



Project Update
Project No. 202100152
Corrosion Control Treatment Program – Pipe Loop Demonstration
Contract HS-002 - Hazen
February 2023

Summary

Consultant	Hazen	Contractor (Loop)	Intuitech
Date of Award	June 24, 2021	Date of Award	August 18, 2022
Completion Date	January 1, 2025, est. (on time)	Completion Date	October 1, 2024, est. (on time)
Consultant Fee	\$735,000.00	Contract Value	\$422,939.00
Spent to Date	\$170,234 (23% of fee)	Spent to Date	\$137,814 (33%)
Funding	none		
Schedule Update	Van de Water Pipe Loop Equipment delivery is ahead of schedule (late March 2023).		
Board Action Items	None at this time		

Scope of Work

This project consists of the completion of a pipe loop demonstration study, which includes the completion of a pipe loop demonstration testing work plan, pipe loop rig design and procurement for one (1) flow-through pipe loop rig to be located at the Van de Water WTP and one (1) recirculating laboratory-scale pipe loop rig to be located at Washington University in St. Louis. The study also includes pipe loop operation and maintenance, Corrosion Control Program assistance, and a final report.

The pipe loop demonstration study will examine the effectiveness of adding an orthophosphate corrosion inhibitor, consistent with USEPA guidelines and the Lead and Copper Rule Revisions LCRR). In addition, the study will evaluate the formation and stability lead scales on existing customer service lines. Lead pipes for each pipe loop rig will be harvested from customer service lines in the Authority’s system.

Completed Work

Pipe Loop Demonstration Work Plan

A Work Plan defining the testing objectives, experimental plan, and operational procedures for the pipe loop study was completed in March of 2022. The Work Plan is the foundation for the design and fabrication of the pipe loop system to achieve the project goals. The Work Plan includes:

- **Experimental Plan:** The experimental plan includes the objectives, test conditions, pipe materials, corrosion inhibitor selection, and staffing for the pipe loop study.
- **Apparatus:** Description of the location of the on-site pipe loop, flow regime, water source, and planning of chemical feed requirements; conceptual design for the on-site pipe loop.
- **Loop Operation:** Pipe loop operation consists of the conditioning and test phases. A protocol was developed for harvesting and installation of LSLs into the pipe loop and describes the operation, monitoring, and sampling procedures during testing.
- **Data Analysis:** Description of the data management approach for the pipe loop study including guidelines for interpretation of pipe loop results.

The final Work Plan was reviewed and shared with the local Health Department.



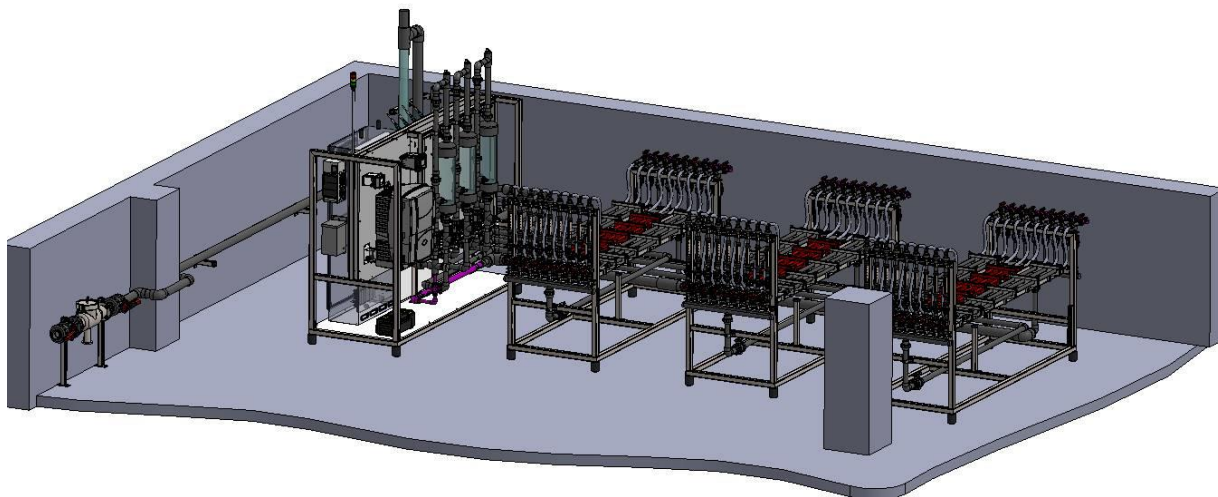
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Van de Water Pipe Loop Rig

The Van de Water pipe loop rig shall consist of a total of eighteen (18) individual harvested lead service line pipe loops (three conditions with six replicate loops) and three replicates of copper pipe with leaded solder for each test condition. The demonstration study will consist of two sequential testing phases to evaluate potential pH changes after introduction of orthophosphate.

Bid documents were prepared and a contract was awarded to Intuitech, Inc. for the loop rig installation, and start-up. Final loop fabrication submittals were approved in November 2022 and delivery of the pipe loop system is expected in late March 2023. Authority, Hazen, and University of Buffalo students will operate the loop for a period of 16 to 24 months.

A rendering of the installation is shown below.



Laboratory Pipe Loop Rig

The experimental plan for the laboratory pipe loop study was developed to address a series of objectives related to optimal corrosion control treatment. Primary objectives of the study include the effects of free chlorine concentration and stagnation time on the formation and stability of PbO_2 as a component of pipe scales on lead pipes, the effectiveness of orthophosphate in maintaining lead oxide (PbO_2) as a stable lead scale in harvested lead pipes and the impacts of variations in orthophosphate and polyphosphate concentrations associated with blending of Buffalo and ECWA water on lead release in harvested pipes.

The laboratory-scale pipe loop consists of four test conditions, each with three replicates of harvested LSLs provided by the Authority. Water matching the characteristics of ECWA will be “created” in the lab and run through each loop. The last of the lead pipe segments will be inserted into the pipe loop within the next two weeks. The laboratory pipe loop rig will be operated by Washington University faculty and students for a period of 16 to 24 months.

Copies of the Work Plan, bid documents, submittals, and minutes are saved to the project folder.