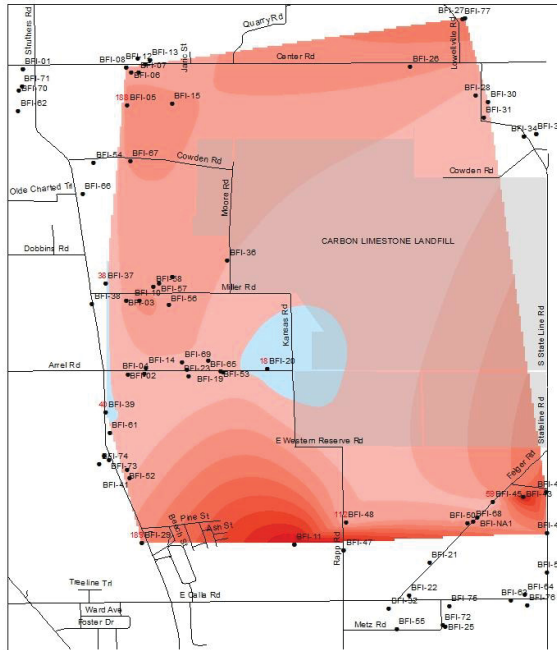


## Manganese

### Legend

- Well Location
  - Carbon Limestone Landfill
- May 2003 Manganese µg/L**
- 16 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
- May 2003 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012

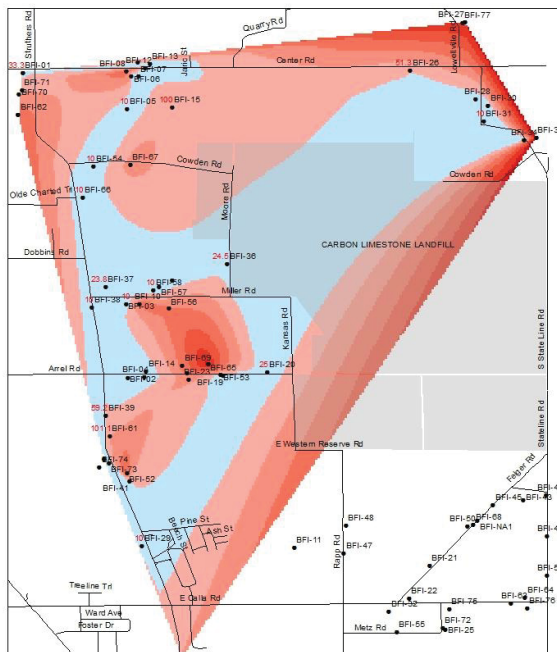


# Manganese

## Legend

- Well Location
  - Carbon Limestone Landfill
- µg/L**
- 19 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
- May 2004 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012

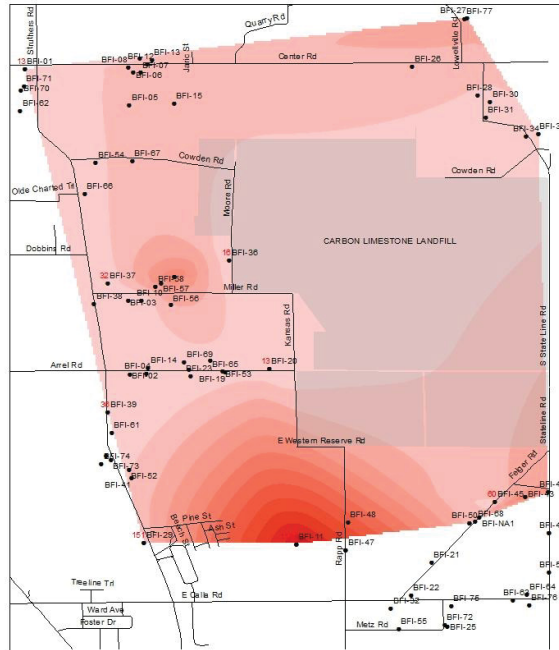


# Manganese

## Legend

- Well Location
  - Carbon Limestone Landfill
- May 2009 Manganese**
- µg/L**
- 10 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
- May 2009 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012



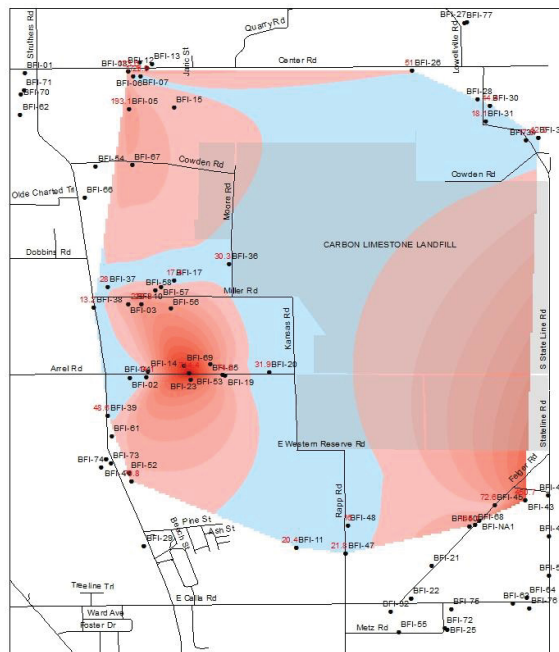
# Manganese

## Legend

- Well Location
  - Carbon Limestone Landfill
- µg/L**
- 12 - 100
  - 101 - 200
  - 201 - 300
  - 301 - 400
  - 401 - 500
  - 501 - 600
  - 601 - 700
  - 701 - 800
  - 801 - 900
  - 901 - 1,000
  - 1,001 - 1,100
  - 1,101 - 1,200

• November 2003 Results  
 Results in Red  
 Secondary Maximum Contaminate Level  
 for Manganese: 50 µg/L

D. Alexander 2012



# Manganese

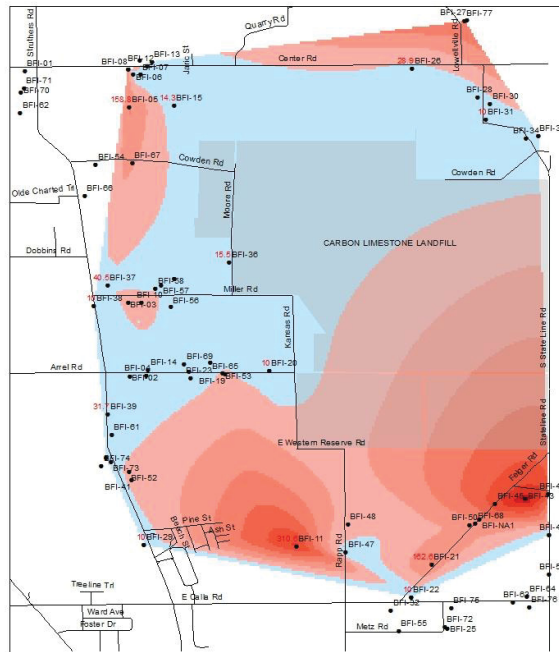
## Legend

- Well Location
  - Carbon Limestone Landfill
- µg/L**
- 13 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
  - 501 - 550
  - 551 - 600
  - 601 - 650
  - 651 - 700
  - 701 - 750

• November 2005 Results  
 Results in Red  
 Secondary Maximum Contaminate Level  
 for Manganese: 50 µg/L

D. Alexander 2012

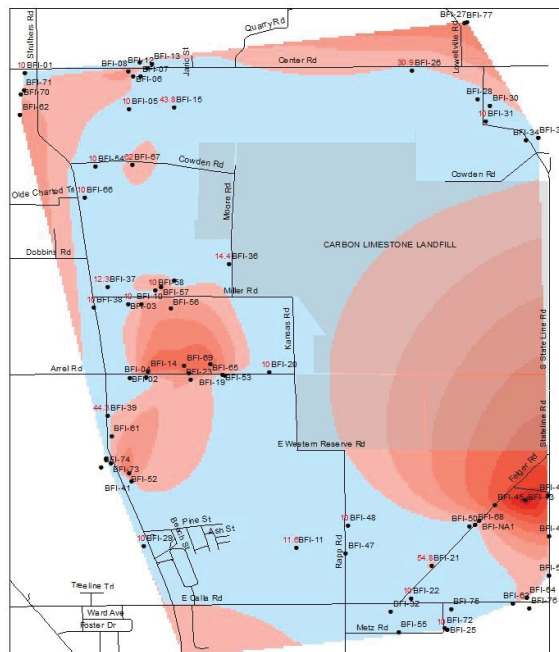




# Manganese

## Legend

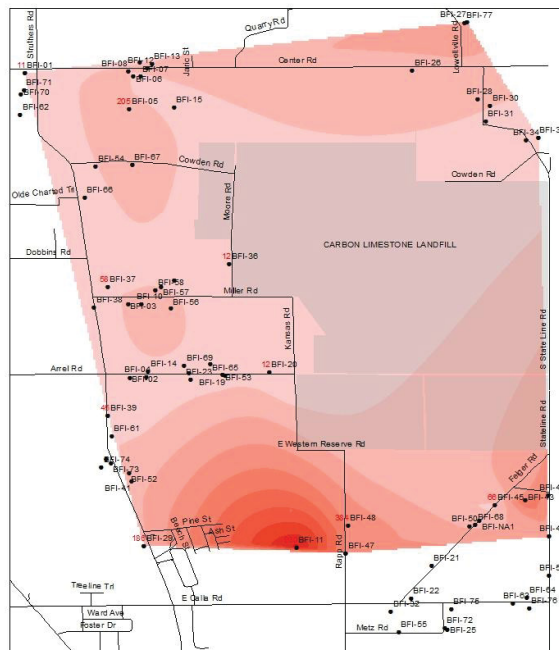
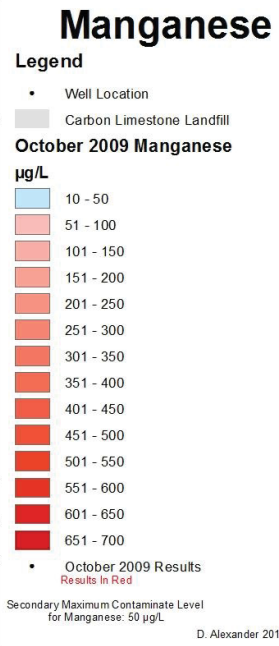
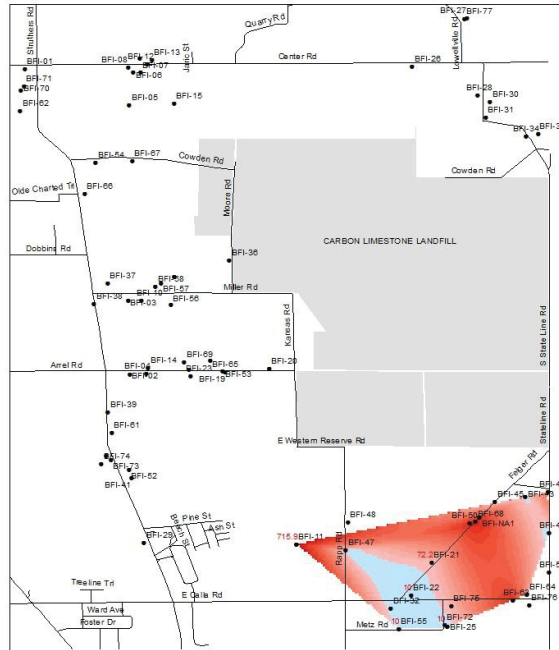
- Well Location
  - Carbon Limestone Landfill
- November 2006 Manganese**
- µg/L
- 10 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
- November 2006 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Manganese: 50 µg/L
- D. Alexander 2012

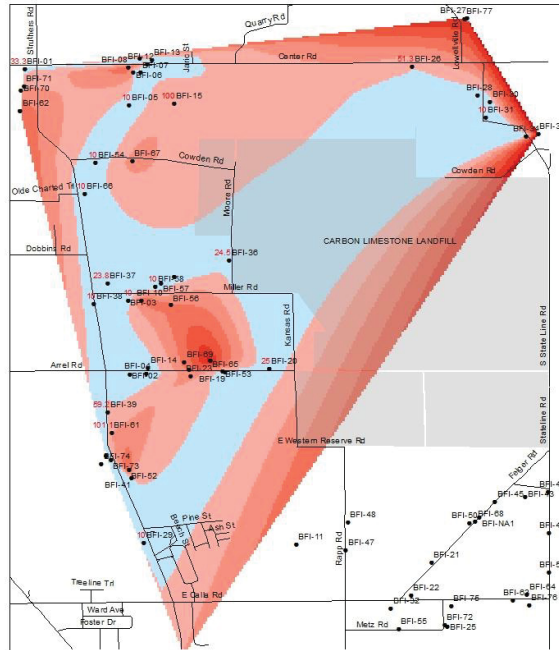


# Manganese

## Legend

- Well Location
  - Carbon Limestone Landfill
- November 2008 Manganese**
- µg/L
- 10 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
- November 2008 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Manganese: 50 µg/L
- D. Alexander 2012





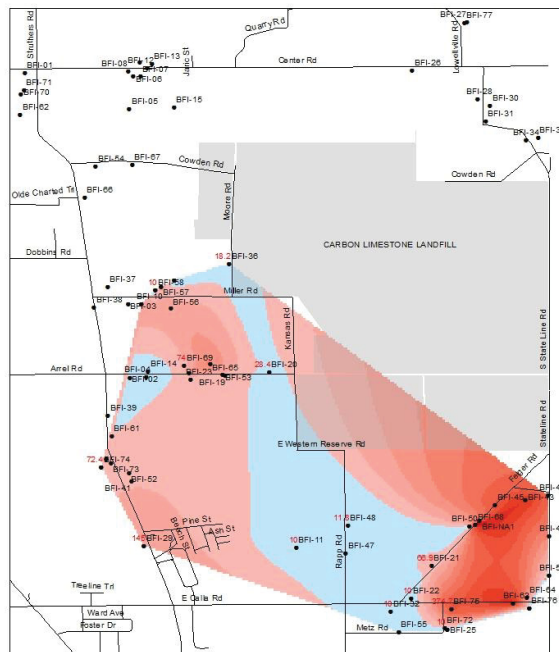
# Manganese

## Legend

- Well Location
- Carbon Limestone Landfill
- September 2009 Manganese**  
µg/L
  - 10 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
- September 2009 Results  
Results in Red

Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012



# Manganese

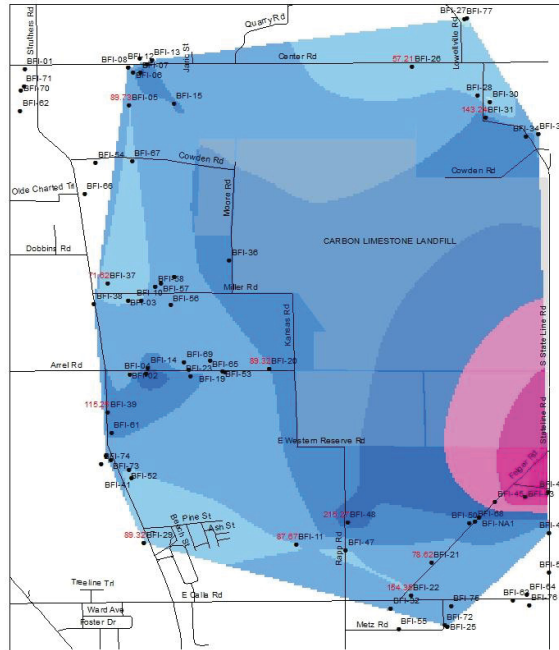
## Legend

- Well Location
- Carbon Limestone Landfill
- September 2010 Manganese**  
µg/L
  - 10 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
  - 501 - 550
- September 2010 Results  
Results in Red

Secondary Maximum Contaminate Level for Manganese: 50 µg/L

D. Alexander 2012

**APPENDIX I: Sulfate Concentration Maps**



# Sulfate

## Legend

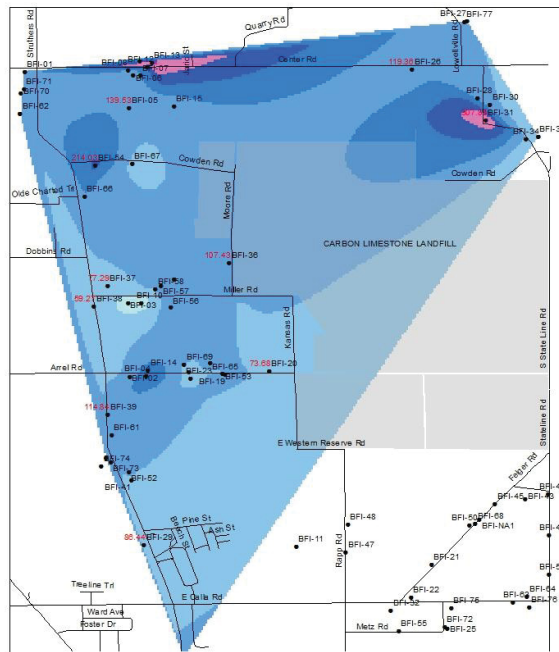
- Well Location
- Carbon Limestone Landfill

### April 2007 Sulfate mg/L

- 45 - 50
- 51 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300
- 301 - 350
- 351 - 400

- April 2007 Results
  - Results In Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012 4



# Sulfate

## Legend

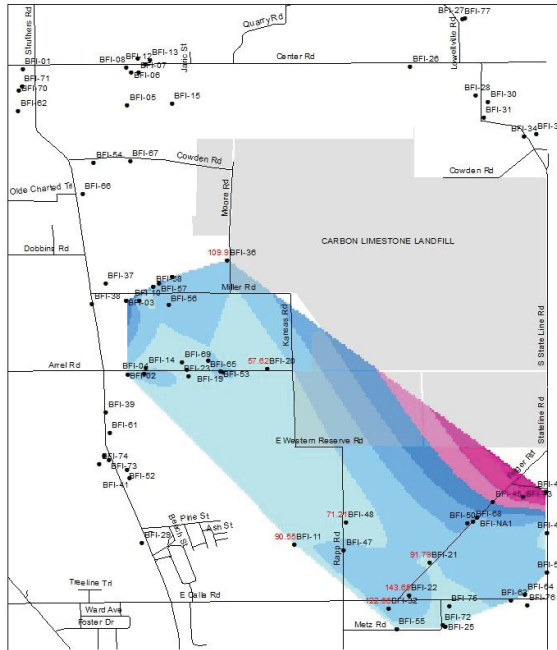
- Well Location
- Carbon Limestone Landfill

### April 2009 Sulfate mg/L

- 27 - 50
- 51 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300
- 301 - 350

- April 2009 Results
  - Results In Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

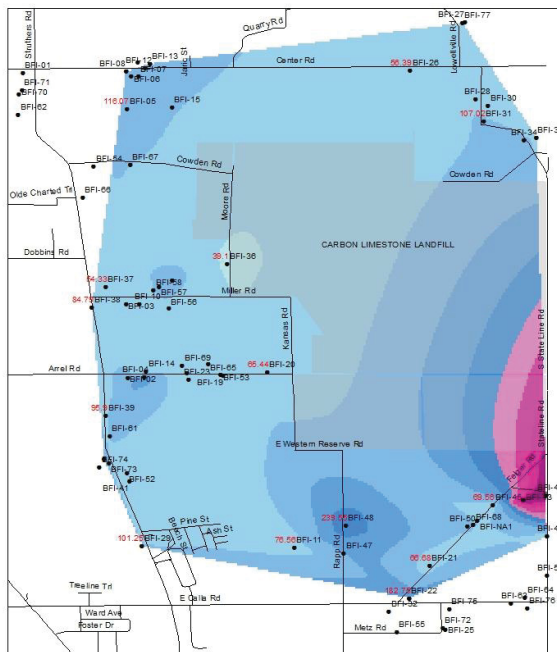


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- April 2010 Sulfate**  
mg/L
- 58 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
- April 2010 Results
  - Results in Red
- Secondary Maximum Contaminate Level  
for Sulfate: 250 mg/L

D. Alexander 2012

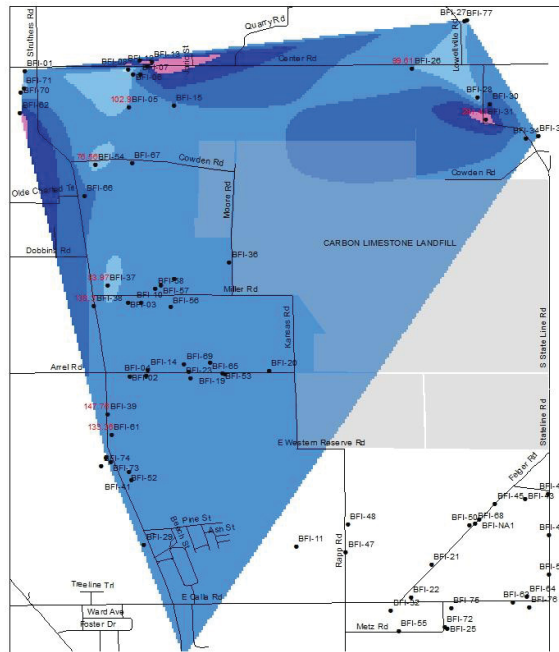


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- August 2006 Sulfate**  
mg/L
- 40 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
- August 2006 Results
  - Results in Red
- Secondary Maximum Contaminate Level  
for Sulfate: 250 mg/L

D. Alexander 2012



## Sulfate

### Legend

- Well Location
- Carbon Limestone Landfill

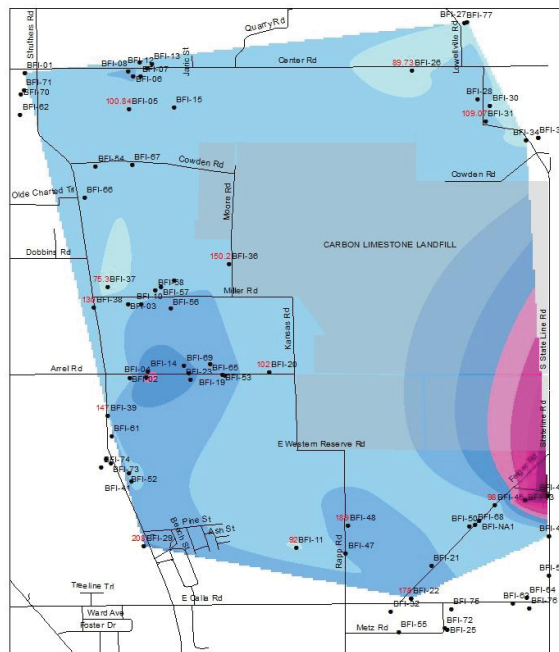
### August 2010 Sulfate mg/L

- 46 - 50
- 51 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300

- August 2010 Results  
Results in Red

Secondary Maximum Contaminate Level  
for Sulfate: 250 mg/L

D. Alexander 2012



## Sulfate

### Legend

- Well Location
- Carbon Limestone Landfill

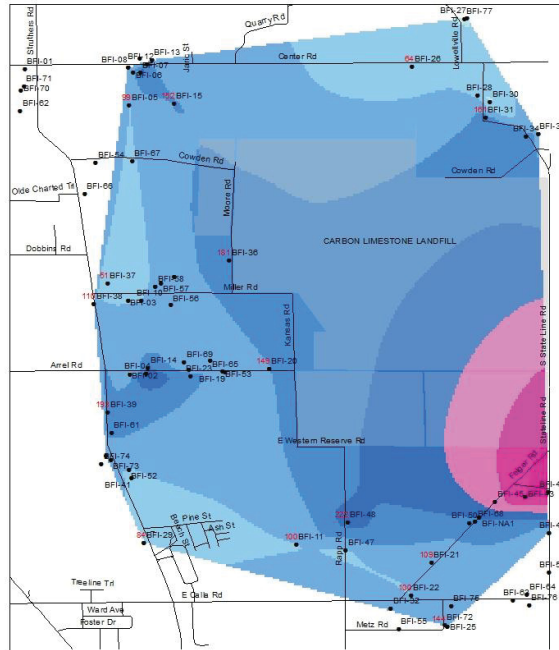
### mg/L

- 77 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300
- 301 - 350
- 351 - 400
- 401 - 450
- 451 - 500

- July 2005 Results  
Results in Red

Secondary Maximum Contaminate Level  
for Sulfate: 250 mg/L

D. Alexander 2012



## Sulfate

### Legend

- Well Location
- Carbon Limestone Landfill

### July 2007 Sulfate

mg/L

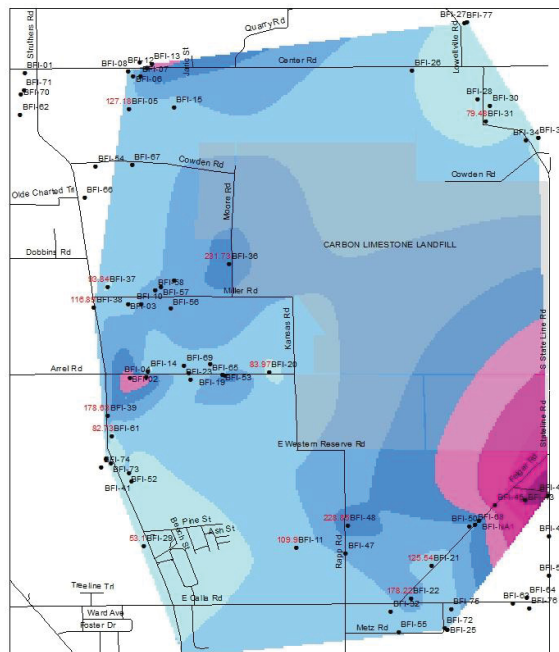
- 45 - 50
- 51 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300
- 301 - 350
- 351 - 400

- July 2007 Results

Results in Red

Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012



## Sulfate

### Legend

- Well Location
- Carbon Limestone Landfill

### June 2008 Sulfate

mg/L

- 54 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 300
- 301 - 350
- 351 - 400
- 401 - 450

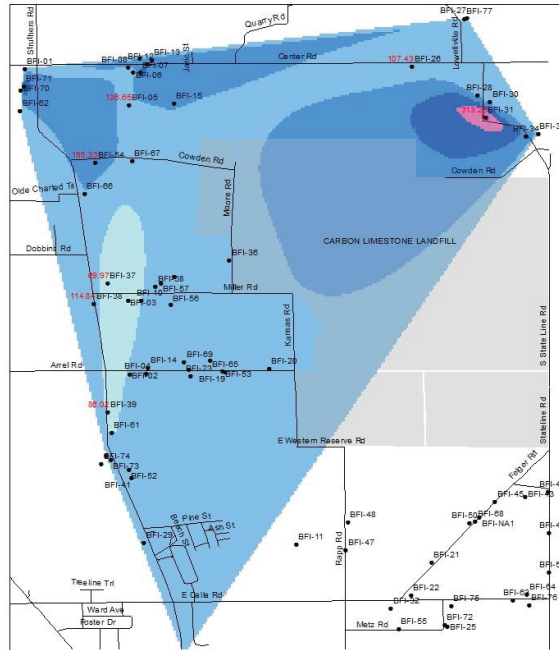
- June 2008 Results

Results in Red

Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012



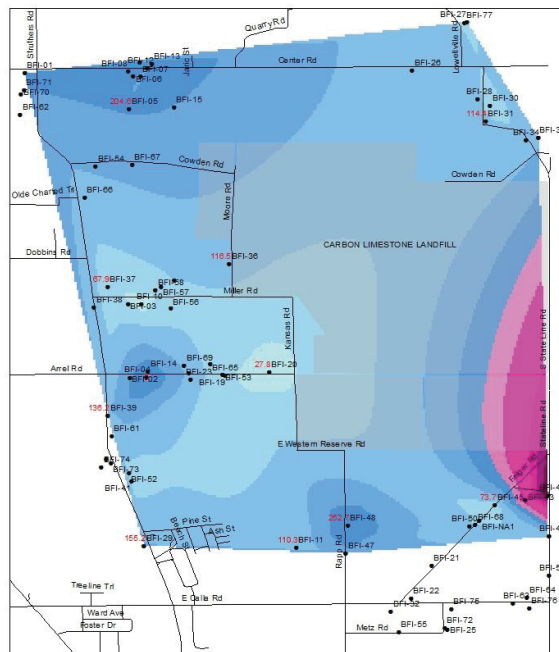


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- March 2010 Sulfate**  
mg/L
- 71 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
- March 2010 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

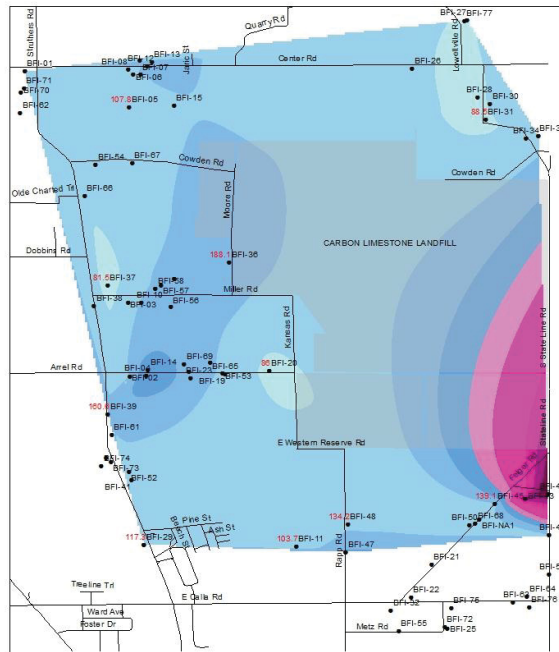


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- May 2003 Sulfate**  
mg/L
- 20 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
  - 501 - 550
- May 2003 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

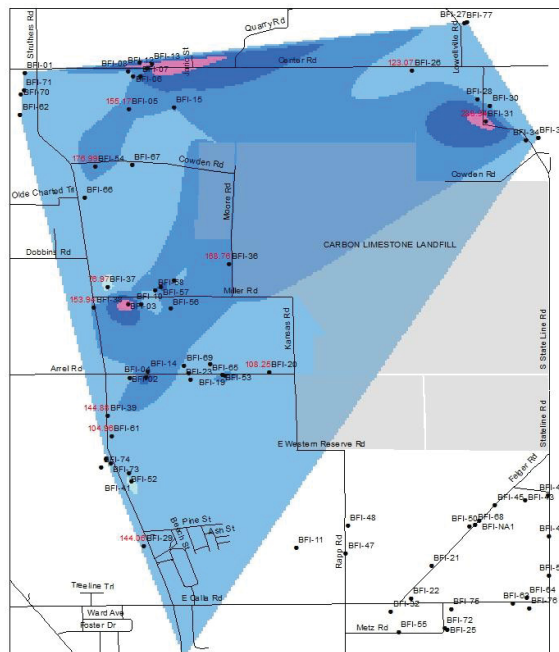


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- mg/L**
- 83 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
  - 501 - 550
- May 2004 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

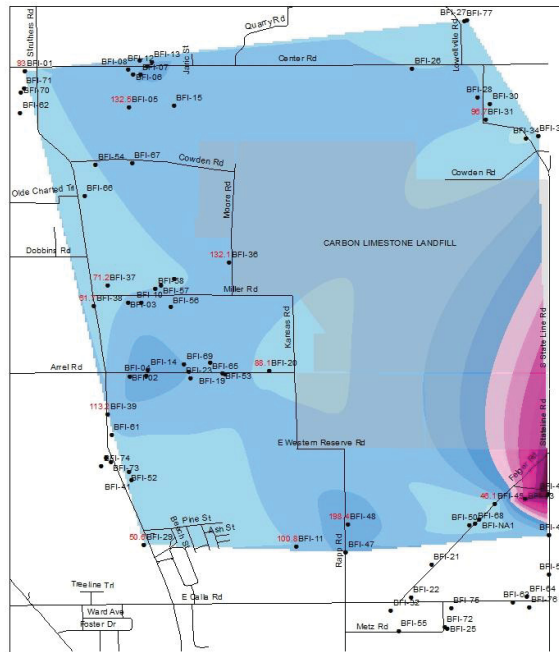


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- May 2009 Sulfate**
- mg/L**
- 81 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
- May 2009 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

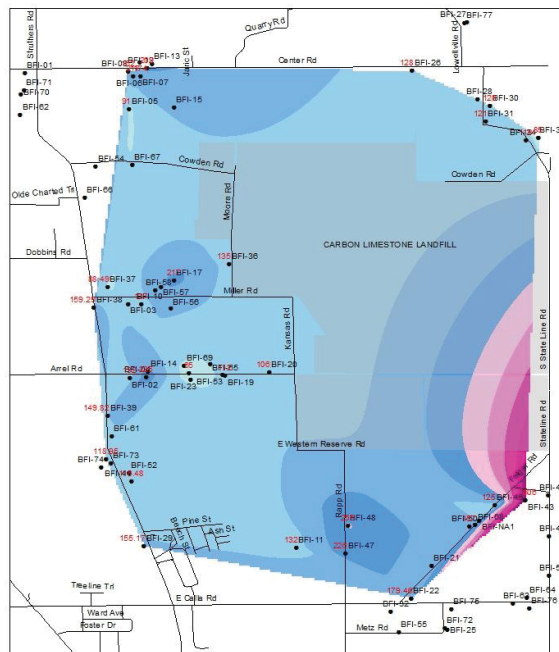


# Sulfate

## Legend

- Well Location
  - Carbon Limestone Landfill
- mg/L**
- 26 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
  - 501 - 550
  - 551 - 600
- November 2003 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

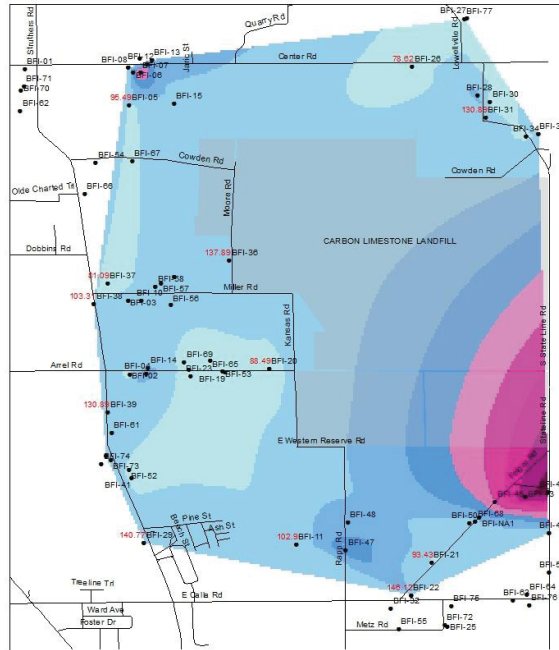


# Sulfate

## Legend

- Well Location
  - Carbon Limestone Landfill
- mg/L**
- 68 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
- November 2005 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

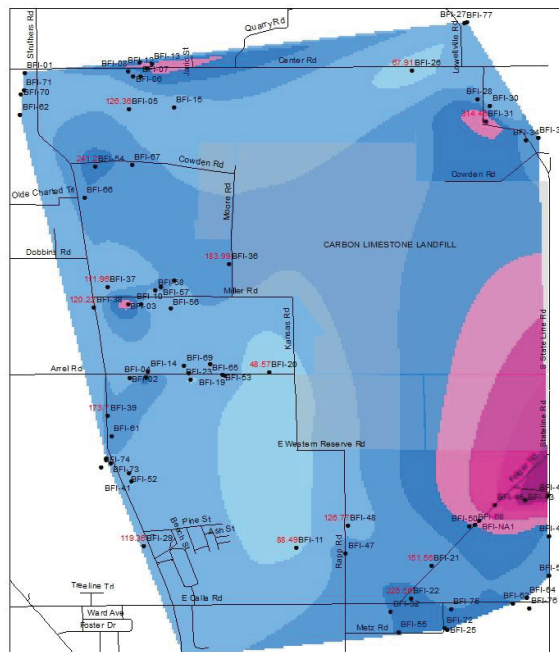


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- November 2006 Sulfate**  
mg/L
- 68 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
- November 2006 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

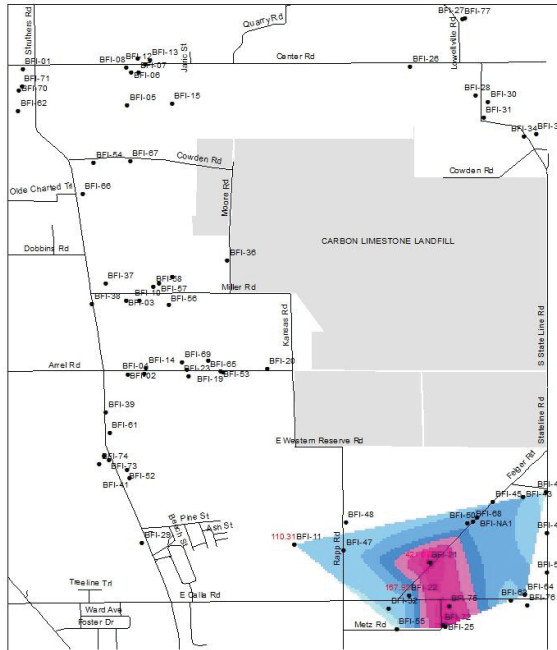


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- November 2008 Sulfate**  
mg/L
- 49 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
- November 2008 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

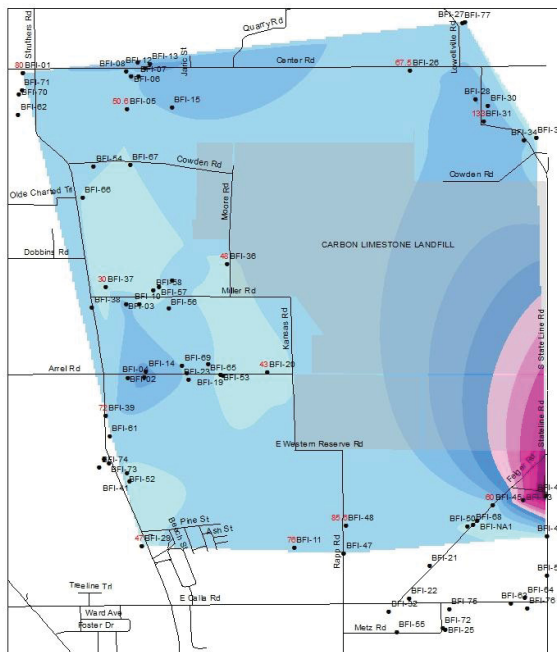


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- October 2009 Sulfate**  
mg/L
- 81 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
- October 2009 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

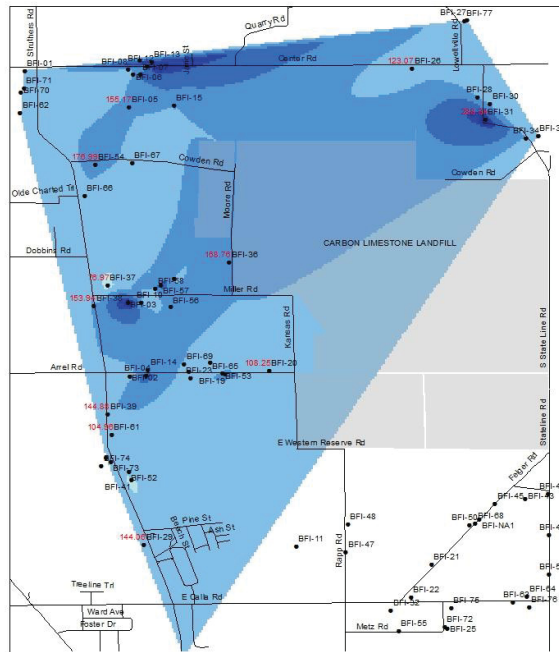


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- September 2004 Sulfate**  
mg/L
- 25 - 50
  - 51 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
  - 351 - 400
  - 401 - 450
  - 451 - 500
  - 501 - 550
- September 2004 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

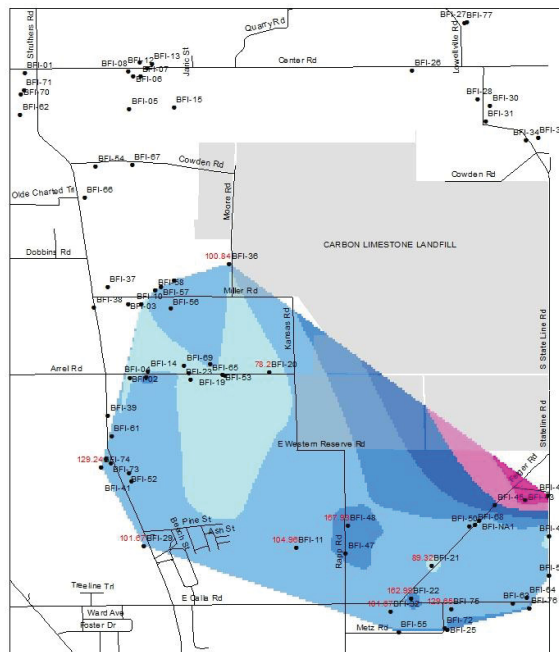


## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- September 2009 Sulfate mg/L**
- 81 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
- September 2009 Results  
Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012



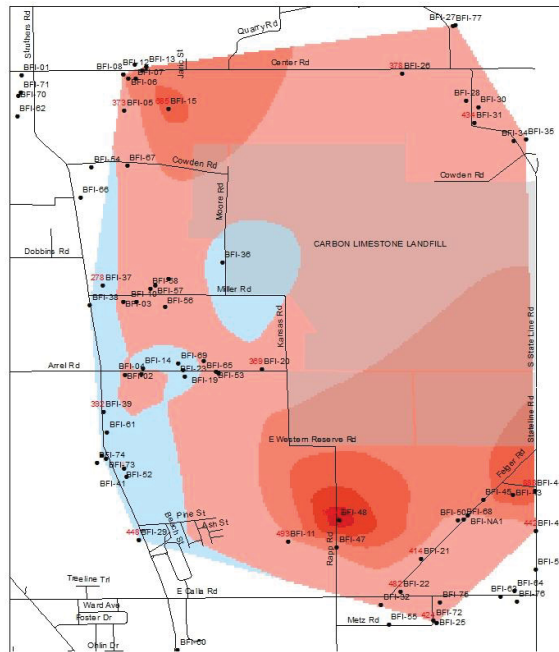
## Sulfate

### Legend

- Well Location
  - Carbon Limestone Landfill
- September 2010 Sulfate mg/L**
- 73 - 100
  - 101 - 150
  - 151 - 200
  - 201 - 250
  - 251 - 300
  - 301 - 350
- September 2010 Results  
Results in Red
- Secondary Maximum Contaminate Level for Sulfate: 250 mg/L

D. Alexander 2012

**APPENDIX J: TDS Concentration Maps**

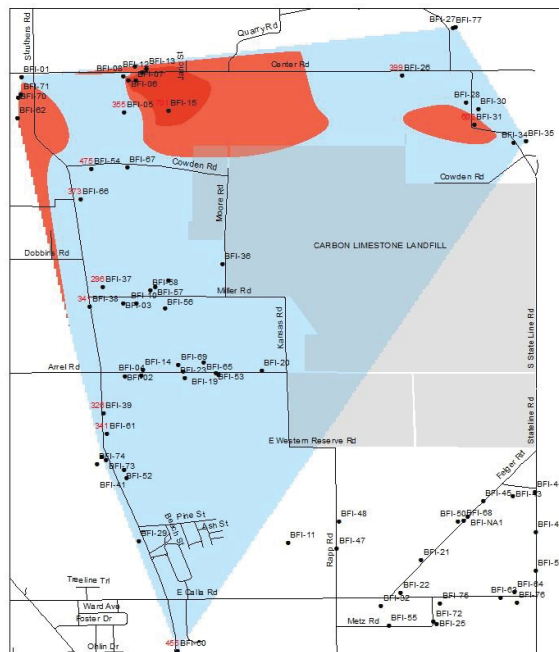


## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- April 2007 Dissolved Solids mg/L**
- 345 - 500
  - 501 - 750
  - 751 - 1,000
  - 1,001 - 1,250
  - 1,251 - 1,500
- April 2007 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Total Dissolved Solids: 500 mg/L

D. Alexander 2012



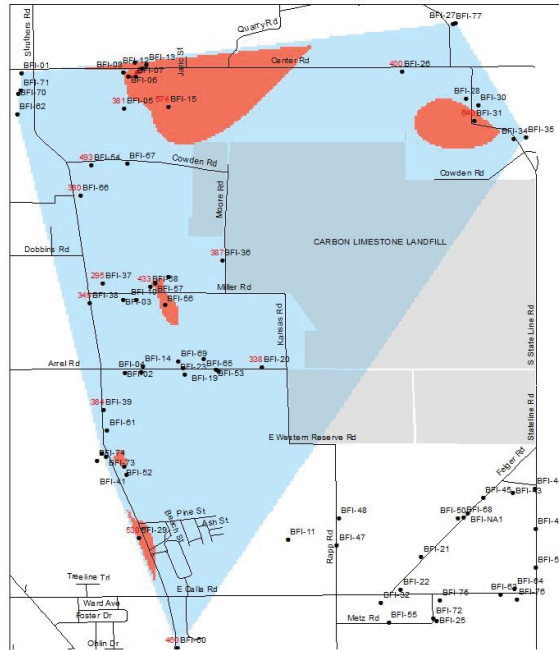
## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- mg/L**
- 298 - 300
  - 301 - 400
  - 401 - 500
  - 501 - 600
  - 601 - 700
- August 2010 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Total Dissolved Solids: 500 mg/L

D. Alexander 2012



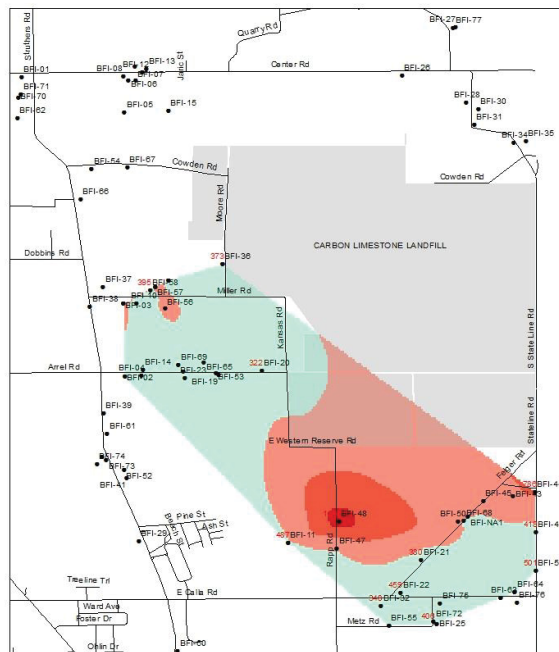


## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- April 2009 Dissolved Solids mg/L**
- 285 - 500
  - 501 - 750
  - 751 - 1,000
- April 2009 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Total Dissolved Solids: 500 mg/L

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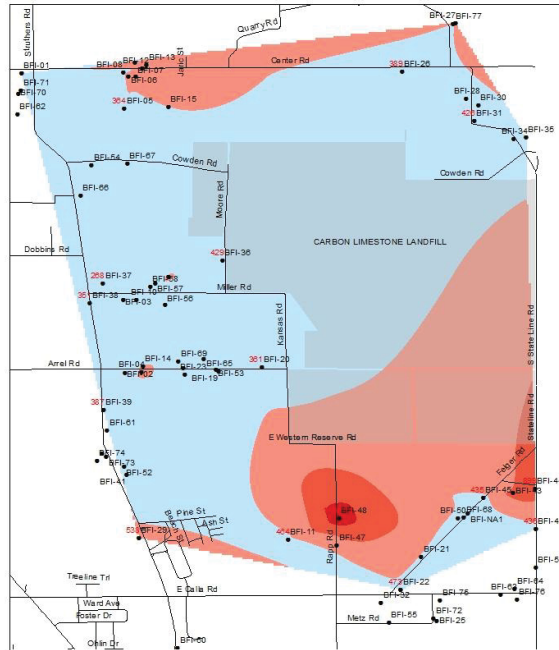


## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- April 2010 Dissolved Solids mg/L**
- 282 - 500
  - 501 - 750
  - 751 - 1,000
  - 1,001 - 1,250
- April 2010 Results
  - Results in Red
- Secondary Maximum Contaminate Level for Total Dissolved Solids: 500 mg/L

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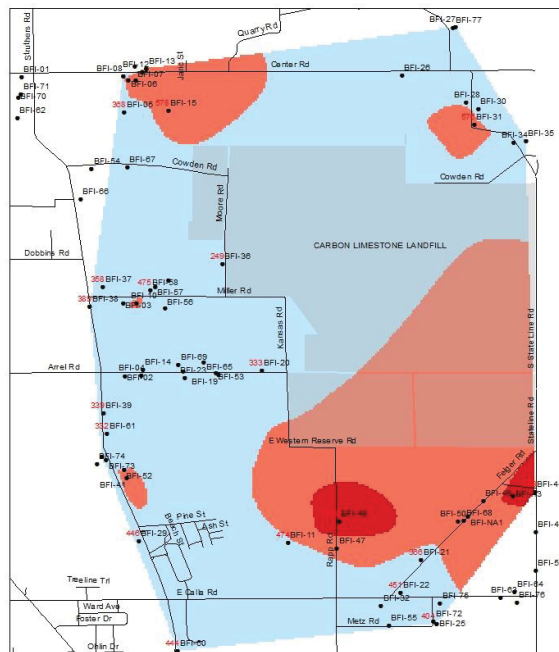
## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- mg/L**
- 272 - 500
  - 501 - 750
  - 751 - 1,000
  - 1,001 - 1,250
- July 2005 Results
  - Results in Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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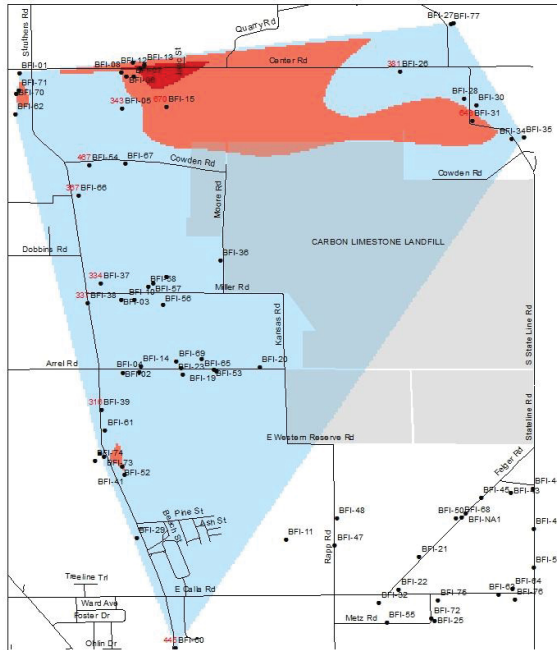
## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- June 2008 Dissolved Solids mg/L**
- 251 - 500
  - 501 - 750
  - 751 - 1,000
- June 2008 Results
  - Results in Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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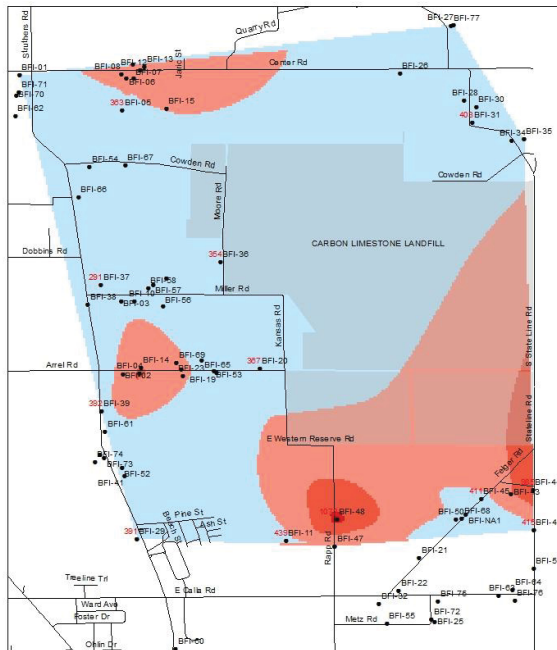
## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- March 2010 Dissolved Solids mg/L**
- 326 - 500
  - 501 - 750
  - 751 - 1,000
- March 2010 Results  
Results in Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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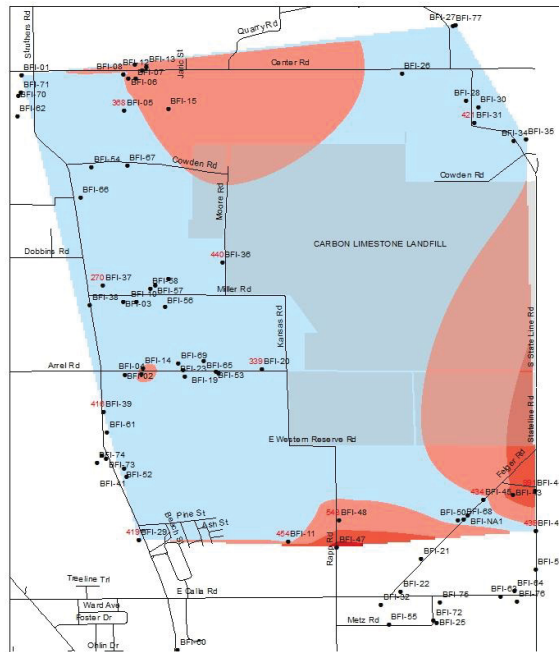
## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- May 2003 Dissolved Solids mg/L**
- 293 - 500
  - 501 - 750
  - 751 - 1,000
  - 1,001 - 1,250
- May 2003 Results  
Results in Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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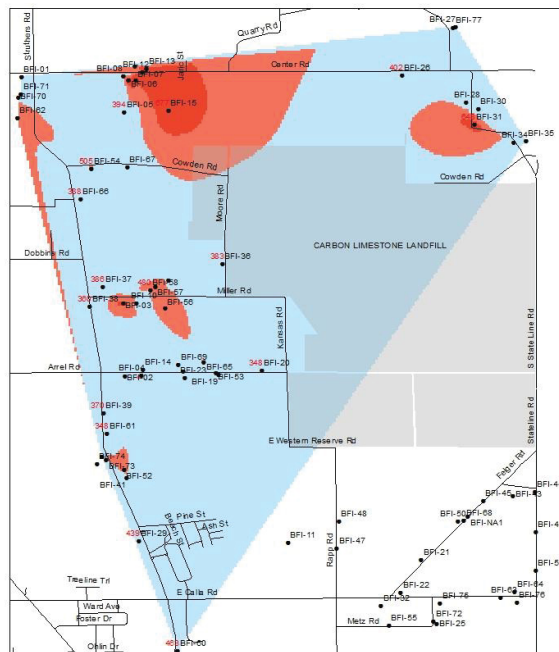
## Total Dissolved Solids

### Legend

- Well Location
- Carbon Limestone Landfill
- mg/L
- 273 - 500
- 501 - 750
- 751 - 1,000
- 1,001 - 1,250
- May 2004 Results
- Results in Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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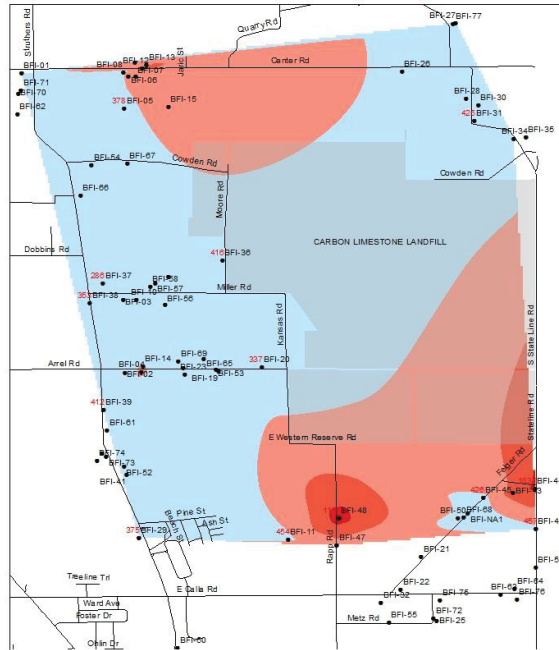
## Total Dissolved Solids

### Legend

- Well Location
- Carbon Limestone Landfill
- May 2009 Dissolved Solids
- mg/L
- 306 - 400
- 401 - 500
- 501 - 600
- 601 - 700
- 701 - 800
- May 2009 Results
- Results in Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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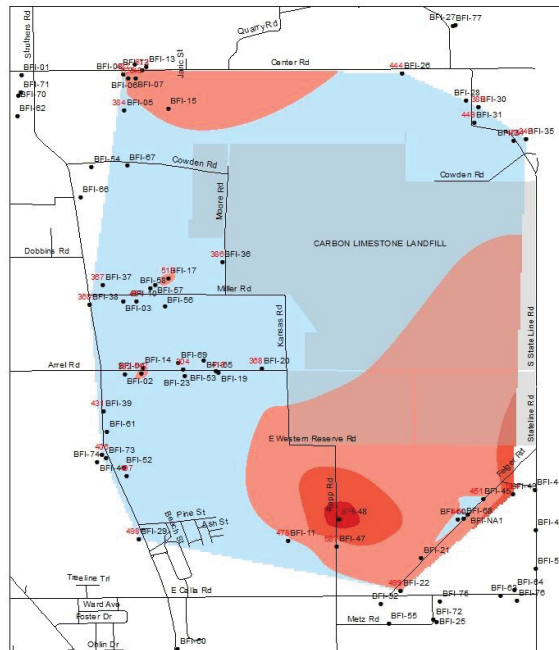
## Total Dissolved Solids

### Legend

- Well Location
- Carbon Limestone Landfill
- mg/L
- 289 - 500
- 501 - 750
- 751 - 1,000
- 1,001 - 1,250
- November 2003 Results
- Results In Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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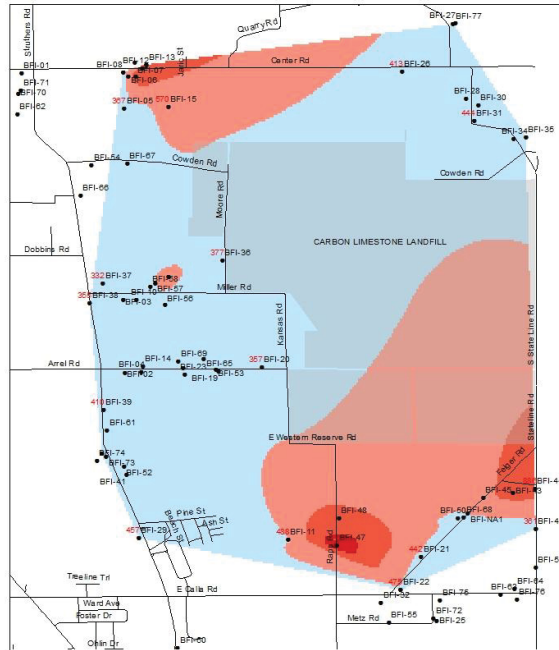
## Total Dissolved Solids

### Legend

- Well Location
- Carbon Limestone Landfill
- mg/L
- 308 - 500
- 501 - 750
- 751 - 1,000
- 1,001 - 1,250
- November 2005 Results
- Results In Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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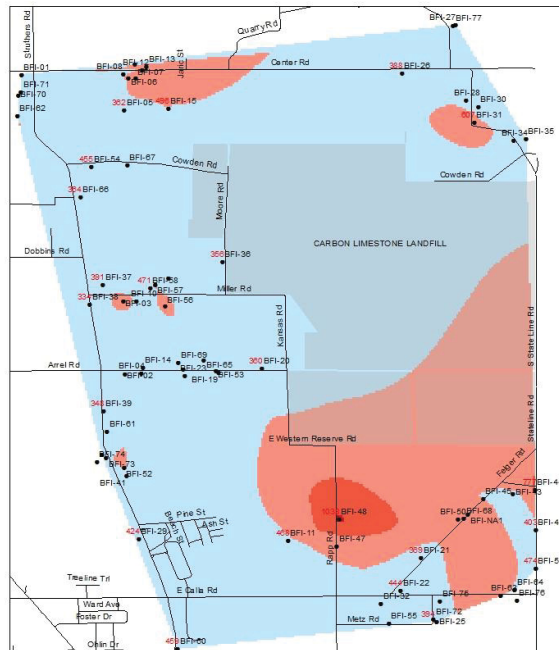
## Total Dissolved Solids

### Legend

- Well Location
- Carbon Limestone Landfill
- November 2006 Dissolved Solids mg/L
  - 330 - 500
  - 501 - 750
  - 751 - 1,000
  - 1,001 - 1,250
- November 2006 Results
  - Results in Red

Secondary Maximum Contaminate Level for Total Dissolved Solids: 500 mg/L

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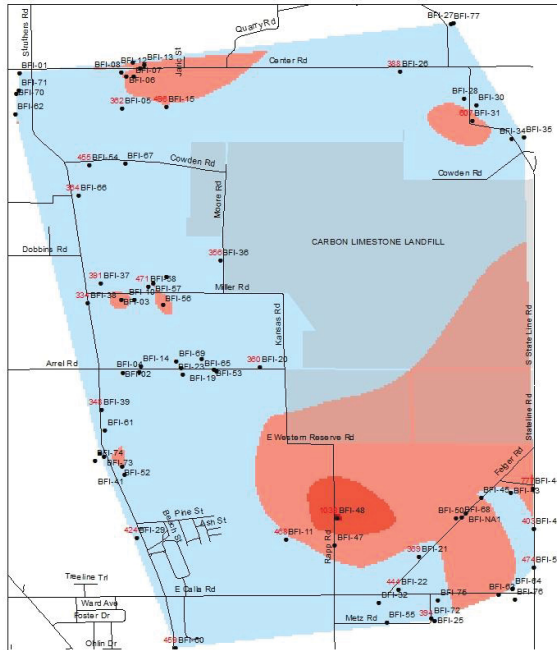
## Total Dissolved Solids

### Legend

- Well Location
- Carbon Limestone Landfill
- November 2008 Dissolved Solids mg/L
  - 285 - 500
  - 501 - 750
  - 751 - 1,000
  - 1,001 - 1,250
- November 2008 Results
  - Results in Red

Secondary Maximum Contaminate Level for Total Dissolved Solids: 500 mg/L

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## Total Dissolved Solids

### Legend

- Well Location

Carbon Limestone Landfill

### November 2008 Dissolved Solids

mg/L

285 - 500

501 - 750

751 - 1,000

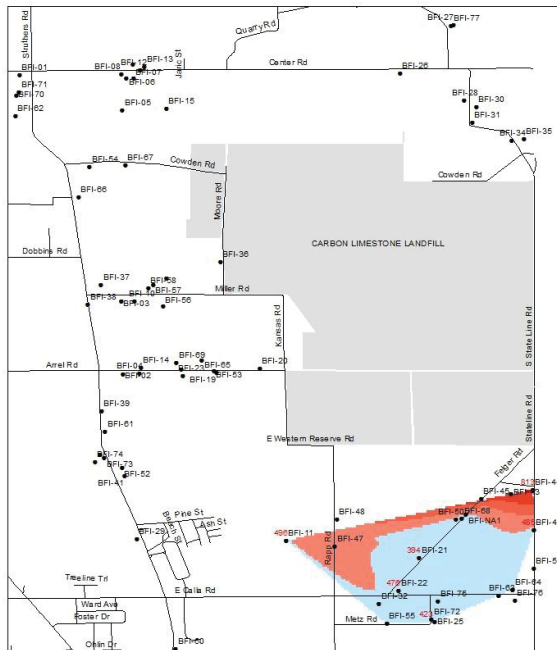
1,001 - 1,250

- November 2008 Results

Results in Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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## Total Dissolved Solids

### Legend

- Well Location

Carbon Limestone Landfill

### October 2009 Dissolved Solids

mg/L

396 - 400

401 - 500

501 - 600

601 - 700

701 - 800

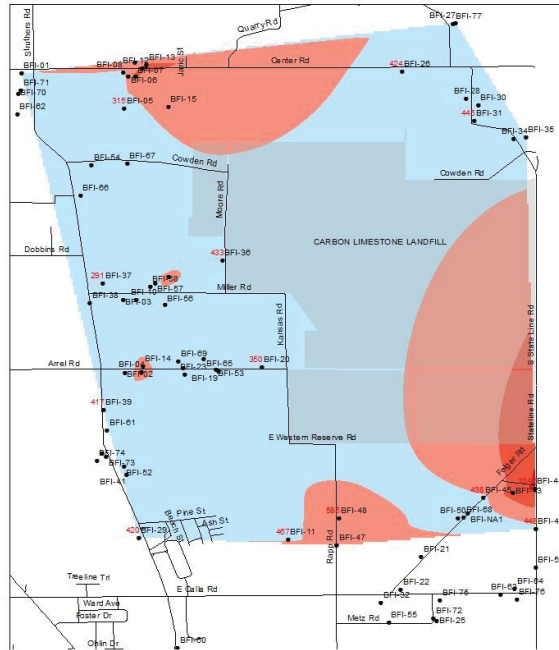
801 - 900

- October 2009 Results

Results in Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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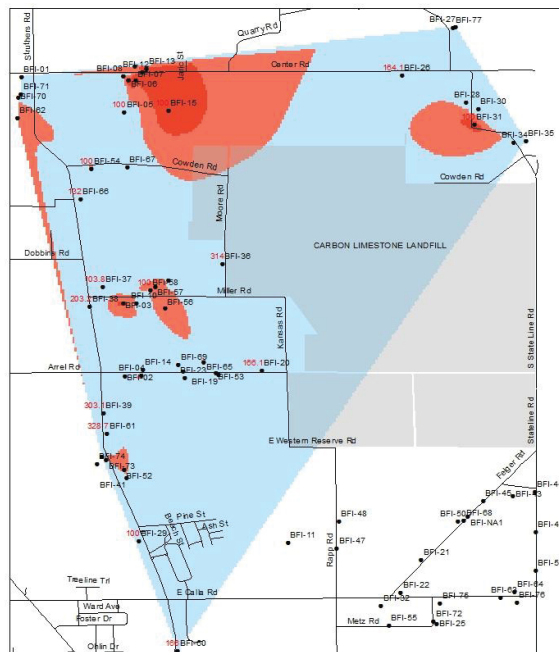
## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- mg/L**
- 294 - 500
  - 501 - 750
  - 751 - 1,000
  - 1,001 - 1,250
- September 2004 Results
  - Results In Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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## Total Dissolved Solids

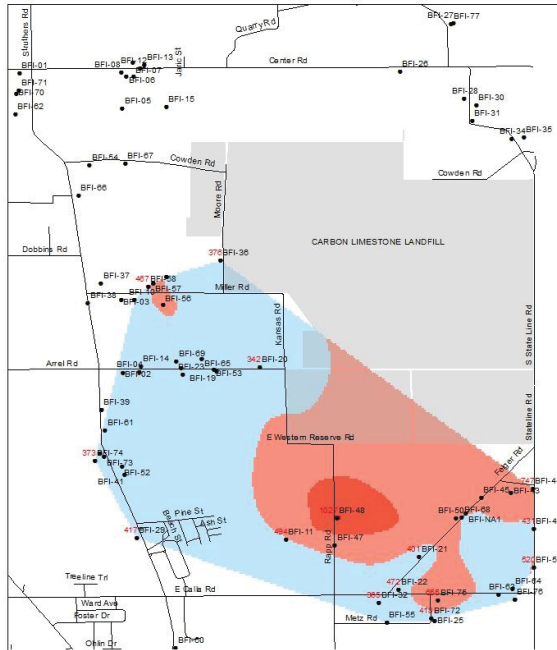
### Legend

- Well Location
  - Carbon Limestone Landfill
- September 2009 Dissolved Solids mg/L**
- 306 - 400
  - 401 - 500
  - 501 - 600
  - 601 - 700
  - 701 - 800
- September 2009 Results
  - Results In Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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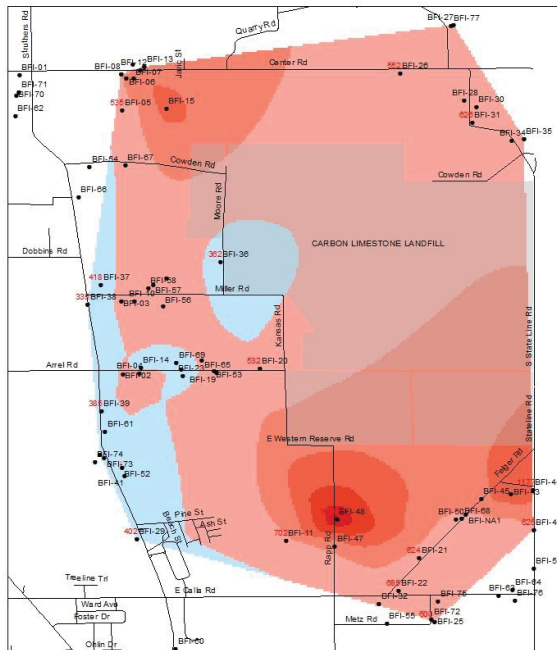
## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- September 2010 Dissolved Solids mg/L**
- 307 - 500
  - 501 - 750
  - 751 - 1,000
  - 1,001 - 1,250
- September 2010 Results
  - Results In Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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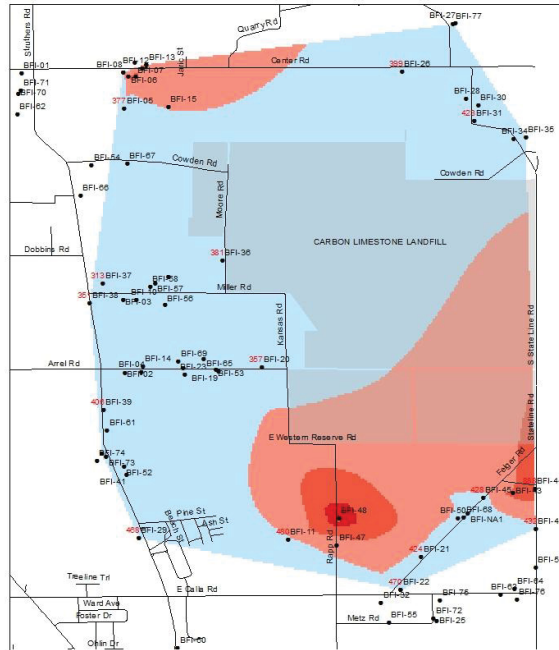
## Total Dissolved Solids

### Legend

- Well Location
  - Carbon Limestone Landfill
- July 2007 Dissolved Solids mg/L**
- 345 - 500
  - 501 - 750
  - 751 - 1,000
  - 1,001 - 1,250
  - 1,251 - 1,500
  - 1,501 - 1,750
- July 2007 Results
  - Results In Red

Secondary Maximum Contaminant Level for Total Dissolved Solids: 500 mg/L

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# Total Dissolved Solids

## Legend

- Well Location
- Carbon Limestone Landfill
- August 2006 Dissolved Solids mg/L**
- 295 - 500
- 501 - 750
- 751 - 1,000
- 1,001 - 1,250
- August 2006 Results
- Results in Red
- Secondary Maximum Contaminate Level for Total Dissolved Solids: 500 mg/L

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**APPENDIX K: On-site ODNR Well Logs**

Pages 281 through 308 have been removed. Please refer to the print version of this thesis available at Youngstown State University, Maag Library.