DATE: August 25, 2020

PROJECT AGREEMENT 2 BETWEEN
CLIENT: LA CROSSE WATER UTILITY
AND
CONSULTING ENGINEER: PROCESS RESEARCH SOLUTIONS, LLC

This second PROJECT AGREEMENT provides project-specific information to the City of La Crosse GENERAL AGREEMENT between the CLIENT: La Crosse Water Utility and CONSULTING ENGINEER: Process Research Solutions, LLC (PRS).

SCOPE OF SERVICES

PRS will assist La Crosse Water Utility personnel in carrying out the recommendations of the *Desktop Corrosion Control Study* submitted to WI Department of Natural Resources (WDNR) on 12/31/2019. There have been modifications to the plan of action based on the results of the recommended pipe scale analysis performed in the summer of 2020. These modifications are considered in the proposed scope below.

1. Continuation of Beneficial Operational Protocols: The La Crosse Water Utility will continue to carry out their protocols of water main flushing and low water age operation of reservoirs. PRS participation in monitoring of the outcomes of these practices will be reflected in the scope items listed below regarding on-going data analysis.

2. Analysis of Disinfection Concentrations: PRS will continue to analyze disinfection concentrations from the routine regulatory sampling at Total Coliform Rule sites as described in Section 6 of the 2019 report. This information will be beneficial to flushing activity that the Utility already carries out. It will also be beneficial to water age evaluation planning that the utility is working on with another engineering consulting firm.

3. Study of Water System pH Variation: La Crosse Water Utility personnel have been collecting pH data as described in the 2019 report and is transferring that data to PRS. PRS will analyze the data using Shewhart Control Charts to calculate the natural variation of pH upon startup of wells, after steady well operation, and in the distribution system. This information will be important to understanding the stability of the lead pipe wall scales found by Dr. Barry Maynard in the summer 2020 pipe scale analysis.

4. Profile Sampling: The Utility will perform more profile sampling as requested by the WDNR within the constraints of coronavirus safety precautions. PRS will modify the previous protocol for profile sampling to eliminate some water quality parameters found to be unnecessary in the initial profiles. In addition, the Utility will need to decide whether or not to pursue the biofilm analyses performed in the profiling previously.

5. Lead and Copper Rule Sampling and Other Regulatory Sampling: PRS will add to the regulatory historical graphs that were developed in the 2019 report as regulatory data are produced. Data will include Lead and Copper Rule compliance data, Lead and Copper Rule water quality data, and disinfection by-product data. The Total Coliform Rule data were discussed previously.

6. Identification of Water Quality Parameters for Lead Control: Chlorine concentration has now been identified as key to maintaining the lead pipe wall insoluble scales. Lead and Copper Rule sampling and profile sampling as well as pipe scale analysis has shown that lead release is not at issue in the La Crosse water system. Maintaining the current chlorine and pH levels in the distribution system area with lead goosenecks will suffice at controlling the low lead release. Those chlorine and pH levels will be identified in the data analyses described above.

7. Identification of Water Quality Parameters for Copper Control: Copper release has been identified as slightly elevated in the Lead and Copper Rule sampling even though the 90^{th} percentile and maximum concentrations have dropped over time in the La Crosse system with flushing and water age improvements since 2006. In addition, the presence of biofilms has been identified in profile sampling with the potential for microbiologically influenced corrosion of both lead and copper by means of a tendency to lower the pH of the water with the production of nitrate. It is proposed that offline testing be performed on PRS Monitoring Stations focusing on chlorine concentration and microbiologically influenced corrosion of copper. These tests will set the minimum chlorine concentration required to control the biofilm activity and its corrosion of copper and to counteract the lowering of the pH. Any benefit to lessening copper corrosion by means of chlorine concentration and pH stability will ensure that that the current lead protection will be maintained. The details of this offline test will be developed by PRS.

8. Final Deliverables: A report will be prepared summarizing conclusions from the data collected during the summer of 2020 using the analyses proposed above in addition to the pipe scale analysis and the biofilm analysis, both previously performed in this study. The offline testing will be proposed and a budget developed for pursuing further recommended study with the goal of optimizing corrosion control in the La Crosse water system.

9. Final Meeting: A meeting with the WDNR explaining the report is anticipated.

COMPENSATION

Professional labor is to be billed at $135 per hour. Car mileage to and from the site or meetings will be billed at the 2020 IRS Rate of 57.5 cents per mile outside of labor costs. Any approved additional expenses, such as laboratory invoices or special supplies, will be billed outside of labor costs.

Seventy hours of professional labor is estimated as a maximum to carry out the scope described above with the final deliverable being a report of conclusions and proposed further study to be submitted to and discussed with the WDNR. The professional labor fee is not to exceed $9,450.

SCHEDULE

This stage of the corrosion control evaluation study can begin upon approval of this project agreement. A maximum deadline for delivering the report will be November 15, 2020. While aiming to finish the report at an earlier date, this will take into account delays because of PRS work load.

Process Research Solutions, LLC	Date
Bernard M Sy	9/01/2020
La Crosse Water Utility	Date

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Abigail Cantor 9/2/2020

Process Research Solutions, LLC Date

Bernard M Sy

La Crosse Water Utility Date