RENDEZVOUS ENGINEERING, P.C.
Civil Engineers and Planners in Wyoming and Idaho

Rendezvous Project No: 20-008.0

December 1, 2023

Nick Orsillo, President
River Meadows Water District
P.O. Box 1042
Jackson, WY 83025

Re: Rivermeadows Water System / Lead and Copper Testing Update

Dear Nick,

Five standard (overnight hold) lead and copper water samples were collected on 9/22-23/2023. The copper concentrations for these samples ranged from 0.22 to 1.43 mg/liter as highlighted in the table below. Two samples exceeded the EPA 1.3 mg/liter copper maximum contaminant level goal. The highest concentration was sampled at 5480 Cottonwood Canyon Road which has been constantly occupied. The second highest concentration of 1.39 mg/liter, was sampled from 2930 Osprey Court which had not been occupied for three weeks.

None of the samples exceeded the 0.015 mg/liter maximum contaminate level for lead. Lead concentrations ranged from non-detect to 0.002 mg/liter.

The water system controls currently rotate each of the three Rivermeadows wells for filling the water tank. Therefore, the current water tests should represent a composite water sample from all three wells.

The current water sampling test data is summarized in Table 1.

Table 1 - Rivermeadows Water Test Results			Current Test Data		9/30/2020	6/24/2020	9/18/2019
	Sample Name	Date	Lead mg/L	Copper mg/L	Copper mg/L	Copper mg/L	Copper mg/L
	Flowing Water Samples						
1	2930 Osprey Court	10/23/2023	-	0.06			
1	SP01- 5072 Beavertail	5/25/2022	ND	ND			
2	SP01- 5072 Beavertail	5/24/2022	ND	ND			
1	5480 Cottonwood Canyon	8/2/2021	ND	0.27			
2	SP01- 5072 Beavertail	8/2/2021	ND	ND			
3	5480 Cottonwood Canyon	8/3/2021	ND	0.24			
4	SP01- 5072 Beavertail	8/3/2021	ND	ND			
1	5450 Cottonwood Canyon	4/7/2021	ND	0.07	0.07		
2	SP01- 5072 Beavertail	4/7/2021	ND	0.01	ND		
3	5450 Cottonwood Canyon	4/8/2021	ND	0.27	0.06		
4	SP01- 5072 Beavertail	4/8/2021	ND	ND	ND		
	Rivermeadows Well1 (WL03)	10/1/2020			0.03		
	Rivermeadows Well2 (WL05)	10/1/2020			ND		
	Rivermeadows Well3 (WL04)	10/1/2020			ND		
Table 1 - Rivermeadows Water Test Results			Current Test Data		9/30/2020	6/24/2020	9/18/2019

	Sample Name	Date	Lead mg/L	Copper mg/L	Copper mg/L	Copper mg/L	Copper mg/L
	Standard Overnight Hold Water Samples						
1	5480 Cottonwood Canyon	9/22/2023	ND	**1.43**			
2	5020 Beavertail Road	9/22/2023	0.001	0.22			
3	2930 Osprey Court	9/23/2023	ND	**1.39**			
4	2800 Sparrow Hawk	9/22/2023	0.002	1.27			
5	4945 Bald Eagle Road	9/22/2023	0.002	0.59			
1	5480 Cottonwood Canyon	6/21/2023	ND	**1.56**			
2	5020 Beavertail Road	6/21/2023	ND	0.11			
3	2930 Osprey Court	6/21/2023	0.001	**1.68**			
4	2800 Sparrow Hawk	6/21/2023	0.001	0.42			
5	4945 Bald Eagle Road	6/21/2023	0.003	0.66			
1	5480 Cottonwood Canyon	8/16/2022	ND	1.29			
2	5020 Beavertail Road	8/16/2022	0.001	0.13			
3	2950 Osprey Court	8/16/2022	0.002	0.38			
1	5480 Cottonwood Canyon	5/25/2022	ND	**1.45**			
2	5445 Cottonwood Canyon	5/25/2022	0.002	0.33			
3	2930 Osprey Court	5/25/2022	ND	1.25			
4	4945 Bald Eagle Road	5/25/2022	0.002	0.59			
5	5020 Beavertail Road	5/25/2022	**0.019**	0.57			
1	5480 Cottonwood Canyon	8/3/2021	ND	1.24			
2	5445 Cottonwood Canyon	8/4/2021	ND	0.57			
3	2930 Osprey Court	8/3/2021	ND	0.19			
4	2800 Sparrow Hawk	8/3/2021	ND	0.39			
5	4945 Bald Eagle Road	8/3/2021	0.002	0.30			
1	5450 Cottonwood Canyon	4/8/2021	ND	**2.23**	**1.69**	**2.62**	**1.43**
2	5480 Cottonwood Canyon	4/8/2021	ND	**1.67**	**1.73**	**1.97**	**2.17**
3	5445 Cottonwood Canyon	4/8/2021	ND	1.26	1.04		
4	5255 Cottonwood Canyon	4/8/2021	0.001	1.06			
5	2930 Osprey Court	4/8/2021	ND	**1.66**	**2.12**	**1.61**	**1.57**
	2800 Sparrowhawk	4/8/2021	0.002		**1.73**		
	4945 Bald Eagle Road	4/8/2021	0.001		0.53		
	2755 Sparrow Hawk					0.37	0.34
	2760 Sparrow Hawk					0.56	0.88

Lead MCL: 0.015 mg/L

Copper MCLG: 1.3 mg/L

ND = Non-Detectable

For information regarding health effects related to copper, please reference the attached *Copper: Health Information Summary – Environmental Fact Sheet*, published by the New Hampshire Department of Environmental Services.

As defined by EPA, "An *action level* exceedance is not a violation but can trigger other requirements that include water quality parameter (WQP) monitoring, corrosion control treatment (CCT), source water monitoring treatment, public education, and lead service line replacement (LSLR)."[1] On behalf of the District, based on the April 2021 test results Rendezvous Engineering submitted an "Optimal Corrosion Control Treatment (OCCT) Recommendation" and a "Source Water Treatment Recommendation" that EPA has approved.

Again, based on prior testing, the wells are not a significant source of copper. The copper concentrations appear to be caused by water corrosion within the copper water service lines and interior home plumbing.

In an effort to reduce copper corrosion, the EPA established a March 23, 2023, deadline for having the orthophosphate system installed and operational. The design and installation of this equipment also requires a permit to construct with the Wyoming Department of Environmental Quality (DEQ). Last winter, DEQ strongly questioned the additional operational complexity and cost for orthophosphate injection for this small water system. DEQ mentioned specific small Wyoming water systems currently struggling with this process.

In light of this perspective, Rendezvous Engineering investigated system operation records and copper test results going back to 2002 and discovered the highest copper concentrations appear to occur when Well #1 was the primary production well. Water from Well #1 has a lower pH value (slightly more acidic) than the other two wells. All copper test values were less than the 1.3 mg/liter EPA action level during summer 2020 when Well #1 was not in production due to coliform and E. coli bacterial issues.

Rivermeadows currently injects chlorine at a constant rate regardless of whether one or multiple wells are operating. We are currently working to change to a variable rate chloring injection system which would pace the feed rate to the actual rate of water flowing from the wells. Our goal is to minimize the amount of chlorine injected.

This summer the well supply water meter stopped operating. A new meter has been purchased, but installation awaits contractor scheduling which will happen this winter.

Based on our analysis, there is potential to raise the overall water pH (less acidic) by more equally mingling the water produced by all three wells and by minimizing the chlorine injection rate. However, this can only be verified with further testing after equipment and operational changes are completed.

While the current September 2023 copper tests are slightly lower than the past, 2 of the 5 tests were higher than the 1.3 mg/liter action level. However, this year we have not been able to make the proposed operational changes with the well supply electronic flow meter not working.

On July 18, 2023, EPA issued a violation of the National Primary Drinking Water Regulations for failure in have orthophosphate injection in place by March 23, 2023. Please reference the previously issued public notice regarding this violation, attached.

Please contact me with any questions.
Sincerely,

Matthew F. Ostdiek, P.E.
President
Enc.

[1] *Lead and Copper Rule: A Quick Reference Guide*, United State Environmental Protection Agency, EPA816-F-08-018, June 2008.

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER
Rivermeadows Water District – High Concentrations of Copper in Drinking Water

Our water system recently violated a drinking water requirement. Although this incident was not an emergency, as our customers, you have a right to know what happened and what the District is doing to correct this situation.

We routinely sample water at consumers' taps for lead and copper. The tests indicate lead levels are well below the 0.015 mg/liter EPA maximum contaminate level. However, some tests have exceeded the 1.3 mg/liter EPA maximum contaminant level goal (MCLG) for copper. Therefore, EPA is requiring the installation of corrosion control treatment. This treatment helps prevent lead and copper in the pipes from dissolving into the water. Corrosion control should have been installed by March 23, 2023, but installation is not complete.

What should I do?
Listed below are some steps you can take to reduce your exposure to lead and copper:

- You may contact us at the number below to find out how to get your water tested for lead and copper.
- Find out whether your pipes contain lead, copper, and/or lead solder.
- Run your water for 15-30 seconds or until it becomes cold before using it for drinking or cooking. This flushes any standing water from the pipes.
- Don't cook with or drink water from the hot water tap; lead and copper dissolve more easily into hot water.
- **Do not boil your water to remove lead and copper.** Excessive water boiling makes the lead and copper more concentrated – the lead and copper remain when the water evaporates.

What does this mean?
This is not an emergency. If it had been, you would have been notified within **24 hours**. Typically lead and copper enters water supplies by leaching from lead, brass, and copper pipes and plumbing components. New lead pipes and plumbing components are no longer allowed for this reason. Water is more likely to contain high lead levels if water pipes in or leading to your home are made of lead or contain lead solder. While many older homes may contain lead pipes, Rivermeadows homes generally have copper and plastic pipes. However, between 1983 and 1988, lead solder was typically used to connect copper piping.

Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink ~~this~~ water with excessive lead over many years could develop kidney problems or high blood pressure.

What is being done?
The District is fine tuning the current water system operations in an effort to slightly raise the water pH level (less acidic), utilizing the current treatment processes. The District continues lead and copper testing twice each year.

Modifications to the existing water system require Wyoming Department of Environmental Quality (DEQ) review and permitting. Although EPA is requiring corrosion control treatment, in initial communications, DEQ staff have questioned the benefits and expressed concerns over the complications of corrosion control treatment for small water systems.

The District intends to complete the corrosion control treatment system design and prepare associated submittal to DEQ. This will require DEQ to make a formal decision regarding this matter.

Once the DEQ permit is approved, the corrosion control treatment equipment installation will likely require at least six months.

For more information, please contact (name of system contact) Matt Ostdiek, Rendezvous Engineering at 307-733-5252 or P.O. Box 4858, Jackson, WY 83001.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly. You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the Rivermeadows Water District.
EPA Public Water System ID#: WY5600786. Date distributed: 11/03/023.

ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

ARD-EHP-9 2013

Copper: Health Information Summary

Copper is a naturally-occurring metallic element that occurs in soil at an average concentration of about 50 parts per million (ppm). It is present in all animals and plants and is an essential nutrient for humans and animals in small amounts.

The major sources of environmental copper releases include the mining, smelting and refining of copper, industries producing products from copper such as wire, pipes and sheet metal, and fossil fuel combustion. Water pipes are often made of copper and bath fixtures may be made from brass and bronze alloys that contain copper. The principal source of copper in drinking water results from the leaching of copper from pipes and bath fixtures due to acidic water. Blue-green stains left in bath fixtures are a sign of the presence of copper in water.

Other releases of copper to the environment include agricultural use against plant diseases and treatments applied to water bodies to eliminate algae.

Health Effects

Absorption/Metabolism

Studies investigating oral absorption of copper have found the percentage absorbed ranging from 24-60 percent. Factors affecting the amount absorbed include the amount of copper in the diet and competition with other metals found in food such as iron and zinc. There are no studies examining inhalation exposure to copper. The amount of dermal absorption is also not known, but a few studies indicate that it is very low.

Beneficial Effects

Copper is a component of several enzymes necessary for normal metabolic functions in humans. The Recommended Daily Allowance (RDA) of copper for adults is 0.9 milligrams (mg). The median intake of copper from the typical U.S. diet ranges from 1 to 1.6 mg/day. The safe highest level of intake for an extended period of time (chronic exposure) is 10 mg/day. Food sources rich in copper include shellfish, organ meats, nuts, beans and cocoa.

Effects of copper deficiency can include anemia, low numbers of white blood cells, osteoporosis in infants and children, and defects in connective tissue leading to skeletal problems.

Short-Term (Acute) Effects

Acute poisoning from ingestion of excessive copper can cause temporary gastrointestinal distress with symptoms such as nausea, vomiting, and abdominal pain. Liver toxicity was seen in doses high enough that resulted in death. High levels of exposure to copper can cause destruction of red blood cells, possibly resulting in anemia.

Long Term (Chronic) Effects

Mammals have efficient mechanisms to regulate copper stores in the body such that they are generally protected from excess dietary copper levels. However, at high enough levels, chronic overexposure to copper can damage the liver and kidneys.

Wilson's disease is an inherited (genetic) disorder in which copper builds up in the liver. Symptoms of liver toxicity (jaundice, swelling, pain) usually do not appear until adolescence.

Carcinogenicity (ability to cause cancer)

Although some studies of workers exposed to copper have shown increased cancer risks, they were also exposed in the workplace to other chemicals with carcinogenic potential. Increased cancer risk has not been found in animal studies. Copper is currently categorized by the EPA as a Group D carcinogen (inadequate evidence to classify) and has not yet been reviewed for placement into one of the new cancer classification categories.

Reproductive/Developmental Effects

There are no reports of developmental effects occurring in humans exposed to elevated levels of copper. Developmental effects have been observed in a few studies of animals given high doses of copper, including delayed growth and development, delayed bone formation, and decreased litter size and body weights.

Health Standards and Criteria

The EPA has established a Maximum Contaminant Level Goal (MCLG) for copper in public drinking water systems at 1,300 parts per billion (ppb). MCLGs are non-enforceable health standards for drinking water. MCLGs are set at a level at which no adverse health effects would be expected to result from the consumption of two liters (0.53 gallons) of contaminated water per day by a 70 kg (154 lb) adult. The MCLG is based on the ability of copper to produce gastrointestinal disturbances from acute exposure.

The EPA has also established a Maximum Contaminant Level (MCL) for copper in public drinking water systems. MCLs are enforceable drinking water standards determined by balancing the adverse health effects of a particular chemical against the feasibility and cost of treating contaminated water. The MCL is an "action level." The action level is defined as the level, which when exceeded, requires the installation of corrosion control technologies. These technologies attempt to reduce the level of copper that enters the drinking water because of leaching of copper from pipes and other plumbing fixtures. Corrosion control technologies employ methods such as the addition of chemicals to either lower the acidity of the water or which coat the inside of the pipes, forming a barrier to reduce leaching. The action level for copper in drinking water is set at 1,300 ppb.

A Secondary Maximum Contaminant Level (SMCL) for copper has been established at 1,000 ppb based upon taste and staining of bath fixtures. SMCLs are guidelines for the protection of the aesthetic qualities of water such as taste, odor and color.

Since excess copper in drinking water is usually due to its slow leaching from the plumbing system into water that has been sitting for several hours in the pipes, running the water for 30 to 60 seconds before using it for drinking or cooking will often significantly reduce copper levels.

The Occupational Safety and Health Administration (OSHA) enforceable standard (permissible exposure limit or PEL) for copper in workplace air is 0.1 milligram per cubic meter (mg/m3) as a fume and 1.0 mg/m^3 as a dust or mist averaged over eight hours.

Suggested Reading and References

Casarett and Doull's Toxicology: The Basic Science of Poisons, Seventh Edition. Klaassen, C.D., ed. McGraw-Hill Publishing Co., Inc., New York, 2008.

Toxicological information on Copper. Integrated Risk Information System (IRIS). U.S. EPA, Office of Health and Environmental Assessment. Last significant revision September, 1988

Toxicological Profile for Copper (Update). Agency for Toxic Substances and Disease Registry (ATSDR). Atlanta, GA. September, 2004.