Figure 1

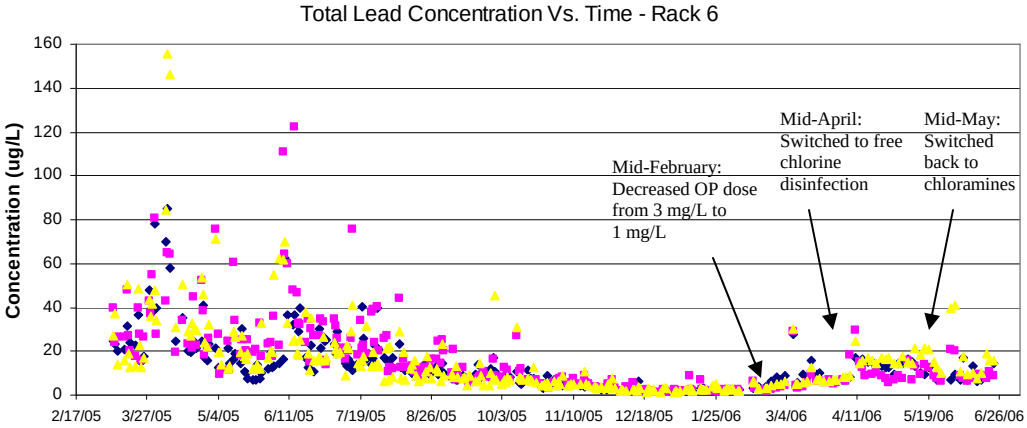
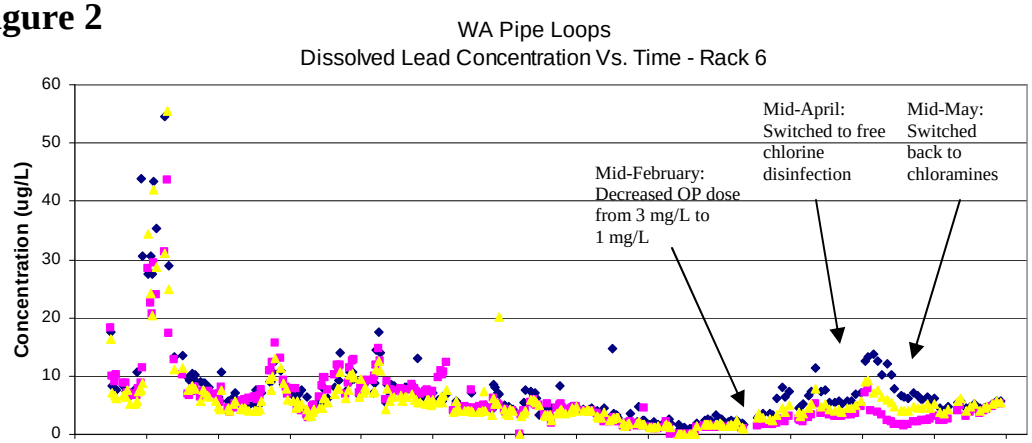


Figure 2



Additional Information on the Washington Aqueduct's Pipe Loop Study

The Washington Aqueduct is conducting a series of experiments to test the effectiveness of lead control strategies by pumping tap water through lead service lines that have been excavated from the WASA distribution system. One strategy that was tested in several loops was orthophosphate treatment. The above graphs presents results typical of the orthophosphate treatment experiments.

In Figure 1, the Y (vertical) axis represents the total lead concentration in micrograms per liter (equivalent to "parts per billion" (ppb)). The X (horizontal) axis shows the date the sample was taken. In Figure 2, the Y axis represents the dissolved lead concentration. The A, B, and C designations indicate replicate experiments subjected to the same

conditions and performed at the same time. The graphs above represent data from rack number 6 – the Aqueduct operated a total of 7 racks (testing various experimental and control conditions), with 3 replicates each. The conditioning phase began in January 2005 and in March 2005 the pipe loops were subject to the different test conditions outlined in the Lead Pipe Loop Test Plan [http://www.epa.gov/dclead/Lead_Pipe_Loop_Test_Plan_table.pdf].

Figure 1 shows that as time progresses, the orthophosphate addition is successful in decreasing total lead levels and decreasing the variation in lead concentrations. Dissolved lead concentrations (Figure 2) are generally below 10 ppb and are stable

Three of the seven original racks were discontinued in February 2006, as the questions they were designed to answer had been answered from the data obtained. The Washington Aqueduct is using the remaining racks to examine the impact of switching from chloramines (the current disinfectant) to free chlorine for a period of several weeks to simulate a springtime disinfectant switch. This switch, often used by utilities using chloramine for secondary disinfection to aid in controlling bacterial growth in the distribution system, usually occurs each year. In the interest of maintaining stable water chemistry in the WASA distribution system, the Washington Aqueduct (which treats DC's drinking water) did not perform this temporary switch to chlorine in 2005 or 2006. The Aqueduct will use the data obtained from the pipe loop testing to consider a temporary disinfectant switch in spring 2007.

The Aqueduct is also examining the effect of decreasing the orthophosphate dose to a maintenance level. A control loop with finished (treated) water is being operated for comparison.

In the future, these racks will be used to examine the potential impacts of other treatment changes being considered on lead levels.

Notes on Laboratory Data

Laboratory data from the loops should be interpreted with care. The amount of lead that leaches from a lead service line depends on many factors. The first is the nature of the service line itself. Excavated lead service lines from the WASA system are used in these experiments. The age of the service line, the way it was manufactured, and the quality of water it received can influence the amount of lead that leaches into drinking water. Another reason that the data should be interpreted carefully is that laboratory experiments are conducted under controlled conditions. In the distribution system and in individual homes, the quality of water can vary more than it does in the laboratory.