

US EPA ARCHIVE DOCUMENT

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■ Corrosion Control Treatment

In January 1997, the Portland Water Bureau began corrosion control treatment of its Bull Run supply. This treatment has increased the pH of water in the Bull Run service area from about 6.7 to about 7.4.

The Water Bureau selected this treatment to avoid changing the mineral content of Portland's water. This treatment has had negligible impact on the alkalinity or hardness of the water. Bull Run Water is still suitable for filling a car battery, a steam iron and many other commercial and industrial uses without further treatment. In addition, the low mineral content of the water minimizes the impact to high-tech industries such as computer chip manufacturers, which use large quantities of water in their production processes.

This pH adjustment takes place at the Bureau's Lusted Hill Treatment Plant. Most of this facility was originally constructed in 1991 to comply with the Surface Water Treatment Rule. At that time, the plant included only an ammonia feed system for forming chloramines following primary disinfection with chlorine. Treatment for pH adjustment was added in 1996. The pH adjustment facility includes fully redundant systems for sodium hydroxide storage, sodium hydroxide feed pumps, flow metering, and pH monitoring. The plant is staffed 9 hours per day, 5 days per week, and is monitored 24 hours per day through a supervisory control and data acquisition system. Operating staff includes a state certified water treatment operator and a registered professional engineer, in compliance with Oregon's operator certification rules. Photographs of this facility are included in Appendix 1-1, at the end of this section.

■ Water Quality Monitoring

A Joint Monitoring Plan was developed by Portland and its large and medium wholesale customers to ensure that water quality results would be representative of the entire Bull Run service area. The Joint Monitoring Plan utilized homes in systems throughout the Bull Run service area in proportion to population. These homes were randomly selected from homes sampled in 1992. This Joint Monitoring Plan was subsequently approved by the Oregon Health Division. Both the monitoring plan and OHD's letter of approval are included in Appendix 1-2.

Table 1-1 summarizes the lead and copper monitoring results before and after pH adjustment. Complete monitoring reports are included in Appendix 1-3. The data shows that pH adjustment has been highly effective in reducing lead and copper levels in the Bull Run service area. Lead levels have been reduced by approximately 75%, copper levels have been reduced by approximately 60%, and both lead and copper levels are now below the Action Levels established in the LCR.

**Table 1-1
Lead and Copper Monitoring Results**

Date of Samples	Monitoring Results		Action Levels	
	Lead (mg/L) 90th Percentile	Copper (mg/L) 90th Percentile	Lead (mg/L) 90th Percentile	Copper (mg/L) 90th Percentile
May 1992 ^(A)	0.044	1.8	0.015	1.3
October 1992 ^(A)	0.053	1.3		
January 1997	Start of pH Adjustment			
May 1997 ^(B)	0.012	0.65		
November 1997 ^(B)	0.013	0.67		

(A) 126 samples from Portland service area only.

(B) 130 samples from Bull Run service area including wholesale customers.

The Bureau conducted further analysis of the Joint Monitoring Plan, to evaluate the validity of the plan. This analysis is included in Appendix 1-3, as an attachment to the July 1997 monitoring report to OHD. This analysis used results from the 1992 monitoring by each system. The analysis showed there was no statistically significant difference in lead results from homes included in the Joint Monitoring Plan and those homes not included. Copper levels in the Joint Monitoring Plan homes were found to be statistically significantly higher than in homes not selected in the joint plan. Therefore, the Joint Monitoring Plan provides a conservative assessment of copper levels and reductions in copper levels due to corrosion control treatment.

Analysis of the 1997 monitoring results showed reductions of median lead and copper values in almost all participating systems. Although the number of homes sampled for the smaller systems is too few to be statistically reliable, all systems did see reductions similar to those seen for the Portland system.

In addition to lead and copper monitoring, Portland and its wholesale customers have conducted required monitoring of distribution system water quality parameters. Figure 1-1 shows results of weekly finished water pH monitoring at the outlet of Portland's 50 million gallon Powell Butte Reservoir (effectively, the entry point to the distribution system). The figure shows that, other than the initial "ramp-up" of pH adjustment treatment, finished water pH has consistently been above 7.0. Additional monitoring has demonstrated that the pH remains above 7.0 throughout the distribution system. The Oregon Health Division is currently reviewing all of the water quality monitoring results to establish goals for applicable water quality parameters in the distribution system.