

Strategic Lean Project Report



For Reporting Period: July 1, 2016 through December 31, 2016

I. General Information:

Lead agency name: Department of Corrections

Partner agencies: N/A

Improvement project title: Wastewater Aeration Basin pH Variation Reduction

Date improvement project was initiated: 6/22/2016

Project type: New Project

Project is directly connected to:

- Results Washington performance measure
- Agency Strategic Plan
- Other

If applicable, specify the alignment:

Goal 3: Sustainable energy & a clean environment;
Clean, cool water
Sustainable facilities

Report reviewed and approved by: Jody Becker-Green, Acting Secretary, Department of Corrections

II. Project Summary:

The Wastewater Department improved lime application process, resulting in increased stability of pH levels and improved health of the biological process.

III. Project Details:

Identify the problem:

In order to protect the Puget Sound, the state Department of Ecology sets limits on pH, Biological Oxygen Demand (BOD) and solids that wastewater plants are permitted to discharge. The Department's permit allows a pH range of 6.0 to 8.0, which was consistently and successfully maintained. Discharges out of the stated range could harm the fish and local wildlife of the waters.

The McNeil Island wastewater treatment plant uses a biological process, whereby a biomass (microscopic organisms, such as amoeba and bacteria) breaks down waste matter and cleans the water. To maintain the pH within permit limits and to keep the microscopic organisms healthy, staff add calcium carbonate or "lime."

Lime was added to the process by pouring bags into the aeration basin every few days. To avoid having the pH rise too high, staff had to wait several days for it to drop again until more lime could be added, creating the variation seen on the graph for June in Section VII. The variation is bad for the biomass, which is sensitive to changes, and increases the risk of pH being out of range. Additionally, a clean out of the basin found fist-sized lumps of undissolved lime at the bottom of the basin.

Problem statement:

Currently, adding lime to the aeration basin causes wide swings in pH levels compared to a target of a consistent pH level, with a goal date of 7/1/2016.

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Improvement description: The project team changed the method of introducing the lime to the wastewater stream by creating a slurry and moved the location further upstream in the process to get more complete mixing. The use of a lime slurry provides more even dispersion throughout the aeration basin and prevent lumps from forming. Also, using a slurry provides better control how much lime is added and allowed lime to be added daily, leading to a far more stable pH. These improvements also positively impacted worker safety.

Customer involvement: N/A

IV. Impact to Washingtonians:

By maintaining a healthy biomass, in which pH plays a significant role in the wastewater aeration basin, the Department reduced the amount of solids and BOD discharged. The impact of low pH discharged into the receiving waters became more limited, helping to keep Puget Sound cleaner and healthier.

V. Project Results:

As a result of the improvements the pH at the plant remains stable relative to the pH of the incoming wastewater stream (refer to visuals in VII). Also, a cost avoidance of approximately \$225.00 or 35% per year has been realized due to better mixing requiring less chemical addition.

Improved process as measured by: <i>(Click those that apply)</i>	Specific results achieved: <i>(Complete the narrative boxes below)</i>	Total Impact: <i>(Actuals; Current Reporting Period)</i>	Results status:
<input checked="" type="checkbox"/> Cost	Decreased use of lime by 35% per year.	Savings of \$187.00 projected based on new usage	Preliminary
<input checked="" type="checkbox"/> Quality	Increased pH level stability (see visuals in VII).	Average pH has increased and has more stability	Final

VI. Contact information:

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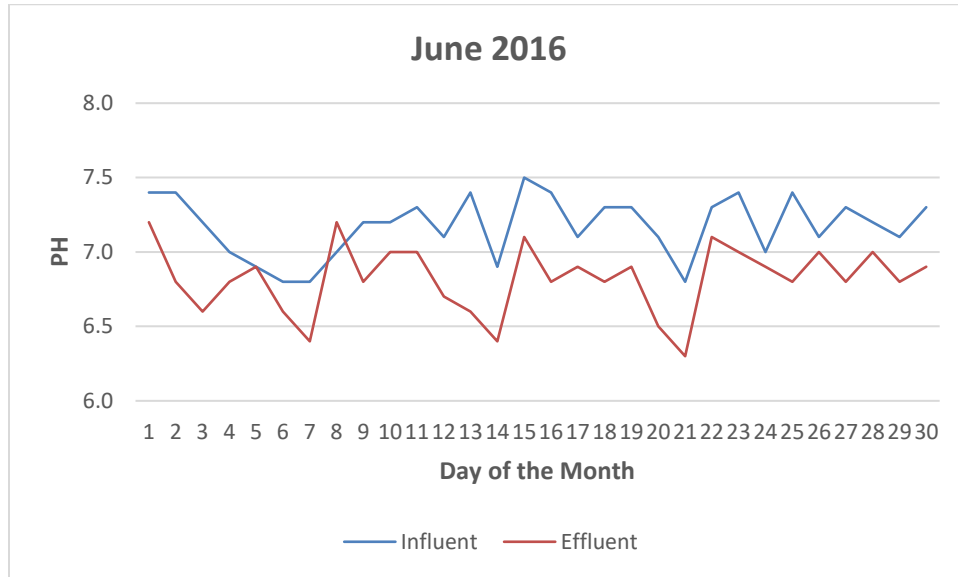
Phone number: (253) 588-5281 ext. 1353

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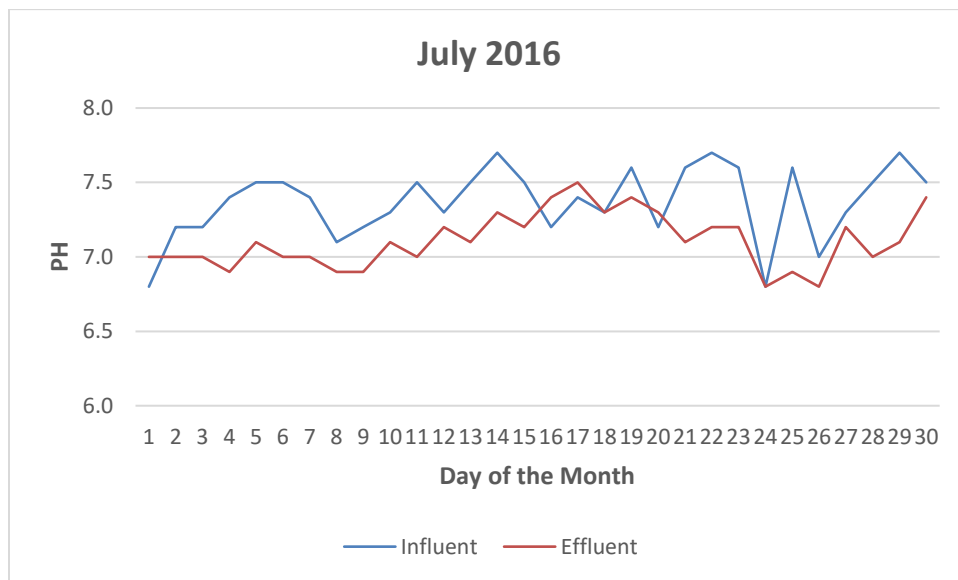


VII. Optional Visuals:

Before



After



Note: Influent is the wastewater coming into the plant. Effluent is the water leaving the plant or tank. The plant influent can vary widely and should be (but not mandated) between pH 5.5 and 8.5. The effluent pH is mandated by the Department of Ecology to be between 6 and 8. This project was focused on reducing the variation in the effluent pH.