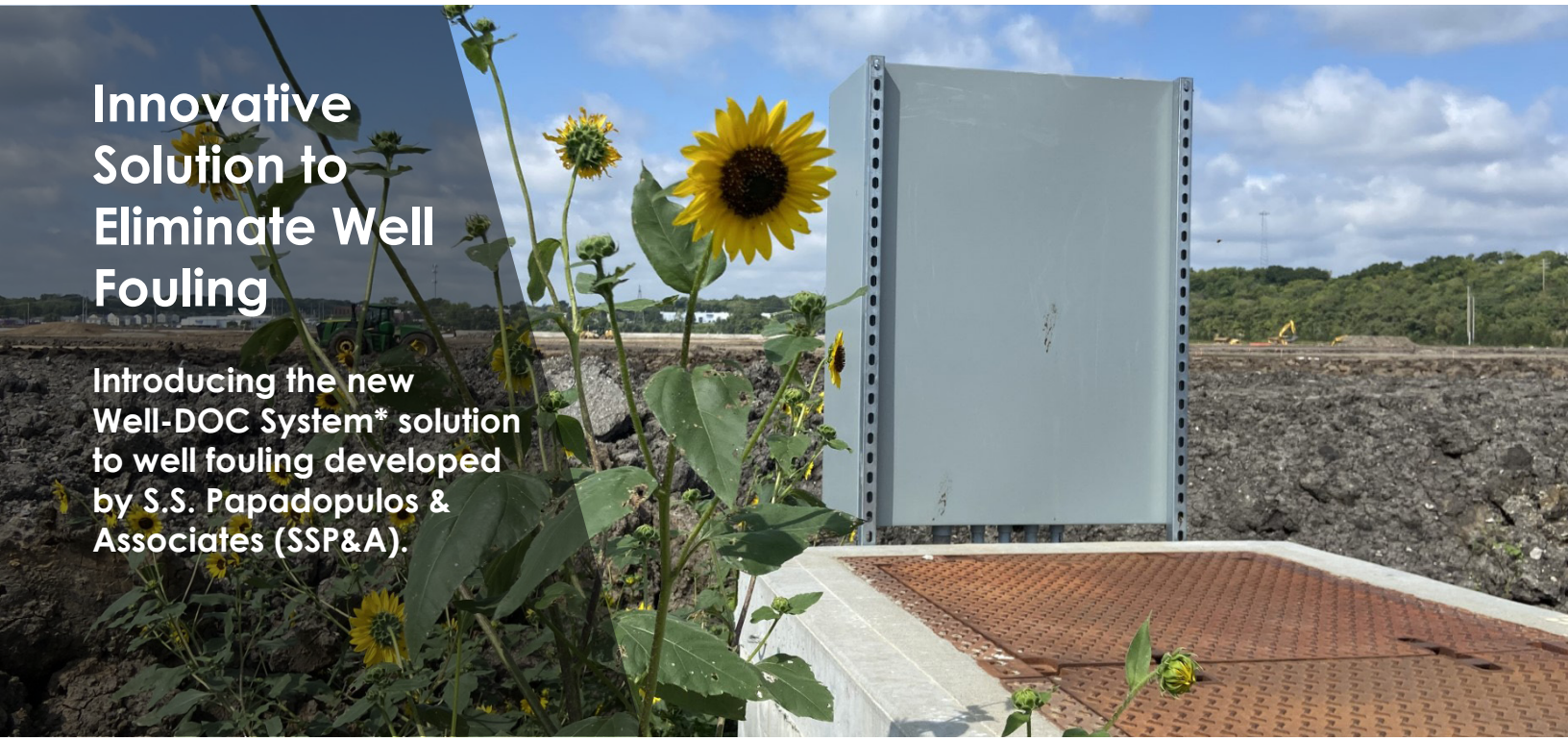
S.S. Papadopulos & Associates, Inc.
Environmental & Water Resource Consultants



Innovative Solution to Eliminate Well Fouling

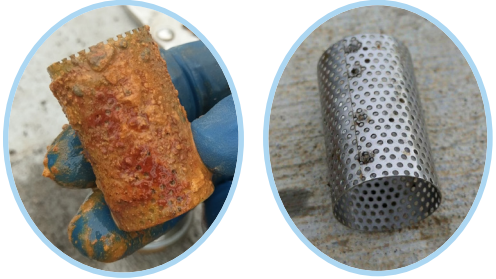
Introducing the new Well-DOC System* solution to well fouling developed by S.S. Papadopulos & Associates (SSP&A).

Stop well fouling in its tracks

Key Benefits

- Helps stop reductions in well yield
- Maintains pump efficiency
- Lowers rate of pump failure/service disruption
- Reduces treatment frequency
- Lowers costs for operations and maintenance
- Allows groundwater remediation systems to perform as designed
- Lowers dissolved oxygen within the well column

Without Treatment **With Treatment**



Strainer from the treatment conveyance system

How it works

Stop well fouling before it stops your pumps: Well fouling is a common condition that well owners are familiar with. The SSP&A Well-DOC System targets conditions that facilitate fouling by eliminating the introduction of atmospheric oxygen to the well. Oxygen is a known growth condition that aids biological fouling and inorganic fouling and scaling. By removing the atmospheric oxygen from the well, the precipitation and scaling of certain inorganics (e.g. iron, manganese, etc.) is prevented. Biological growth dependent on oxygen or oxidized products may in turn be limited. Long-term control of well fouling dependent on oxygen can be achieved using SSP&A's Well-DOC System.

The SSP&A Well-DOC System was shown to be superior to traditional treatment methods (e.g. chlorination) and keeps wells and pumps cleaner longer than traditional chemical and scrubbing treatment processes.

*U.S. Patent No. 11,619,113

Case Study

As the environmental contractor at the former Bannister Federal Complex brownfields site in Kansas City, Missouri, SSP&A and Bannister Transformation and Development LLC inherited wells historically plagued with heavy fouling. The ongoing problem was heavy biological and inorganic fouling, which showed limited improvements with traditional rehabilitation efforts. Using traditional methods, well conditions would begin to decline in as few as six weeks after treatment. SSP&A developed the innovative Well-DOC System to solve this problem.

In early 2019, SSP&A began a year-long pilot test. Within six weeks, it was apparent the Well-DOC System was a success. Wells which normally would have experienced fouling were free of precipitates and scaling. 14 months after initial implementation, the pilot study wells were still free of fouling and suffered no fouling-related pumping declines. The success of the pilot system led to Department of Energy funding to expand the Well-DOC System nearly site-wide. The system continues to operate successfully more than two years after implementation.

$120,000

decrease in annual maintenance costs

Actual Cost Savings Realized: Based on previous site treatments, annual treatment costs for 15 extraction wells would cost our client ~$140,000 for fouled well treatment and rehabilitation. After development and implementation of the SSP&A Well-DOC System, annual treatment costs ~$20,000 per year; a savings of ~$120,000 or an **85 percent decrease in costs**.

Why choose us?

*Known for innovation, SSP&A was established in 1979 to provide professional **groundwater** and **hydrogeology** consulting services. With that cornerstone of expertise, we have built an internationally-recognized practice specializing in **contaminant studies**, **environmental engineering**, **remediation**, **geochemistry**, and **surface-water hydrology**.*

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Demonstrated Performance Improvements: Project success continued beyond the initial pilot study. The following conditions were observed in the first 14 months after the study ended:

May 2019:
6 weeks into treatment

Well-DOC Treatment

October 2019:
6 months with no manual cleaning

Well-DOC Treatment

July 2020:
14 months later

Chlorine Treatment

Well-DOC Treatment

Actual results, benefits, and cost savings will vary based on site-specific conditions and implementation.

*U.S. Patent No. 11,619,113

Request additional information about the SSP&A Well-DOC System at:

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