Portland Water Bureau

Triannual Water Quality Analysis
April 2013

Bull Run Water
The Portland Water Bureau supplies water to over 930,000 people in the Portland metropolitan area. The primary source is water drawn from two reservoirs in the protected Bull Run watershed 25 miles east of Portland. The water from Bull Run is low in dissolved minerals and meets or surpasses all drinking water quality standards as measured at the entry point to the distribution system.

Water Treatment
Water is first disinfected with chlorine, entering the system at about 2 parts per million (ppm). At the end of the disinfection process, sodium hydroxide (NaOH) and ammonium hydroxide (NH_4OH) are added to the water. Sodium hydroxide (at a dose of 3.5 to 5.0 ppm) is added to raise the pH slightly (approximately 1 pH unit). This helps prevent corrosion of household plumbing and lowers the amount of lead and copper that can leach into the water. Ammonium hydroxide (aqueous ammonia) is added (at a dose of about 0.35 ppm as NH_3-N) to form a long-lasting chloramine disinfectant residual. Chlorine and ammonia are used in a ratio by weight of approximately 4.9 to 1.

Water Quality Standards
The U.S. Environmental Protection Agency (EPA) and the Oregon Health Authority-Drinking Water Program set water quality standards. Primary standards are set by regulations to protect public health and are usually maximum contaminant levels (MCL). Lead and copper standards are determined by action levels. These action levels, when exceeded at selected consumers' taps, trigger requirements that water providers take steps to reduce corrosion and provide public education.

Secondary standards are guidelines set to assure good aesthetic quality and are secondary maximum contaminant levels (SMCL). Secondary standards identify levels of substances that may affect taste, odor or color of water, may stain sinks and bathtubs, or may interfere with treatment processes.

About the Report
This report presents analysis results for Portland's water to those needing technical data. The report covers results from May 2012 through April 2013, emphasizing April 2013 results from Bull Run. Please feel free to provide feedback on the report; contact information is provided toward the end of the report. Additional background information is available in the annual Water Quality Report, available to Portland customers in early June and posted at www.portlandoregon.gov/water/waterqualityreport.

Most substances listed within this document are reported in units of concentration, parts per million. One part per million corresponds to one penny in $10,000. One part per million is equal to 1,000 parts per billion. When other units are used, they are displayed adjacent to the name of the substance.

Many substances were either present in levels below the reporting limits of the prescribed method or were not present. These results are shown with a "<MRL" (less than the method reporting limit) in the result column. The method reporting limit (MRL) is the lowest quantity that can be reliably reported for the test method.

Abbreviations:

<	Less Than
MRL	Method Reporting Limit
ppm	Parts Per Million (equivalent to mg/L)
ppb	Parts Per Billion (equivalent to µg/L)
MCL	Maximum Contaminant Level
SMCL	Secondary Maximum Contaminant Level
--	No Sample Result
NA	Not Applicable

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Bull Run Treated Water

Treated water samples were collected at the outlet of the Lusted Hill Treatment Facility on **April 9, 2013**.

Physical characteristics include temperature, pH, specific conductance, color, and solids. These characteristics themselves pose no health risk. Results are reported as parts per million unless otherwise noted.

Physical Characteristics	Past 12 Months Range	April 9, 2013	MRL	EPA Standard
Secondary Contaminant				**SMCL**
pH (Standard Units), field	7.8 – 8.1	8.1	NA	6.5 – 8.5
Total Dissolved Solids	27 – 32	27	1	500
Color (Color Units)	5 – 15	5	5	15
Unregulated Characteristics				
Specific Conductance (µmhos/cm @25°C)	23 – 45	25	0.1	Not Regulated
Water temperature (^{o}C)	4.3 – 16.5	6.7	NA	Not Regulated
Suspended Solids	<MRL – 0.8	<MRL	0.5	Not Regulated
Total Solids (@180°C)	27 – 33	27	1	Not Regulated
Turbidity (NTU)	0.20 – 1.3	0.35	0.05	Not Regulated at this point in system

Nutrients are chemicals that plants and bacteria need to grow. All results reported as parts per million.

Nutrients	Past 12 Months Range	April 9, 2013	MRL	EPA Standard
Primary Contaminants				**MCL**
Nitrate Nitrogen (NO_3-N)	<MRL – 0.06	0.02	0.01	10
Nitrite Nitrogen (NO_2-N)	<MRL	<MRL	0.005	1
Unregulated Contaminants				
Ammonia Nitrogen, Free (NH_3-N)	<MRL – 0.025	<MRL	0.02	Not Regulated
Nitrogen, Organic (N)	<MRL – 0.09	<MRL	0.01	Not Regulated
Phosphorus, Reactive (PO_4-P)	<MRL – 0.003	<MRL	0.003	Not Regulated
Phosphorus, Total (P)	<MRL	<MRL	0.01	Not Regulated
Silica (SiO_2 as Si)	3.8 – 4.4	3.8	1.0	Not Regulated
Total Organic Carbon (TOC as C)	0.78 – 1.8	0.91	0.3	Not Regulated

Anions and cations are negative and positive ions. When water flows over soil and rocks, major constituents dissolve in water where they form anions and cations. All results reported as parts per million.

Anions and Cations	Past 12 Months Range	April 9, 2013	MRL*	EPA Standard
Primary Contaminant				**MCL**
Fluoride (F)	<MRL	<MRL	0.025/0.4	4.0
Secondary Contaminants				**SMCL**
Chloride (Cl)	2.2 – 3.1	2.5	0.25/0.4	250
Fluoride (F)	<MRL	<MRL	0.025/0.4	2.0
Hardness (as $CaCO_3$)	5.9 – 7.8	5.9	0.1/0.4	250**
Sulfate (SO_4)	0.22 – 0.46	0.41	0.2/0.25	250
Unregulated Contaminants				
Alkalinity (as $CaCO_3$)	7.2 – 16	7.4	1.0	Not Regulated
Hydroxide (as $CaCO_3$)	<MRL	<MRL	0.1	Not Regulated
Carbonate (as $CaCO_3$)	<MRL	<MRL	0.1	Not Regulated
Bicarbonate (as $CaCO_3$)	7.4 – 12	7.4	0.1	Not Regulated
Carbon Dioxide, Free (CO_2)	0.74 – 1.5	1.5	0.1	Not Regulated
Carbon Dioxide, Total (CO_2)	8.0 – 11	8.0	0.1	Not Regulated
Calcium (Ca)	1.4 – 1.9	1.4	0.004/0.02/0.5	Not Regulated
Magnesium (Mg)	0.5 - 0.7	0.5	0.002/0.05/0.5	Not Regulated
Potassium (K)	<MRL – 0.2	<MRL	0.1/0.2	Not Regulated
Sodium (Na)	2.8 – 3.8	2.8	0.2/0.5	Not Regulated

* Testing for some analytes in 2012-13 was done by more than one method. In these cases, more than one MRL is listed.
**Hardness of 250 is a secondary standard in the Oregon Administrative Rules; there is no secondary standard set by EPA.

Bull Run Treated Water (cont.)

Metals are a group of similar elements that occur in the earth's crust. Many are toxic at low levels and are considered primary contaminants by EPA. Other metals, such as iron, are not toxic, but can cause nuisance effects, such as discolored water. These are considered secondary contaminants. All results reported as parts per million.

Metals*	Past 12 Months Range	April 9, 2013	MRL**	EPA Standard
Primary Contaminants				**MCL**
Antimony (Sb)	<MRL	<MRL	0.00005/0.0005	0.006
Arsenic (As)	<MRL	<MRL	0.0005	0.010
Barium (Ba)	0.001 – 0.0012	0.0011	0.00005/0.0005	2
Beryllium (Be)	<MRL	<MRL	0.00002/0.0005	0.004
Cadmium (Cd)	<MRL	<MRL	0.00002/0.0005	0.005
Chromium (Cr)	<MRL – 0.0003	<MRL	0.0002/0.0005	0.1
Copper (Cu)	<MRL – 0.0005	<MRL	0.0001/0.0005/0.03	Treatment Technique
Cyanide (CN)	<MRL	<MRL	0.01	0.2
Lead (Pb)	<MRL	<MRL	0.00002/0.00005/0.001	Treatment Technique
Mercury (Hg)	<MRL	<MRL	0.0002	0.002
Selenium (Se)	<MRL	<MRL	0.001/0.0025	0.05
Thallium (Tl)	<MRL	<MRL	0.00002/0.0005	0.002
Secondary Contaminants				**SMCL**
Aluminum (Al)	0.015 – 0.059	0.031	0.0005/0.002	0.05 – 0.2
Iron (Fe)	<MRL – 0.072	<MRL	0.01/0.02/0.2	0.3
Manganese (Mn)	0.0041 – 0.014	0.0041	0.00005/0.0005	0.05
Silver (Ag)	<MRL	<MRL	0.00002	0.10
Zinc (Zn)	<MRL – 0.0005	0.0005	0.0005/0.1	5
Unregulated Contaminants				
Nickel (Ni)	<MRL	<MRL	0.0002	Not Regulated

* All metals results represent the total metal (e.g. total iron, total chromium) rather than constituent parts, such as the dissolved components or components with certain valencies.
** Testing for metals in 2012-13 was done by more than one method. Thus for some analytes, more than one MRL is listed.

Would you like to access the Triannual Water Quality Report electronically?

Contact Sarah Silkie by email at sarah.silkie@portlandoregon.gov to be added to the electronic mailing list for the Triannual Water Quality report, which is compiled three times a year. For more information about Portland's drinking water, visit www.portlandoregon.gov/water. Click the What We Do link for detailed information on water quality reports, state and federal drinking water regulations, treatment, sources and more. The web site includes a wealth of historical information, reference material, and updates on current issues.